

INSTALLATION AND USER'S GUIDE
DURASTOR 6220SS/7220SS

DuraStor 6220SS/7220SS

Installation and User's Guide

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EMC Directive 89/336/EEC, as amended by 92/31/EEC and 93/68/EEC

EN 50081-1 (1992)

EN 55022 (1994) Class A

EN 50082-1 (1992)

EN61000-4-2 (1998)

EN61000-4-3 (1998)

EN61000-4-4 (1995)

EN61000-4-5 (1995) Surges

EN61000-4-6 (1996) Conducted immunity

EN61000-4-11 (1994) Supply dips of variation



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Japanese Compliance (Voluntary Control Council Initiative)

This is a class A product. In a domestic environment, this product may cause radio interference, in which case the user may be required to take corrective action.

Contents

1 Introduction

- About This Guide 1-1
- Installation Overview 1-2
- Storage Management Software Tools 1-2
 - Adaptec Storage Manager Pro 1-2
 - Adaptec Disk Array Administrator 1-3
 - The Operator Control Panel 1-3

2 About the DuraStor Storage Subsystem

- About the DuraStor RAID Appliances 2-1
 - Front Bezel 2-3
 - Controller Canister 2-4
 - Power System 2-5
 - Cooling Fan Module 2-6
 - SCSI RAID Appliance I/O Connectivity Panel 2-7
 - Fibre Channel-to-SCSI RAID Appliance I/O Connectivity Panel 2-10
- About the DuraStor 312R Storage Enclosure 2-14
 - Front Bezel 2-15
 - Disk Drives 2-16
 - Power Supply Units 2-17
 - Cooling Fan Module 2-18
 - Disk I/O Card 2-19
 - SAF-TE Controller Card 2-20

3 Installing the DuraStor Storage Subsystem

- Storage Subsystem Installation Overview 3-2
- Setting Up the DuraStor RAID Appliance 3-3
 - Removing the Front Bezel 3-3
 - Mounting the RAID Appliance on the Rack 3-4
 - Replacing the Front Bezel 3-6
 - Connecting the Power Cords 3-6

Setting Up the DuraStor 312R Storage Enclosure	3-6
Removing the Front Bezel	3-7
Mounting the Storage Enclosure on the Rack	3-8
Attaching a Disk Drive to a Drive Carrier	3-10
Installing Disk Drives	3-10
Replacing the Front Bezel	3-11
Connecting the Power Cords	3-11
Completing the Connections for the DuraStor 6220SS	3-11
Connecting the SCSI RAID Appliance to the DuraStor 312R	3-12
Connecting the SCSI RAID Appliance to the Host System	3-17
Changing Your Drive Configuration	3-22
Changing Your Operating Mode	3-22
Setting the Host System HBA to Multiple-LUN Support	3-22
Completing the Connections for the DuraStor 7220SS	3-23
Connecting the Fibre Channel-to-SCSI RAID Appliance to the DuraStor 312R	3-23
Connecting the Fibre Channel-to-SCSI RAID Appliance to the Host System	3-29
Important Information About SAN Environments	3-31
Topology Setup	3-33
SAN Solution Strategies	3-46
Turning On the Power	3-54
Powering On	3-54
Powering Off	3-54
Accessing Your Storage Management Tool	3-54
Installing Storage Manager Pro	3-55
Accessing Disk Array Administrator	3-56

4 Monitoring the DuraStor Storage Subsystem

Monitoring the DuraStor RAID Appliance	4-2
Front Bezel LEDs	4-2
Audible Alarm	4-3
The Operator Control Panel	4-4

Monitoring the DuraStor 312R Storage Enclosure 4-4
 Status LEDs 4-5
 Drive LEDs 4-5
 Audible Alarm 4-7

5 Maintaining the DuraStor Storage Subsystem

Maintaining the DuraStor RAID Appliance 5-1
 Replacing a RAID Controller 5-2
 Replacing the Cooling Fan Module 5-4
 Replacing a Power Supply Unit 5-5
 Replacing the DuraStor RAID Appliance Chassis 5-6
Maintaining the DuraStor 312R Storage Enclosure 5-7
 Replacing a Disk Drive 5-8
 Replacing the Cooling Fan Module 5-10
 Replacing a Power Supply Unit 5-11
 Replacing the Disk I/O Card 5-13
 Replacing the SAF-TE Controller Card 5-14
 Replacing the DuraStor 312R Chassis 5-15

6 Troubleshooting

Problems with the DuraStor RAID Appliance 6-1
Problems with the DuraStor 312R Storage Enclosure 6-2

A Port Information

B The Operator Control Panel of the DuraStor RAID Appliance

Glossary

Index

Introduction

In This Chapter

About This Guide	1-1
Installation Overview	1-2
Storage Management Software Tools	1-2

About This Guide

This *Installation and User's Guide* describes how to install, use, and maintain the following DuraStor products:

- DuraStor RAID Appliance (the RAID enclosure that houses the SCSI or Fibre Channel-to-SCSI RAID control)
- DuraStor 312R Storage Enclosure
- DuraStor 6220SS Storage Subsystem (composed of the DuraStor SCSI RAID Appliance and the DuraStor 312R)
- DuraStor 7220SS Storage Subsystem (composed of the DuraStor Fibre Channel-to-SCSI RAID Appliance and the DuraStor 312R)

This *Guide* does not describe the DuraStor 6200S or 7200S RAID controller. For information, refer to the *DuraStor 6200S/7200S RAID Controller Installation Guide* for installation instructions and product specifications.

This *Guide* also does not describe the three storage management software tools provided with the DuraStor RAID appliance and DuraStor 6220SS/7220SS. Detailed operation instructions for these

tools are provided in separate user's guides provided on the DuraStor CD. See [Storage Management Software Tools on page 1-2](#).

This *Guide* assumes that you are familiar with basic computer hardware and network administration terminology and tasks, and that, if you are using your DuraStor product as part of an external storage subsystem, you have a working knowledge of Redundant Array of Independent Disks (RAID) technology.

Installation Overview

The installation instructions can be followed to set up the complete storage subsystem (DuraStor 6220SS/7220SS) or to install just one of the two components (DuraStor RAID appliance or DuraStor 312R).

If you are installing either the DuraStor RAID appliance or the DuraStor 312R *but not both*, use the *Table of Contents* to help you move directly to the information you are seeking.

Storage Management Software Tools

If you are building an external RAID storage subsystem, you can create and manage it using three different software tools:

- Adaptec Storage Manager™ Pro. See [page 1-2](#).
- Adaptec Disk Array Administrator. See [page 1-3](#).
- Operator Control Panel (OCP) of the DuraStor RAID appliance. See [page 1-3](#).

Adaptec Storage Manager Pro

We recommend using the Storage Manager Pro software application. It is included on the DuraStor CD as part of the DuraStor Storage Subsystem and runs on both Windows NT® and Windows® 2000. Use it to create and reconfigure arrays, manage spares, monitor the status of your storage devices, and more.

Storage Manager Pro allows you to perform all these functions for all systems on your network that are running Storage Manager Pro and gives you the power to manage all your storage devices from a single location.

The *Adaptec Storage Manager Pro User's Guide* is provided with the DuraStor RAID appliance and DuraStor 6220SS/7220SS, and is also available on the DuraStor CD. See [Installing Storage Manager Pro on page 3-55](#) for details.

Adaptec Disk Array Administrator

If you are using an operating system other than Windows NT[®] or Windows[®] 2000, you need to use Disk Array Administrator to manage your storage subsystem.

Disk Array Administrator is firmware built into the DuraStor 6200S/7200S RAID controller BIOS, and can be accessed using the RS-232 serial port connection on the rear panel of the DuraStor RAID appliance. See [Accessing Disk Array Administrator on page 3-56](#) for detailed instructions.

You can find the *Adaptec Disk Array Administrator User's Guide* on the DuraStor CD.

The Operator Control Panel

If you don't have a computer monitor available and cannot use one of the user-friendly applications, the alternative is the Operator Control Panel (OCP) located on the front bezel of the DuraStor RAID appliance. It can be used to perform most of the functions required to monitor your storage devices and create and manage arrays and spares.

You can find the *DuraStor RAID Appliance Operator Control Panel User's Guide* on the DuraStor CD.

For more information, see [Appendix B, The Operator Control Panel of the DuraStor RAID Appliance](#).

About the DuraStor Storage Subsystem

In This Chapter

<i>About the DuraStor RAID Appliances</i>	2-1
<i>About the DuraStor 312R Storage Enclosure</i>	2-14

This chapter describes the components of the DuraStor Storage Subsystem which is composed of the DuraStor RAID appliance (SCSI or Fibre Channel-to-SCSI) as well as the DuraStor 312R storage enclosure. You should familiarize yourself with all the components of your DuraStor product before you begin installing and using it.

About the DuraStor RAID Appliances

This section provides illustrated descriptions of the main features of the DuraStor RAID appliances, both SCSI and Fibre Channel-to-SCSI. [Figure 2-1](#) provides an overview of both the RAID appliances from the front. Both RAID appliances look similar from the front; the difference is in the back where one provides SCSI connections; the other provide Fibre Channel connections.

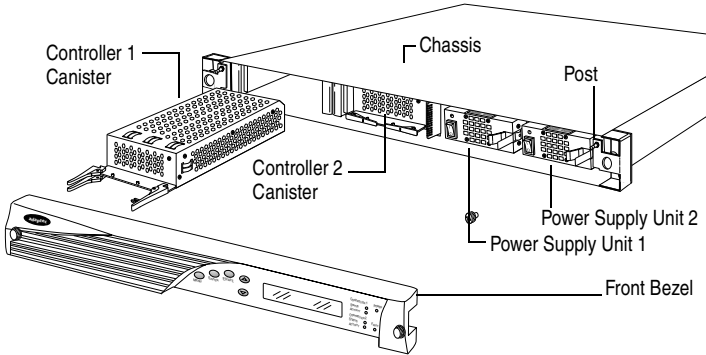


Figure 2-1. Front View of the DuraStor SCSI RAID Appliance

Figure 2-2 provides an overview of the back view of the SCSI RAID appliance and Figure 2-3 shows the back view of the Fibre Channel-to-SCSI RAID appliance. Detailed specifications can be found in Table 2-1 on page 2-9.

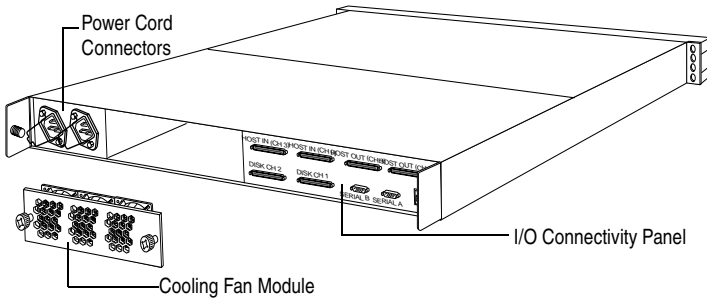


Figure 2-2. Back View of the DuraStor SCSI RAID Appliance

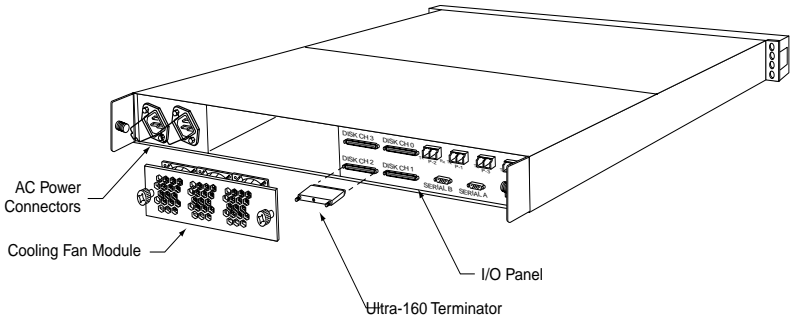


Figure 2-3. Back View of the DuraStor Fibre Channel RAID Appliance

Front Bezel

The removable front bezel of the DuraStor RAID appliance covers the RAID controllers and power supply units. See [Figure 2-4](#). It also houses the OCP buttons, the LCD panel, and the Power, Fault, and Controller LEDs.

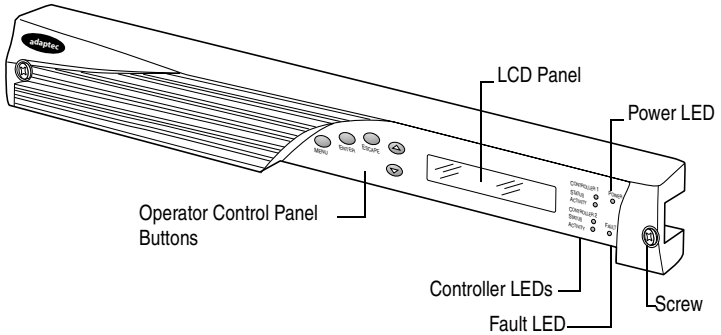


Figure 2-4. DuraStor RAID Appliance Front Bezel

When the bezel is properly installed and power is turned on, the front bezel is energized. It is removable or hot-swappable at any time without interruption to the system functions. See [Removing the Front Bezel on page 3-3](#) for more information.

Operator Control Panel (OCP)

The OCP is located on the front bezel of the DuraStor RAID appliance, and can be used to build and monitor your storage subsystem if you are unable to use a computer monitor and storage management software such as Storage Manager Pro.

For more information on the OCP, see [Appendix B, The Operator Control Panel of the DuraStor RAID Appliance](#).

Controller Canister

The DuraStor RAID appliance contains two controller canisters (see [Figure 2-5](#)), each capable of housing a RAID controller.

The DuraStor SCSI RAID appliance contains a DuraStor 6200S RAID controller preinstalled; the second controller canister is empty. The empty canister contains the hardware you need to install a second controller.

The DuraStor Fibre Channel-to-SCSI RAID appliance contains one DuraStor 7200S RAID controller preinstalled; the second controller canister is empty. The empty canister contains the hardware you need to install a second controller.

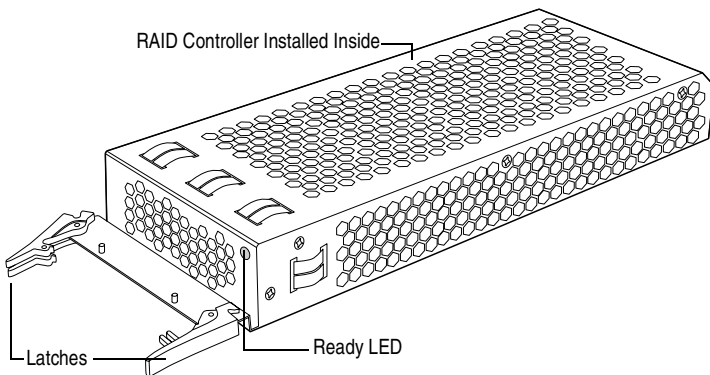


Figure 2-5. DuraStor RAID Appliance Controller Canister

The controller canister fits into the front of the chassis, behind the bezel, and is easily removable for quick controller installation or replacement. See [Replacing a RAID Controller on page 5-2](#) for details.

Power System

The DuraStor RAID appliance power system consists of two hot-swappable, power supply units (PSUs) and two AC power cord connectors. This system provides the appliance with an N+1 redundant power system. Each PSU has auto-switching circuitry for 110/220 VAC systems.

The DuraStor RAID appliance PSU is shown in [Figure 2-6](#).

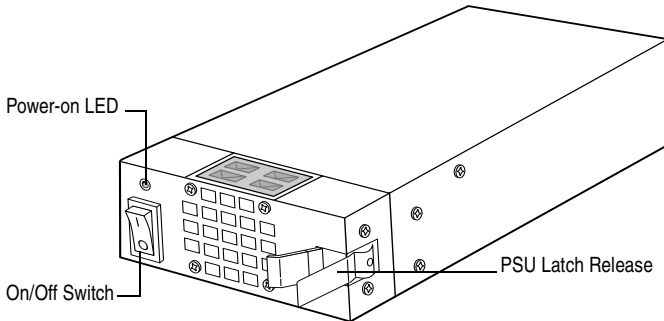


Figure 2-6. DuraStor RAID Appliance Power Supply Unit

You access the PSUs by removing the front bezel, and turn them on by using their On/Off switches. When you turn on a PSU, its own Power-on LED and the Power LED on the front bezel light up, and the DuraStor RAID appliance performs a power-on self-test (POST), which can be monitored via the LCD panel on the OCP.

Figure 2-7 shows the AC power cord connectors on the back of the chassis. The security bales hold the power cords in place and prevent accidental disconnections.

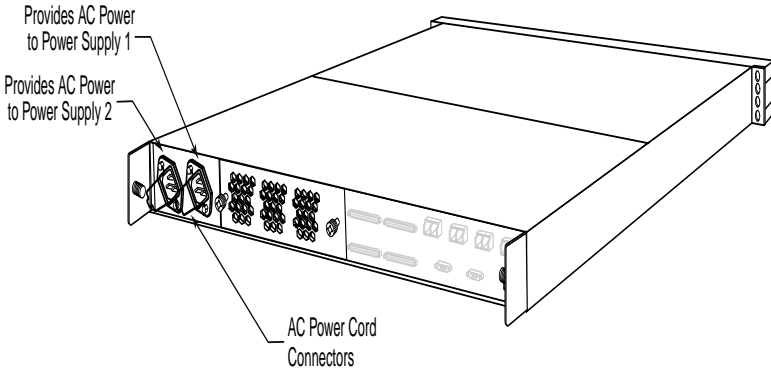


Figure 2-7. DuraStor RAID Appliance Power Cord Connector Location

Cooling Fan Module

The cooling system of the DuraStor RAID appliance consists of three high-performance cooling fans contained in a module that fits into a bay on the back of the appliance. See Figure 2-8. The module is easily accessible and hot-swappable.

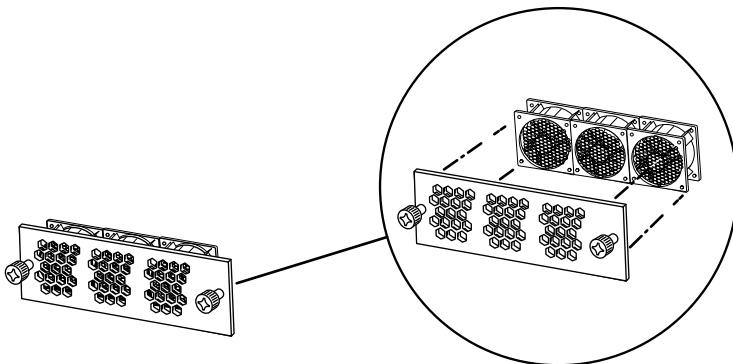


Figure 2-8. DuraStor RAID Appliance Cooling Fan Module

If the appliance temperature exceeds the established threshold of 60 °C (140 °F), the Fault LED begins to flash. (The controller

processor monitors the temperature and reports when this condition occurs.)

If a fan fails, the Fault LED lights up. *Failed cooling fans must be replaced immediately.*

The cooling fan module can be hot-swapped during normal operation. See [Replacing the Cooling Fan Module on page 5-4](#) for more details.



Caution: Do not operate the DuraStor RAID appliance for longer than 5 minutes with the cooling fan module removed. Cooling is unavailable to all components while the fans are removed.

SCSI RAID Appliance I/O Connectivity Panel

The I/O connectivity panel of the SCSI RAID appliance connects the host computer (server) to the storage enclosure disk drives. See [Figure 2-9](#) for detailed connection information.

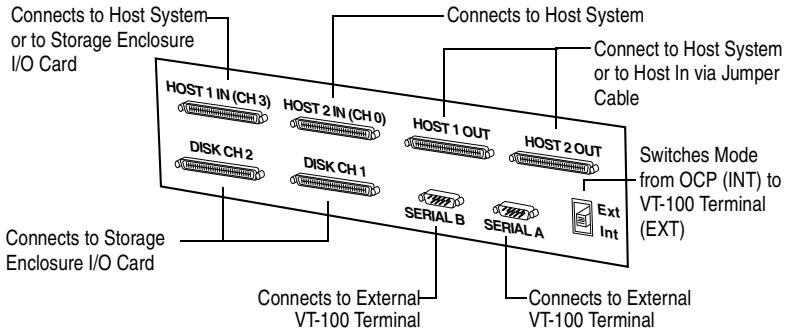


Figure 2-9. SCSI RAID Appliance I/O Connectivity Panel

Four 68-pin very-high-density SCSI connectors connect the host system Host Bus Adapters (HBAs) to the DuraStor SCSI RAID controller host channels. From left to right:

- Host 1 In (CH 3)
- Host 2 In (CH 0)
- Host 1 Out
- Host 2 Out

Additionally, two 68-pin very-high-density SCSI connectors connect to the disk channels of the DuraStor 312R storage enclosure. From left to right:

- Disk CH 2
- Disk CH 1

The connector labeled Host In (CH 3) can also be used as a disk channel under some configurations. See [Appendix A, Port Information](#) for connector pin-out detail.

Two RS-232 serial ports each connect a controller to a VT-100 terminal, and are used when you want to access Disk Array Administrator management software. Serial A port is for Controller 1; Serial B port is for Controller 2.



Note: Host 1 In (CH 3), Host 2 In (CH 0), Disk CH 2, and Disk CH 1 ports require external termination when they are unused in any dual-controller (active-active or active-passive) configuration. The single-controller (stand-alone) configuration requires no external terminators.

Host 1 Out and Host 2 Out have automatic internal termination when they are unused.

The switch in the lower right corner of the panel sets the keyboard/keypad input control to either INT (internal, via the OCP) or EXT (external, via the VT-100 keyboard or a computer running Hyper Terminal). Setting the switch to EXT disables the OCP buttons.



Note: The front bezel LEDs will work whether the OCP is being used or not. Setting this switch to EXT will not disable the front bezel LEDs.

[Table 2-1](#) summarizes the specific technical specifications of the DuraStor SCSI RAID appliance.

Table 2-1. DuraStor SCSI RAID Appliance Technical Specifications

Operating Environment	40 °F to 86 °F (+5 °C to +30 °C)
Relative Humidity	
Operating/Nonoperating	5%–95% (noncondensing)
Power Requirements	100/220 VAC (auto-sensing) 2.0/0.8 Amperes (maximum) 50–60 Hz 150 W
Dimensions (HxWxD)	1.70 in x 17.70 in x 24.50 in
Weight	20.25 lbs with one controller 22.25 lbs with two controllers
Altitude	-200 to 10,000 ft
Electromagnetic Emissions Requirements (EMI)	FCC, Part 15, Class A CISPR 22 EN55022-A
Safety Requirements	UL1950 CSA #950 TUV/EN60950
CE Compliance (EMC)	89/336/EEC EMC Directive
Shock	
Operating	1.0 G, 2–50 ms
Nonoperating	20.0 G, 2–20 ms
Vibration	
Operating	5–500 Hz, 0.25 G (pk to pk)
Nonoperating	5–500 Hz, 1.0 G (pk to pk)

Fibre Channel-to-SCSI RAID Appliance I/O Connectivity Panel

The I/O connectivity panel of the Fibre Channel-to-SCSI RAID appliance connects the host computer (server) to the storage enclosure disk drives. See [Figure 2-10](#) for detailed connection information.

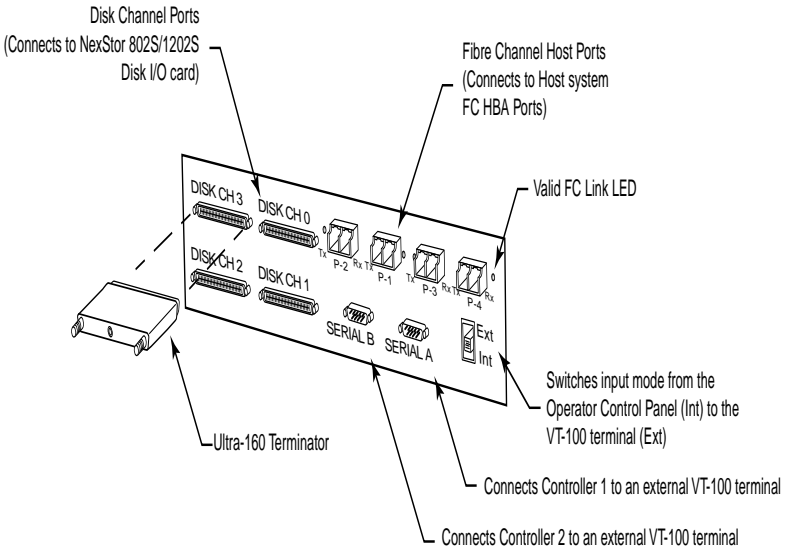


Figure 2-10. DuraStor Fibre Channel RAID Appliance I/O Connectivity Panel

There are four 2-Gb Fibre Channel (FC) ports which provide the connectivity from the host system FC HBAs to the RAID appliance host channels. Each port has an FC link LED to indicate a valid FC loop connection. These LEDs are marked with Tx and Rx.



