StorageWorks

SH043-Series Cabinet Installation and User's Guide

Order Number: EK–SH043–IG. A01

This manual describes the concepts and procedures necessary to install, configure, and use StorageWorks SH043-series cabinets. Both mechanical cabinet configuration and power configuration are covered in this manual. The configuration and connection of SCSI–2 signal busses is covered in referenced StorageWorks documentation.

Digital Equipment Corporation
Maynard, Massachusetts

First Printing, October 1993

NOTE: This equipment generates, uses, and may emit radio frequency energy. The equipment has been type tested and found to comply with the limits for a Class A digital device persuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation.

Any changes or modifications made to this equipment may void the user's authority to operate the equipment.

Operation of this equipment in a residential area may cause interference in which case the user at his own expense will be required to take whatever measures may be required to correct the interference.

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Preface

This document presents the concepts and procedures necessary to install, configure, and use **StorageWorks™** SH043-series **cabinets**. Both mechanical cabinet configuration and power configuration are covered in this manual. The configuration and connection of SCSI–2 signal busses is covered in referenced StorageWorks documentation.

Intended Audience

This manual is intended for use by customers and Multivendor Customer Services engineers responsible for installing, configuring, and using StorageWorks SH043-series cabinets.

Note

The procedures described in this guide are to be performed only by qualified service personnel.

Model Numbers

Some equipment model numbers used in this manual are equivalent to those of other StorageWorks equipment. Table 1 contains equivalent StorageWorks model numbers for some of the equipment covered in this manual.

Some documentation applicable to equipment covered in this manual is written against the equivalent StorageWorks model number. Use Table 1 as a cross reference to the appropriate documents.

Table 1 Equivalent StorageWorks Model Numbers

Document Model No.	Equivalent StorageWorks Model No	Description
SH043	SW500	Cabinet series
SHDZZ–ZZ	BA350–SA	Storage shelf
SHxzz–zz	BA350–EA	Controller/storage shelf series
SHZ1Z–ZZ	HSZ10	Controller
SHZ2Z–ZZ	HSZ15	Controller
SHZBZ–ZZ	RZ26–VA	Disk drive
TZLX	TZ8xx	Tape loader series (Tape drive series)

Structure

This manual is organized as follows:

Chapter 1	Provides an overview of the SH043-series cabinet, a description of its major components, and a discussion of the power options available for it.
Chapter 2	Contains site preparation information.
Chapter 3	Describes the unpacking and installation of SH043-series cabinets.
Chapter 4	Describes the configuration of SH043-series storage-only cabinets.
Chapter 5	Describes the configuration of SH043 **controller**/storage cabinets.
Chapter 6	Describes the mounting of StorageWorks shelves within SH043-series cabinets.
Chapter 7	Describes the mounting of TZ8xx-series tape drives within SH043-series cabinets.
Chapter 8	Describes the configuration of power within SH043-series cabinets.
Appendix A	Provides information regarding the temperature stabilization of newly unpacked equipment.
Glossary	The Glossary defines the acronyms and specialized terms used in this document.
Index	The Index provides a cross-reference to subject matter in this document.

Related Documents

Table 2 lists the StorageWorks related *user* documents organized by use, system, or product.

Table 2 StorageWorks Related Documentation

Document Title	Order Number
StorageWorks Primary Publications†	
StorageWorks Family Configuration Guide	EK–BA350–CG
StorageWorks Family User's Guide ‡	EK–BA350–UG
StorageWorks Family StorageWorks Building Blocks User's Guide	EK–SBB35–UG
StorageWorks RAID Array 110 Subsystem	
BA350–EA Modular Storage Shelf User's Guide	EK–350EA–UG
BA35X–VA Vertical Mounting Kit User's Guide	EK–350SV–UG
DEC RAID Utilities User's Guide	EK–DECRA–UG
HSZ10–AA Controller Site Preparation Guide	EK–HSZ10–IN
StorageWorks RAID Array 110 Subsystem User's Guide	EK–SM2CA–UG
StorageWorks RAID Array 110 Utility for MS–DOS User's Guide	AA–Q0N5A–TE

†—Provided with each system
‡—Includes BA350–SA SBB shelf user's guide
§—Available from Digital Account Representative

(continued on next page)

Table 2 (Cont.) StorageWorks Related Documentation

Document Title	Order Number
StorageWorks RAID Array 110 Subsystem	
StorageWorks RAID Array 110 Utility for Novell Netware User's Guide	AA–Q0N4A–TE
StorageWorks RAID Array 110 Utility for SCO UNIX User's Guide	AA–Q0N6A–TE
StorageWorks Array Controller 140-Series	
StorageWorks Array Controller HS Family of Array Controllers User's Guide	EK–HSFAM–UG
StorageWorks BA350–MA Controller Shelf User's Guide	EK–350MA–UG
DECraid+ Rackmount Storage Subsystem	
HSC Intelligent I/O Servers	
HSC Controller User's Guide	AA–PFSQA–TK
HSC Controller Installation Manual	EK–HSCMN–IN
StorageWorks Enclosures	
BA35X–VA Vertical Mounting Kit User's Guide	EK–350SV–UG
StorageWorks Family Desktop Expansion Unit User's Guide	EK–BA353–UG
StorageWorks Metric Shelf Bracket Kit Installation Guide	EK–35XRD–IG
StorageWorks RETMA Shelf Rail Kit Installation Guide	EK–35XRB–IG
StorageWorks SH043-Series Cabinet Installation and User's Guide	EK–SH043–IG
StorageWorks SH043-Series Cabinet Cable Distribution Unit Installation Guide	EK–SW43C–IG
StorageWorks SW500-Series Cabinet Installation and User's Guide	EK–SW500–IG
StorageWorks SW500–Series Cabinet Cable Distribution Unit Installation Guide	EK–SW5CU–IG
StorageWorks SW800-Series Data Center Cabinet Installation and User's Guide	EK–SW800–IG
StorageWorks SW800-Series Data Center Cabinet Cable Distribution Unit Installation Guide	EK–SWCDU–IS
Alpha AXP DEC 7000 and DEC 1000 Systems	
BA350–LA Modular Storage Shelf User's Guide	EK–350LA–UG
BA655 SCSI Disk and Tape PIU Installation Guide	EK–BA655–IN

†—Provided with each system
‡—Includes BA350–SA SBB shelf user's guide
§—Available from Digital Account Representative

(continued on next page)

Table 2 (Cont.) StorageWorks Related Documentation

Document Title	Order Number
Storage Devices	
Installation Notice—RZ73 Bus Termination and Jumper Installation Guide	EK–RZ73X–IS
RRD42 Disk Drive Owner's Manual	EK–RRD42–OM
RZ Series Disk Drive Installation Guide	EK–DRZ01–IG
RZ Series Disk Drive Reference Manual	EK–RZXXD–RM
RZ24 Hard Disk Drive Installation Guide	EK–RZ24I–IS
RZ26B Disk Drive Installation Guide	EK–RZ26B–IN
RZ2x Hard Disk Drive Upgrade Installation Instructions	EK–RZ2XH–UG
RZ2x Series Drive Bracket Installation Sheet	EK–RZ2XD–UG
SCSI Signal Converter DWZZA–AA	EK–DWZZA–SV
SCSI Signal Converter DWZZA–MA	EK–DWZZM–SV
SCSI Signal Converter DWZZA–VA	EK–DWZAA–SV
TLZ06 Cassette Tape Drive Installation Guide	EK–STEXP–AD
TLZ06 Cassette Tape Drive Owner's Manual	EK–TLZ06–OM
TZ30 Cartridge Tape Drive Operator's Manual	EK–OTZ30–OM
TZ30 Cartridge Tape Drive Reference Card	EK–OTZ30–RC
TZ30 Cartridge Tape Drive Technical Manual	EK–OTZ30–TM
General Reference Publications	
Digital Systems and Options Catalog§	
Small Computer System Interface, An Overview	EK–SCSIS–OV
Small Computer System Interface, A Developer's Guide	EK–SCSIS–DK

†—Provided with each system
‡—Includes BA350–SA SBB shelf user's guide
§—Available from Digital Account Representative

Documentation Conventions

The following conventions are used in this manual:

boldface type	Boldface type indicates the first instance of terms being defined in text, in the glossary, or both.
italic type	Italic type indicates emphasis and complete manual titles. In the glossary, italic type is also used to indicate cross-references.

Manufacturer's Declarations

Following are manufacturer's declarations applicable to StorageWorks SH043-series cabinets:

CAUTION

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 adequate measures.

ACHTUNG !

Dieses ist ein Gerät der Funkstörgrenzwertklasse A. In Wohnbereichen können bei Betrieb dieses Gerätes Rundfunkstörungen auftreten, in welchen Fällen die Benutzer für entsprechende Gegenmaßnahmen verantwortlich sind.

ATTENTION !

Ceci est un produit de Classe A. Dans un environment domestique, ce produit risque de créer des interférences radiélectriques, il appartiendra alors à l´utilisateur de prendre les mesures spécifiques appropriées.

Note

The equipment described in this manual is listed by the Underwriters Laboratories Incorporated and bears the UL Listing mark. SH043-series cabinets are also certified by the Canadian Standards Association and TÜV Product Service GmbH and bear both the CSA certification and TÜV GS marks. The equipment also complies with the requirements for CE-mark Class A.

Note

Das in diesem Manual beschriebene Gerät wurde von TÜV Produkt Service GmbH auf Sicherheit geprüft and trägt das GS Zeichen. Bitte beachten Sie, daß Eingriffe in das Gerät, Reparaturen oder der Einbau von Erweiterungen nur von Digital Personal erfolgen darf, da sonst die GS Zulassung ungültig wird. Die Zulassung wird auch ungültig, wenn nicht von Digital qualifizierte Speichererweiterungen eingebaut werden.

Das Gerät muß so aufgestellt werden, daß die Steckdose frei zugänglich ist.