Note: The SFP transceivers are available in copper and optical models. Be sure you have the correct transceiver for your connectivity to your host HBA.

Additionally, four 68-pin very-high-density SCSI connectors connect the disk channels of the DuraStor 312R storage enclosure. They are:

- DISK CH 3
- DISK CH 0
- DISK CH 2
- DISK CH 1

See [Appendix A, Port Information](#) connector pin-out details.

Two RS-232 serial ports each connect a controller to a VT-100 terminal, and are used when you want to access Disk Array Administrator. Serial A port is for Controller 1; Serial B port is for Controller 2.

The switch in the lower right corner of the panel sets the keyboard/keypad input control to either INT (internal, via the OCP) or EXT (external, via the VT-100 keyboard or a computer running Hyper Terminal). Setting the switch to EXT disables the OCP buttons.



Note: The front bezel LEDs will work whether the OCP is being used or not. Setting this switch to EXT will not disable the front bezel LEDs.

Optical SFP Transceiver

The Fibre Channel-to-SCSI RAID appliance uses a hot-swappable Small Form Factor Pluggable (SFP) transceiver. The SFP optical transceiver provides operations up to 2.5 Gb/sec. The transceiver includes a lost signal detect circuit which provides TTL logic high output when an unusable input signal is detected.

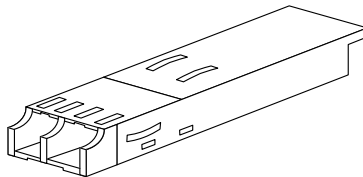


Figure 2-11. Optical Transceiver

The SFP transceiver is Class 1 Laser safety compliant and conforms to Class 1 eye safety standards.



Warning: Do not look into the laser light beam for any extended period of time.

Dust covers are provided to protect the optical transceivers' optics. We highly recommend using the dust covers provided when a connector is not in place.

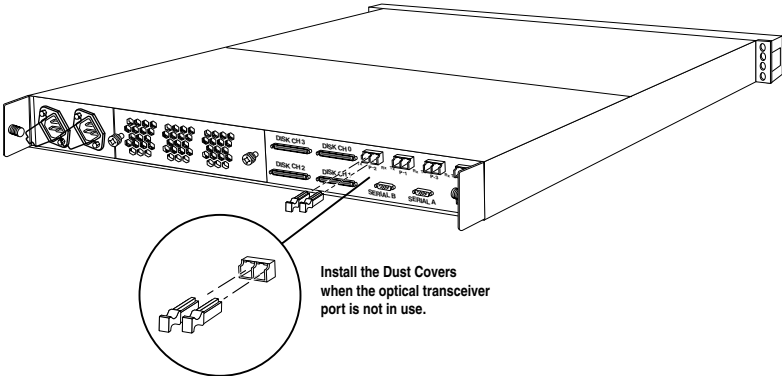


Figure 2-12. Installing and Removing SFP Dust Covers

Table 2-2 summarizes the specific technical specifications of the DuraStor Fibre Channel-to-SCSI RAID appliance.

Table 2-2. DuraStor Fibre Channel RAID Appliance Technical Specifications

Operating Environment	40 °F to 95 °F (+5 °C to +35 °C)
Relative Humidity	
Operating/Nonoperating	5%–95% (noncondensing)
Power Requirements	100/240 VAC (auto-sensing) 2.0/0.8 Amperes (maximum) 50–60 Hz 150 W
Dimensions (HxWxD)	1.70 in x 17.70 in x 24.50 in
Weight	20.25 lbs with one controller 22.25 lbs with two controllers
Altitude	-200 to 10,000 ft
Electromagnetic Emissions Requirements (EMI)	FCC, Part 15, Class A CISPR 22 EN55022-A VCCI, BSMI, C-TICK
Safety Requirements	UL1950 CSA #950 TUV/EN60950
CE Compliance (EMC)	89/336/EEC EMC Directive
Shock	
Operating	1.0 G, 2–50 ms
Nonoperating	20.0 G, 2–20 ms
Vibration	
Operating	5–500 Hz, 0.25 G (pk to pk)
Nonoperating	5–500 Hz, 1.0 G (pk to pk)

About the DuraStor 312R Storage Enclosure

This section provides illustrated descriptions of the main features of the DuraStor 312R storage enclosure. [Figure 2-13](#) and [Figure 2-14](#) give an overview of the whole enclosure. Detailed specifications can be found in [Table 2-5](#) on [page 2-24](#).

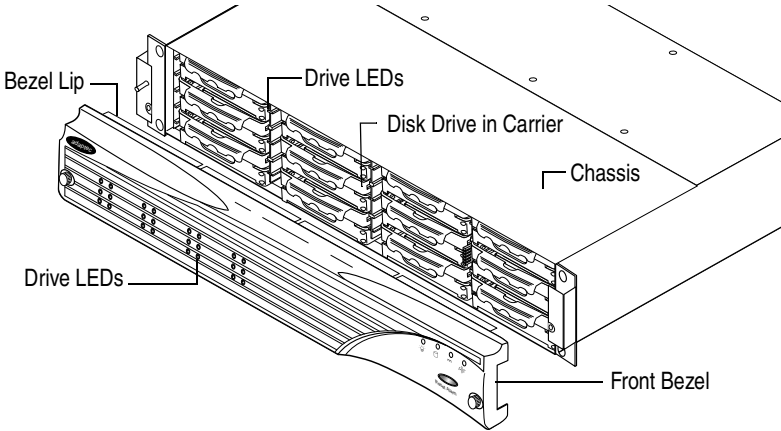


Figure 2-13. Front View of the DuraStor 312R Storage Enclosure

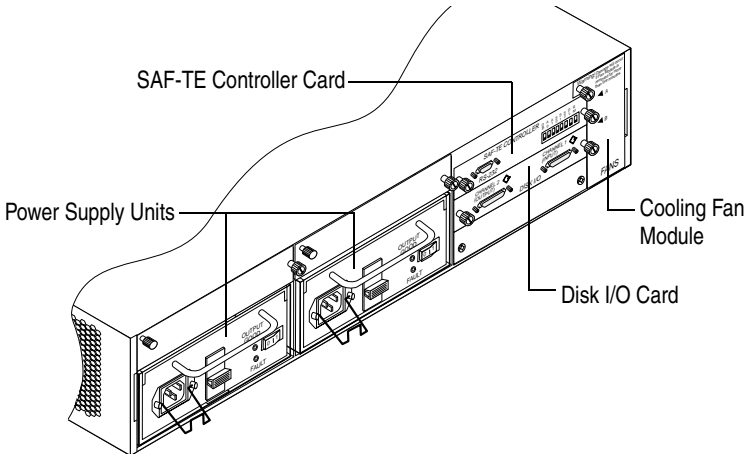


Figure 2-14. Back View of the DuraStor 312R Storage Enclosure

Front Bezel

The removable front bezel of the DuraStor 312R covers the disk drives. It also houses the audible alarm, the alarm reset button, the Status LEDs, and the Drive Status and Drive Activity LEDs. See [Figure 2-15](#).

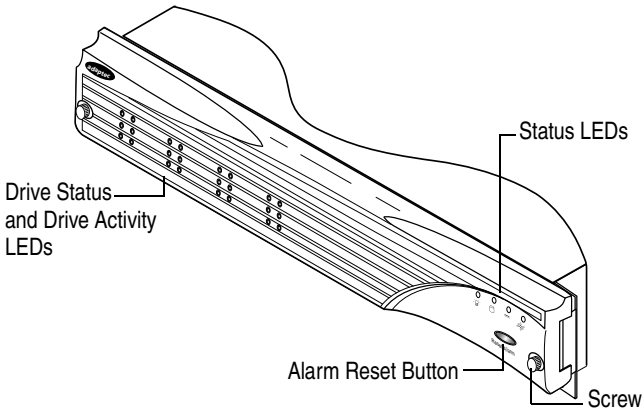


Figure 2-15. DuraStor 312R Front Bezel

When the bezel is properly installed and power is turned on, the bezel is energized. The front bezel is removable or hot-swappable at any time without interruption to the storage subsystem functions. See [Removing the Front Bezel on page 3-7](#) for information.

Disk Drives

The DuraStor 312R storage enclosure uses high-performance, 80-pin, 3.5-inch, 1-inch high, hot-swappable SCA disk drives. See [Figure 2-16](#). For information on DuraStor 312R-compatible disk drives, go to the Adaptec Web site at www.adaptec.com/go/durastor.

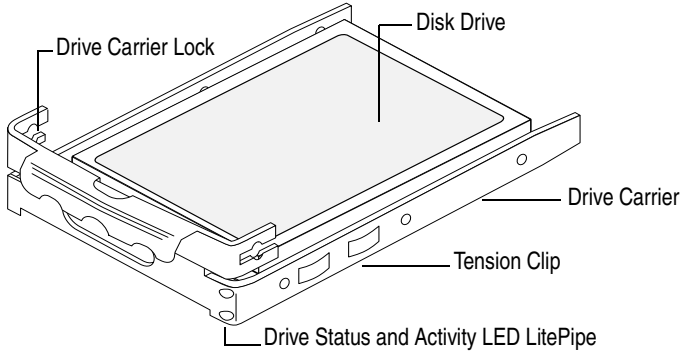


Figure 2-16. Disk Drive in Drive Carrier

The drive carriers use rails and built-in connectors for easy installation, and have a built-in locking feature, Drive Status/Activity LED LitePipes, and tension clips, which maintain a positive fit. The drive carriers also serve as heat sinks for the dissipation of disk drive heat.

[Figure 2-17](#) shows the location of the 12 disk drive slots in the storage enclosure.

Slot 1	Slot 4	Slot 7	Slot 10
Slot 2	Slot 5	Slot 8	Slot 11
Slot 3	Slot 6	Slot 9	Slot 12

Figure 2-17. DuraStor 312R Disk Drive Slot Locations

Power Supply Units

The DuraStor 312R storage enclosure has two independent hot-swappable power supply units (PSU). See [Figure 2-18](#). Each PSU has auto-sensing/load-sharing circuitry that balances the load between the power supplies. If a PSU fails, the load is transferred to the remaining good PSU without interruption of normal operation.

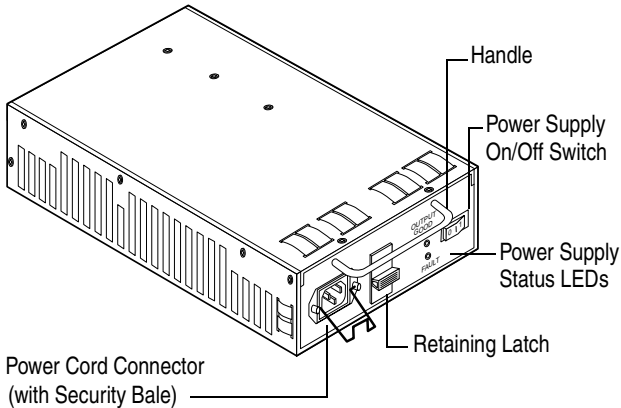


Figure 2-18. DuraStor 312R Power Supply Unit

Each PSU has a power switch, a power cord connector (with a security bale that fits over the power cord to prevent accidental disconnections), and an independent AC power cord. (The power switches are identified with a 1 for ON and a 0 for OFF.)

If a failure occurs, the Power Supply LED on the front bezel changes from solid green to solid amber and the audible alarm sounds. On the failed PSU, the green Output Good LED goes out and the amber Fault LED lights up.

See [Replacing a Power Supply Unit on page 5-11](#) for information.

Cooling Fan Module

The cooling system of the DuraStor 312R consists of four high-performance cooling fans enclosed in a module that fits into a bay on the back of the enclosure. See [Figure 2-19](#). The front two fans cool the drive bay area and the back two fans cool the interface cards and power supply chamber.

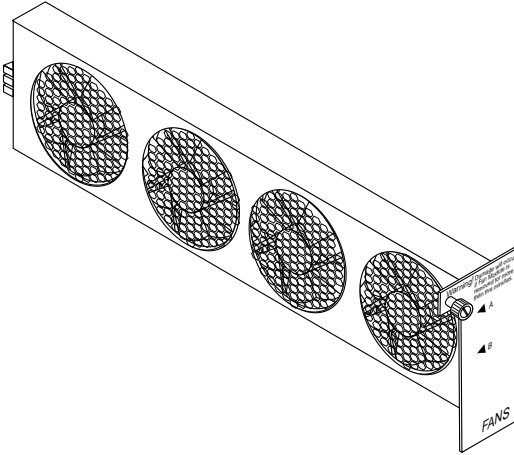


Figure 2-19. DuraStor 312R Cooling Fan Module

The SCSI-Accessed Fault Tolerant Enclosure (SAF-TE) processor monitors the temperature and reports when it exceeds the established threshold of 60 °C (140 °F). If this occurs, the Fan Status LED flashes amber.

If one fan fails, the audible alarm sounds and the Fan Status LED lights up solid amber. Failed fans must be replaced immediately.

The cooling fan module can be hot-swapped during normal operation. For detailed information, see [Replacing the Cooling Fan Module](#) on page 5-10.



Caution: *Do not* operate the DuraStor 312R storage enclosure for longer than 5 minutes with the cooling fan module removed. Cooling is unavailable to all components while the fan canister is removed.

Disk I/O Card

The disk I/O card of the DuraStor 312R (see [Figure 2-20](#)) connects the host computer (server) to the storage enclosure's disk drives and to other DuraStor 312R storage enclosures.



Warning: The disk I/O card is *not hot-swappable*. You must turn off the power to the DuraStor 312R to replace this card. See [Powering Off](#) on page 3-54.

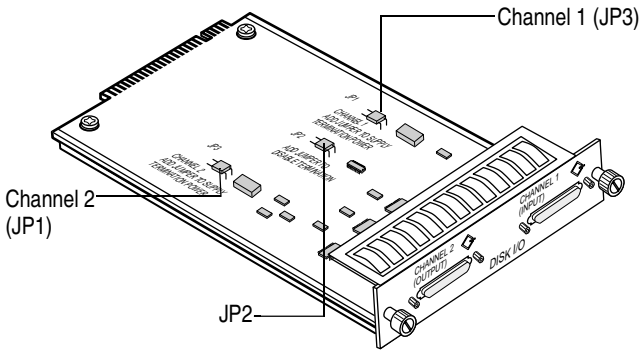


Figure 2-20. DuraStor 312R Disk I/O Card

Located on the disk I/O card are two 68-pin very-high-density SCSI connectors. These connectors are labeled Channel 1 (Input) and Channel 2 (Output).



Note: The DuraStor 312R does not support High Voltage Differential (HVD) SCSI.

Also located on the disk I/O card are three sets of jumpers. Two of the jumpers, JP1 and JP3, route termination power to the SCSI bus. The default setting is *jumpered* (a jumper on both pins).

The third jumper, JP2, enables or disables automatic termination. The default setting is *unjumpered* (the jumper offset—removed from one pin). This default setting means that termination is automatic, so that when a data cable is plugged in, the system automatically senses the connection's ground and provides the required SCSI termination. No external termination is required.

When you add a jumper to JP2, you disable automatic termination. In this configuration, the daisy-chained RAID appliance or the host connection to Channel 2 provides the termination.

SAF-TE Controller Card

The SAF-TE controller card of the DuraStor 312R (see [Figure 2-21](#)) is installed into the back of the storage enclosure, just above the disk I/O card. It contains the SAF-TE switches and an RS-232 serial communications port.

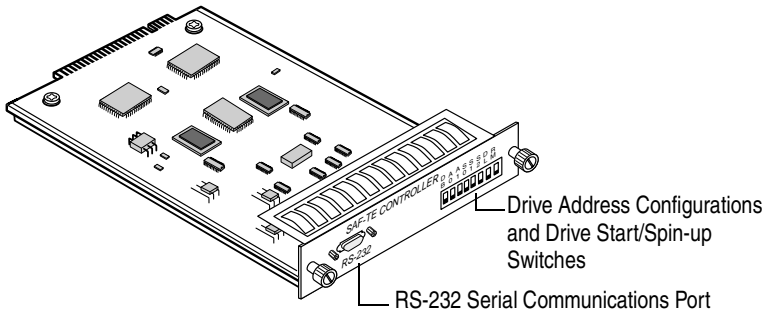


Figure 2-21. DuraStor 312R SAF-TE Controller Card



Warning: The SAF-TE controller card is *not hot-swappable*. You must turn the power off to the DuraStor 312R storage enclosure to replace this card. See [Powering Off on page 3-54](#).

The SAF-TE controller card monitors the disk drives, PSUs, cooling fans, and enclosure temperature, and continually reports conditions to the host system. It also sets the drive ID (drive configuration), the SCSI bus mode, and the disk drive start/spin-up options.

The DuraStor 312R storage enclosure is compliant with version 1.0 of the SAF-TE specification. Under this specification, your external RAID storage subsystem is implemented as a fixed SCSI target ID, allowing standard alert detection and status reporting with the SCSI bus as the underlying transport mechanism.

When used in conjunction with storage management software tools such as Storage Manager Pro or Disk Array Administrator, the DuraStor 312R can alert users or administrators to conditions requiring their attention. These alerts are in addition to the LEDs and audible alarms that are part of the DuraStor 312R storage enclosure.

Drive ID Settings

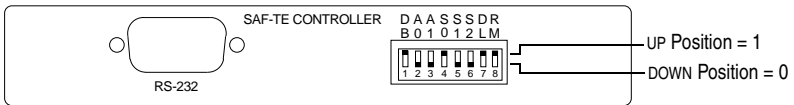


Figure 2-22. DuraStor 312R SAF-TE Switches

The SAF-TE controller card sets the disk drive configuration. It has eight switches that control many settings.



Note: By default, SAF-TE switches 1 through 6 are set to their DOWN (0) position and SAF-TE switches 7 and 8 are set to their UP (1) position.

Table 2-3 describes the function and use of each switch.

Table 2-3. SAF-TE Switch Functions

Switch	Function
1	<p>Sets the bus mode.</p> <p>The DOWN position (0) configures the enclosure for single-bus mode. In this configuration, all 12 disk drives are on a single SCSI bus and are accessed through the Channel 1 Input connector on the disk I/O card. See Disk I/O Card on page 2-19.</p> <p>The UP position (1) configures the enclosure for dual-bus mode. In this configuration, the disk drives in slots 1–6 are on one SCSI bus and are accessed through the Channel 1 Input connector and the disk drives in slots 7–12 are on the other SCSI bus and are accessed through the Channel 2 Output connector on the same disk I/O card.</p>
2 and 3	<p>Determines the disk drive SCSI ID configuration. See Connecting the SCSI RAID Appliance to the Host System on page 3-17 for more information.</p>
4	<p>Determines the disk drive SCSI ID configuration. See Connecting the SCSI RAID Appliance to the Host System on page 3-17 for more information.</p> <p>Note: Make sure switch 4 is set to the up position whenever connecting the DuraStor 312R to any RAID controller.</p>
5	<p>Unused.</p>
6	<p>Sets the baud rate for VT-100 connection to the RS-232 port.</p> <p>The UP position sets the baud rate to 19,200.</p> <p>The DOWN position sets the baud rate to 9,600.</p>
7, 8	<p>Control delay and remote spin-up.</p> <p>See Spin-up Settings on page 2-23 for information.</p>

Spin-up Settings

SAF-TE switches 7 and 8 control the drive spin-up functions. The switches are directly attached to all of the disk drive slot start signals. Switch 7 controls the Start_1 signal (Delay Spin-up) and switch 8 controls the Start_2 signal (Remote Spin-up).

Table 2-4 describes the functional mode for each SAF-TE switch setting.

Table 2-4. SAF-TE Switch Functional Modes

DL Switch 7	RM Switch 8	Drive Spin-up Function
Up (1) ¹	Up (1) ¹	Drive motor spins up at DC power-on.
Down (0)	Down (0)	Drive motor does not spin up.
Up (1)	Down (0)	Drive motor spins up only on SCSI Start command.
Down (0)	Up (1)	Drive motor spins up after a delay of 12 seconds times the numeric ID setting of the associated disk drive. (This may vary depending on the disk drive type.)

¹ Default setting for proper operation.

[Table 2-5](#) summarizes the specific technical specifications of the DuraStor 312R storage enclosure.

Table 2-5. DuraStor 312R Technical Specifications

Operating Environment	40 °F to 86 °F (+5 °C to +30 °C)
Relative Humidity	
Operating/Nonoperating	5%–95% (noncondensing)
Power Requirements	100/220 VAC (auto-sensing) 3.0 A (maximum) 50–60 Hz 350 W
Dimensions (HxWxD)	3.47 in x 17.65 in x 23.00 in
Weight	37 lbs without drives 56.2 lbs with 12 drives
Altitude	-200 to 10,000 ft
Number of Drives Supported	12 per enclosure
Total Capacity	876 GB (73 GB Drives)
Host Interface	Ultra160 SCSI
Drive Interface	SCA-80 Ultra160 SCSI
I/O Interface	RS-232 (power supply, temperature, and fan monitoring)
Electromagnetic Emissions Requirements (EMI)	FCC, Part 15, Class A CISPR 22 EN55022-A VCCI, BSMI
Safety Requirements	UL1950 CSA #950 TUV/EN60950
CE Compliance (EMC)	89/336/EEC EMC Directive
Shock	
Operating	1.0 G, 2–50 ms
Nonoperating	20.0 G, 2–20 ms
Vibration	
Operating	5–500 Hz, 0.25 G (pk to pk)
Nonoperating	5–500 Hz, 1.0 G (pk to pk)

Installing the DuraStor Storage Subsystem

In This Chapter

<i>Storage Subsystem Installation Overview</i>	3-2
<i>Setting Up the DuraStor RAID Appliance</i>	3-3
<i>Setting Up the DuraStor 312R Storage Enclosure</i>	3-6
<i>Completing the Connections for the DuraStor 6220SS</i>	3-11
<i>Completing the Connections for the DuraStor 7220SS</i>	3-23
<i>Turning On the Power</i>	3-54
<i>Accessing Your Storage Management Tool</i>	3-54

This chapter explains how to set up the complete storage subsystem (DuraStor 6220SS/7220SS); however, the installation instructions can be followed if you are only setting up one of the two components.

If you are installing either the DuraStor RAID appliance or the DuraStor 312R *but not both*, refer to the following pages:

- To install the DuraStor RAID appliance, see [page 3-3](#).
- To install the DuraStor 312R storage enclosure, see [page 3-6](#).

Storage Subsystem Installation Overview

1. Setting Up the DuraStor RAID Appliance

- a Removing the Front Bezel. See page 3-3.
- b Mounting the RAID Appliance on the Rack. See page 3-4.
- c Replacing the Front Bezel. See page 3-6.
- d Connecting the Power Cords. See page 3-11.

2. Setting Up the DuraStor 312R Storage Enclosure

- a Removing the Front Bezel. See page 3-7.
- b Mounting the Storage Enclosure on the Rack. See page 3-8.
- c Installing Disk Drives. See page 3-10.
- d Replacing the Front Bezel. See page 3-11.
- e Connecting the Power Cords. See page 3-11.

3. Completing the DuraStor Storage Subsystem Setup

- a Connecting the SCSI RAID Appliance to the DuraStor 312R. See page 3-12. Or, Connecting the Fibre Channel-to-SCSI RAID Appliance to the DuraStor 312R. See page 3-23.
- b Connecting the SCSI RAID Appliance to the Host System. See page 3-17. Or, Connecting the Fibre Channel-to-SCSI RAID Appliance to the Host System. See page 3-29.
- c Setting the Host System HBA to Multiple-LUN Support. See page 3-22. (DuraStor SCSI RAID appliance only.)
- d Turning On the Power. See page 3-54.

4. Installing Your Storage Management Tool

See *Accessing Your Storage Management Tool* on page 3-54.

Setting Up the DuraStor RAID Appliance

This section describes how to install and set up your DuraStor RAID appliance.

Removing the Front Bezel

- 1 Unlock the front bezel by turning the screws one-quarter turn to the left. See [Figure 3-1](#).