Table 3 Acoustics—Preliminary Declared Values per ISO 9296 and ISO 7779

	Sound Power Level L_{WAd}, B‡		Sound Pressure Level L_{pAm}, dBA (Bystander Positions)	
Product†	**Idle**	**Operate**	**Idle**	**Operate**
SH043 cabinet only	0.0	0.0	0.0	0.0
SH043 with 2 BA350–MA shelves, each containing 2 HSJ40 controllers and 8 SHDZZ-ZZ shelves, each containing 6 SHZBZ-ZZ disk drives	7.0	7.0	50.0	51.0
Per device when installed in SH043				
SHDZZ-ZZ shelf containing 6 SHZBZ-ZZ disk drives	5.7	5.7	39	39
BA350–MA shelf with 2 HSJ40 controllers	5.6	5.6	39	39

	Sound Power Level L_{WAd}, B‡		Sound Pressure Level L_{pAm}, dBA (Operator Positions)	
Product†	**Idle**	**Operate**	**Idle**	**Operate**
SH043 cabinet only	0.0	0.0	0.0	0.0
SH043 with 2 BA350–MA shelves, each containing 2 HSJ40 controllers and 8 SHDZZ-ZZ shelves, each containing 6 SHZBZ-ZZ disk drives	7.0	7.0	50.0	51.0
Per device when installed in SH043				
SHDZZ-ZZ shelf containing 6 SHZBZ-ZZ disk drives	5.8	5.8	46	46
BA350–MA shelf with 2 HSJ40 controllers	5.7	5.7	46	46

† Current values for specific configurations are available from Digital representatives.

‡ 1 B = 10 dBA

Note

Table 4 is a translation of the English language specifications in Table 3 into the German language.

Table 4 Schallemissionswerte—Vorläufige Werteangaben nach ISO 9296 und ISO 7779/DIN EN27779

	Schalleistungspegel L_{WAd}, B‡		Schalldruckpegel L_{pAm}, dBA (Beistehende Position)	
Gerät†	**Leerlauf**	**Betrieb**	**Leerlauf**	**Betrieb**
nur SH043 Kabinett	0,0	0,0	0,0	0,0
SH043 mit 2 BA350–MA shelves, jedes bestückt mit 2 HSJ40 controllers und 8 SHDZZ-ZZ shelves, jedes bestückt mit 6 SHZBZ-ZZ disk drives	7,0	7,0	50,0	51,0
Pro Gerät installiert im SH043				
SHDZZ-ZZ shelf mit 6 SHZBZ-ZZ disk drives	5,7	5,7	39	39
BA350–MA shelf mit 2 HSJ40 controllers	5,6	5,6	39	39

	Schalleistungspegel L_{WAd}, B‡		Schalldruckpegel L_{pAm}, dBA (Bediener Position)	
Gerät†	**Leerlauf**	**Betrieb**	**Leerlauf**	**Betrieb**
nur SH043 Kabinett	0,0	0,0	0,0	0,0
SH043 mit 2 BA350–MA shelves, jedes bestükt mit 2 HSJ40 controllers und 8 SHDZZ-ZZ shelves, jedes bestükt mit 6 SHZBZ-ZZ disk drives	7,0	7,0	50,0	51,0
Pro Gerät installiert im SH043				
SHDZZ-ZZ shelf mit 6 SHZBZ-ZZ disk drives	5,8	5,8	46	46
BA350–MA shelf mit 2 HSJ40 controllers	5,7	5,7	46	46

† Aktuelle Werte für spezielle Ausrüstungsstufen sind über die Digital Equipment Vertretungen erhältlich.

‡ 1 B = 10 dBA

1
Introduction

This chapter presents an overview, a description of major components, and a discussion of power options for StorageWorks SH043-series cabinets.

1.1 Overview

The SH043-series cabinet, shown in Figure 1–1, is a member of Digital's StorageWorks family of modular enclosures. The 600 mm (23.62 inch) wide cabinet provides an attractive enclosure with rackmount space and primary power for up to 10 StorageWorks shelves of different types. Up to 8 StorageWorks shelves can be used in conjunction with 2 TZLX-series tape drives. The cabinet can accommodate both data storage and controller/data storage combinations. The cabinet and its StorageWorks shelves can be configured with dual ac power capability for power redundancy.

SH043-series cabinets offer a versatile, modular solution to array storage problems. You may use them in both open-office and data center applications. You may order the cabinet in a variety of preconfigured subsystem versions with such options as mixed storage device types and storage, controller, or power redundancy. You may also order custom configurations to meet your specific needs. The modularity of the cabinet and its components offers efficient and cost-effective upgrade paths.

Specifications for SH043-series cabinets are shown in Table 1–1.

Figure 1–1 SH043-Series Cabinet

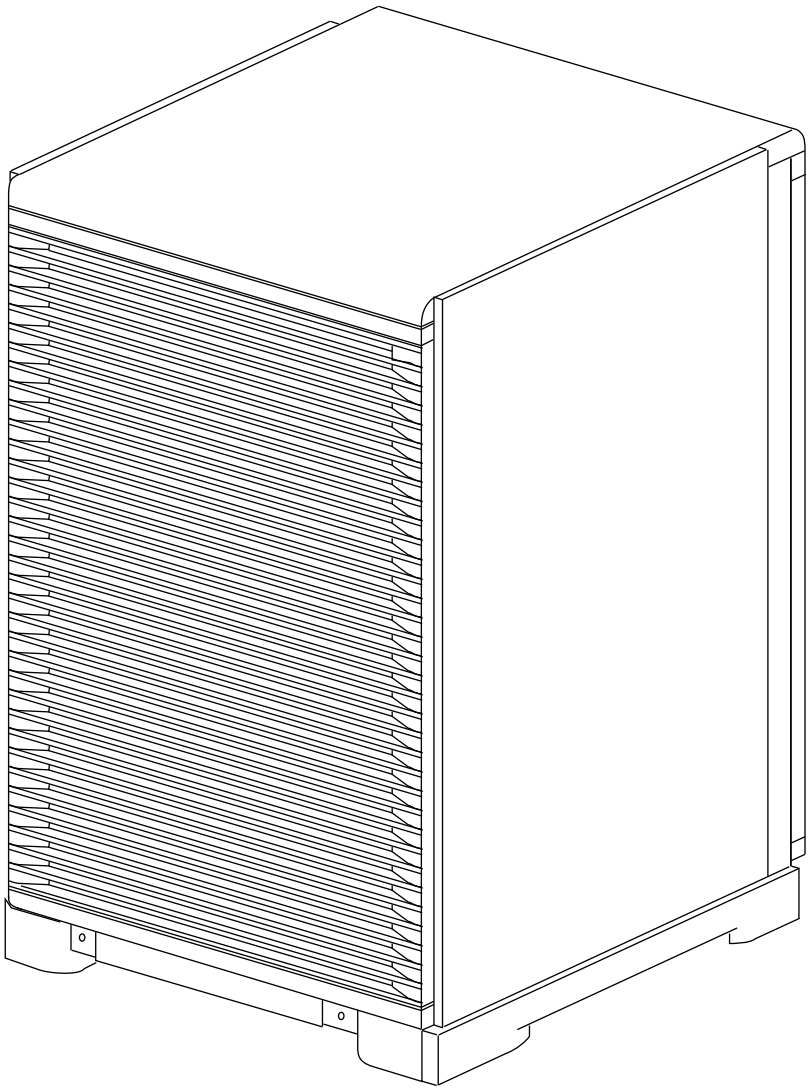

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Table 1–1 SH043-Series Cabinet Specifications

Characteristic	Specification
Dimensions (nominal)	110.00 cm (43.31 in) height, 60.00 cm (23.62 in) width, 87.25 cm (34.35 in) depth
Weight	
Empty cabinet (only 1 CDU installed)	140 kg (309 lb)
Empty cabinet with shipping packaging	160 kg (353 lb)
Maximum configuration (2 BA350–MA shelves, 8 SHDZZ–ZZ shelves with 6 SHZBZ-ZZ disk drives in each, 2 CDUs)	290 kg (639 lb)
Agency compliance	FCC, UL, CSA, TÜV, and CE-mark
Electrical rating	
SW5xx–AC	100–120 volts, 60 Hz, single phase, 20 amperes
SW5xx–AD	100–120/200–240 volts, 50/60 Hz, single phase, 20/16 amperes
Temperature	+10°C to +35°C (+50°F to +95°F) Reduce rating by 1.8°C for each 1000 m altitude (1.0°F for each 1000 ft altitude)
Humidity	10 to 85 percent at maximum wet bulb temperature of +32°C (+90°F) and minimum dew point of +2°C (+36°F)
Recommended Environmental Limits†	
Operating environment	
Temperature	18°C to 24°C (64.4°F to 75.2°F) with an average rate of change of 3°C/hour maximum and a step change of 3°C or less
Relative humidity	40 to 60 percent (noncondensing) with a step change of 10 percent or less (noncondensing)
Altitude	Up to 2400 m (8000 ft)
Air quality (maximum particle count)	Not to exceed 500,000 particles per cubic foot of air at a size of 0.5 micron or larger
Nonoperating environment	
Temperature	–40°C to +66°C (–40°F to +151°F)
Relative humidity	10 to 80 percent noncondensing
Altitude	4900 m (16,000 ft)