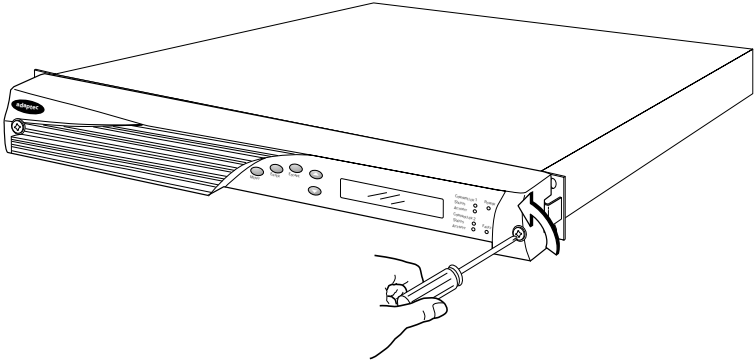


Figure 3-1 Unlocking the Front Bezel

- 2 Using both hands, pull the front bezel from the appliance. See [Figure 3-2](#).

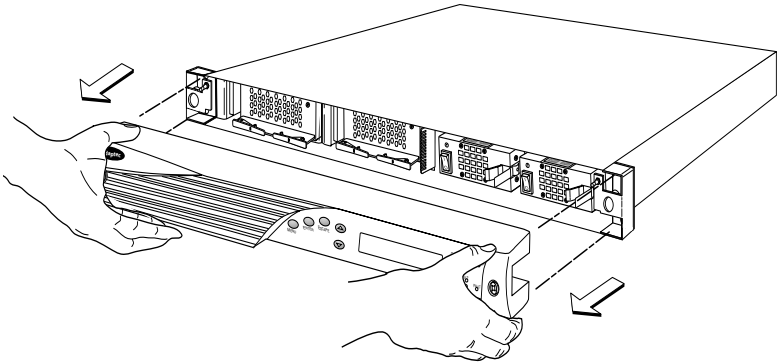


Figure 3-2 Removing the Front Bezel

Mounting the RAID Appliance on the Rack

The RAID appliance can be installed into any standard 19-inch rack.

Installation tips: It will be helpful to have someone assist you. Also, make sure that the mounting hardware is easily accessible before you begin the installation.



Note: If you are not installing your RAID appliance into a rack cabinet, skip to [Connecting the Power Cords on page 3-11](#).

- 1 Select a location within your rack.

If you are installing the DuraStor 6220SS/7220SS, consider the placement of the DuraStor storage subsystem in relation to where the DuraStor 312R storage enclosure will be installed later and ensure that there will be adequate airflow for the front-to-side and side-to-side areas.

- 2 Place the RAID appliance in the desired position in the rack.
- 3 Secure the left and right front chassis ears to the rack's front vertical members using the supplied screws and nuts. See [Figure 3-3](#).

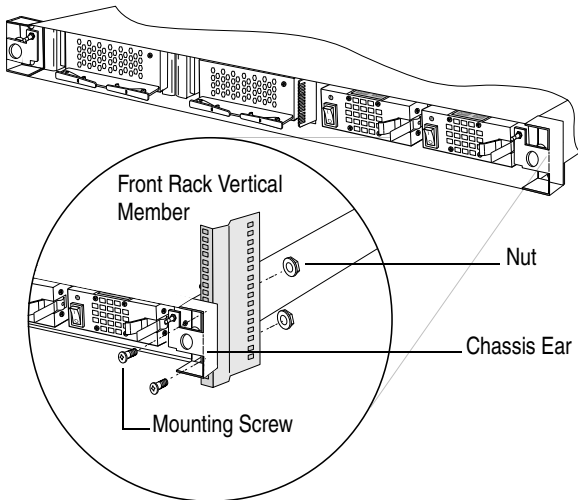


Figure 3-3 Attaching the Chassis Ears

- Slide one of the rack's mounting rails into the slot on the left side of the RAID appliance's back panel. See [Figure 3-8](#).

Push the rail in until it fits the depth of the rack. The rail should mate with mounting slots on the rack's rear vertical member and make the appliance level and tight-fitting.

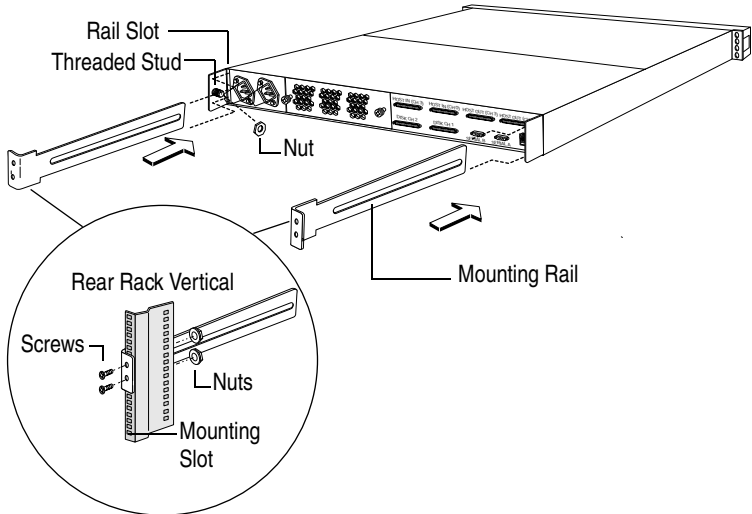


Figure 3-4 Attaching the Rails

- Secure the left side rail to the rack's rear vertical member using the screws and nuts.
- Repeat steps 6 and 7 for the other side rail.



Note: Be sure that the RAID appliance is level. Check that you used mounting slots of the same height on both sides of the rack.

- Reinstall the PSUs. See [Replacing a Power Supply Unit on page 5-5](#).

Replacing the Front Bezel

- 1 Ensure that the front bezel mounts to the two posts and that the bezel lip fits under the chassis top.
- 2 Lock the front bezel by turning the screws one-quarter turn to the right.

Connecting the Power Cords

Once the DuraStor RAID appliance is in place, the power cords can be attached and secured.

- 1 On the back of the RAID appliance, lift a security bale and plug in a power cord.
- 2 Place the bale over the cord. (This protects the power cord from accidental disconnection.)
- 3 Plug the other end of the power cord into a grounded outlet or UPS power strip.
- 4 Repeat this process for the other power cord.

If you are installing the DuraStor RAID appliance *only*, go to [Turning On the Power on page 3-54](#).

Setting Up the DuraStor 312R Storage Enclosure

This section describes the installation and set up of the DuraStor 312R storage enclosure.

If you are installing the DuraStor 6220SS/7200SS storage subsystem, you should install the DuraStor RAID appliance before installing the DuraStor 312R.

Removing the Front Bezel

- 1 Unlock the front bezel by turning the screws one-quarter turn to the left. See [Figure 3-5](#).

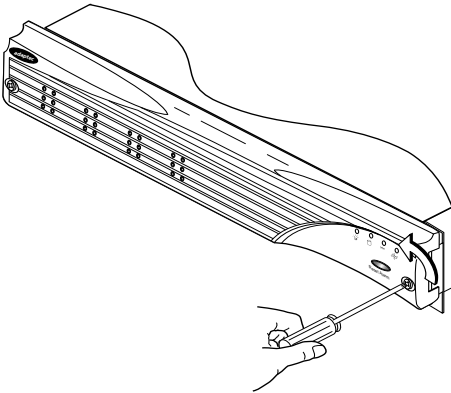


Figure 3-5 Unlocking the Front Bezel

- 2 Using both hands, pull the front bezel from the enclosure. See [Figure 3-6](#).

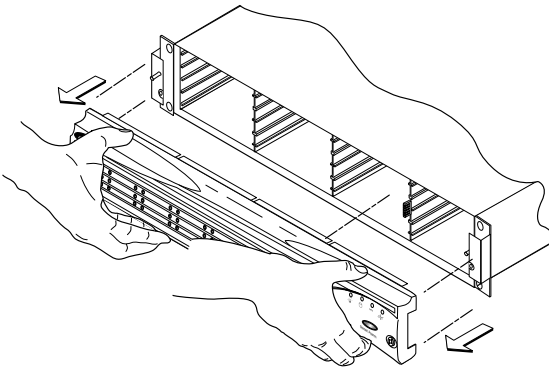


Figure 3-6 Removing the Front Bezel

Mounting the Storage Enclosure on the Rack

The DuraStor 312R storage enclosure can be installed into any standard 19-inch rack.

Installation tips: It will be helpful to have someone assist you. Also, make sure that the mounting hardware is easily accessible before you begin the installation.



Note: If you are not installing your storage enclosure into a rack, skip to [Connecting the Power Cords on page 3-11](#).

- 1 Remove the PSUs. See [Replacing a Power Supply Unit on page 5-11](#).



Warning: The PSUs *must* be removed prior to installing the RAID appliance into the rack. The added weight of the PSUs could damage the RAID appliance chassis during installation. See [Replacing a Power Supply Unit on page 5-5](#) for detailed instructions.

- 2 Select a location within your rack.

If you are installing the DuraStor 6220SS/7200SS, consider the placement in relation to the DuraStor RAID appliance and ensure that there will be adequate airflow for the front-to-side and side-to-side areas.

- 3 Place the DuraStor 312R storage enclosure in the desired position in the rack.
- 4 Secure the left and right front chassis ears to the rack's front vertical members using the supplied screws and nuts. See [Figure 3-7](#).

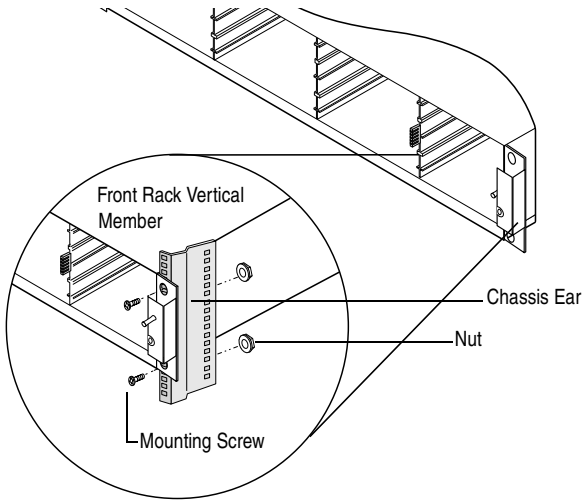


Figure 3-7 Attaching the Chassis Ears

- 5 Slide one of the rack's mounting rails into the slot on the left side of the storage enclosure's back panel. See [Figure 3-8](#).

Push the rail in until it fits the depth of the rack. The rail should mate with mounting slots on the rack's rear cabinet vertical member and make the enclosure level and tight-fitting.

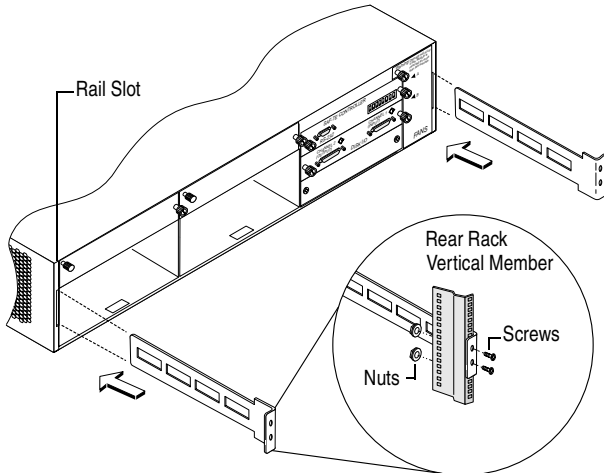


Figure 3-8 Attaching the Rails

- 6 Secure the left side rail to the vertical member using the screws and nuts.
- 7 Repeat steps 6 and 7 for the other side rail.



Note: Be sure that the enclosure is level. Check that you used mounting slots of the same height.

Attaching a Disk Drive to a Drive Carrier

- 1 Place the disk drive component-side down on a flat surface, with the SCSI connector facing away from you.
- 2 Slide the drive carrier over the disk drive so that the handle of the drive carrier curves down and is facing you. See [Figure 3-9](#).
- 3 Attach the drive carrier to the disk drive using six screws, three on each side of the drive carrier.

Installing Disk Drives

- 1 Align the drive carrier rail with the grooves in the drive bay. See [Figure 3-9](#).

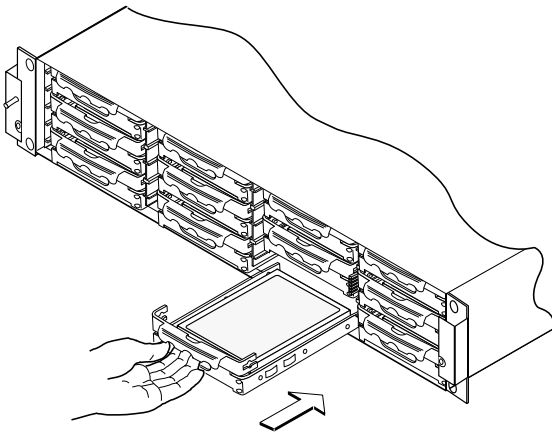


Figure 3-9 Installing a Disk Drive

- 2 Push the drive carrier into its bay until it seats completely.

The tension clips on the drive carrier ensure that the fit is tight. Gentle but firm force may be required to completely seat the drive carrier.

- 3 Repeat this step to populate all the disk drive slots.

Replacing the Front Bezel

- 1 Ensure that the front bezel lip fits under the chassis top.
- 2 Lock the screws by turning them one-quarter turn to the right.

Connecting the Power Cords

Once the DuraStor 312R storage enclosure is in place, the power cords can be attached and secured.

- 1 On the back of the storage enclosure, lift a security bale and plug in a power cord.
- 2 Place the bale over the cord. (This protects the power cord from accidental disconnection.)
- 3 Plug the other end of the power cord into a grounded outlet or a UPS power strip.
- 4 Repeat this process for the other power cord.

Completing the Connections for the DuraStor 6220SS

The following section describes several methods for connecting and configuring the DuraStor 6220SS storage subsystem.

If you have installed the DuraStor SCSI RAID appliance or the DuraStor 312R *but not both*, go directly to the sections that apply to you. To complete the installation and setup of the DuraStor 6220SS

- Connect the DuraStor SCSI RAID appliance to the DuraStor 312R(s). See [page 3-12](#).
- Connect the DuraStor SCSI RAID appliance to the host system. See [page 3-17](#).
- Set the host system HBA to multiple-LUN support. See [page 3-22](#).

Connecting the SCSI RAID Appliance to the DuraStor 312R

This section explains how to connect the DuraStor SCSI RAID appliance to the DuraStor 312R storage enclosure(s) and how to set the drive configuration.

You can connect the DuraStor SCSI RAID appliance to up to three DuraStor 312Rs, depending on your storage requirements.

- To connect to one storage enclosure (2–12-drive configuration), see [page 3-12](#).
- To connect to two storage enclosures (13–24-drive configuration), see [page 3-13](#).
- To connect to three storage enclosures (25–36-drive configuration), see [page 3-15](#). (This configuration is not available if you are using dual controllers.)

Connecting to One Storage Enclosure (2–12-Drive Configuration)

- 1 Establish the drive configuration by setting the SAF-TE switches to reflect one of the options shown in [Figure 3-10](#). Two setting options are shown for a dual-bus 12-drive configuration. Choose the option with the drive IDs you want.

Option #1

SAF-TE ID = 15/15
RAID Controllers = 6 & 7

Dual-bus Mode

DAASSDR
B01012LM



UP (1)
DOWN (0)

Switch Settings

Slot 1	ID 1	Slot 4	ID 2	Slot 7	ID 1	Slot 10	ID 2
Slot 2	ID 3	Slot 5	ID 4	Slot 8	ID 3	Slot 11	ID 4
Slot 3	ID 5	Slot 6	ID 0	Slot 9	ID 5	Slot 12	ID 0

Drive IDs of the Drive Slots (Drive Channel Side)

Option #2

SAF-TE ID = 15/15
RAID Controllers = 6 & 7

Dual-bus Mode

DAASSDR
B01012LM



UP (1)
DOWN (0)

Switch Settings

Slot 1	ID 9	Slot 4	ID 10	Slot 7	ID 9	Slot 10	ID 10
Slot 2	ID 11	Slot 5	ID 12	Slot 8	ID 11	Slot 11	ID 12
Slot 3	ID 13	Slot 6	ID 14	Slot 9	ID 13	Slot 12	ID 14

Drive IDs of the Drive Slots (Drive Channel Side)

Figure 3-10 Dual-bus 2–12-drive Switch Settings

- 2 Connect the DuraStor SCSI RAID appliance to the DuraStor 312R using SCSI data cables, as shown in [Figure 3-11](#).

- Go to [Connecting the SCSI RAID Appliance to the Host System on page 3-17](#), which describes how to set your operating mode.

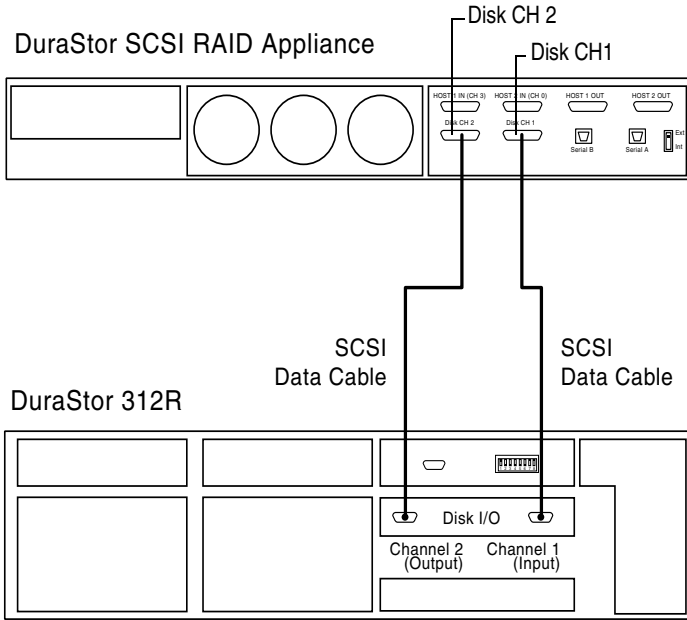


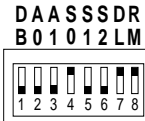
Figure 3-11 Dual-Bus 2-12-Drive Cabling Diagram

Connecting to Two Storage Enclosures (13-24-Drive Configuration)

- Establish the drive configuration by setting the SAF-TE switches to reflect the settings shown in [Figure 3-12](#).

SAF-TE ID = 15
RAID Controllers = 6 & 7

Single-bus Mode



Switch Settings

UP (1)
DOWN (0)

Slot 1 ID 1	Slot 4 ID 2	Slot 7 ID 9	Slot 10 ID 10
Slot 2 ID 3	Slot 5 ID 4	Slot 8 ID 11	Slot 11 ID 12
Slot 3 ID 5	Slot 6 ID 0	Slot 9 ID 13	Slot 12 ID 14

Drive IDs of the Drive Slots (Drive Channel Side)

Figure 3-12 Single-bus 13-24-drive Switch Settings

- 2 Connect the DuraStor SCSI RAID appliance to the DuraStor 312R using SCSI data cables, as shown in [Figure 3-13](#).

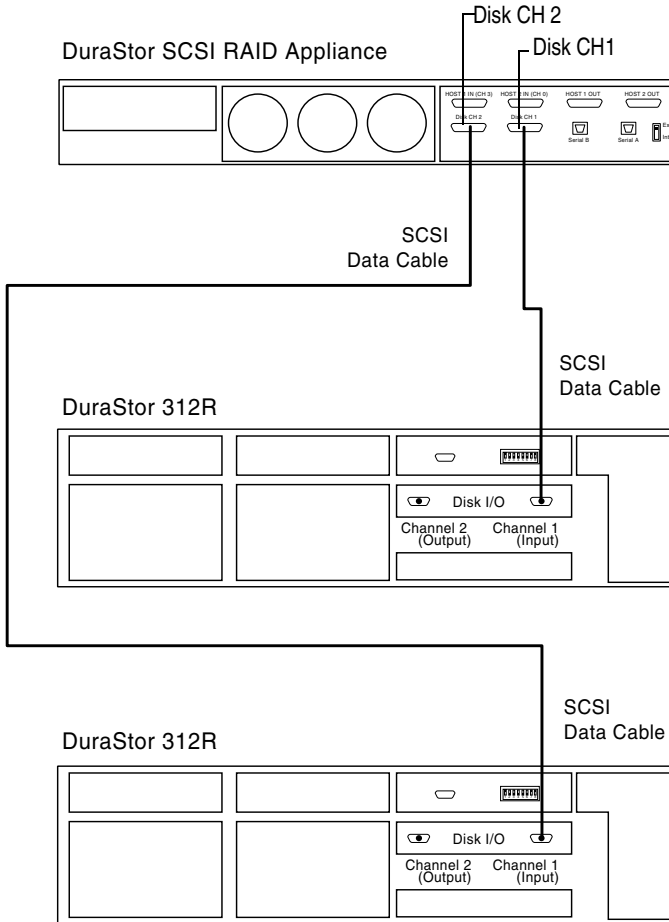


Figure 3-13 Single-Bus 13–24-Drive Cabling Diagram



Note: In this configuration, each storage enclosure is in a single-bus configuration.

- 3 Go to [Connecting the SCSI RAID Appliance to the Host System on page 3-17](#), which describes how to set your operating mode.

Connecting to Three Storage Enclosures (25–36-Drive Configuration)



Note: This configuration is only available when you are using a single controller in your DuraStor SCSI RAID appliance. One of the host channels—Host In (CH 3)—is used as a drive channel, which limits the DuraStor RAID appliance to a single Host In port.

- 1 Establish the drive configuration by setting the SAF-TE card switches to reflect the settings shown in [Figure 3-14](#).

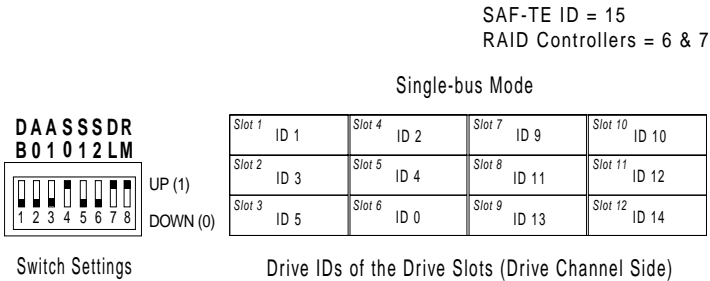


Figure 3-14 Single-Bus 25–36-Drive Switch Settings

- 2 Connect the DuraStor SCSI RAID appliance to the DuraStor 312R using SCSI data cables, as shown in [Figure 3-15](#).
- 3 Go to [Connecting the SCSI RAID Appliance to the Host System on page 3-17](#), which describes how to set your operating mode.

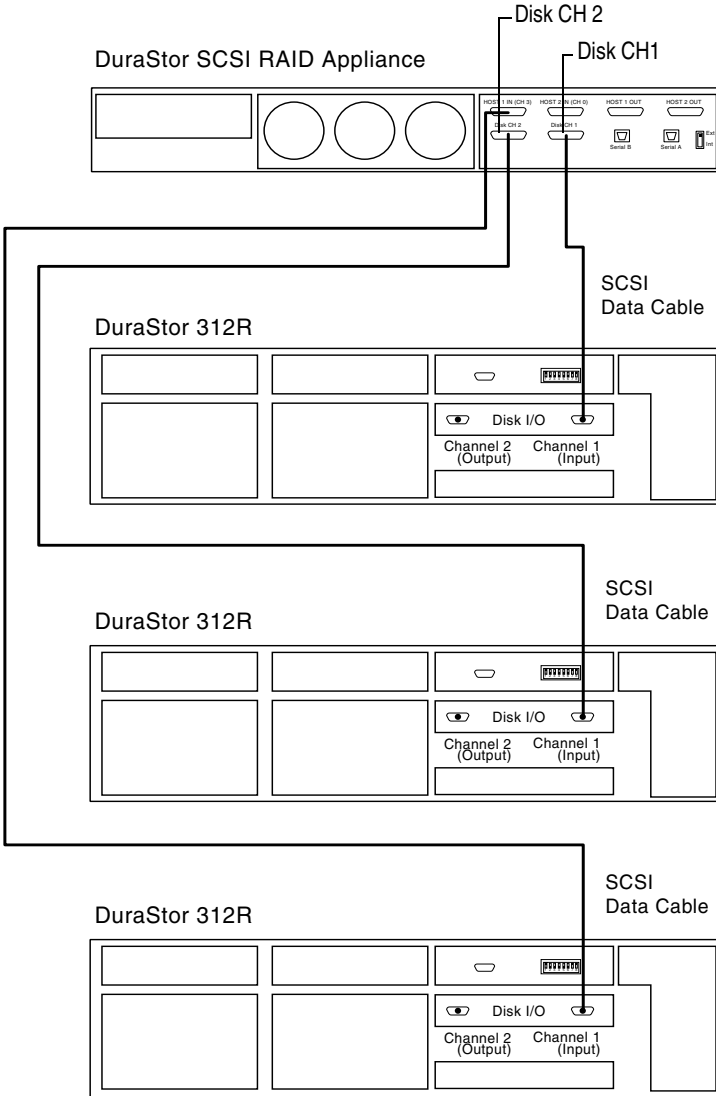


Figure 3-15 Single-Bus 25–36-Drive Cabling Diagram



Note: In this configuration, each storage enclosure is in a single-bus configuration.

Connecting the SCSI RAID Appliance to the Host System

This section explains how to connect the DuraStor SCSI RAID appliance to the host system in one of four operating modes:

- Stand-alone single-port mode. See [page 3-18](#).
- Stand-alone dual-port mode. See [page 3-19](#).
- Active-active single-port mode. See [page 3-20](#).
- Active-passive dual-port mode. See [page 3-21](#).

[Table 3-1](#) provides an overview of each operating mode.

Table 3-1 DuraStor 6220SS Operating Mode Summary

Operating Mode	Number of Controllers	Number of Active Host Ports per Controller	Number of Disk Channels
Stand-alone single-port	1	1	3
Stand-alone dual-port	1	2	2
Active-active single-port	2	1	2
Active-passive dual-port	2	2 (on active controller only)	2

Refer to *Adaptec Storage Manager Pro User's Guide* or *Adaptec Disk Array Administrator User's Guide* for more detailed information about each operating mode.

Stand-Alone Single-Port Mode

This operating mode is a low-cost entry-level RAID storage solution. Use this mode for maximum storage capacity with a single host computer. In this mode, the Host In (CH 3) port becomes a disk channel, providing additional storage capacity.

- 1 Connect the SCSI data cables as shown in [Figure 3-16](#).

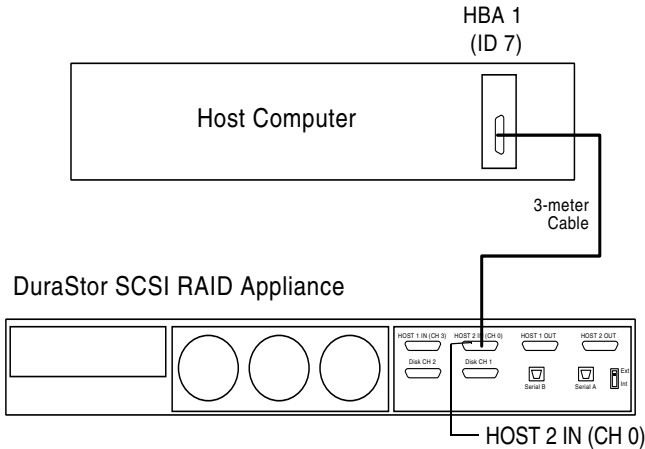


Figure 3-16 Stand-alone Single-port Cabling Diagram



Note: External terminators are not required for any stand-alone configuration.

- 2 Set the host system HBA to SCSI ID 7. Refer to your host system's user's guide for details on setting HBA SCSI IDs.
- 3 Power on the DuraStor Storage Subsystem. See [Powering On on page 3-54](#).
- 4 Set the controller operating mode. For detailed instructions, refer to the user's guide for the storage management tool you are using.

Stand-Alone Dual Port Mode

This operating mode is a low-cost, high-performance RAID storage solution. Use this mode to get the most from the controller with a single host computer.



Note: Protected LUN sharing between two host systems is not supported without third-party software which provides file share/file lock capabilities such as MS clustering software.

- 1 Connect the SCSI data cables as shown in [Figure 3-17](#).

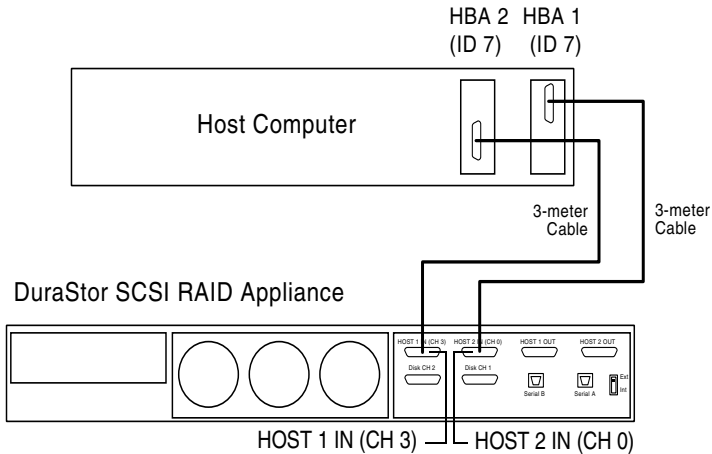


Figure 3-17 Stand-alone Dual-port Cabling Diagram



Note: External terminators are not required for any stand-alone configuration.

- 2 Set the host system HBAs to SCSI ID 7. Refer to your host system's user's guide for details on setting HBA SCSI IDs.
- 3 Power on the DuraStor Storage Subsystem. See [Powering On on page 3-54](#).
- 4 Set the controller operating mode. For detailed instructions, refer to the user's guide for the storage management tool you are using.

Active-Active Single Port Mode

This operating mode provides redundancy, transparent failover and failback, and high-performance. In this mode, LUNs appear only once to the operating system. Use this mode to achieve a fault-tolerant disk subsystem with a single host computer.

By default, the controller's operating mode is set to active-active single port.

- 1 Connect the SCSI data cables as shown in [Figure 3-18](#).

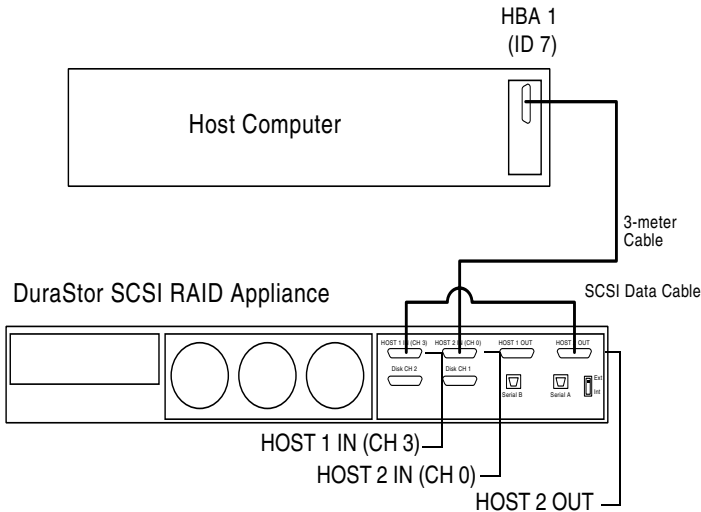


Figure 3-18 Active-active Single-port Cabling Diagram



Note: External terminators are required for any dual controller configuration where Host 2 In (CH 0), Host 1 In (CH 3), Disk CH 1, or Disk CH 2 are not cabled.

- 2 Set the host system HBA to SCSI ID 7. Refer to your host system's user's guide for details on setting HBA SCSI IDs.
- 3 Power on the DuraStor External Storage Subsystem. See [page 3-54](#).

Active-Passive Dual-Port Mode

This operating mode provides redundancy, transparent failover and failback, and support for optional upstream failover. It is suitable when a single host computer needs access to all LUNs.

However, this mode has lower performance than active-active single-port mode. It requires third-party software if upstream failover is implemented and it reports all arrays twice to the operating system, causing the potential for data overwrites.

Because this operating mode does not provide any special advantages, we recommend using active-active single-port mode instead.

- 1 Connect the SCSI data cables as shown in [Figure 3-19](#).

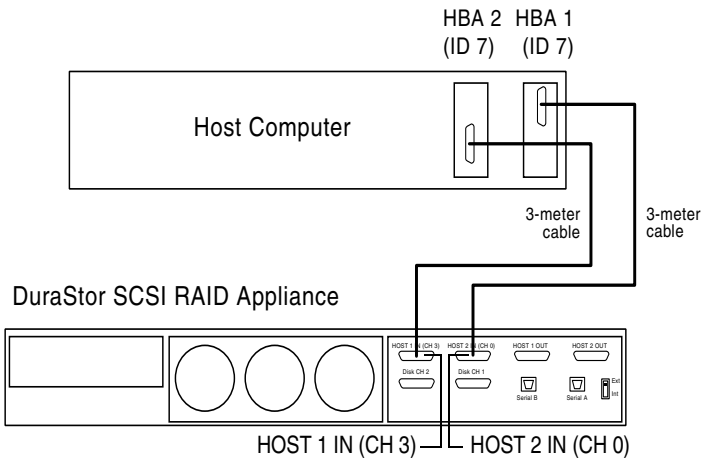


Figure 3-19 Active-passive Dual-port Cabling Diagram



Note: External terminators are required for any dual controller configuration where Host 2 In (CH 0), Host 1 In (CH 3), Disk CH 1, or Disk CH 2 are not cabled.

- 2 Set the host system HBAs to SCSI ID 7. Refer to your host system's user's guide for details on setting HBA SCSI IDs.
- 3 Power on the DuraStor External Storage Subsystem. See [page 3-54](#).
- 4 Set the controller operating mode. For detailed instructions, refer to the user's guide for the storage management tool you are using.

Changing Your Drive Configuration

You may need to change your storage subsystem from one drive configuration to another or add another RAID controller to expand your storage subsystem capabilities and capacity.

The DuraStor 6200S RAID controller features *drive roaming*. Drive roaming allows RAID controllers to keep track of which disk drive belongs to which logical array if the enclosure is changed or the disk drive is moved.

To change to a new drive configuration, follow the setup instructions for that configuration as provided in [Connecting the SCSI RAID Appliance to the DuraStor 312R](#) on page 3-12.



Note: You will not be required to move disk drives around in the enclosure. Drive roaming will locate those disk drives when the DuraStor Storage Subsystem is powered on.

Changing Your Operating Mode

To change to a new operating mode, follow the setup instructions for that mode as provided in [Connecting the SCSI RAID Appliance to the Host System](#) on page 3-17.

Setting the Host System HBA to Multiple-LUN Support

Before your host system will recognize the arrays you create, you must set the host system HBA to multiple-LUN support status.

- 1 Open your host system HBA BIOS. (Refer to your HBA documentation for instructions on how to do this.)
- 2 Set Multiple LUN Support for controller ID (default 1) to **Yes**.
- 3 Close your host system HBA BIOS. (Refer to your HBA documentation for instructions on how to do this.)

Completing the Connections for the DuraStor 7220SS

The following section describes several methods for connecting and configuring the DuraStor 7220SS storage subsystem.

If you have installed the DuraStor Fibre Channel-to-SCSI RAID appliance or the DuraStor 312R *but not both*, go directly to the sections that apply to you.

To complete the installation and setup of the DuraStor 7220SS, you must

- Connect the DuraStor Fibre Channel-to-SCSI RAID appliance to the DuraStor 312R units. See [page 3-23](#).
- Connect the DuraStor Fibre Channel-to-SCSI RAID appliance to the host system. See [page 3-29](#).

Connecting the Fibre Channel-to-SCSI RAID Appliance to the DuraStor 312R

This section explains how to connect the DuraStor Fibre Channel-to-SCSI RAID appliance to the DuraStor 312R storage enclosure(s) and how to set the drive configuration.

You can connect the DuraStor Fibre Channel-to-SCSI RAID appliance to up to four DuraStor 312Rs storage enclosures, depending on your storage requirements.

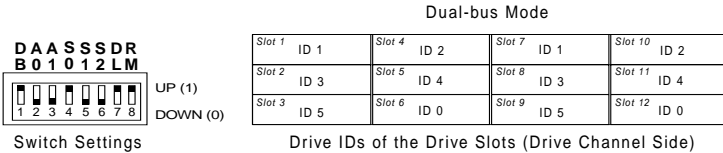
- To connect to one storage enclosure (2–12-drive configuration), see [page 3-24](#).
- To connect to two storage enclosures (13–24-drive configuration), see [page 3-25](#).
- To connect to three storage enclosures (25–36-drive configuration), see [page 3-26](#). (This configuration is not available if you are using dual controllers.)
- To connect to four storage enclosures (37–48-drive configuration), see [page 3-28](#).

Connecting to One Storage Enclosure (2–12-Drive Configuration)

- Establish the drive configuration by setting the SAF-TE switches to reflect the settings shown [Figure 3-20](#).

Option #1

SAF-TE ID = 15/15
RAID Controllers = 6 & 7



Option #2

SAF-TE ID = 15/15
RAID Controllers = 6 & 7

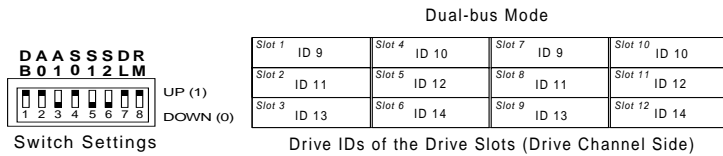


Figure 3-20 12-Drive Switch Settings

- Connect the DuraStor Fibre Channel-to-SCSI RAID appliance to the DuraStor 312R using SCSI data cables as shown in [Figure 3-21](#).

DuraStor FC RAID Appliance

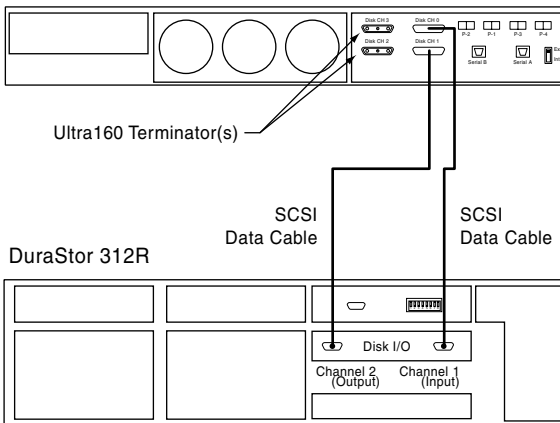


Figure 3-21 2–12-Drive Cabling Diagram

- Go to [Connecting the Fibre Channel-to-SCSI RAID Appliance to the Host System on page 3-29](#) which describes your operating mode.

Connecting to Two Storage Enclosures (13–24-Drive Configuration)

- 1 Establish the drive configuration by setting the SAF-TE switches to reflect the settings shown in [Figure 3-20 on page 3-24](#). Use the same switch settings for both storage enclosures.
- 2 Connect the DuraStor Fibre Channel-to-SCSI RAID appliance to the DuraStor 312R using SCSI data cables as shown in [Figure 3-22](#).

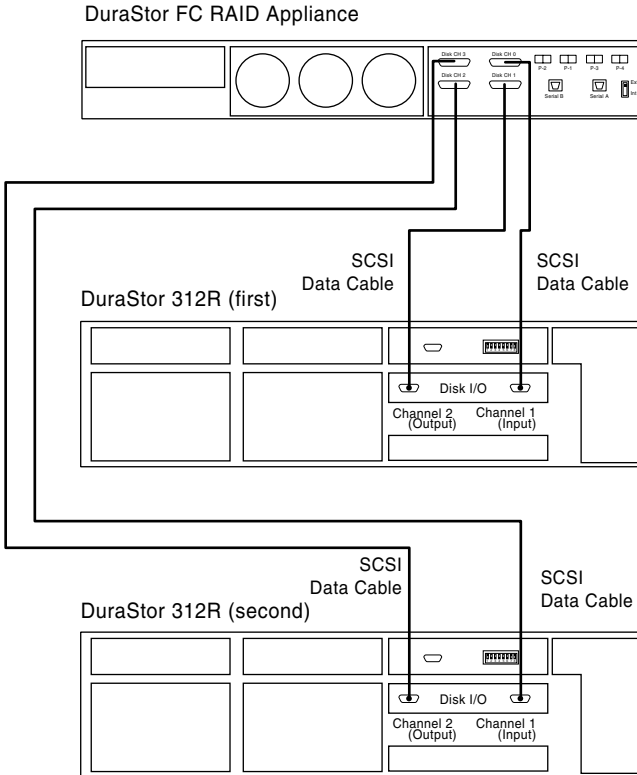


Figure 3-22 Dual-Bus 13–24-Drive Cabling Diagram

- 3 Go to [Connecting the Fibre Channel-to-SCSI RAID Appliance to the Host System on page 3-29](#) which describes your operating mode.

Connecting to Three Storage Enclosures (25–36-Drive Configuration)

- 1 Establish the drive configuration by setting the SAF-TE switches to reflect the settings shown in [Figure 3-23](#). Use the same switch settings for all three enclosures.

SAF-TE ID = 15

RAID Controllers = 6 & 7

Single-bus Mode

D A A S S S D R
B 0 1 0 1 2 L M



UP (1)

DOWN (0)

Slot 1	ID 1	Slot 4	ID 2	Slot 7	ID 9	Slot 10	ID 10
Slot 2	ID 3	Slot 5	ID 4	Slot 8	ID 11	Slot 11	ID 12
Slot 3	ID 5	Slot 6	ID 0	Slot 9	ID 13	Slot 12	ID 14

Switch Settings

Drive IDs of the Drive Slots (Drive Channel Side)

Figure 3-23 Single-Bus 25–36-Drive Switch Settings

- 2 Connect the DuraStor Fibre Channel-to-SCSI RAID appliance to the DuraStor 312R using SCSI data cables as shown in [Figure 3-24](#).

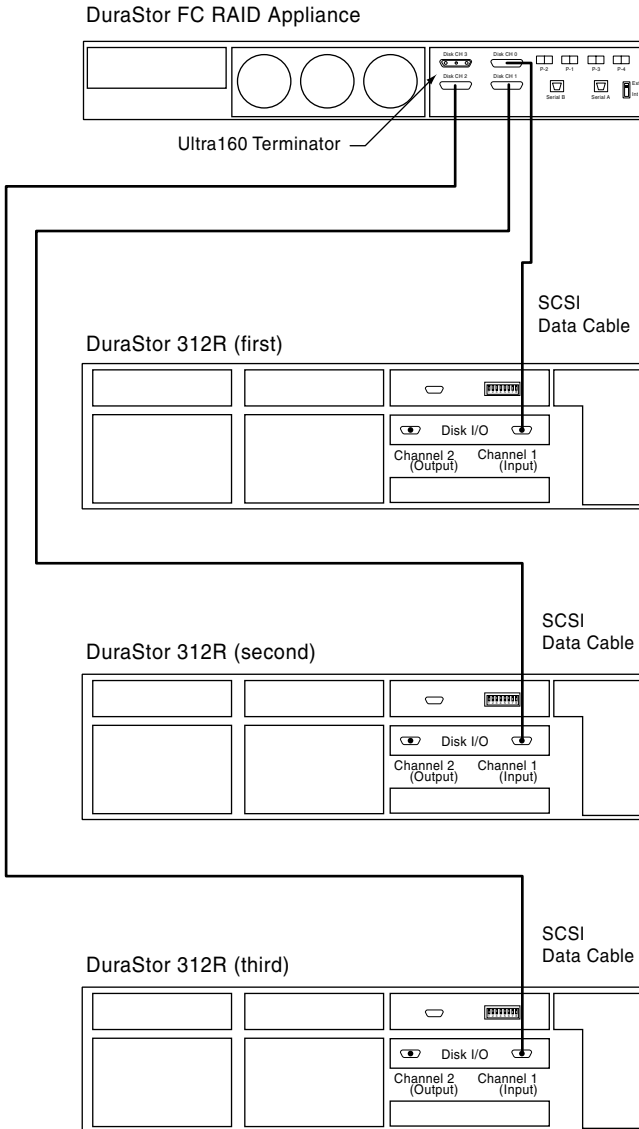


Figure 3-24 25–36 Drive Cabling Diagram

- 3 Go to [Connecting the Fibre Channel-to-SCSI RAID Appliance to the Host System on page 3-29](#) which describes your operating mode.

Connecting to Four Storage Enclosures (37–48-Drive Configuration)

- 1 Establish the drive configuration by setting the SAF-TE switches to reflect the settings shown in [Figure 3-23 on page 3-26](#).
- 2 Connect the DuraStor Fibre Channel-to-SCSI RAID appliance to the DuraStor 312R using SCSI data cables as shown in [Figure 3-25](#).

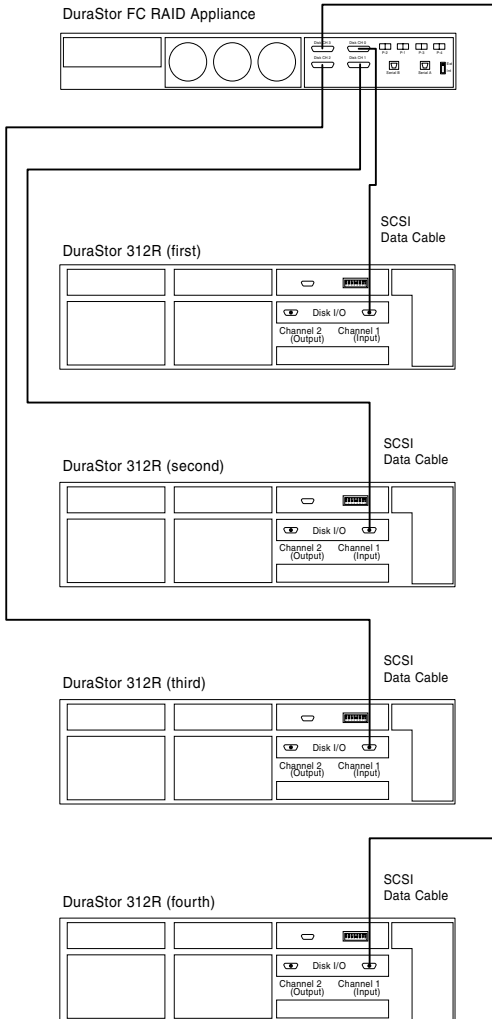


Figure 3-25 37–48-Drive Cabling Diagram

- 3 Go to [Connecting the Fibre Channel-to-SCSI RAID Appliance to the Host System on page 3-29](#) which describes your operating mode.

Connecting the Fibre Channel-to-SCSI RAID Appliance to the Host System

This section explains how to connect the DuraStor Fibre Channel-to-SCSI RAID appliance to the host system or its hub/switch. The topologies are based on the number of RAID controllers installed, single or dual port operating modes and whether the internal hubs are enabled or disabled.

[Table 3-2](#) provides an overview of each operating mode.

Table 3-2 DuraStor Fibre Channel-to SCSI RAID Appliance Operating Mode Summary

Operating Mode	Number of Controllers	Number of Active Host Ports per Controller	Number of Disk Channels
Stand-alone dual-port	1	2	4
Active-active single-port	2	1	4
Active-active dual-port	2	2	4
Active-passive dual-port	2	2 (on active controller only)	4

Refer to *Adaptec Storage Manager Pro User's Guide* or *Adaptec Disk Array Administrator User's Guide* for more detailed information about each operating mode.

To connect the DuraStor Fibre Channel-to-SCSI RAID appliance to the host system:

- 1 Insert the SFP Transceivers into the FC (Fibre Channel) ports that are intended to be used.
- 2 Connect the FC data cables. Refer to the following sections depending on your topology:
 - Stand-alone dual-port topology. See [page 3-33](#).
 - Active-active single port topology. See [page 3-35](#).
 - Active-active dual port topology. See [page 3-34](#).

- a On each end of the optical FC data cable and on the SFP optical transceivers, installed in the FC ports at the rear I/O panel, are dust covers to protect the optics. Remove these dust covers and store them in a safe place.

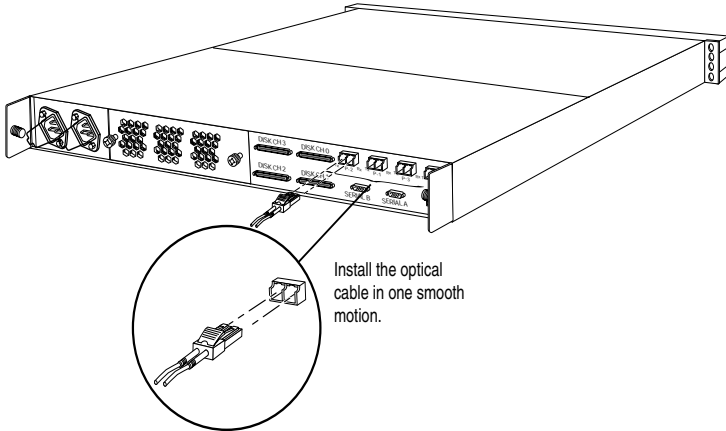


Figure 3-26 Optical Fibre Channel Data Cable



Note: Be sure to install the optical cables in one smooth, positive motion.

- b Connect the required FC data cables to the host system's FC host bus adapter port connectors.
 - c Connect the other end of those FC data cables to the RAID appliance FC ports on the rear I/O panel.
- 3 Power on the DuraStor Storage Subsystem. See [Powering On on page 3-54](#).
 - 4 Set the controller operating mode. For detailed instructions, refer to the user's guide for the storage management software tool you are using.