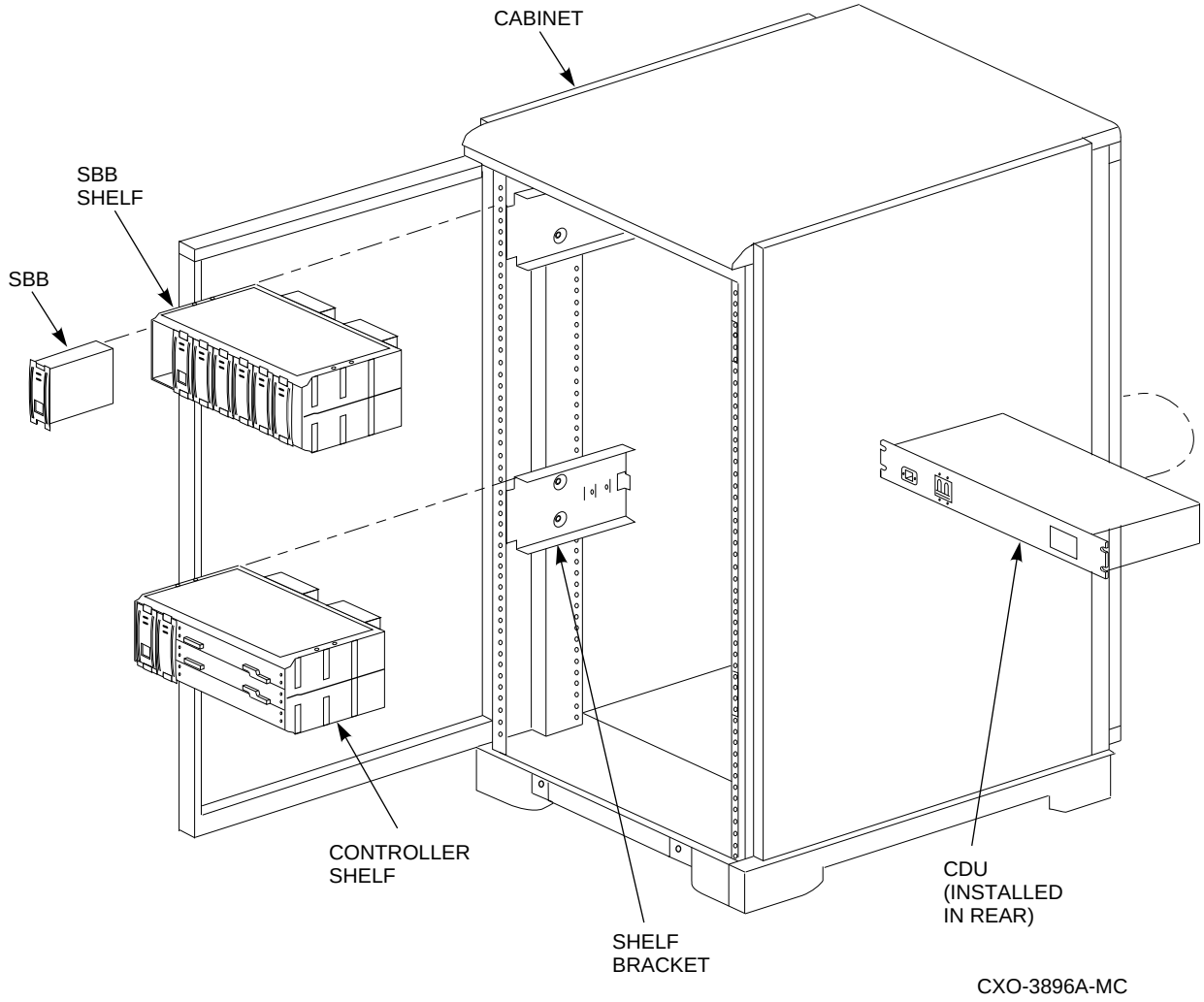
†These limits are for optimum equipment performance and reliability.

1.2 Major Components

The major components of the SH043-series cabinet are shown in Figures 1–2 and 1–3 and are as follows:

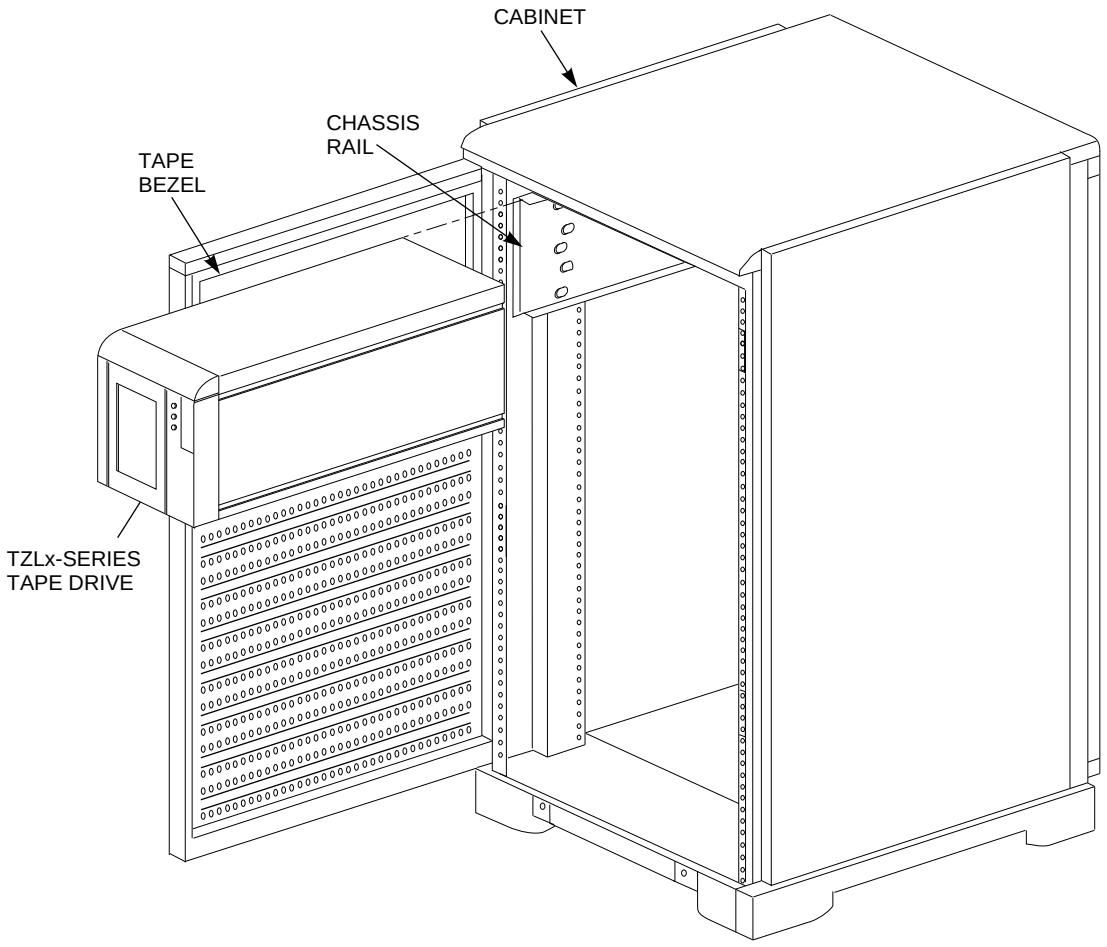
- Cabinet—The cabinet is a general-purpose enclosure that provides rack-mount capability for standard 44.5 cm (17.5 inch) wide components. The cabinet uses a standard metric rackmount bolt pattern with holes on 25 mm (.98 inch) centers. Hinged front and rear doors and removable side panels allow easy access to the cabinet interior. Casters and leveler feet are provided to facilitate placement of the cabinet, and base trim **skirts** are provided to enhance its appearance.
- Shelf brackets—Movable **shelf brackets** within the cabinet can be configured to hold any of the StorageWorks shelf types. Six shelf positions may be used in the front of the cabinet and four in the rear. Storage shelves may generally be installed in any of the usable shelf positions, although some limitations may be imposed by either weight or cable length restrictions. One shelf position in the rear of the cabinet is reserved for power **cable distribution unit (CDU)** installation, and one is left open for proper airflow.
- SBB shelves—**StorageWorks building block (SBB) shelves** are designed to house any of the SBBs in the StorageWorks family. The shelves can accept one or two power supply SBBs as well as a number of peripheral device SBBs. SBB shelves provide the mechanical mounting, power, and signal interfaces for the SBBs they house. The shelves are 445 mm (17.5 inch) in width and are designed to slide into the shelf brackets.
- SBBs—StorageWorks building blocks (SBBs) are modular computer peripheral devices or power units from the StorageWorks family. SBBs may be disk drives, tape drives, shelf power supplies, battery backup units, or other types of peripherals conforming to the **Small System Computer Interface 2 (SCSI–2)** specification. They are housed in both 3½-inch and 5¼-inch wide modular carriers designed to plug into slots in SBB shelves. Connectors on the rear of each SBB mate with connectors in the SBB shelf to provide the electrical interface between the two units.
- Controller shelves—Controller shelves are StorageWorks shelves designed specifically to house SCSI–2 peripheral controller and cache memory modules. These shelves may also accept one or two power supply SBBs. Controller shelves provide the mechanical mounting, power, and signal interfaces for the units they house. The cabinet allows for the mounting of one controller shelf in the front and one in the rear. Digital's SHZ1Z-ZZ, and SHZ2Z-ZZ controllers are both qualified for use with the SH043-series cabinet. In special situations, different controller types can be installed within the same cabinet.
- CDUs—Cable distribution units (CDUs) provide the connections necessary to distribute ac power to the shelves in the SH043 cabinet. CDUs also provide surge and spike protection, along with a circuit breaker to control the incoming ac power. As an option, two CDUs can be configured with an auxiliary ac power source to provide redundant primary power within the cabinet.

Figure 1–2 Cabinet Major Components



- TZLX-series tape drives—Up to two TZLX-series tape drives can be installed in the upper area of the cabinet, as shown in Figure 1–3. A **chassis rail** is used to support the tape drive from one side.

Figure 1–3 TZLX-Series Tape Drive



1.3 Power Configurations

The ac power distribution within the SH043-series cabinet can be configured in one of the following three ways to provide the desired level of power redundancy to the cabinet's shelf-mounted peripheral devices:

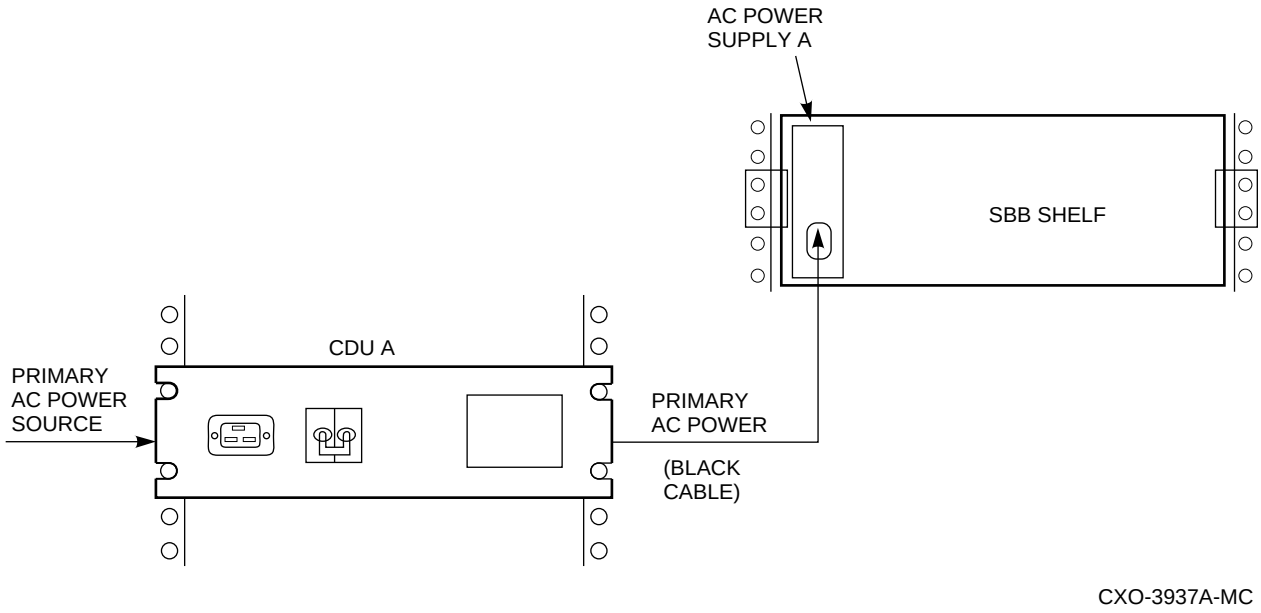
- **Single cabinet power configuration**
- **Dual shelf power configuration**
- **Dual cabinet power configuration**

A description of each configuration option follows.

1.3.1 Single Cabinet Power Configuration

In the single cabinet power configuration, shown in Figure 1–4, a single ac power source and CDU (A) are used to supply ac power to a single **ac power supply** (A) in each shelf. This is the normal configuration for the cabinet, and it provides no power redundancy to shelf peripheral devices.

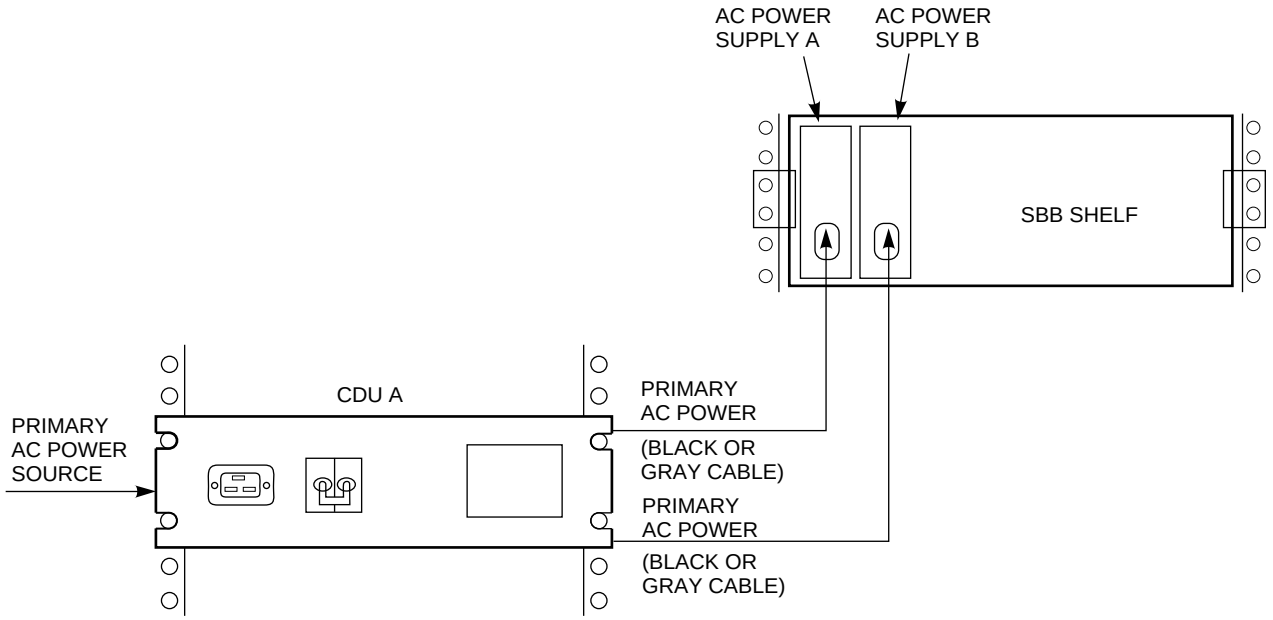
Figure 1–4 Single Cabinet Power Configuration



1.3.2 Dual Shelf Power Configuration

In the dual shelf power configuration, shown in Figure 1–5, a single primary power source and CDU (A) are used to supply ac power to two ac power supplies (A and B) in each shelf. If either power supply fails, the shelf remains powered by the other supply. This configuration provides shelf power supply redundancy to the shelf's peripheral devices. The cabinet supports a maximum of six shelves in the dual shelf power configuration.

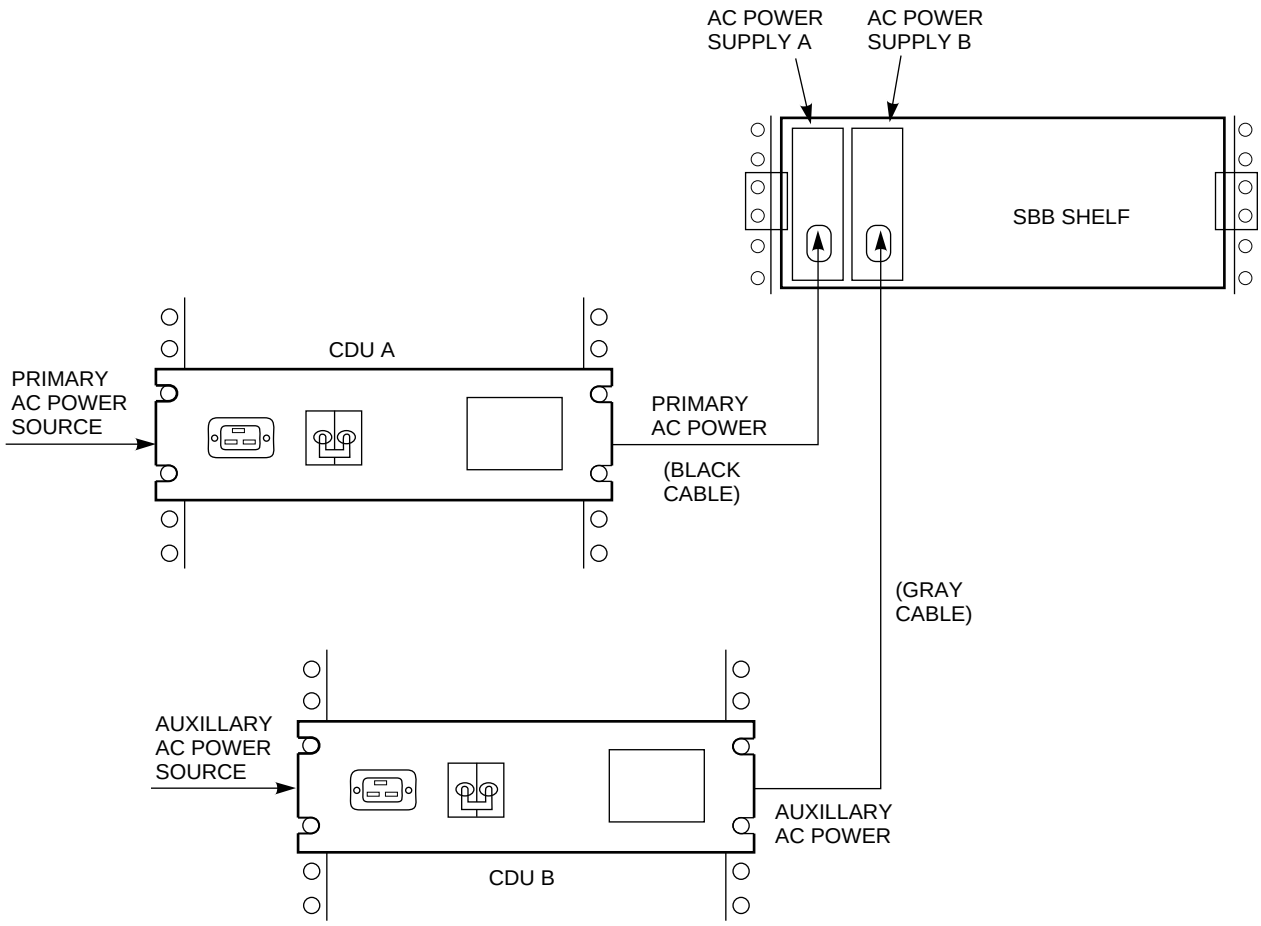
Figure 1–5 Dual Shelf Power Configuration



1.3.3 Dual Cabinet Power Configuration

In the dual cabinet power configuration, shown in Figure 1–6, an auxiliary power source and a second CDU (B) are used to supply ac power to a second ac power supply (B) in each shelf. If the primary power source, CDU A, or ac power supply A fails, the shelf remains powered by ac power supply B. This configuration provides complete power redundancy to the shelf's peripheral devices.