Important Information About SAN Environments

In configurations where there are multiple paths from the host server to the DuraStor, each partition (defined as a FC LUN) is presented to the host as many times as there are paths. For example, if there are two paths from the host to the DuraStor, each partition is seen by the host two times; if there are four paths, each partition is seen four times, and so on. See [Figure 3-27](#) through [Figure 3-30](#) for examples.

To prevent the operating system on the host from being confused by the redundant instances of each partition, they must be *masked* out by using an FC HBA that offers LUN masking. This feature hides the redundant instances of each partition from the operating system on the host server until the *primary* path fails.



Caution: In a multi-path SAN environment, you must use FC HBAs that offer LUN masking; otherwise, the host operating system will see the redundant instances of each partition. If the host operating system attempts to write to the redundant instances of the same partition on the DuraStor, it will likely cause data corruption or loss.



Figure 3-27 Two Data Paths - Example A



Figure 3-28 Two Data Paths - Example B

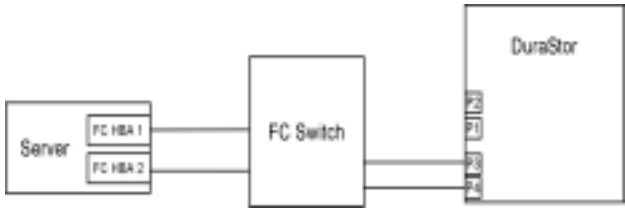


Figure 3-29 Four Data Paths - Example A

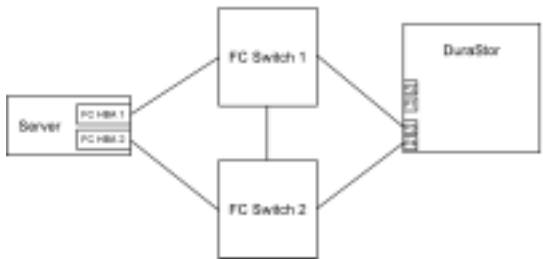


Figure 3-30 Four Data Paths - Example B

Since each partition defined on the DuraStor is presented to all hosts connected to the SAN, LUN zoning enabled FC HBAs must be used to prevent contention over partition ownership. LUN zoning allows each partition to be seen only by the host server that owns it. See [Figure 3-31](#) and [Figure 3-32 on page 3-33](#). This is done in much the same way as LUN masking. The FC HBA in each server is configured to allow the host operating system access only to the partitions each server owns. All other partitions are hidden.



Caution: In a multi-host SAN environment, you must use FC HBAs that offer LUN zoning; otherwise, all of the partitions will be presented to all of the host servers in the SAN. If more than one host in the SAN attempts to write to the same partition on the DuraStor, they will conflict, causing data corruption or loss.

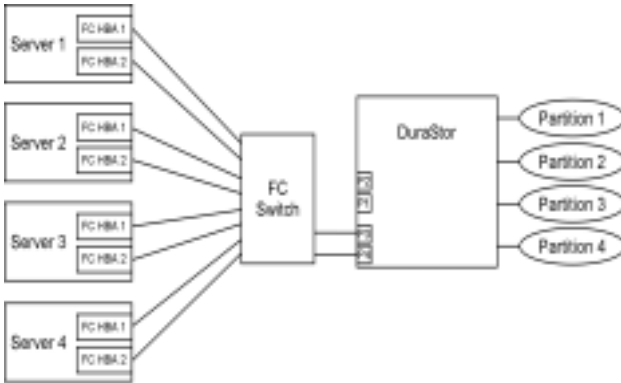


Figure 3-31 No Partition Ownership - All Servers See All Partitions

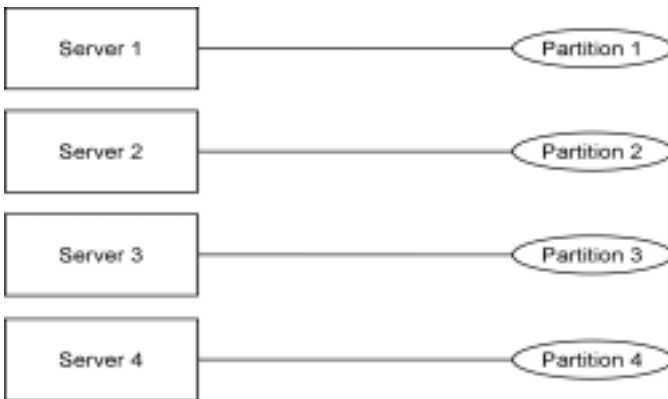


Figure 3-32 Partition Ownership Using LUN Zoning

Topology Setup

The following sections cover the operating modes and physical connecting or cabling of the DuraStor 7220SS to your host system or hub/switch. For those installations that will involve connecting to a Storage Area Network (SAN), see [SAN Solution Strategies on page 3-46](#).

The DuraStor 7220SS supports many different topologies. To optimize and simplify all of the supported topologies, three user selectable operating modes are available. The operating modes are chosen based on performance, redundancy, and host connectivity.

These modes address everything from direct attach single controller configuration to high-availability dual controller SAN configurations.

The DuraStor 7220SS storage subsystem features built-in internal hubs that add further flexibility to the different operating modes, thus reducing the reliance on external hubs and cables. The topologies are described for each operating mode based on whether the internal hub is disabled or enabled.

The following sections provide a description of each topology operating mode:

- [Stand-Alone Dual-Port Topology on page 3-34](#)
- [Active-Active Dual-Port Topology on page 3-34](#)
- [Active-Active Single-Port Topology on page 3-35](#)

Stand-Alone Dual-Port Topology

Use stand-alone dual-port mode when you have an application that requires a low cost high-performance fault-tolerant disk storage solution. This solution provides a single controller configuration that supports multiple or dual-ported hosts.

Use stand-alone dual-port mode with the internal hubs disabled when the application requires an external switch/hub. See [Stand-Alone Dual-Port \(Hubs Disabled\) on page 3-38](#).

Stand-alone dual-port mode with the internal hubs enabled is ideal in clustered applications where multiple hosts must have access to the same storage. No external switches or hubs are required. See [Stand-Alone Dual-Port, Hubs Enabled on page 3-39](#).

Active-Active Dual-Port Topology

Use active-active dual-port mode when you have an application that requires a high-performance, robust, full system-level fault-tolerant disk storage solution. This dual controller configuration supports multiple hosts and has true failover and failback operations. All host input ports are active and available to external hosts.

Use active-active dual-port mode with the internal hubs disabled when the application requires an external switch/hub. This mode is generally used when four or more hosts are required. Single loop

access is provided to the individual active ports of each RAID controller. See [Active-Active Dual-Port, Hubs Disabled on page 3-40](#)

Use active-active dual-port mode with the internal hubs enabled when one or two hosts need to be connected to the storage subsystem. This mode eliminates the need for external switches/hubs and still provides a fault-tolerant environment. See [Active-Active Dual-Port, Hubs Enabled on page 3-42](#).

Active-Active Single-Port Topology

Use active-active single-port mode when you have an application that requires a high-performance, robust, full system-level fault-tolerant disk storage solution and transparent controller failover. This dual controller configuration supports hosts with a single Fibre Channel port. It is very similar to the active-active dual-port configuration, except that only two of the four ports are passive. This configuration is ideal when the host driver software will not support LUN zoning, as would be the case in active-active dual-port mode.

Use active-active single-port mode with the internal hubs disabled when the application requires an external switch/hub. This mode is generally used when four or more hosts are required. Single loop access is provided to the individual ports of each RAID controller. See [Active-Active Single-Port, Hubs Disabled on page 3-43](#).

Use active-active single-port mode with the internal hubs enabled when one or two hosts need to be connected to the storage subsystem. This mode eliminates the need for external hubs or switches and still provides a fault-tolerant environment. See [Active-Active Single-Port, Hubs Enabled on page 3-44](#).

About Stand-Alone Mode

In Stand-Alone mode, the Fibre Channel-to-SCSI RAID controller operates autonomously. In dual-host port operation, there are up to four disk channels.

One advantage of running dual-host port mode is to maximize bandwidth and host IOPs. For sequential access patterns, where disks can supply more than 160 MB/sec of data to a host, it could be advantageous to run in dual-port mode.

Another advantage is that with an appropriate host driver, the host has a redundant path to each array.

In dual-host port mode, all arrays appear on both host ports at the same LUN positions. If both ports are connected to the same host, the host will see a given array twice unless it does special processing, called LUN masking, to detect duplicate paths to an array. A host device driver may provide this functionality. Hosts can detect redundant paths to an array by matching array serial numbers from SCSI inquiry data.

About Active-Active Mode

In active-active mode, two Fibre Channel-to-SCSI RAID controllers cooperate to provide redundancy. If one controller fails, the remaining controller will take over the failed controller's functionality. To accomplish this, each controller has two host Fibre Channel ports; one of which is normally active, the other is normally passive. In a failed-over configuration, the passive port becomes active and assumes the identity of the failed controller. This failover process occurs without user intervention.

In active-active mode, arrays can be accessed only by the controller that currently owns them. The other controller will have no visibility to the other controller's arrays.

If a controller fails, the surviving controller will take ownership of all arrays. Pool spares and unassigned disks are visible to both controllers.

The two controllers communicate via the back-end disk buses. Although many different message types are sent between the two controllers, the majority of the data is write cache data. In the default write-back caching mode, any data that the host writes to a controller is copied to the other controller before good status is returned to the host. By mirroring the data, if a controller fails, the surviving controller will have a copy of all data that has not been written to the disk.



Caution: When in active-active mode, the two controllers communicate with each other using SCSI initiator IDs 6 and 7 on the disk channels. The values of 6 and 7 are mandatory defaults to guarantee good communication between the two controllers, and you cannot change them. Do not configure any other devices to IDs 6 and 7 on the disk channels, or the active-active configuration will fail to operate.

Each controller also sends heartbeat messages to its partner controller. If a controller does not receive a heartbeat message within a set timeout period, it will kill the other controller assuming that it has malfunctioned. After killing the other controller, it will take ownership of the arrays and will activate its passive host port to assume the defunct controller's identity.

In this failed-over configuration, the controller will present its native identity on one host port, and the failed-over controller's identity on its other host port. The controller's host interface impersonates the other's World Wide Name (WWN) Identifier and other identifiers as appropriate to the current Fibre Channel topology. The arrays native to the controller are presented on the controller's native host port, and the arrays for the failed-over controller are presented on the other host port. This is different from the dual-port configuration where each array is presented on both host ports.

After the controller has failed over, you can replace the failed controller with a new controller, assuming the enclosure allows hot plugging. The arrays will fail back to the new controller without intervention. If you want to retry the failed controller, it is necessary to release the kill line that the survivor asserts. This can be done with the Disk Array Administrator (Other Controller Menu, Unkill Other menu option). You can kill the other controller with the Kill Other menu option.

Stand-Alone Dual-Port (Hubs Disabled)

The following diagram illustrates the logical connection of the stand-alone dual-port topology with the hubs disabled.

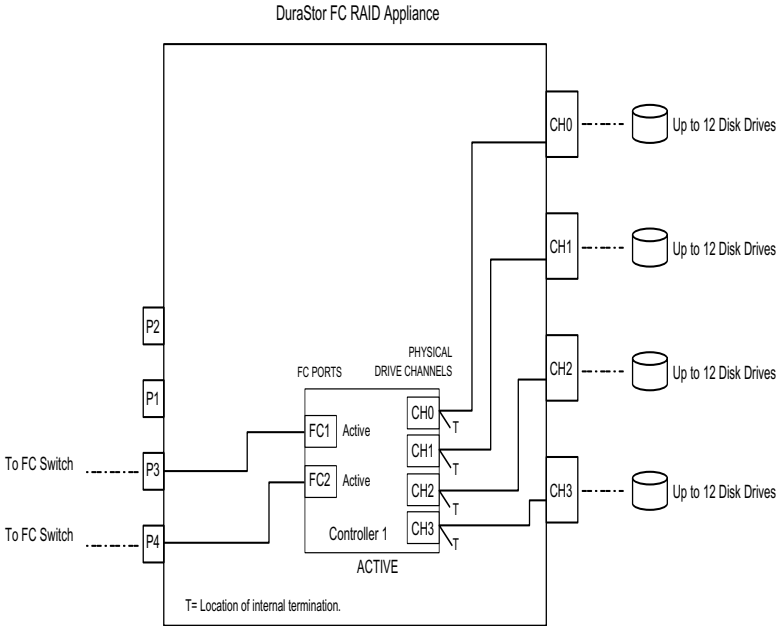


Figure 3-33 Single Host - Hubs Disabled



Note: Ports P3 and P4 active.

By default the controller's operating mode is set to active-active single-port and the internal hub is set to be *Enabled*. This topology is for stand-alone dual-port and will need to be changed. If your topology uses the *hubs disabled* you will need to access the OCP menu and disable this feature.

- 1 Access the controller menu from the OCP and select the appropriate controller (Controller 1 or Controller 2).
- 2 From the System menu, select **Configuration** then select **Option Configuration**.
- 3 From the Option Configuration menu, select **Operating Mode**, select **StandAlone Dual Port**, then press **Enter**.

- 4 Press the **Esc** to return to the previous menu.
- 5 From the Option Configuration menu, select **Enclosure Services**, then select **Config Internal Hubs**.
- 6 Choose the selection to Disable the Internal Hub then press the **Enter**.
- 7 Press **Esc** to return to the previous menu.

Stand-Alone Dual-Port, Hubs Enabled

The following diagram illustrates the logical connection of the stand-alone dual-port topology with the hubs enabled.



Note: Ports P1 and P3 are on one loop, and P2 and P4 are on another loop.

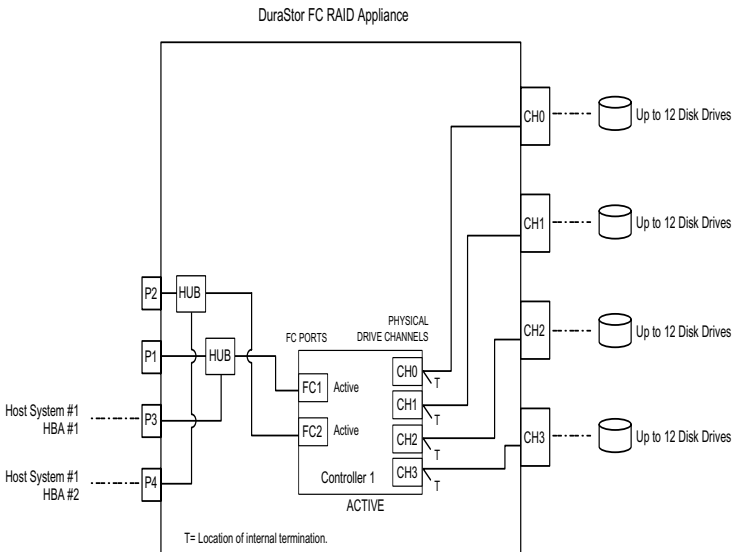


Figure 3-34 Stand-Alone Dual-Port, Hubs Enabled Logical Connections

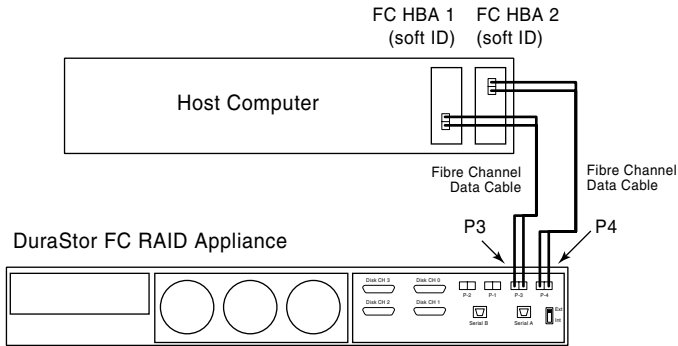


Figure 3-35 Stand-Alone Dual-Port Cabling Diagram

After powering up all the system(s), you need to set the operating mode. By default, the controller's operating mode is set to active-active single-port and the internal hub is set to *Enabled*. This topology is for stand-alone dual-port and will need to be changed.

- 1 Access the Controller menu from the OCP and select the appropriate controller (Controller 1 or Controller 2).
- 2 From the System menu, select **Configuration**, then select **Option Configuration**.
- 3 From the Option Configuration menu, select **Operating Mode**, select **StandAlone Dual Port**, then press **Enter** to set this selection.
- 4 Press **Esc** to return to the previous menus.

Active-Active Dual-Port, Hubs Disabled

The following diagram illustrates the logical connection of the active-active dual-port topology with hubs disabled.



Note: All ports are independent and active.

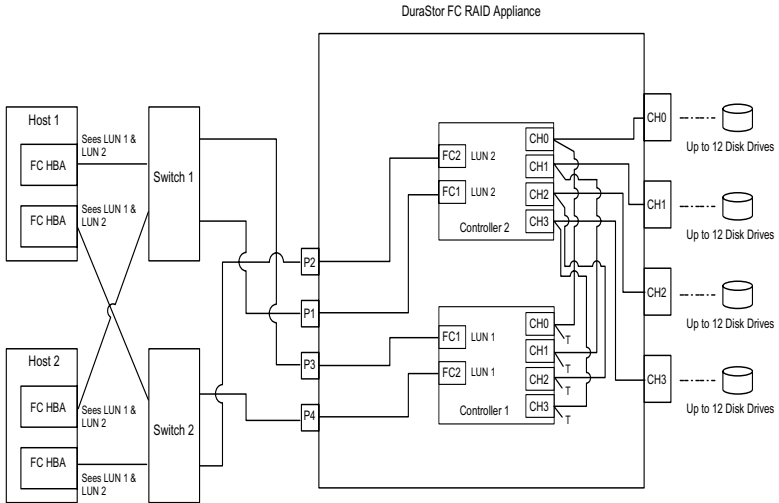


Figure 3-36 Active-Active Dual-Port, Hubs Disabled Logical Connections

See [Figure 3-38 on page 3-43](#) for one example of a dual-port cabling option.

After powering up all the systems, you need to set the operating mode and configure the internal hub. By default, the controller's operating mode is set to active-active single-port and the internal hub is set to *Enabled*. This topology is for active-active dual-port and will need to be changed. This topology is for hubs disabled and will need to be changed.

- 1 Access the Controller menu from the OCP and select the appropriate controller (Controller 1 or Controller 2).
- 2 From the System menu, select **Configuration**, then select **Option Configuration**.
- 3 From the Option Configuration menu, select **Operating Mode**, select **Active-Active Dual Port**, then press **Enter** to set this selection.
- 4 Press **Esc** to return to the previous menu.
- 5 (Hub Selection, if required) From the Option Configuration menu, select **Enclosure Services**, then select **Config Internal Hubs**.

- 6 Choose the selection to Disable the Internal Hub, then press **Enter** to set this selection.
- 7 Press **Esc** to return to the previous menu.

Active-Active Dual-Port, Hubs Enabled

The following diagram illustrates the logical connection of active-active dual-port topology with hubs enabled.



Note: Ports P1 and P3 are on one loop, and P2 and P4 are on another loop. All ports are active.

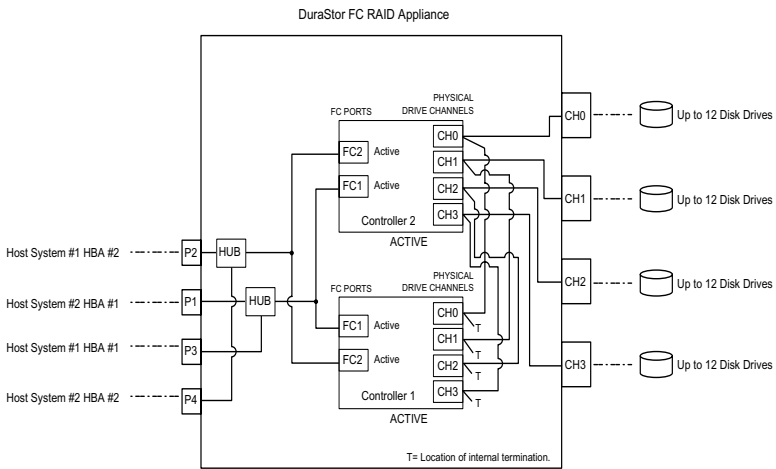


Figure 3-37 Active-Active Dual-Port, Hubs Enabled Logical Connections

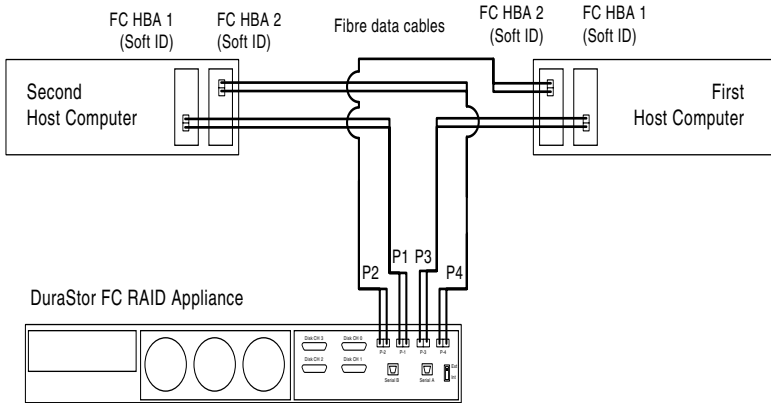


Figure 3-38 Active-Active Dual-Port Cabling Diagram

After powering up all the system(s), you will need to set the operating mode. By default, the controller's operating mode is set to active-active single-port and the internal hub is set to *Enabled*. This topology is for active-active dual-port and will need to be changed.

- 1 Access the Controller menu from the OCP and select the appropriate controller (Controller 1 or Controller 2).
- 2 From the System menu, select **Configuration**, then select **Option Configuration**.
- 3 From the Option Configuration menu, select **Operating Mode**, select **Active-Active Dual Port**, then press **Enter** to set this selection.
- 4 Press the **Esc** to return to the previous menu.

Active-Active Single-Port, Hubs Disabled

The following diagram illustrates the logical connection of active-active single-port topology with hubs disabled.



Note: All ports are independent.

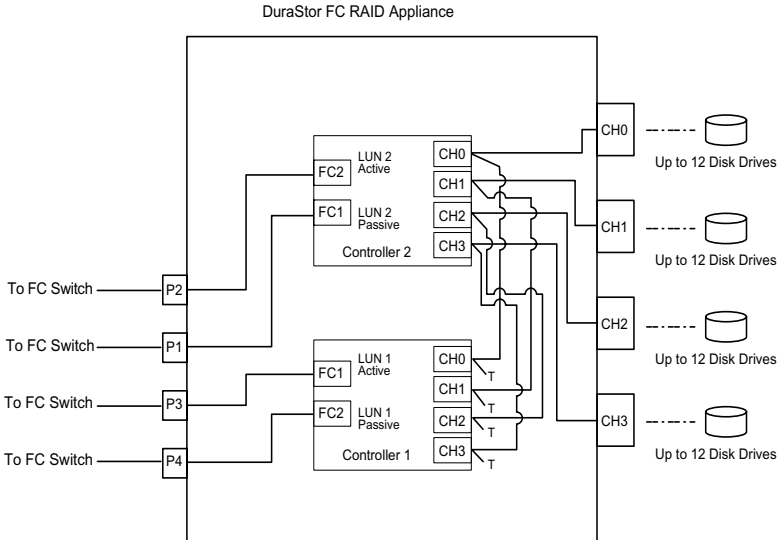


Figure 3-39 Active-Active Single-Port, Hubs Disabled Logical Connections

After powering up all the system(s), you will need to set the operating mode for the internal hubs. By default, the controller's internal hubs is set to Enabled. If your topology strategy is to use a selection with the *hubs disabled* you will need to access the OCP menu and disable this feature.

- 1 Access the Controller menu from the OCP and select the appropriate controller (Controller 1 or Controller 2).
- 2 From the System menu, select **Configuration**, then select **Option Configuration**.
- 3 From the Option Configuration menu, select **Enclosure Services**, then select **Config Internal Hubs**.
- 4 Select **Disable the Internal Hub**.
- 5 Press **Esc** to return to the previous menus.

Active-Active Single-Port, Hubs Enabled

The following diagram illustrates the logical connection of active-active single-port topology with hubs enabled.



Note: Ports P1 and P3 are on one loop, and P2 and P4 are on another loop.