Figure 1–6 Dual Cabinet Power Configuration



1.4 Cabinet Cooling System

Each StorageWorks shelf contains two rear-mounted **blowers** that move heat from the shelf into the cabinet interior. The cabinet structure is such that heated air moves from the cabinet interior up and out through the unused shelf positions in the rear. It is then exhausted through the rear door. Logic signals allow the status of the shelf blowers to be monitored by the host system.

Filler panels and **air separation panels** are used to properly route heated air through the cabinet. Filler panels are flat plates that serve as covers for unused shelf positions. Air separation panels are small baffles that mount just above and outside the upper-most shelf in each side of the cabinet to prevent heated air from being drawn down between the cabinet door and the shelf. Such air would be drawn back into the shelf and would interfere with proper cooling.

2
Site Preparation

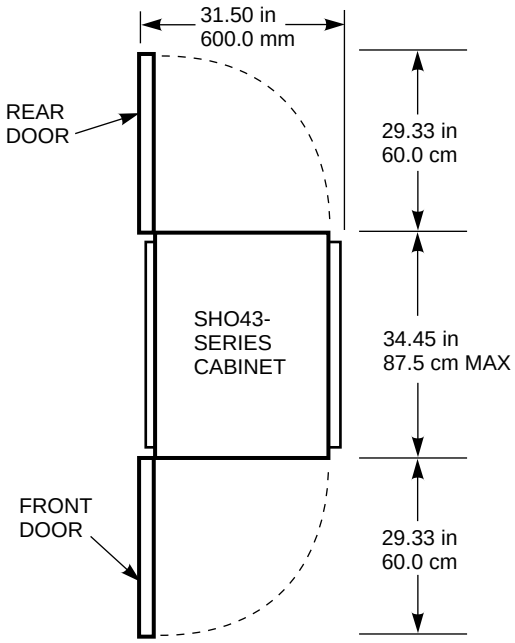
This chapter presents the information necessary to prepare a site for the installation of the StorageWorks SH043-series cabinet.

2.1 General Considerations

SH043-series cabinets are intended for installation in Class A computer room environments. Before installing the cabinet, make sure that the following conditions have been met:

- The primary power source can supply the required amount of ac power, as specified in Table 1–1.
- The site's primary power receptacles are the correct versions for the power plugs provided with the cabinet. The SH043-ZZ cabinet is supplied with a power cable that has an IEC 309 plug.)
- The site floor can safely bear the weight of the cabinet, as specified in Table 1–1. Keep in mind that the entire weight of the cabinet is borne by the small surface area of the four leveler feet when the cabinet is installed in its final position.
- Adequate space is provided around the cabinet for opening the front and rear doors, for accessing cables, and for adequate airflow. SH043-series cabinets are not designed to be fastened to adjacent cabinets. See Figure 2–1 for specific space requirements.

Figure 2–1 Minimum Installation Clearances



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- The cabinet is positioned to allow external interface cables to reach to the appropriate system units.
- If the cabinet is to be positioned next to other enclosures, there is sufficient service loop in any connecting cables to allow the cabinet to be moved out for access.

2.2 Equipment Grounding

SH043-series cabinets are normally connected to other equipment by one or more interface buses. For both safety and reliable operation, proper grounding is required between the cabinet and other equipment.

WARNING

If enclosures are not connected to a common ground, there is a potential for a personal injury as a result of electric shock.

WARNING

When connecting a terminal to a controller within the cabinet, proper grounding is required to prevent personnel injury and equipment damage. For optimum safety and performance, it is recommended that the terminal be powered by one of the two utility IEC outlets on the back of each cable distribution unit (CDU). A spare power cord is furnished with each cabinet for this purpose.

If ground offset voltages generated in the power distribution system are excessive, data transmission across interface buses can be affected. Significant performance degradation or possible data corruption could result. SH043-series cabinets are shipped with a ground strap (Digital part number 12–13756–A8) that is connected to the rear of the unit. For optimum safety and performance, Digital recommends that the ground strap be connected to the chassis of the **host** system.

Make sure that site power distribution systems meet local electrical codes prior to the installation of SH043-series cabinets.

To make sure that the power distribution system will perform satisfactorily, a power system survey should be done before installation. The following areas should be investigated:

- Do all outlets have power ground connections?
- Do the power cables on all equipment at the site have grounding prongs?
- Are all power outlet neutral connections isolated from ground?
- Are the grounds for all outlets connected to the same power distribution panel?
- Are all devices that are connected to the same breaker as the SH043 cabinet Underwriter's Laboratories (UL) or International Electrotechnical Commission (IEC) approved?

CAUTION

If there is a deficiency found in any area during the power survey, a qualified electrician must correct it before installation may begin. Failure to resolve power survey deficiencies before installing the equipment may result in personnel injury as a result of electric shock.

If no problems are found during the survey, the site grounding system may be considered to be adequate for personnel safety and reliable SH043-series cabinet operation.

3
Unpacking and Installation

This chapter describes the unpacking, installation, inspection, and powering of StorageWorks SH043-series cabinets.

3.1 Unpacking the Cabinet

SH043-series cabinets are packed in a corrugated carton attached to a wooden shipping pallet, as shown in Figure 3–1. Unpack the cabinet as follows:

Note

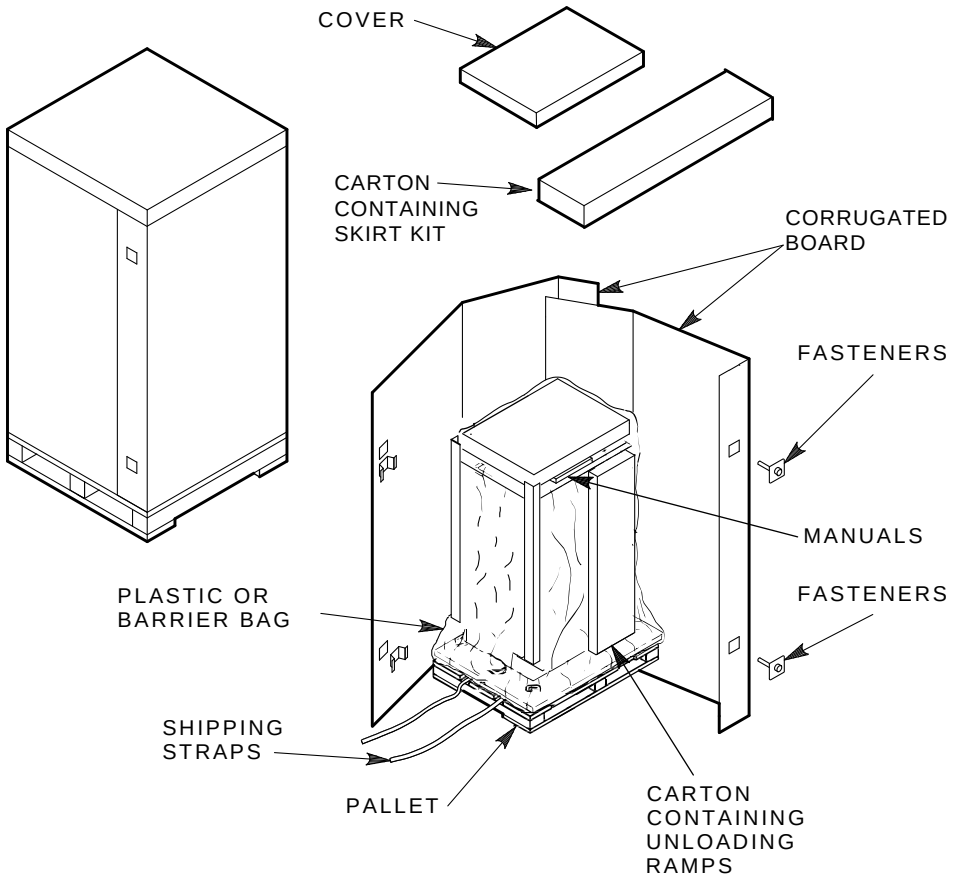
Before unpacking the equipment, inspect the shipping carton for signs of external damage. Report any damage to the local carrier and to Multivendor Customer Services or your local Digital sales office.

CAUTION

Failure to thermally stabilize preconfigured storage subsystems may damage drive media or associated electronics when the unit is turned on. Environmental stabilization begins when the equipment is placed in the room in which it is to be installed.

1. Remove the cover, the fasteners, and the corrugated board from the pallet.
2. Remove the cartons containing the ramp set and skirt kit and set them aside.
3. Cut the shipping straps. Some cabinets are packaged in a plastic or barrier bag. If the cabinet arrives in a plastic bag, leave the bag in place until the cabinet has adjusted to the local temperature and humidity. Refer to Appendix A for more information on environmental stabilization.
4. Once the cabinet is unpacked, examine the front and rear doors, right and left side panels, top panel, and undercarriage for any apparent damage. Report such problems immediately.
5. Retain the shipping container and all packing materials.

Figure 3–1 Shipping Container Contents



3.2 Removing the Cabinet from the Pallet

This section describes how to remove the cabinet from the pallet.

Use the following procedure to remove the cabinet from the shipping pallet:

1. Remove any packing material remaining on the pallet.

WARNING

Serious personal injury may result if correct safety precautions are not taken during the unpacking procedure. All personnel should wear safety glasses. The ramps, ramp side rails, and metal hardware should be inspected for the following defects:

- Cracks more than 25 percent of the ramp depth, either across or lengthwise on the ramp
- Knots or knotholes going through the thickness of the ramp and greater than 50 percent of the ramp width
- Loose, missing, or broken ramp side rails
- Loose, missing, or bent metal hardware

If any of these defects exist, do not use the ramp. Investigate alternate means of removing the cabinet or order a new ramp. (The part number for the ramp set is 99–08897–05.)

2. Remove the two unloading ramps from the carton and inspect them.
3. Attach the ramps by fitting the metal prongs into the holes on the pallet, as shown in Figure 3–2. Make sure that the arrows on the ramps match up with the arrows on the pallet.
4. Extend the ramps to their full length.
5. See Figure 3–3 for the location of the shipping bolts. Remove the bolts.
6. Remove the shipping brackets, shown in Figure 3–3, from the cabinet levelers and set them aside.

Figure 3–2 Shipping Pallet Ramp Installation

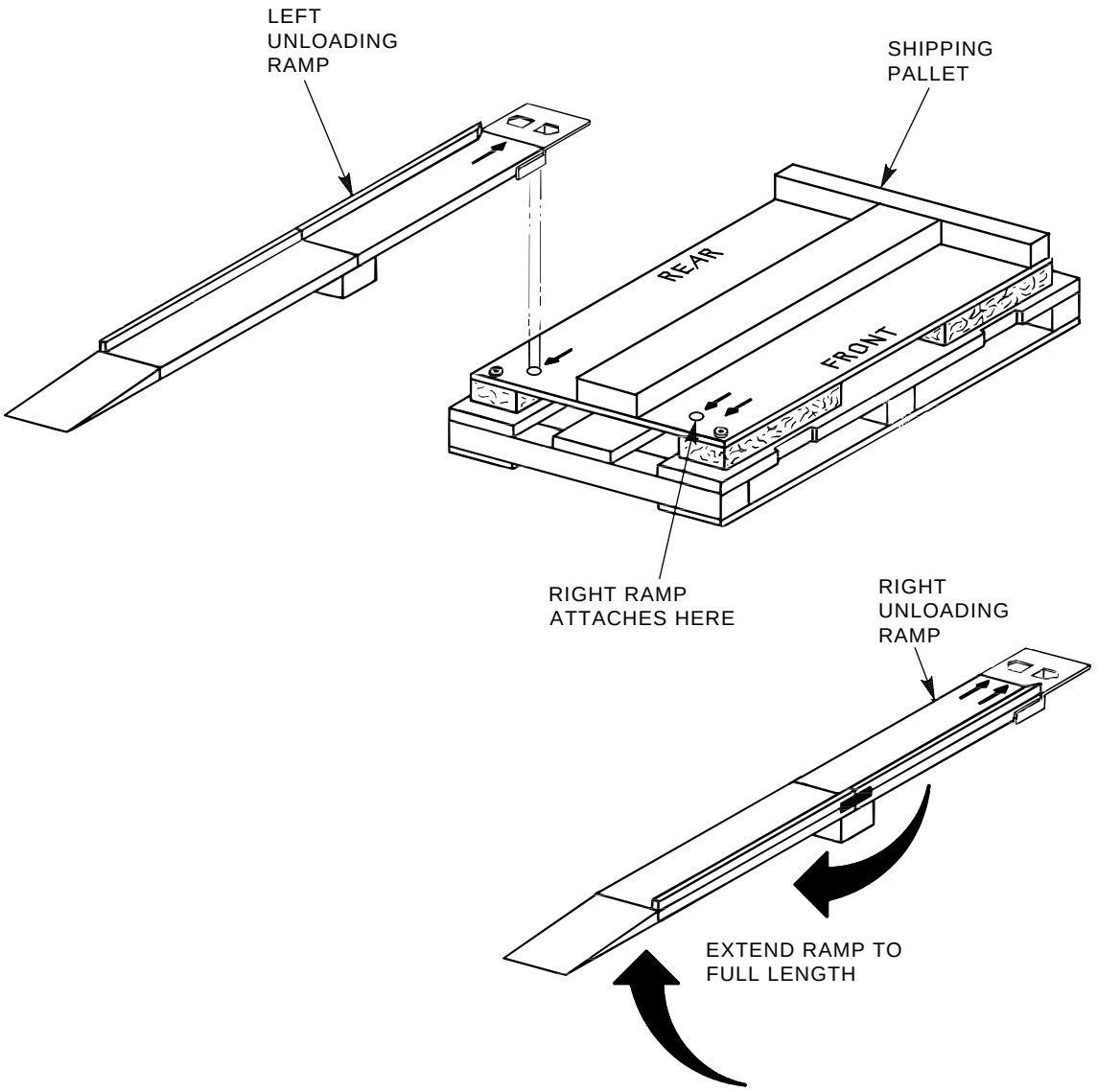
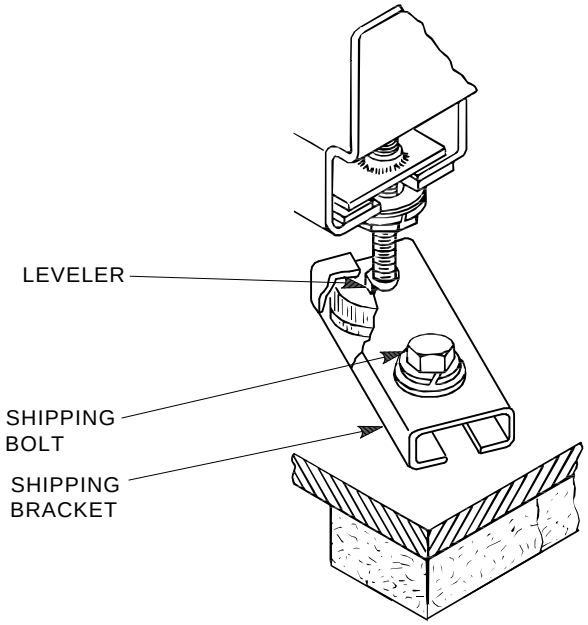


Figure 3–3 Shipping Bolts and Brackets



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WARNING

The levelers must be raised fully for the cabinet to roll easily down the unloading ramps. Failure to do so may result in personnel injury as a result of the cabinet tipping off the pallet or ramp.

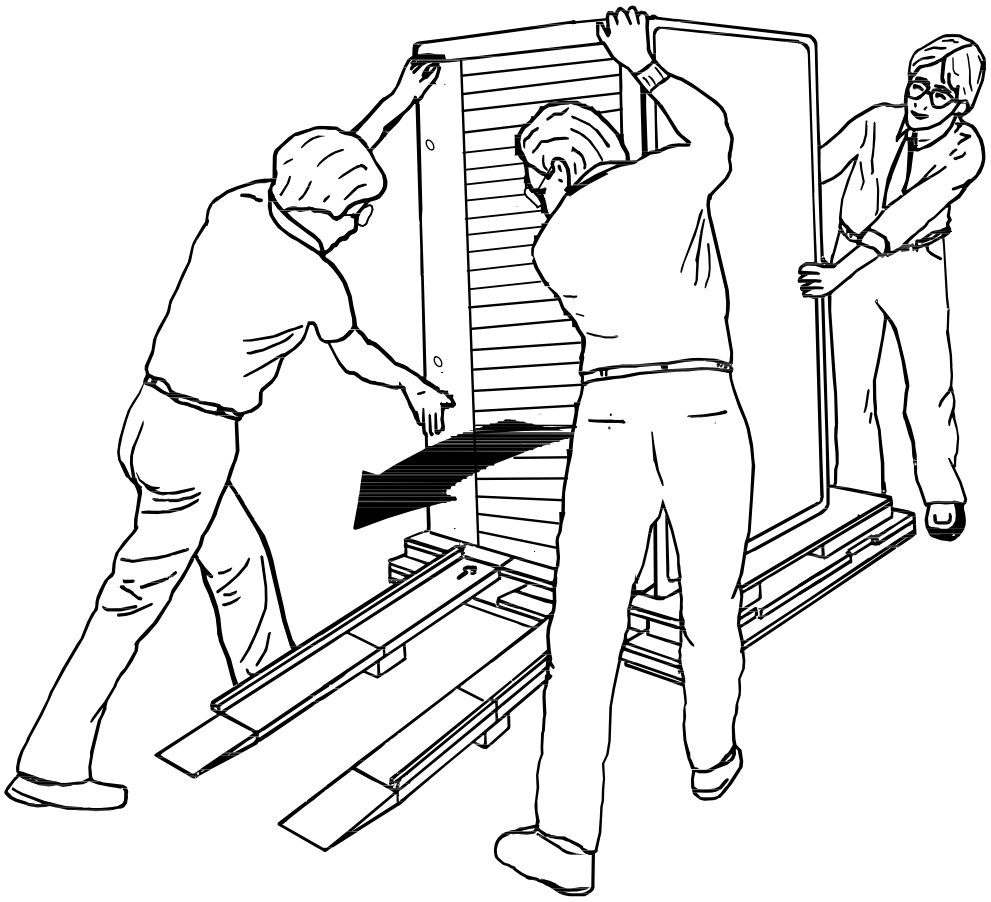
7. Loosen the leveler locking nuts and screw the four cabinet levelers all the way up into the cabinet.

WARNING

Three people are required to unload the cabinet from the shipping pallet. Failure to use sufficient personnel may result in injury and equipment damage.

8. Carefully roll the cabinet off the pallet and down the ramps to the floor as shown in Figure 3–4.

Figure 3–4 Removing the Cabinet from the Pallet



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3.3 Configuring the Cabinet Rack Space

Any shelves to be added to the cabinet should be installed before it is placed in its permanent position. See the chapter in this document pertaining to your specific cabinet configuration for the proper location of shelves. See Chapter 6 for detailed information and procedures regarding shelf bracket and shelf installation.

3.4 Placing the Cabinet

WARNING

Use extreme caution when rolling the cabinet across the floor. Failure to raise all leveler feet and to provide a clear path for the cabinet's casters may result in the cabinet tipping over and injury to personnel.

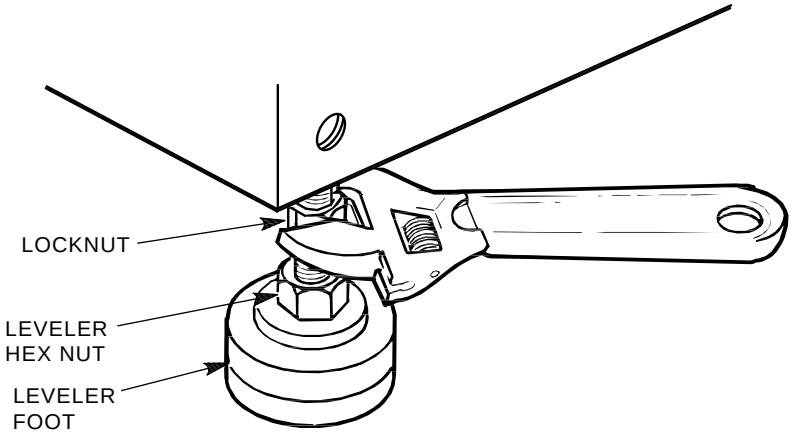
Once the cabinet rack space is configured as desired, the cabinet may be rolled to its final installation position. Secure loose cabinet cables up and out of the way when rolling the cabinet.