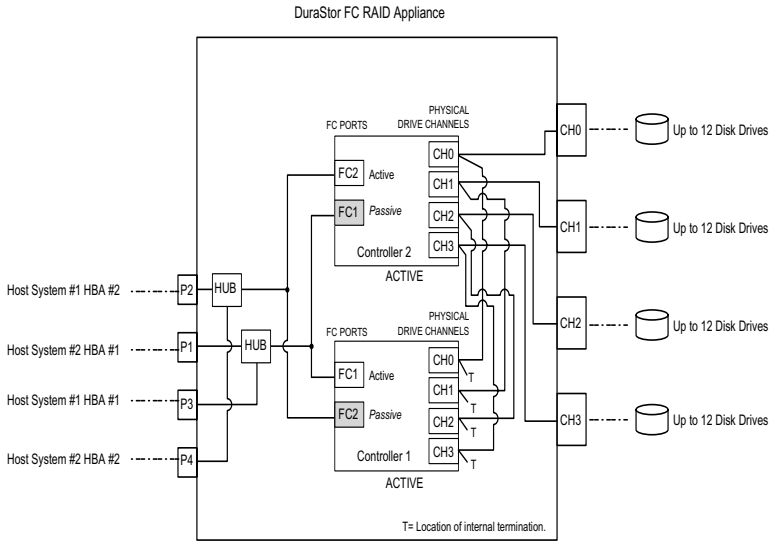


Figure 3-40 Active-Active Single-Port, Hubs Enabled Logical Connections

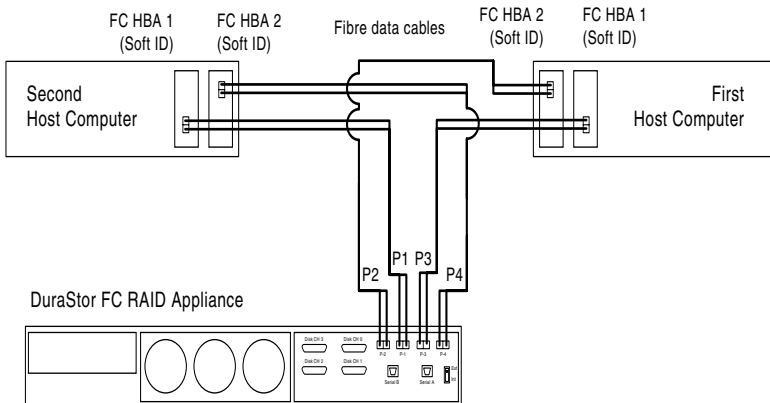


Figure 3-41 Active-Active Single-Port Cabling Diagram

SAN Solution Strategies

This section describes connecting the DuraStor storage subsystem active-active configuration to a Storage Area Network (SAN).

Active-Active Dual-Port Mode

At the heart of this strategy is the active-active dual-port operating mode. In this mode, four Fibre Channel (FC) ports are simultaneously active when both controllers are online. In the event of a controller failure, two FC ports remain available to service all host I/O. [Table 3-3](#) illustrates how LUNs are presented by each controller in this mode.

Table 3-3. Controller LUNs

	Controller 1 Host Port 0	Controller 1 Host Port 1	Controller 2 Host Port 0	Controller 2 Host Port 1
Both Controllers Online	Controller 1 LUNs	Controller 1 LUNs	Controller 2 LUNs	Controller 2 LUNs
Controller 1 Failed	Inactive	Inactive	Controller 2 LUNs	Controller 1 LUNs
Controller 2 Failed	Controller 1 LUNs	Controller 2 LUNs	Inactive	Inactive

Note that when a controller fails, the surviving controller continues to present its LUNs to its Host Port 0, and changes to present the failed controller's LUNs to its Host Port 1. The Fibre Channel Node and Port World Wide Names corresponding to the failed controller's Host Port 0 are also associated with its LUNs on the surviving controller's Host Port 1.

Hubs Enabled

In the following figures, the DuraStor 7220SS storage subsystem’s two controllers are configured in an active-active dual-port mode with the internal hubs enabled.

In [Figure 3-42](#), two hosts are connected via two independent loops using the enclosure’s built-in hub bypass circuits. These circuits provide two internal hubs, eliminating the need for the use of external Fibre Channel hardware, other than the cables.

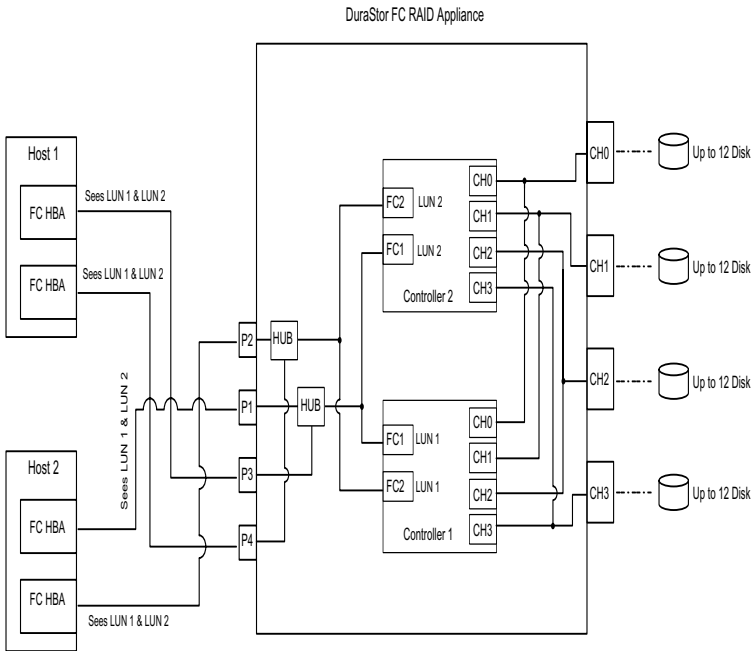


Figure 3-42 Active-Active Dual-Port Hubs Enabled

Figure 3-43 illustrates the conditions when Controller 2 fails. Note that both hosts can still see Controller 1's LUNs (LUN 1) and Controller 2's LUN (LUN 2); however, each host HBA can only see one LUN, instead of both.

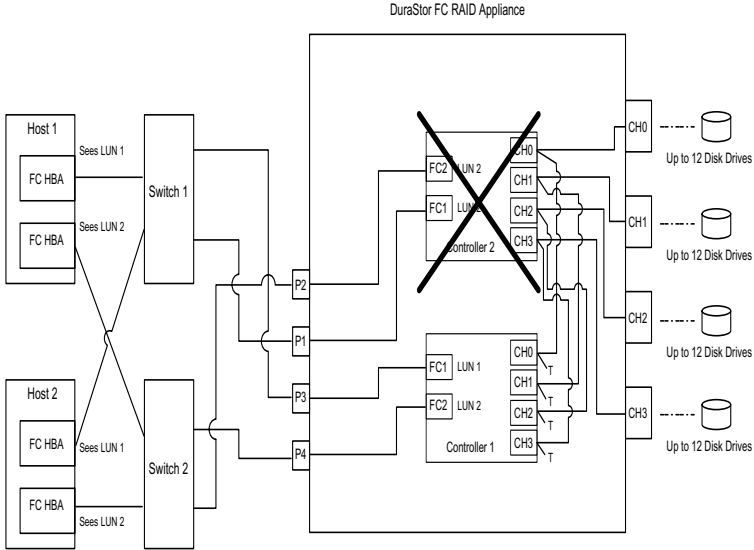


Figure 3-43 Active-Active Dual-Port Hubs Enabled, Controller 2 Failure

Hubs Disabled

In the following figures, the DuraStor 7220SS storage subsystem’s two controllers are configured in an active-active dual-port mode with the internal hubs disabled.

In [Figure 3-44](#), two hosts are connected via two independent switches. Using external switches supports higher bandwidth, since the host ports are not required to share bandwidth on a loop.

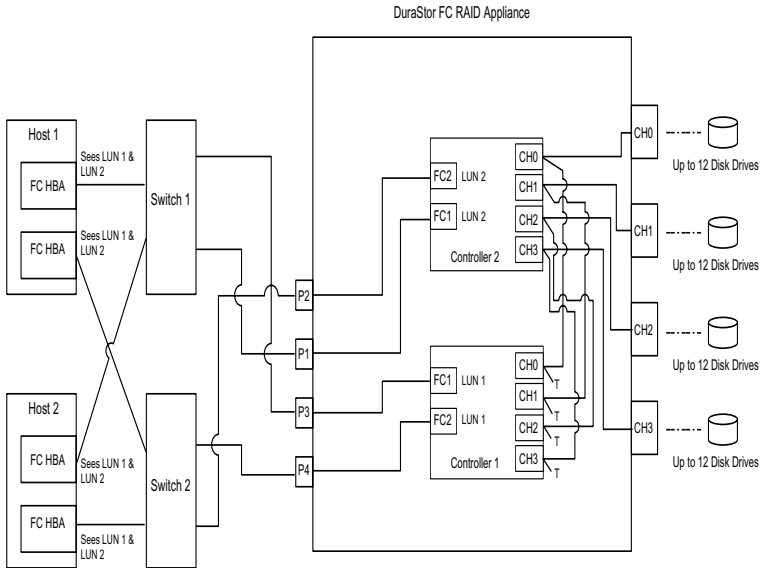


Figure 3-44 Active-Active Dual-Port Hubs Disabled

In [Figure 3-45](#), two hosts are connected via two independent switches. Note that both hosts can still see Controller 1's LUNs (LUN 1) and Controller 2's LUNs (LUN 2); however, each host HBA can only see one LUN, instead of both.

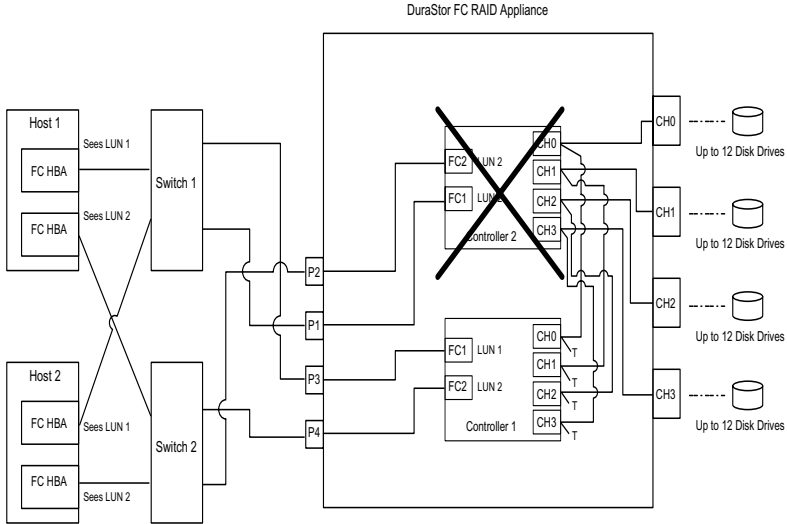


Figure 3-45 Active-Active Dual-Port Hubs Disabled, Controller 2 Failure

Active-Active Single-Port Mode

There are several scenarios when you may want to configure the controllers in active-active single-port mode. In general, these are situations where the hosts have a single Fibre Channel port, and so the SAN is not truly fault-tolerant.

Hubs Disabled (Single-Port Hosts and One Switch)

In [Figure 3-46](#), two single-ported hosts connected to the DuraStor 7220SS storage subsystem's two controllers via a single switch. In this case, there would be an advantage to configuring the controllers in active-active dual-port mode, because of increased connectivity. However, the host driver software would need to handle the fact that each LUN would appear twice in the SAN fabric, and that one image of the LUNs would disappear if one controller failed. Depending on the host software being used, it may be more desirable to run in active-active single-port mode, since a controller failover would be transparent to the hosts (as far as the number of LUN images and the port WWNs attached to the LUNs). The advantages of using a switch is that the two hosts each have a direct path to a controller port and don't have to compete for access on the same loop.

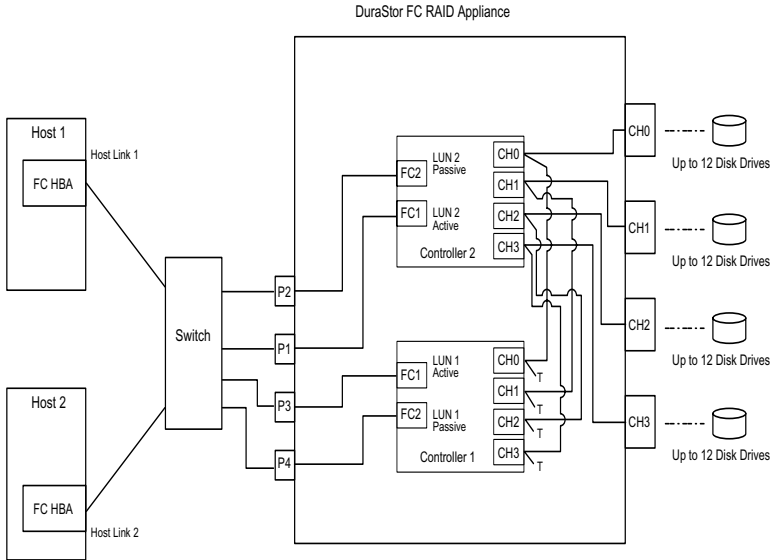


Figure 3-46 Active-Active Single-Port Hubs Disabled

Hubs Disabled (Single External Hub)

Figure 3-47 shows the hosts in a single loop using an external hub connected to the DuraStor 7220SS storage subsystem's two controllers. From a controller failover perspective, this configuration operates much the same as the previous configuration which uses a switch. The advantage of using a hub is that it is less expensive. In active-active dual-port mode, you must deal with the cost of host software and multiple images of the same LUN.

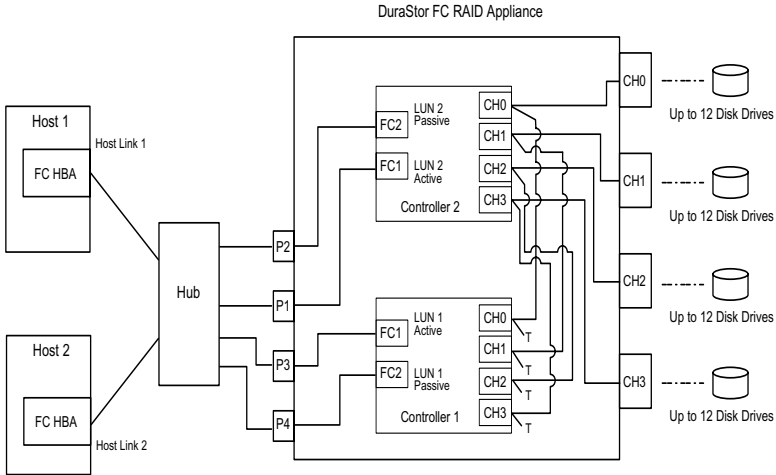


Figure 3-47 Active-Active Single-Port Hubs Disabled, Single External Hub

Hubs Enabled

Figure 3-48 shows the hosts in a single loop connected to the DuraStor 7220SS storage subsystem's controllers with the internal hubs enabled. The internal hub circuits eliminate the need for an external hub. This allows one or two hosts to be connected to the

DuraStor 7220SS storage subsystem's without the cost of external hardware, other than cables.

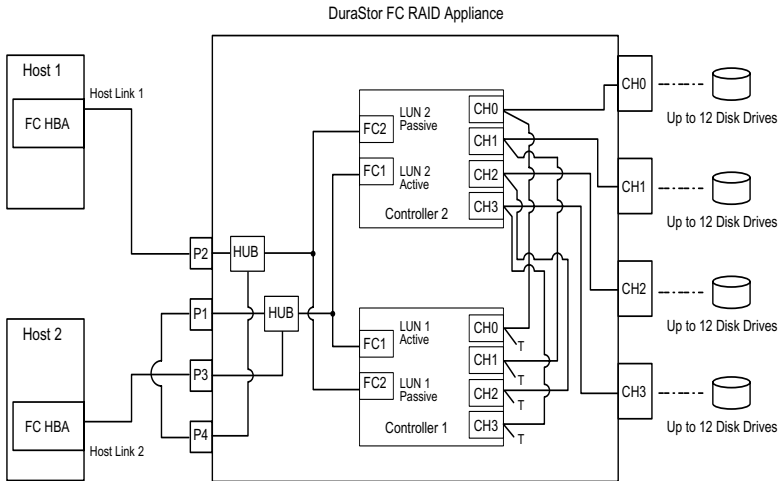


Figure 3-48 Active-Active Single-Port Hubs Enabled

SAN Configuration Not Supported

In the active-active dual-port configuration with two independent hubs or the internal hub, two single-ported hosts are not supported. The issue with this configuration is that if a controller fails, each host loses access to one of the LUNs. For example, if Controller 1 fails, Host 1 can no longer access LUN 2, because Port 2 on Controller 2 has changed from presenting its own LUNs to presenting Controller 1's LUNs. A need for this SAN configuration can arise if multiple single-ported hosts need access to LUNs from both controllers, and two hubs are desired to improve performance by decreasing loop access contention.

Note that this SAN is only partially fault-tolerant because the hubs and controllers have redundant hardware, but the hosts do not. The problem with this configuration can be overcome by using a single switch at the cost of replacing the two hubs with a switch. If loop access contention is not an issue, then the single hub configuration works as well.

Turning On the Power



Note: Ensure that none of the data cables or power cables are obstructing the airflow exiting the cooling fan modules.

Powering On

- 1 Locate the PSUs' On/Off switches at the rear of the DuraStor 312R storage enclosure.
- 2 Turn on each PSU.
- 3 Locate the PSUs' On/Off switches behind the front bezel of the DuraStor RAID appliance.
- 4 Turn on each PSU.
- 5 Power on the host computer(s).

Powering Off

- 1 Power down the host computer(s).
- 2 Gracefully shut down the controller(s) in the DuraStor RAID appliance by selecting **Shutdown/Restart** from the Utility menu of either the OCP or Disk Array Administrator.
- 3 Turn off the DuraStor RAID appliance's PSUs.
- 4 Turn off the DuraStor 312R storage enclosure's PSUs.

Accessing Your Storage Management Tool

If you have installed a DuraStor RAID appliance, you can use three different storage management software tools to help you create and manage your external RAID storage subsystems:

- Storage Manager™ Pro. See [Installing Storage Manager Pro on page 3-55](#).
- Disk Array Administrator. See [Accessing Disk Array Administrator on page 3-56](#).
- The Operator Control Panel (OCP) of the DuraStor RAID appliance. Refer to the *DuraStor RAID Appliance Operating Control Panel User's Guide* for instructions.

Installing Storage Manager Pro

Storage Manager Pro runs on Microsoft Windows 2000 and Windows NT 4.0

Storage Manager Pro's remote management capabilities are only available on your system if it contains a network card configured to use the TCP/IP protocol.



Note: If you already have Storage Manager Pro installed on your computer, you must uninstall it before reinstalling it. You must also delete the old `StorageManagerPro` directory. To uninstall Storage Manager Pro, refer to the *Adaptec Storage Manager Pro User's Guide*.

When you install Storage Manager Pro for Windows, you automatically install Java Runtime Environment (JRE) 1.1.8, which is required to run Storage Manager Pro. This does not conflict with any other version of the JRE or Java Development Kit (JDK) you have installed.



Note: Do not install Storage Manager Pro on a network drive, because Storage Manager Pro runs as a Windows NT/2000 service and services do not have network access rights.

To install Storage Manager Pro

- 1 If you are using a Windows 2000 or Windows NT system, verify that you have administrator privileges.
- 2 If your Windows system is configured to automatically start CD software, insert the *DuraStor CD* into your drive. When the installation menu appears, click **Install Adaptec Storage Manager Pro**.

If your system does not start the CD automatically, browse the CD and click **autorun.exe**. Click **Install Adaptec Storage Manager Pro** to begin the installation.

- 3 From the drop-down list box, select the language you want. This selects only the language for the installation information. It does not affect the language used in Storage Manager Pro.

- 4 Click **OK**. The Storage Manager Pro Introduction window appears.
- 5 Follow the on-screen instructions to complete the installation.
- 6 When the installation is complete, click **Done**.

The Set Administrator Password window appears.

- 7 Type a new password, re-enter it to verify it, then click **OK**. *Do not* click **OK** without changing the password.



Caution: You *must* supply the password immediately. If you do not supply the password, you will be unable to log in after the next reboot, and will have to uninstall and reinstall Storage Manager Pro.

The installation is complete.

You can now perform all of the functions described in the *Adaptec Storage Manager Pro User's Guide*.



Warning: We strongly recommend that you regularly and consistently back up your data so that it may be recovered in the event of a failure that's not protected by a fault-tolerant array.

Accessing Disk Array Administrator

Disk Array Administrator is firmware built in to the DuraStor 6200S/7200S external RAID controller installed in the DuraStor RAID appliance.

To access Disk Array Administrator, you need

- A computer with terminal emulator software, such as HyperTerminal.
- A straight-through serial cable. (You *cannot* use a null modem cable.)

Using the cable, connect the computer to an RS-232 serial port on the back of your DuraStor RAID appliance. Connect to Serial A port for Controller 1 or Serial B port for Controller 2.



Note: If you are using HyperTerminal as your terminal emulator software, you must be using HyperTerminal Private Edition (HTPE) 6.3 for the up and down arrow (↑ or ↓) keys to work.

If you are not using HTPE 6.3, you can download it for free at www.hilgraeve.com/htpe/index.html.

Configure the RS-232 serial port in your terminal emulator software using the settings in [Table 3-4](#).

Table 3-4 RS-232 Serial Port Settings

Setting	Value
Terminal Emulation	VT-100 or ANSI (for color support)
Font	Terminal
Translations	None
Columns	80

Set the communications parameters for the terminal program as shown in [Table 3-5](#).

Table 3-5 Communications Parameter Settings

Setting	Value
Baud Rate	115,200
Data Bits	8
Stop Bits	1
Parity	None
Flow Control	None
Connector	COM1 (typically)

To access Disk Array Administrator:

- 1 On the I/O connectivity panel of the DuraStor RAID appliance, turn the switch to EXT.
- 2 On the DuraStor RAID appliance Operator Control Panel, use the arrow buttons to:
 - a Choose **Hardware Menu**, then press **Enter**.
 - b Choose **Mode**, then press **Enter**.

c Choose **Serial Port:Ext Mode**, then press **Enter**.

- 3** From the computer connected to the controller, start your terminal emulator software.

Be sure that your terminal emulator software is set to use the correct COM port on your computer. Refer to the *Adaptec Disk Array Administrator User's Guide* for more details on how the DuraStor 6200S/7200S RAID controller can auto-detect the baud rate.

- 4** Press **CTRL-R**.

The initial Disk Array Administrator screen appears.

- 5** Press **Enter**.

The System Menu screen appears.

You can now perform all of the functions described in the *Adaptec Disk Array Administrator User's Guide*.



Caution: Adaptec recommends that you regularly and consistently back up your data so that it may be recovered in the event of a failure that's not protected by a fault-tolerant array.

Monitoring the DuraStor Storage Subsystem

In This Chapter

<i>Monitoring the DuraStor RAID Appliance</i>	4-2
<i>Monitoring the DuraStor 312R Storage Enclosure</i>	4-4

Two features of the DuraStor Storage Subsystem help you monitor your external RAID storage subsystem:

- Your storage management tool (Storage Manager Pro, Disk Array Administrator, or the OCP) generates events to inform you of errors, failovers, changes to your array configuration, and other functions. These events appear on your system monitor.
- LEDs and alarms on the hardware components provide visual or audible cues about the status of the disk drives, cooling fans, power supply units, and other physical parts of the system.

This chapter describes the functions of the LEDs and alarms on the DuraStor RAID appliance and the DuraStor 312R. For complete instructions on using your storage management tool to monitor your system, refer to the user's guide for the storage management software tool you are using.

Monitoring the DuraStor RAID Appliance

Front Bezel LEDs

There are six LEDs located on the front bezel of the DuraStor RAID appliance. See [Figure 4-1](#).

- Power LED (1)
- Controller Activity and Controller Status LEDs (2 each)
- Fault LED (1)

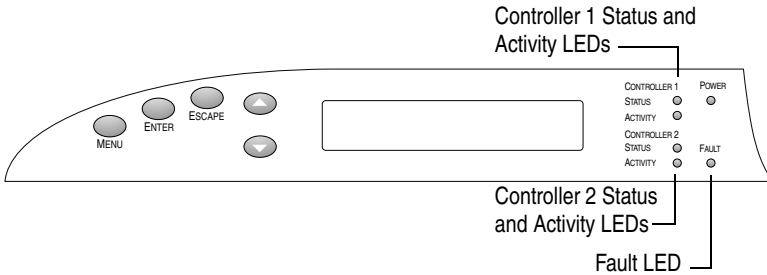


Figure 4-1. The Front Bezel Panel

[Table 4-1](#) explains how to interpret these LEDs.