3.5 Leveling the Cabinet

Level the cabinet in its final position as follows:

1. Loosen the locknuts on all four leveler feet as shown in Figure 3–5.
2. Turn each leveler hex nut clockwise until the leveler foot contacts the floor.
3. Adjust all four leveler feet until the cabinet is level and the load is removed from all casters. Verify that the casters spin freely.
4. Tighten the locknuts on all four leveler feet.

Figure 3–5 Leveler Foot Adjustment



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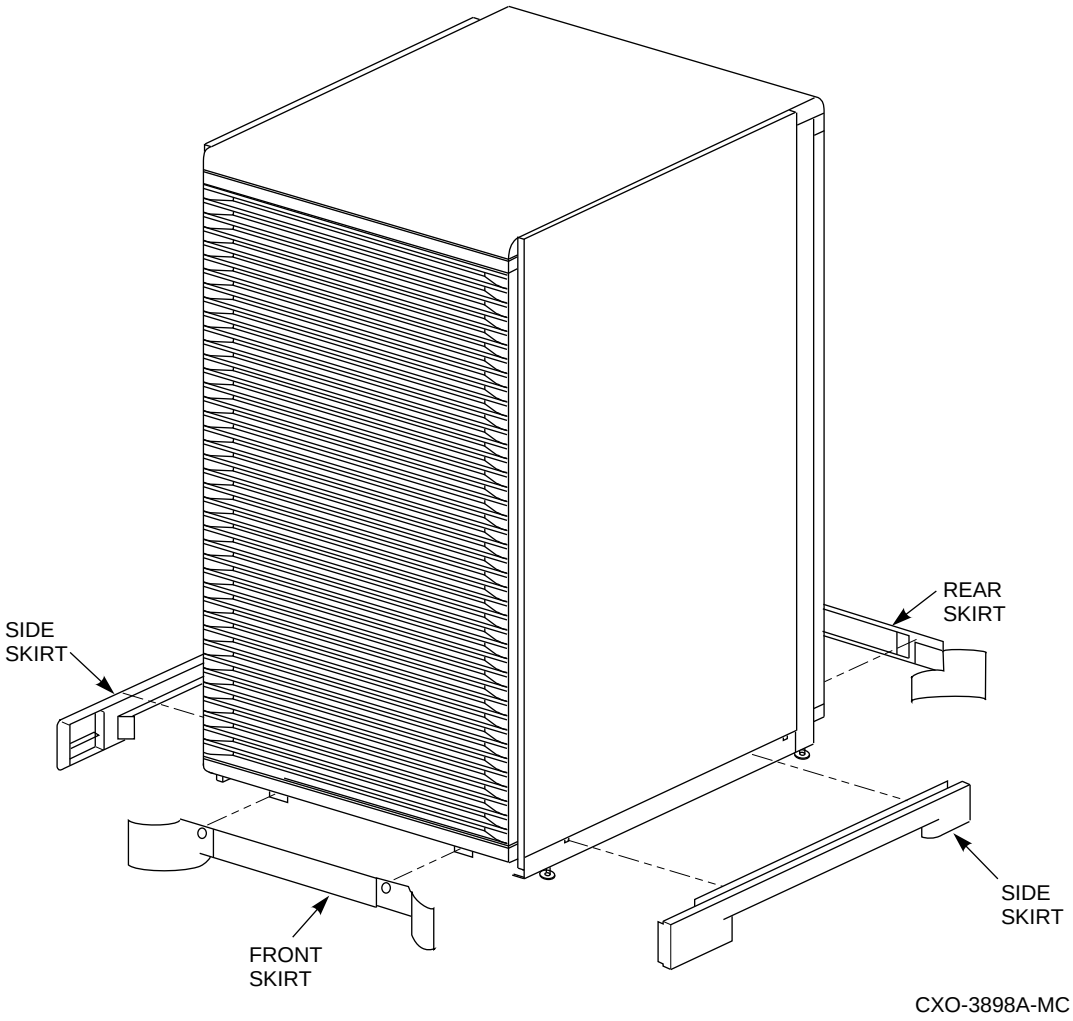
3.6 Installing the Skirt Kit

The skirt kit is packaged separately inside the corrugated carton with the cabinet. Installation of the skirt kit is optional. Install the skirt kit around the base of the cabinet as follows:

1. Unpack the skirt kit carton and use Figure 3–6 to identify the right, left, front, and rear skirts.
2. Position the skirts next to the cabinet, as shown in Figure 3–6.
3. The fasteners on the skirts consist of small pins with flat and barbed sides. Using a Phillips screwdriver, turn the fasteners on each skirt until the flat sides face up.
4. Position each skirt such that the fasteners mate with the receptacles on the cabinet's base.
5. Using a Phillips screwdriver, push each fastener straight into its mating receptacle on the cabinet base.

   (With the fasteners locked in place, a small amount of play allows the skirts to be adjusted slightly up or down for proper alignment.)

Figure 3–6 Cabinet Skirt Installation



3.7 Inspecting the Cabinet

Inspect the cabinet installation as follows:

1. Make sure that all hardware within the cabinet is fastened securely, and that there are no loose pieces present in the cabinet interior.
2. Make sure that all four leveller feet are lowered to support the full weight of the cabinet, and that the cabinet is level.
3. Make sure that there are no obstructions to the airflow from the shelf blowers. (The side panels may need to be removed to check the shelf blowers.)
4. Check the identification label on the rear of the cabinet to verify that the cabinet is configured to accept the power available at the site.
5. Make sure that all ac power cords connected from the shelves and cabinet fans to the CDUs are firmly seated in their connectors at both ends.
6. Make sure that all signal cables internal to the cabinet are firmly seated in their connectors at both ends.

7. Make sure that all SBBs are seated firmly in their shelves.
8. Make sure that any necessary external interface cables are installed and firmly seated in their connectors.
9. Make sure that the circuit breaker on each CDU is in the ○ (OFF) position.

3.8 Powering the Cabinet

Once the cabinet has been inspected, power may be applied as follows:

1. Plug the primary power cables from each CDU into the appropriate site power receptacles.
2. Switch the circuit breaker on each CDU to the | (ON) position.
3. Verify that all shelf blowers are operating and that both status indicators on each shelf power supply SBB are illuminated. Refer to the *StorageWorks Family User's Guide* for further information on shelf status indicators.

WARNING

Failure to reduce the leakage current can result in equipment performance degradation and personnel injury due to electric shock.

4. Measure the cabinet's leakage current. If the leakage current exceeds 3.5 mA after installation, Digital recommends that power cables with industrial type B, IEC 950 connectors be installed.
5. Initialize the storage subsystem. Procedures for initializing the cabinet's controller and storage devices are specific to the host system to which it is connected. Refer to the appropriate system documentation for initialization procedures.

4

Configuring SH043 Storage-Only Cabinets

This chapter describes the configuration of the SH043 storage-only cabinet. This storage subsystem uses only the StorageWorks SHDZZ–ZZ shelf type. The Small Computer Systems Interface 2 (SCSI–2) interface is used as the communications path between the cabinet's storage devices and their external controllers. SH043 storage-only cabinets can be configured with up to 10 storage shelves.

WARNING

While working in the cabinet interior, ac power must be removed from cabinet components. Failure to do so may result in personnel injury as a result of electric shock.

Prior to performing any of the procedures in this chapter, remove ac power from the cabinet components. If the cabinet is installed and operating, spin down all disk drives and halt all tape drives in the cabinet. Switch the circuit breaker on the front panel of the cabinet's cable distribution units (CDUs) to the ◯ (OFF) position.

4.1 Cabinet Configuration

WARNING

Failure to install cabinet components in the proper order could result in cabinet instability, injury to personnel, and damage to equipment.

Note

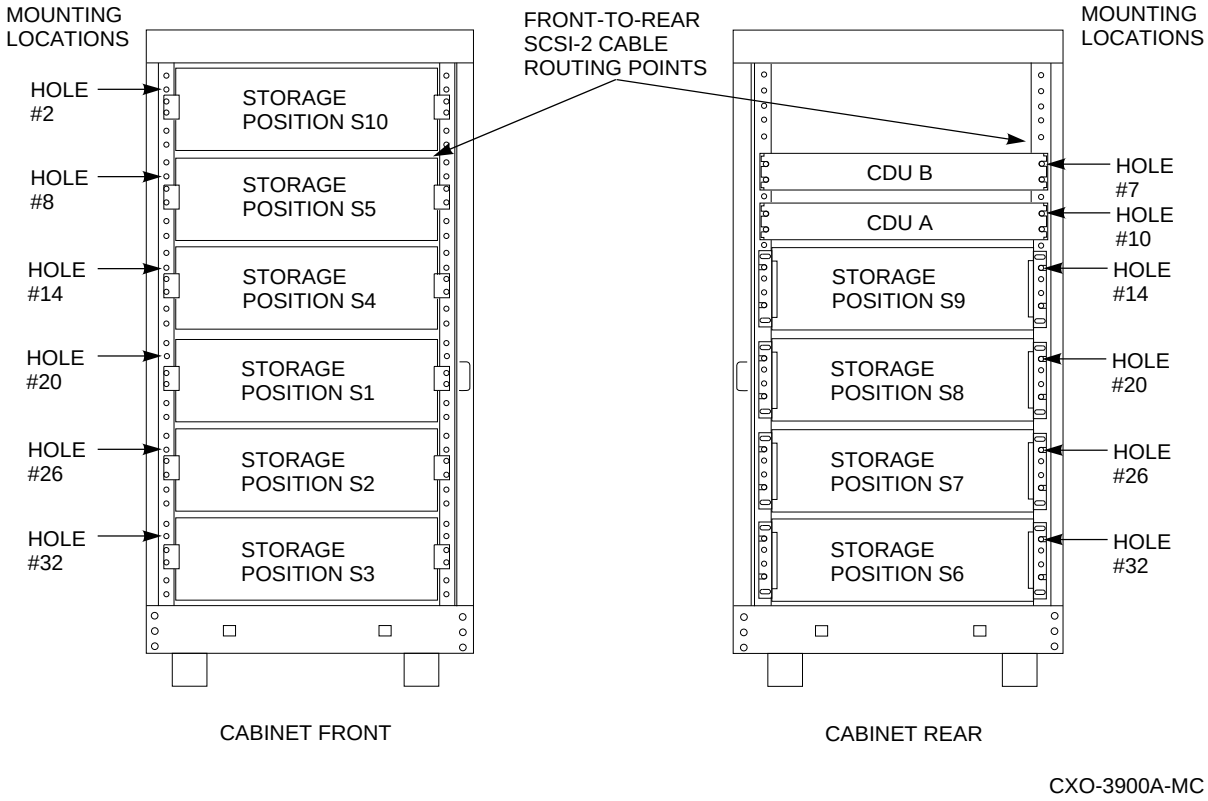
To maintain FCC compliance and proper airflow, filler panels and air separation panels must be installed as specified for your particular cabinet configuration. See Section 4.2 for further information.