Table 4-1. DuraStor RAID Appliance LEDs

LED	Condition	Status Indicated
Power	Solid	Power is on.
	Unlit	Power is off.
Controller Activity	Flashing	I/O activity is occurring on that controller.
	Solid	Controller functions are normal.
Controller Status	Unlit	A fault has occurred on that controller.
	Flashing	Appliance is powering on.
	Solid	A fault has occurred with a part of the appliance (for example, a fan or PSU failure).
Fault	Solid	A fault has occurred with a part of the appliance (for example, a fan or PSU failure).
	Unlit	System functions are normal.

If the Fault LED and a Controller Status LED light up simultaneously, there is a fault condition on that controller.

Audible Alarm

An audible alarm sounds when the Fault LED lights up, or when the RAID appliance's temperature or voltage enters warning or shutdown range.

You can silence the alarm by touching any button on the OCP.

The temperature and voltage thresholds for each alarm are shown in [Table 4-2](#).

Table 4-2. RAID appliance Alarm Thresholds and Response Information

Alarm Threshold	What to Do When the Alarm Sounds
CPU temperature:	
<ul style="list-style-type: none"> ■ Warning—0 °C to 5 °C and 65 °C to 70 °C ■ Shutdown—0 °C and 70 °C, <0 °C, >70 °C 	<p>Check your system monitor to see what the alarm means. Check the ambient temperature and lower it if needed. (Ambient temperature should be less than 45 °C.)</p>
Onboard temperature:	
<ul style="list-style-type: none"> ■ Warning—0 °C to 5 °C and 45 °C to 50 °C ■ Shutdown—0 °C and 50 °C, <0 °C, >50 °C 	<p>Same as for the CPU temperature.</p>
VCC Voltage:	
<ul style="list-style-type: none"> ■ Warning—5 V -3.5% and +6.5% ■ Shutdown—5 V -6.5% and +10% 	<p>Check your system monitor to see what the alarm means. If it is a warning alarm, let the controller continue to operate. If it is a shutdown alarm, turn off the power to the controller, remove it, and send it for service.</p>
12V Voltage:	
<ul style="list-style-type: none"> ■ Warning—12 V -8% and +8% ■ Shutdown—12 V -10% and +10% 	<p>Same as for VCC voltage.</p>

The Operator Control Panel

For information on the OCP, see [Appendix B, The Operator Control Panel of the DuraStor RAID Appliance](#).

Monitoring the DuraStor 312R Storage Enclosure

There are 28 LEDs located on the front bezel of the DuraStor 312R. See [Figure 4-2](#).

Status LEDs:

- Power On LED (1)
- Channel Status LED (1)
- Power Supply Status LED (1)
- Fan Status LED (1)

Drive LEDs (in pairs):

- Drive Status LEDs (12)
- Drive Activity LEDs (12)

[Table 4-3](#) and [Table 4-4](#) explain how to interpret these LEDs.

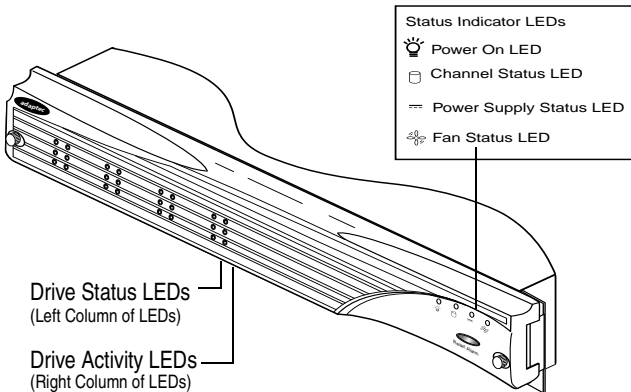


Figure 4-2. Front Bezel LEDs

Status LEDs

There are four Status LEDs. [Table 4-3](#) explains how to interpret the different colors and conditions they display.

Table 4-3. Status LEDs

LED	Color and Condition	Status Indicated
Power On	Green (solid)	The power is on.
Channel Status	Green (solid)	Normal.
	Amber (solid)	A fault condition has occurred (for example, a broken or disconnected cable).
Power Supply Status	Green (solid)	Normal.
	Amber (solid)	A PSU has failed. (The Fault LED on the failed PSU will also be lit.)
Fan Status	Green (solid)	Normal.
	Amber (flashing)	Enclosure temperature has exceeded 60 °C (140 °F).
	Amber (solid)	One or more fans have failed.

Drive LEDs

There are 12 pairs of Drive LEDs on the front bezel. Each pair is made up of one Drive Status LED (on the left) and one Drive Activity LED (on the right).

[Figure 4-3](#) shows which disk drive slot within the enclosure corresponds to which pair of Drive LEDs on the front bezel.

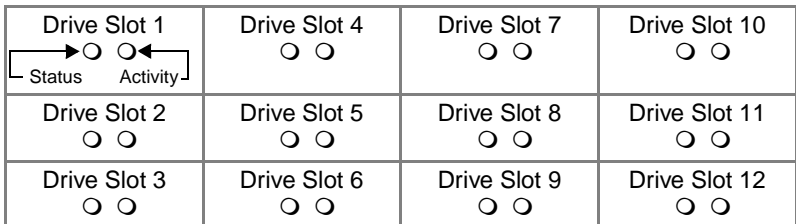


Figure 4-3. Drive LEDs

The Drive Status LED (on the left) indicates the status of the corresponding disk drive. The Drive Activity LED (on the right) flashes to indicate I/O activity on the corresponding disk drive.

Table 4-4 explains how to interpret the Drive LEDs.

Table 4-4. Drive Status and Activity LEDs

Drive Status LED	Drive Activity LED	Status
Solid green	Solid green	Powering on.
Flashing green	Solid green	Drive ready, not assigned to an array.
Solid green	Solid green	Drive ready, assigned to an array.
Flashing green	Solid green	Hot spare ready, assigned to an array.
Flashing green	Solid amber	Drive error—Fault, not assigned to an array.
Flashing amber	Solid amber	Drive error—Fault, assigned to an array.
Solid amber	Solid amber	Array critical, remaining good drive LEDs.
Solid amber	Solid amber	Hot spare, rebuild mode (all Drive Status LEDs).
Off	N/A	Empty drive slot.
Flashing amber	Solid amber	Drive manually disabled (applies to LVD-LVD only).
Solid green		Array is fault-tolerant.
Solid amber		Array is in rebuild mode.
Solid amber		Array has a failed drive.
Alternating amber and green		Firmware checksum error.

Audible Alarm

An audible alarm sounds when the condition of any of the storage enclosure's components changes to an abnormal state.

To silence the alarm, press the **Alarm Reset** button on the front bezel. The LED indicating the location of the problem stays illuminated until normal status returns.

Maintaining the DuraStor Storage Subsystem

In This Chapter

<i>Maintaining the DuraStor RAID Appliance</i>	5-1
<i>Maintaining the DuraStor 312R Storage Enclosure</i>	5-7

This chapter provides complete instructions for maintaining the DuraStor RAID appliance and the DuraStor 312R.

Visit the Adaptec Web site at www.adaptec.com for information on replacement parts.

Maintaining the DuraStor RAID Appliance

This section provides detailed instructions for:

- Replacing the DuraStor RAID appliance external RAID controller. See [page 5-2](#).
- Replacing the cooling fan module. See [page 5-4](#).
- Replacing a power supply unit. See [page 5-5](#).
- Replacing the DuraStor RAID appliance chassis. See [page 5-6](#).

Replacing a RAID Controller

When a RAID controller fails

- The alarm sounds.
- The Fault LED on the front bezel lights up.
- A Controller Status LED goes out, indicating which RAID controller has failed.
- The system monitor displays an error event.

A failed controller should be replaced immediately.



Note: The DuraStor 6200S/7200S external RAID controller is hot-swappable.

- 1 Remove the front bezel. See [Removing the Front Bezel on page 3-3](#).
- 2 Identify and locate the failed RAID controller. Controller 1 is on the left and Controller 2 is on the right.
- 3 Pull out on the two latches that secure the controller canister.
- 4 Using the latches as handles, carefully pull the controller canister from the RAID appliance. See [Figure 5-1](#).

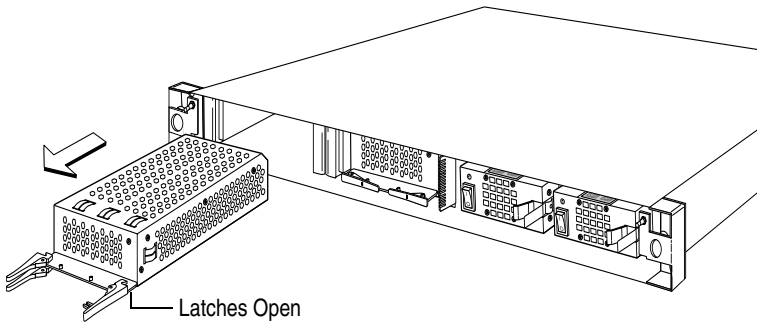


Figure 5-1. Removing the Controller

- 5 Install the replacement controller in the controller canister. Refer to your controller's installation guide and/or the *DuraStor 6200S/7200S External RAID Controller Installation Guide* for detailed instructions.

- 6 Slide the controller canister into the open bay until the latches hook onto the anchors.



Caution: Be sure the latches are hooked into the anchors, and *be gentle* as you complete the installation. The pins that the controller mates with inside the DuraStor RAID appliance are very fragile and bend easily.

- 7 Using your thumbs, push both latches into their locked position. The controller canister automatically slides the rest of the way into the bay and locks into place.
- 8 Replace the front bezel. See [Replacing the Front Bezel on page 3-6](#). The Fault LED goes out and the Controller Status LED flashes and then becomes solid to show normal controller status.

Replacing a Down Controller When in Active-Active Mode



Note: Active-active mode is only available when there are two controllers installed in the DuraStor RAID appliance. Refer to the *Adaptec Storage Manager Pro User's Guide* for more information on operating modes.

If one controller detects that the other has a problem, it will kill it and output an event on the system monitor. The Fault LED will light up, the Controller Status LED will light up, and the audible alarm will sound.

If the down controller has a permanent failure, you must replace it. See [Replacing a RAID Controller on page 5-2](#).

Replacing the Cooling Fan Module

When a cooling fan fails

- The audible alarm sounds.
- The Fault LED on the front bezel lights up.
- The system monitor displays an error event.

A failed cooling fan must be replaced immediately.



Note: The cooling fan module is hot-swappable.



Warning: *Do not* operate the DuraStor RAID appliance for longer than 5 minutes with the cooling fan module removed. Cooling is unavailable to all components while the fan module is removed.

- 1 Loosen the screws that secure the cooling fan module to the RAID appliance. See [Figure 5-2](#).

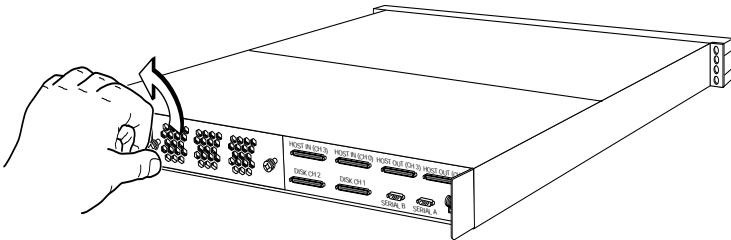


Figure 5-2. Releasing the Cooling Fan Module

- 2 Grasp the screws and pull the cooling fan module from the RAID appliance. See [Figure 5-7](#).

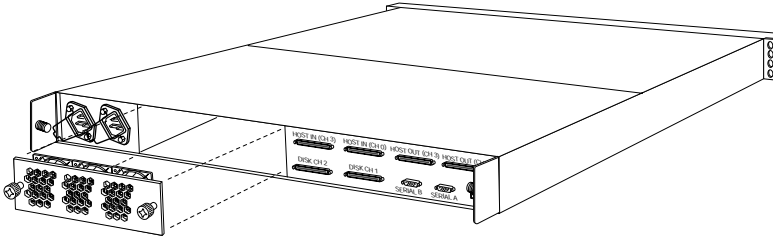


Figure 5-3. Removing the Cooling Fan Module

- 3 Align the replacement cooling fan module with the open bay and push the module into the RAID appliance until it seats completely.
- 4 Tighten the screws on the cooling fan module. *Do not* overtighten.

The Fault LED on the front bezel goes out.

Replacing a Power Supply Unit

When a PSU fails

- The alarm sounds.
- The Fault LED on the front bezel lights up.
- The system monitor displays an error event.

A failed PSU should be replaced as quickly as possible to maintain power system redundancy.



Note: PSUs are hot-swappable.

- 1 Remove the front bezel. See [Removing the Front Bezel on page 3-3](#).
- 2 Turn off the affected PSU.
- 3 Squeeze the PSU's release latch.

- 4 Pull the power supply from the RAID appliance. See [Figure 5-4](#).

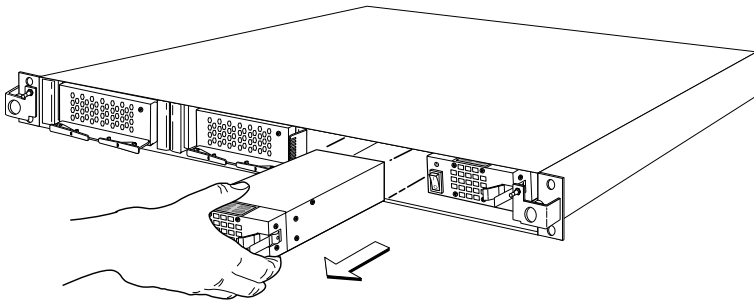


Figure 5-4. Removing the PSU

- 5 Slide the new PSU into the empty bay until it seats completely and the release latch resets.
- 6 Turn on the replacement PSU.
- 7 Replace the front bezel. See [Replacing the Front Bezel on page 3-6](#).
The Fault LED on the front bezel goes out.

Replacing the DuraStor RAID Appliance Chassis



Warning: Printed circuit board components are sensitive to electrostatic discharge. To prevent damage, establish a ground for yourself by using a wrist grounding strap, or by touching the metal chassis prior to handling or installing a printed circuit board component.

- 1 Power off the host computer, the DuraStor 312R storage enclosure, and the defective DuraStor RAID appliance.



Note: Refer to the host computer user's guide and [Powering Off on page 3-54](#). Mark or make a note of the location of the data cables prior to disconnecting or removing these items. Tag the cables appropriately to make reinstallation easier.

- 2 Disconnect the data cables and power cable from the defective DuraStor RAID appliance.
- 3 Remove the front bezel. See [Removing the Front Bezel on page 3-3](#).

- 4 Remove each controller, noting its position. See [Replacing a RAID Controller on page 5-2](#).
- 5 Remove the defective DuraStor RAID appliance from the rack. Reverse the procedures described in [Mounting the RAID Appliance on the Rack on page 3-4](#).
- 6 Mount the replacement DuraStor RAID appliance in the rack. See [Mounting the RAID Appliance on the Rack on page 3-4](#).
- 7 Reinstall the controllers. See [Replacing a RAID Controller on page 5-2](#).
- 8 Reconnect the data cables and power cable. Refer to the notes and tags you made for the proper connection locations.
- 9 Power on the DuraStor Storage Subsystem. See [Turning On the Power on page 3-54](#).
- 10 Verify that all systems are operating normally.

Maintaining the DuraStor 312R Storage Enclosure

This section provides detailed instructions for

- Replacing a disk drive. See [page 5-8](#).
- Replacing a cooling fan module. See [page 5-10](#).
- Replacing a power supply unit. See [page 5-11](#).
- Replacing the disk I/O card. See [page 5-13](#).
- Replacing the SAF-TE controller card. See [page 5-14](#).
- Replacing the DuraStor 312R chassis. See [page 5-15](#).

Replacing a Disk Drive

When a disk drive fails

- Its Drive Status LED flashes (amber if the disk drive is assigned to an array, green if the disk drive is unassigned).
- Its Drive Activity LED lights up solid amber.
- The alarm sounds.
- The system monitor displays an error event.

A failed disk drive should be replaced immediately.



Warning: Drives and printed circuit board components are sensitive to electrostatic discharge. To prevent damage, establish a ground for yourself by using a wrist grounding strap, or by touching the metal chassis prior to handling the disk drives or printed circuit board components.



Note: The disk drives are hot-swappable. There is no need to power off the DuraStor 312R or the host computer system. However, when removing a disk drive, ensure that it doesn't twist in your hand as a result of the spinning disk. Pull it slightly from its locked position and allow it to spin down completely before removing it.

To replace a disk drive:

- 1 Remove the front bezel. See [Removing the Front Bezel on page 3-7](#).
- 2 Identify the failed disk drive using the Drive Status LED. See [Drive LEDs on page 4-5](#).

- 3 Grasp the drive carrier handle and pull the disk drive from the storage enclosure. See [Figure 5-5](#).

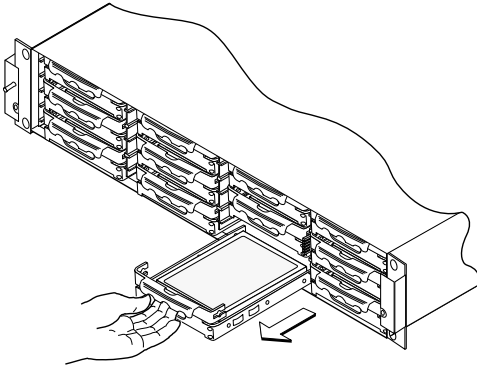


Figure 5-5. Removing a Disk Drive

Tension clips ensure that the drive carrier fits tightly in the drive bay. Gentle but firm force may be required to remove the drive carrier.

- 4 Remove the failed disk drive from the drive rails.
- 5 Install the new disk drive into the drive rails.
- 6 Install the new disk drive into the storage enclosure. See [Installing Disk Drives on page 3-10](#).
- 7 Reinstall the front bezel. See [Replacing the Front Bezel on page 3-11](#).

The Drive Status LED lights up solid green if the disk drive is assigned to an array, and flashes green if the disk drive is unassigned. The Drive Activity LED lights up solid green.

Replacing the Cooling Fan Module

When a cooling fan fails

- The Fan Status LED on the front bezel lights up solid amber.
- The alarm sounds.

A failed cooling fan must be replaced immediately.



Note: The cooling fan module is hot-swappable.



Warning: *Do not* operate the DuraStor 312R for longer than 5 minutes with the cooling fan module removed. Cooling is unavailable to all components while the fan module is removed.

- 1 Loosen the screw that secures the cooling fan module to the storage enclosure. See [Figure 5-6](#).

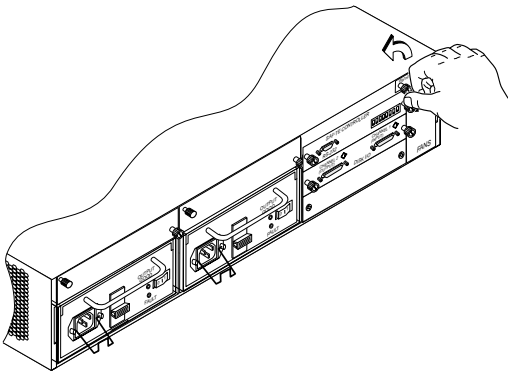


Figure 5-6. Loosening the Screw

- 2 Grasp the screw and pull the cooling fan module from the storage enclosure. See [Figure 5-7](#).

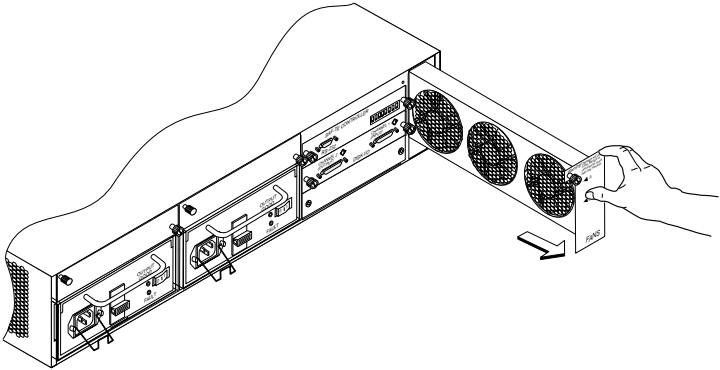


Figure 5-7. Removing the Cooling Fan Module

- 3 Slide the replacement cooling fan module into the open bay until it seats completely.
- 4 Tighten the screw on the cooling fan module. *Do not* overtighten. The Fan Status LED on the front bezel lights up solid green to indicate normal fan status.

Replacing a Power Supply Unit

When a PSU fails

- The Power Supply Status LED on the front bezel lights up solid amber.
- The failed PSU's Fault LED lights up, and its Output Good LED goes out.
- The alarm sounds.
- The system monitor displays an error event.

A failed PSU should be replaced as quickly as possible to maintain system redundancy.



Note: PSUs are hot-swappable.

To replace a PSU:

- 1 Identify the failed PSU and turn it off.
- 2 Remove the power cord from the PSU.
- 3 Grasp the PSU handle with one hand, lift the retaining latch with your thumb, and pull the PSU from the storage enclosure. See [Figure 5-8](#).

The PSU fits tightly inside the storage enclosure. Considerable force may be required to remove it.

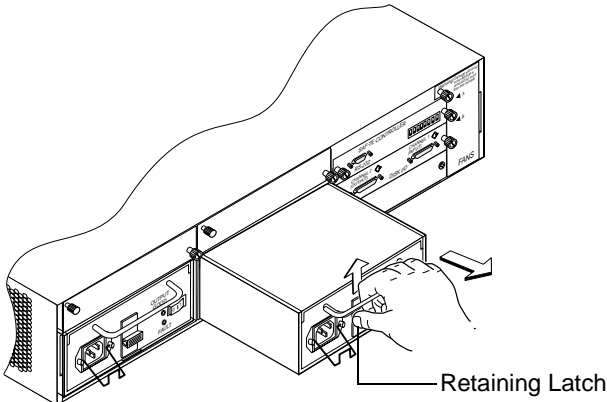


Figure 5-8. Removing a PSU

- 4 Slide the new PSU into the open bay until it seats completely and the retaining latch resets.
- 5 Reconnect the power cord and replace the security bale.
- 6 Turn on the PSU.

The PSU's Output Good LED lights up, its Fault LED goes out, and the Power Supply LED on the front bezel changes to solid green to indicate normal PSU status.

Replacing the Disk I/O Card

A failed disk I/O card must be replaced immediately.



Note: The disk I/O card is *not* hot-swappable. You must *power off* the storage enclosure to replace this card.

- 1 Power off the DuraStor 312R. See [Powering Off on page 3-54](#).
- 2 Disconnect the cables attached to the disk I/O card.
- 3 Loosen the two screws that secure the card.
- 4 Grasp the screws and gently pull the disk I/O card from the storage enclosure.
- 5 Align the replacement card with the rail guides of the open bay and push gently but firmly until the card seats completely. See [Figure 5-9](#).

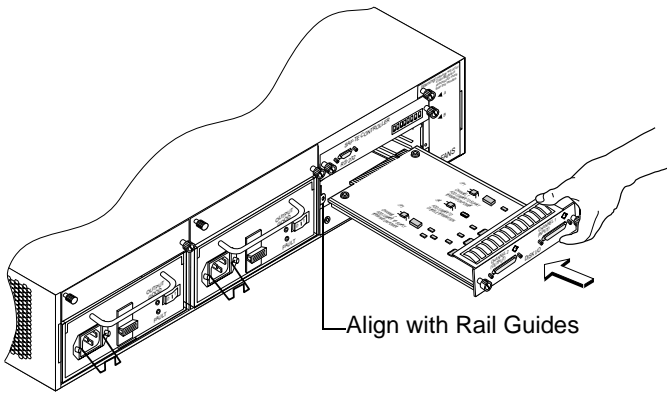


Figure 5-9. Replacing the Disk I/O Card

- 6 Tighten the screws. *Do not* overtighten.
- 7 Power on the DuraStor 312R. See [Turning On the Power on page 3-54](#).

Replacing the SAF-TE Controller Card

The SAF-TE controller has SCSI ID 15. If your storage management software tool is not recognizing that SCSI ID, the SAF-TE controller card may have failed. See [Problems with the DuraStor 312R Storage Enclosure on page 6-2](#) for other indications that the SAF-TE controller card has failed.

A failed SAF-TE controller card should be replaced immediately.



Warning: The SAF-TE controller card is *not* hot-swappable. You must *power off* the storage enclosure to replace this card.



Note: Make a note of the switch settings on the SAF-TE controller card before you remove it from the storage enclosure.

- 1 Power off the DuraStor 312R. See [Powering Off on page 3-54](#).
- 2 Loosen the two screws that secure the SAF-TE controller card to the storage enclosure.
- 3 Grasp the screws and gently pull the SAF-TE controller card from the storage enclosure.
- 4 Align the replacement card with the rail guides of the open bay and push gently but firmly until the card seats completely. See [Figure 5-10](#).
- 5 Tighten the screws. *Do not* overtighten.
- 6 Set the switch settings. Refer to the note you made before step 1.

- 7 Power on the DuraStor 312R. See [Turning On the Power on page 3-54](#).

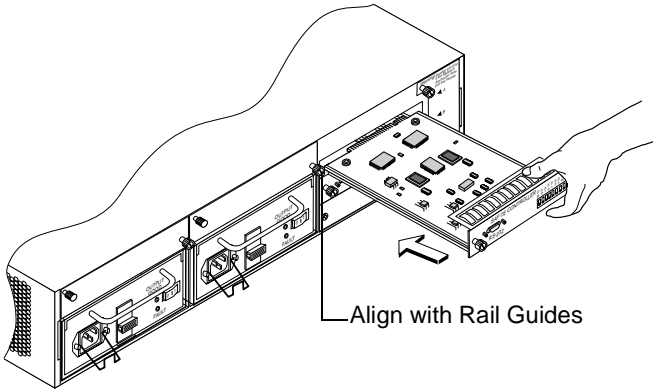


Figure 5-10. Replacing the SAF-TE Controller Card

Replacing the DuraStor 312R Chassis



Warning: Drives and printed circuit board components are sensitive to electrostatic discharge. To prevent damage, establish a ground for yourself by using a wrist grounding strap, or by touching the metal chassis prior to handling the disk drives or printed circuit board components.

Removing the Defective Enclosure

- 1 Power off the host computer.
- 2 Power off the DuraStor 312R. See [Powering Off on page 3-54](#).



Note: Note the location of the data cables, disk drives, and interface cards, and the switch settings on the SAF-TE controller card, prior to disconnecting or removing these items. Tag the cables and disk drives appropriately to make reinstallation easier.

- 3 Remove each of the interface cards. See [Replacing the SAF-TE Controller Card on page 5-14](#) and [Replacing the Disk I/O Card on page 5-13](#).

- 4 Disconnect the SCSI data cables and power cords.
- 5 Remove the cooling fan module. See [Replacing the Cooling Fan Module on page 5-10](#).
- 6 Remove the PSUs. See [Replacing a Power Supply Unit on page 5-11](#).
- 7 Remove the front bezel. See [Removing the Front Bezel on page 3-7](#).



Note: Remember to mark or tag the disk drives carefully. They must be installed in the replacement storage enclosure in exactly the same position.

- 8 Remove each disk drive, noting its position. See [Replacing a RAID Controller on page 5-2](#).
- 9 Remove the defective DuraStor 312R storage enclosure from the rack cabinet. Reverse the procedures described in [Mounting the Storage Enclosure on the Rack on page 3-8](#).

Installing the New Storage Enclosure

- 1 Install the new DuraStor 312R storage enclosure in the rack cabinet. See [Mounting the Storage Enclosure on the Rack on page 3-8](#).
- 2 Install the interface cards. See [Replacing the Disk I/O Card on page 5-13](#) and [Replacing the SAF-TE Controller Card on page 5-14](#).
- 3 Install the cooling fan module. See [Replacing the Cooling Fan Module on page 5-10](#).
- 4 Install the PSUs. See [Replacing a Power Supply Unit on page 5-11](#).
- 5 Install the disk drives in exactly the same order as they were removed. They must be installed in exactly the same position as they were previously. Refer to the notes you made of the proper installation locations. See [Replacing a RAID Controller on page 5-2](#).
- 6 Replace the front bezel. See [Replacing the Front Bezel on page 3-11](#).
- 7 Connect the SCSI data cables and power cords. Refer to the notes and tags you made for the proper connection locations.

- 8** Power on the DuraStor 312R storage enclosure. See *Turning On the Power* on page 3-54.
- 9** Power on the host computer.
- 10** Verify that all systems are operating normally.

Troubleshooting

In This Chapter

<i>Problems with the DuraStor RAID Appliance</i>	6-1
<i>Problems with the DuraStor 312R Storage Enclosure</i>	6-2

This chapter provides answers to many frequently asked questions. If a situation occurs that is not covered in this chapter, or if these recommendations do not correct the problem, contact Adaptec Technical Support.

Please refer to the user's guide for the storage management tool you are using (Storage Manager Pro, Disk Array Administrator, the OCP of the DuraStor RAID appliance) for help troubleshooting problems with your storage management software tool.

Problems with the DuraStor RAID Appliance

The RAID appliance fails to power on.

Verify that the power cables are properly connected to the PSUs.

Verify that power to the outlet has not been interrupted.

If necessary, replace the power cables. If the DuraStor RAID appliance still fails to power on, contact Adaptec Technical Support.

Problems with the DuraStor 312R Storage Enclosure

The enclosure fails to power on.

Verify that the power cords are plugged in properly. Replace them if necessary.

Verify that power to the outlet has not been interrupted.

Check the PSUs. If a PSU has failed, replace it. See [Replacing a Power Supply Unit on page 5-11](#) for detailed instructions.

If the DuraStor 312R still fails to respond, contact Adaptec Technical Support.

The Power Supply LED on the front bezel is amber.

Ensure that both PSUs are functioning normally. If a power supply has failed, replace it. See [Replacing a Power Supply Unit on page 5-11](#).

Ensure that both PSUs are installed. If a PSU is missing, replace it. See [Replacing a Power Supply Unit on page 5-11](#).

Ensure that proper AC power is available to the PSUs.

Ensure that the PSUs are turned on.

Ensure that power to the outlet has not been interrupted.

The Fan Status LED is solid amber.

A cooling fan has failed. Replace the cooling fan module. See [Replacing the Cooling Fan Module on page 5-10](#).

The Drive Status LED is not on and a disk drive is present in the slot.

There may be a fault on the disk I/O card. Replace the disk I/O card if necessary. See [Replacing the Disk I/O Card on page 5-13](#).

The disk drive may be faulty. Replace the disk drive if necessary. See [Replacing a Disk Drive on page 5-8](#).

The SAF-TE card may be faulty. Replace the SAF-TE card if necessary. See [Replacing the SAF-TE Controller Card on page 5-14](#).

Port Information

This appendix contains detailed information about the very-high-density SCSI connectors disk I/O card of the DuraStor 312R storage enclosure and the I/O connectivity panel of the DuraStor RAID appliance. See [Figure A-1](#).

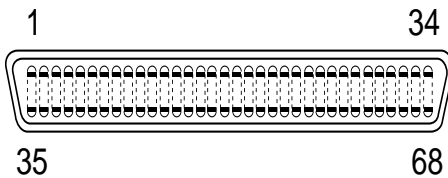


Figure A-1. VHDCI SCSI Connector

[Table A-1](#) provides signal names and pin numbers for both connectors.

Table A-1. VHDCI Connector Pin Signals

Connector P1		Connector P2	
Signal Name	Pin Number	Signal Name	Pin Number
+DB(12)	1	+DB(12)	1
+DB(13)	2	+DB(13)	2
+DB(14)	3	+DB(14)	3
+DB(15)	4	+DB(15)	4
+DB(P1)	5	+DB(P1)	5
+DB(0)	6	+DB(0)	6
+DB(1)	7	+DB(1)	7
+DB(2)	8	+DB(2)	8

Table A-1. VHDCI Connector Pin Signals (Continued)

Connector P1		Connector P2	
Signal Name	Pin Number	Signal Name	Pin Number
+DB(3)	9	+DB(3)	9
+DB(4)	10	+DB(4)	10
+DB(5)	11	+DB(5)	11
+DB(6)	12	+DB(6)	12
+DB(7)	13	+DB(7)	13
+DB(P0)	14	+DB(P0)	14
GROUND	15	GROUND	15
DIFFSENS	16	DIFFSENS	16
TERMPWR	17	TERMPWR	17
TERMPWR	18	TERMPWR	18
RESERVED	19	RESERVED	19
GROUND	20	GROUND	20
+ATN	21	+ATN	21
GROUND	22	GROUND	22
+BSY	23	+BSY	23
+ACK	24	+ACK	24
+RST	25	+RST	25
+MSG	26	+MSG	26
+SEL	27	+SEL	27
+C/D	28	+C/D	28
+REQ	29	+REQ	29
+I/O	30	+I/O	30
+DB(8)	31	+DB(8)	31
+DB(9)	32	+DB(9)	32
+DB(10)	33	+DB(10)	33
+DB(11)	34	+DB(11)	34
-DB(12)	35	-DB(12)	35
-DB(13)	36	-DB(13)	36
-DB(14)	37	-DB(14)	37
-DB(15)	38	-DB(15)	38

Table A-1. VHDCI Connector Pin Signals (Continued)

Connector P1		Connector P2	
Signal Name	Pin Number	Signal Name	Pin Number
-DB(P1)	39	-DB(P1)	39
-DB(0)	40	-DB(0)	40
-DB(1)	41	-DB(1)	41
-DB(2)	42	-DB(2)	42
-DB(3)	43	-DB(3)	43
-DB(4)	44	-DB(4)	44
-DB(5)	45	-DB(5)	45
-DB(6)	46	-DB(6)	46
-DB(7)	47	-DB(7)	47
-DB(P0)	48	-DB(P0)	48
GROUND	49	GROUND	49
GROUND	50	GROUND	50
TERMPWR	51	TERMPWR	51
TERMPWR	52	TERMPWR	52
RESERVED	53	RESERVED	53
GROUND	54	GROUND	54
-ATN	55	-ATN	55
GROUND	56	GROUND	56
-BSY	57	-BSY	57
-ACK	58	-ACK	58
-RST	59	-RST	59
-MSG	60	-MSG	60
-SEL	61	-SEL	61
-C/D	62	-C/D	62
-REQ	63	-REQ	63
-I/O	64	-I/O	64
-DB(8)	65	-DB(8)	65
-DB(9)	66	-DB(9)	66
-DB(10)	67	-DB(10)	67
-DB(11)	68	-DB(11)	68

The Operator Control Panel of the DuraStor RAID Appliance

If you do not have a computer monitor, or cannot run storage management software (Storage Manager Pro) or firmware (Disk Array Administrator), you can control and manage the DuraStor RAID appliance or DuraStor 6200SS/7200SS by using the OCP on the front bezel of the Adaptec DuraStor RAID appliance.

A switch on the rear panel of the DuraStor RAID appliance switches the input mode from keyboard (EXT) to OCP (INT). See [SCSI RAID Appliance I/O Connectivity Panel on page 2-7](#) for information.



Note: The front bezel LEDs will work whether the OCP is being used or not. Setting this switch to EXT will not disable the front bezel LEDs.

We *highly recommend* that you use either Storage Manager Pro or Disk Array Administrator to manage your external RAID system. However, if you don't have a computer monitor available and cannot use one of these user-friendly applications, the DuraStor RAID appliance's OCP can be used to perform most storage management functions, such as:

- Creating and managing arrays and partitions
- Monitoring system status
- Managing spares

- Configuring the controller(s)
- Managing disk drives and enclosures

Figure B-1 shows the OCP.

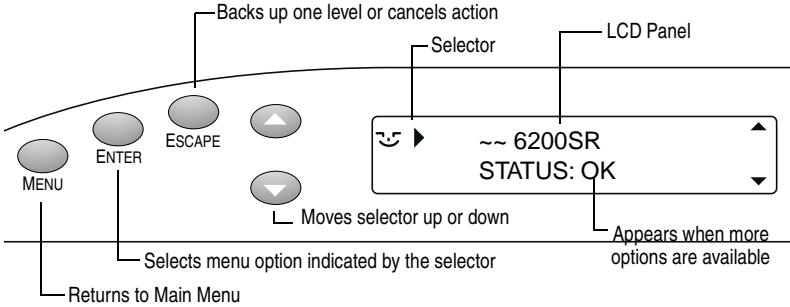


Figure B-1. The DuraStor RAID appliance OCP

You navigate the menus using the OCP buttons. The menu options appear in the two-line LCD window.

For detailed instructions on using the OCP, please refer to the *DuraStor RAID Appliance Operator Control Panel User's Guide*. You can find it on the DuraStor CD.

Glossary

A

active-active

Active-active mode is when two controllers in an external subsystem cooperate to provide redundancy. If one controller fails, the remaining controller will take over the failed controller's functionality. To accomplish this, each controller has two host SCSI ports, one of which is normally active, the other normally passive. In a failed-over configuration, the passive port becomes active and assumes the identity of the failed controller. In active-active mode, arrays can be accessed only by the controller that currently owns them. One controller will have no visibility of the other controller's arrays. Disk drives in the spare pool and unassigned disk drives are visible to both controllers.

array

Two or more physical drives grouped together to appear as a single device (logical drive) to the user. Also known as a container.

B

bus

See [channel](#).

C

channel

Any path used for the transfer of data and the control of information between storage devices and a storage controller. Each controller's channels are identified by a number. They are numbered in enter short product name starting with number 0. Also known as a bus. See also [LUN \(logical unit number\)](#).

controller

A hardware device that performs I/O functions. Controllers also perform other functions such as read and write caching and RAID management. Also known as an adapter, embedded storage controller, or subsystem.

D

disk array

See [array](#).

disk drive

A physical disk drive on a SCSI bus. Drives are addressed by their disk ID, which includes the channel (bus) number, SCSI ID, and LUN. See also [channel](#); [LUN \(logical unit number\)](#).

E

enclosure

A physical housing for drives, which can be connected internally or externally to a computer. An enclosure usually contains one or more power supplies, fans, and temperature sensors. The term enclosure also applies to a SAF-TE-compliant backplane. See also [SAF-TE \(SCSI Accessed Fault-Tolerant Enclosure\)](#).

F

failback

In active-active mode, failback is the act of returning ownership of controller resources from a surviving controller to a previously failed (but now active) controller. The resources include disk arrays, cache data, and host ID information.

failover

In active-active mode, failover is the act of temporarily transferring ownership of controller resources from a failed controller to a surviving controller. The resources include disk arrays, cache data, and host ID information.

fibre channel

A high-performance connection standard designed for bidirectional, serial data communication. FC provides long-distance connectivity and high bandwidth for efficiently moving large data files.

H

HBA (host bus adapter)

An HBA is the critical link between a host server or workstation and a subsystem, integrating computing platforms, OSs, and I/O protocols to ensure proper interoperability and functionality. The bus adapter provides direct storage connectivity from the system to data within the subsystem and enables stable, high-speed transmission of information and files. HBAs manage the controller-specific aspects of handling a storage driver interface device implemented as a target driver, which supports mass storage peripheral devices such as disks and tapes. A storage driver interface is used to implement SCSI and other storage device drivers. An HBA connects the storage subsystem to the host computer and uses either fiber or copper media.

hot-swapping

Removing a component from a system and installing a new component while the power is on, the system is running, and without pausing I/O.

K

kill

In active-active mode, one controller can kill the other controller by resetting it and taking it offline.

L

LUN (logical unit number)

The number assigned to a subdevice (logical unit) of a SCSI device. Each SCSI device can contain up to eight subdevices numbered 0 through 7; however, most SCSI devices contain only one subdevice (LUN 0).

LVD (low voltage differential)

LVD is a method of powering SCSI cables that will be formalized in the SCSI-3 specifications. LVD uses less power than the current differential drive (HVD), is less expensive, and allows for higher speeds such as those of Ultra2 SCSI. LVD requires 3.3 volts (versus 5 volts for HVD).

O

ownership

In an active-active configuration, each controller has ownership of arrays and dedicated spares. If one controller fails, the other controller assumes temporary ownership of its arrays and dedicated spares.

P

PSU

Stands for Power Supply Unit.

S

SAF-TE (SCSI Accessed Fault-Tolerant Enclosure)

The SAF-TE specification is an open specification designed to provide a comprehensive standardized method to monitor and report status information on the condition of disk drives, power supplies, cooling systems, and other components used in high-availability LAN servers and subsystems. *See also* [enclosure](#).

SAN (Storage Area Network)

A high-speed, special-purpose network that interconnects different data storage devices with data servers, on behalf of a larger network of users.

SCSI (Small Computer System Interface)

SCSI is an industry standard for connecting peripheral devices and their controllers to an initiator. Storage devices are daisy-chained together and connected to an HBA. The HBA provides a shared bus that attached peripherals use to pass data to and from the host system. Examples of devices attached to the HBA include disk drives, CD-ROM drives, optical disk drives, and tape drives. In theory, any SCSI device can be plugged into any SCSI controller. *See also* [HBA \(host bus adapter\)](#).

SCSI adapter

A SCSI adapter is a 16-bit fast/wide or 8-bit narrow, single-ended or differential physical connection between a router and SCSI devices. Each SCSI adapter supports up to 16 (fast/wide) or 8 (narrow) SCSI devices, including itself.

SCSI bus

A SCSI bus provides a means of transferring data between SCSI devices. A SCSI bus is either an 8- or 16-bit bus that supports up to 8 or 16 devices, including itself. The bus can consist of any mix of initiators and targets, with the requirement that at least one initiator and one target must be present.

SCSI device

A SCSI device is a single unit on a SCSI bus that originates or services SCSI commands. A SCSI device is identified by a unique SCSI address. SCSI devices can act as initiators or targets.

SCSI port

A SCSI port is an opening at the back of a router that provides connection between the SCSI adapter and SCSI bus.

slot

A receptacle in an enclosure for inserting and removing a SCSI device.

spin-up

Disk drives operate at a specific speed, for instance 10,000 rotations per minute. When power is applied to a disk drive, it *spins up* (starts spinning and spins at increasing speeds) to reach this final operating speed.

stand-alone

Stand-alone mode is when only one controller is used in an external subsystem.

U**unkill**

In active-active mode, when a surviving controller removes the reset from the other controller, it unkills it. The other controller will reboot and attempt to come online.

A

- active-active single port 3-20
- active-passive dual port 3-21
- Adaptec Storage Manager Pro 1-2
- audible alarm
 - of RAID appliance 4-3
 - of storage enclosure 4-7

B

- baud rate 3-57

C

- cables
 - active-active single port 3-20
 - active-passive dual port 3-21
 - dual-bus 12-drive 3-13
 - single-bus 24-drive 3-14
 - single-bus 36-drive 3-16
 - stand-alone dual port 3-19
 - stand-alone single port 3-18
- Channel Status LED 4-4
- chassis
 - of RAID appliance 5-6
 - of storage enclosure 5-15
- communications parameters 3-57
- connector parameters 3-57
- connector pin signals A-1
- Controller Activity LED 4-2
- controller canister 2-4
- Controller Status LED 4-2
- cooling fan module
 - of RAID appliance
 - description 2-6
 - replacing 5-4
 - of storage enclosure
 - description 2-18
 - replacing 5-10

D

- data bits 3-57
- Disk Array Administrator. *See* DuraStor Disk Array Administrator
- disk drive slots/Drive LEDs 4-5
- disk drives
 - description 2-16
 - installing 3-10
 - replacing 5-8
- disk I/O card
 - description 2-19
 - replacing 5-13
- Drive Activity LED 4-4
- drive carrier 2-16
- drive configuration
 - 12 drives 3-12, 3-24
 - 24-drive 3-13, 3-25 to 3-26, 3-28
 - 36-drive 3-15
 - changing 3-22
- Drive ID settings 2-21
- Drive LEDs 4-5 to 4-6
- drive roaming 3-22
- Drive Status LED 4-4
- drives. *See* disk drives
- DuraStor 312R. *See* storage enclosure
- DuraStor 6200SR. *See* RAID appliance
- DuraStor Disk Array Administrator
 - accessing 3-56
 - communications parameters 3-57
 - description 1-3
 - port settings 3-57

F

- Fan Status LED [4-4](#)
- Fault LED (RAID appliance) [4-2](#)
- firmware [1-3](#)
- flow control software [3-57](#)
- front bezel
 - of RAID appliance
 - description [2-3](#)
 - removing [3-3](#)
 - replacing [3-6](#)
 - of storage enclosure
 - description [2-15](#)
 - removing [3-7](#)
 - replacing [3-11](#)

H

- HBAs [2-7](#)
- Host Bus Adapters. *See* HBAs

I

- I/O Connectivity Panel [2-7](#), [2-10](#)
- installation overview [3-2](#)

J

- jumpers [2-19](#)

L

- LEDs
 - of RAID appliance [4-2](#)
 - of storage enclosure [4-4](#), [6-2](#)

M

- maintenance
 - RAID appliance [5-1](#) to [5-7](#)
 - storage enclosure [5-7](#) to [5-17](#)
- monitoring
 - RAID appliance [4-2](#) to [4-4](#)
 - storage enclosure [4-4](#) to [4-7](#)
- monitoring options [4-1](#)

O

- OCF [2-4](#), [B-1](#) to [B-2](#)
- operating modes [3-22](#)
- Operator Control Panel. *See* OCP

P

- parity [3-57](#)
- ports [A-1](#)
- power cords
 - of RAID appliance [3-6](#)
 - of storage enclosure [3-11](#)
- Power LED
 - of RAID appliance [4-2](#)
 - of storage enclosure [4-4](#)
- Power Supply LED [4-4](#)
- power supply units. *See* PSUs
- powering on and off [3-54](#)
- PSUs
 - of RAID appliance
 - description [2-5](#)
 - replacing [5-5](#)
 - of storage enclosure
 - description [2-17](#)
 - replacing [5-11](#)

R

- rack-mounting
 - placement [3-4](#)
 - RAID appliance [3-4](#)
 - storage enclosure [3-8](#)
- RAID appliance
 - AC power [2-5](#)
 - audible alarm [4-3](#)
 - chassis [5-6](#)
 - controller canister [2-4](#)
 - cooling fan module
 - description [2-6](#)
 - replacing [5-4](#)
 - description [2-1](#) to [2-9](#), [2-13](#)
 - front bezel
 - description [2-3](#)
 - removing [3-3](#)
 - replacing [3-6](#)

- HBAs 2-7
- I/O Connectivity Panel 2-7, 2-10
- installing 3-3 to 3-11
- LEDs 4-2
- maintenance 5-1 to 5-7
- monitoring 4-2 to 4-4
- OCP 2-4, B-1 to B-2
- power cords 3-6
- Power LED 4-2
- PSUs
 - description 2-5
 - replacing 5-5
- rack-mounting 3-4
- RS-232 serial ports 2-8, 2-11
- SCSI connectors 2-8
- security bales 2-6
- specifications 2-8, 2-13
- temperature and voltage thresholds 4-3
- troubleshooting 6-1
- RS-232 serial ports 2-8, 2-11

S

- SAF-TE controller card
 - description 2-20
 - replacing 5-14
- SAF-TE specification 2-21
- SAF-TE switches 2-21 to 2-23
- SCSI Accessed Fault-Tolerant Enclosure. *See* SAF-TE
- SCSI connectors 2-8, 2-19
- security bales
 - of RAID appliance 2-6
 - of storage enclosure 2-17
- specifications
 - of RAID appliance 2-8, 2-13
 - of storage enclosure 2-24
- spin-up settings 2-23
- stand-alone dual port 3-19
- stand-alone single port 3-18
- Status LEDs 4-5
- stop bits 3-57

- storage enclosure
 - audible alarm 4-7
 - chassis 5-15
 - cooling fan module
 - description 2-18
 - replacing 5-10
 - description 2-14 to 2-24
 - disk drive slots 4-5
 - disk drives
 - description 2-16
 - installing 3-10
 - replacing 5-8
 - disk I/O card
 - description 2-19
 - replacing 5-13
 - Drive ID settings 2-21
 - Drive LEDs 4-4 to 4-6
 - front bezel
 - description 2-15
 - removing 3-7
 - replacing 3-11
 - maintenance 5-7 to 5-17
 - monitoring 4-4 to 4-7
 - power cords 3-11
 - Power LED 4-4
 - PSUs
 - description 2-17
 - replacing 5-11
 - rack-mounting 3-8
 - SAF-TE controller card
 - description 2-20
 - replacing 5-14
 - SAF-TE switches 2-21 to 2-23
 - security bales 2-17
 - specifications 2-24
 - spin-up settings 2-23
 - Status LEDs 4-4 to 4-5
 - troubleshooting 6-2
- Storage Manager Pro 1-2
- switch settings
 - dual-bus 12-drive 3-12
 - single-bus 24-drive 3-13
 - single-bus 36-drive 3-15
- system monitoring. *See* monitoring

T

temperature thresholds (RAID appliance) [4-3](#)
terminal emulator software [3-57](#)
terminal program parameters [3-57](#)
troubleshooting

RAID appliance [6-1](#)
storage enclosure [6-2](#)

V

voltage thresholds (RAID appliance) [4-3](#)



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