The order of shelf installation in SH043 storage-only cabinets is predetermined to allow for cabinet loading and cable length factors. Figures 4–1 and 4–2 show the layout of both the front and rear of the storage-only cabinet. To prevent cabinet instability, shelves must be installed in the order shown by the position numbers in the illustrations.

4.1.1 Shelf Locations

Figure 4–1 shows the proper cabinet rail mounting holes for each shelf location when TZLX-series tape drives are not installed. Shelf mounting hole numbers are counted from the top of each rail. The hole number assignments shown in the figure identify the mounting holes for each shelf's *top* bracket screw. See Chapter 6 for detailed procedures pertaining to the mounting of StorageWorks shelves.

Figure 4–1 SH043 Storage-only Cabinet Shelf Locations



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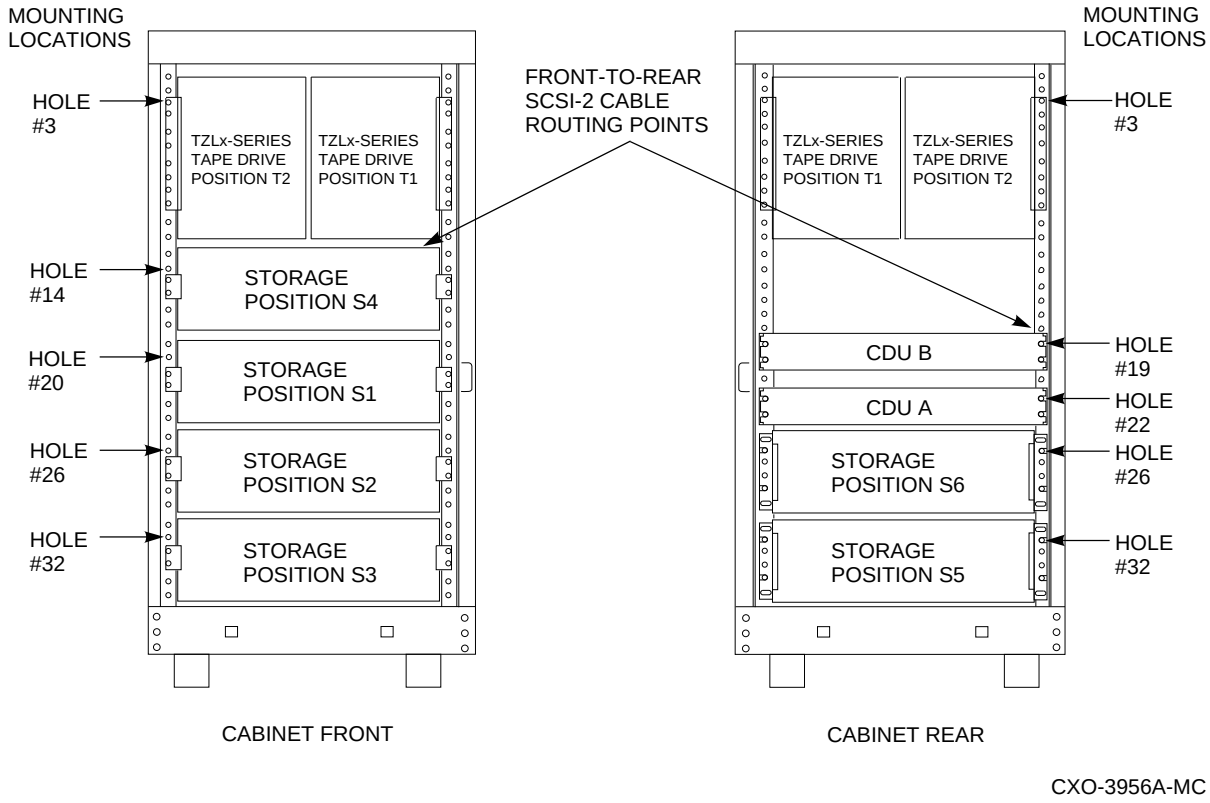
4.1.2 TZLX-Series Tape Drive/Shelf Locations

Figure 4–2 shows the proper cabinet rail mounting holes for each shelf location when TZLX-series tape drives are installed. Mounting hole numbers are counted from the top of each rail. The hole number assignments shown in the figure identify the mounting holes for each shelf's *top* bracket screw and for the *round standoff* chassis rail locating hole for TZLX-series tape drives. See Chapter 6 for detailed procedures pertaining to the mounting of StorageWorks shelves. See Chapter 7 for detailed procedures pertaining to the mounting of the tape drive. Note that the TZLX-series tape drive extends from the front to the rear of the SH043 cabinet and utilize the upper two shelf mounting positions on each side.

Figure 4–2 SH043 Storage-only Cabinet Shelf and Tape Drive Locations



4.2 Filler and Air Separation Panels

Note

To maintain FCC compliance and proper airflow, filler panels and air separation panels must be installed as specified for your particular cabinet configuration and in accordance with the following guidelines.

Filler panels can be installed in empty shelf positions to control air flow and electromagnetic emissions and for the purpose of cosmetics. Filler panels are normally supplied and installed based on the specific configuration of the SH043 storage-only cabinet ordered. At least two filler panels are shipped with each cabinet. Install filler panels using the following guidelines:

- If a particular filler panel configuration is specified for your cabinet, install the panels exactly as specified.
- If a particular filler panel configuration is not specified for your cabinet, use filler panels in all open slots *below* the highest shelf installed. Repeat for each side of the cabinet.
- To ensure proper cooling air flow, never install filler panels *above* the highest shelf installed in the cabinet.

See Chapter 6 for details on the installation of filler panels.

Two air separation panels are supplied with each cabinet. Install an air separation panel just above the upper-most shelf in each side of the cabinet. Air separation panels are not required above TZLX-series tape drives. See Chapter 6 for details on the installation of air separation panels.

4.3 Power Configuration

The power in SH043 storage-only cabinets can be configured in any of the forms described in Section 1.3. See Chapter 8 for detailed procedures on configuring power within the cabinet.

4.4 Signal Cabling and Routing

Signal cabling in the SH043 storage-only cabinet consists of inter-shelf SCSI–2 cabling and shelf-host SCSI–2 controller cabling.

4.4.1 Shelf SCSI–2 Cable Selection and Connection

Refer to the *StorageWorks Family Configuration Guide* and the *StorageWorks Family User's Guide* for details on how to select and connect SCSI–2 cables to the cabinet's shelves.

4.4.2 SCSI–2 Cable Routing

SCSI–2 signal cables enter SH043 storage-only cabinets through openings in the rear edges of the base pan of the cabinet. Cables destined for rear shelves are normally routed along the base pan to the right-most vertical rail. They are then routed to the the right-hand side of each rear shelf along the rail.

SCSI–2 cables destined for front shelves are routed along the base pan and up the right-hand vertical cabinet rail to a point just above the CDUs (refer to Figures 4–1 and 4–2). They then pass into the interior of the cabinet and across to an opening in the vertical chassis rail behind the two right-hand shelf brackets of positions S5 and S10. They pass through the opening and out to the front of the cabinet through the space between the S5/S10 shelf brackets. On the front of the cabinet, cables are normally routed along the right vertical cabinet rail to the right-hand side of each shelf along the rail. Half-meter, SCSI–2 cables are normally used to link adjacent shelves to each other.

When TZLX-series tape drives are installed, there is a space between the bottom of the drives and shelf position S4 (refer to Figure 4–2). This space is normally used for the routing of SCSI–2 cables from the rear to the front of the cabinet.

4.4.3 General Cable Routing Rules

Cables should be routed and installed with the following rules in mind:

WARNING

Cabinet rail edges may be sharp and can slice or abrade skin or cable insulation.

- Cables should be routed in a manner that allows the shortest overall cable length.
- Signal cables should be kept away from power cables.
- Care should be taken to avoid sharp cable bends.

- Cables should be routed to allow StorageWorks building blocks (SBBs) and controller modules to be freely inserted and removed from their shelves.
- Cables should not be routed tightly against the metal edges of the cabinet.
- Signal cable bundling along the outside of the cabinet rails should be done to allow the doors to easily close.
- Cables should be fastened along cabinet rails using cable ties or nylon cable clamps, U-nuts, and screws. Added cables should be included in existing cable clamps where possible.

5

Configuring SH043 Controller/Storage Cabinets

This chapter describes the configuration of SH043 controller/storage cabinets. These storage subsystems use StorageWorks HS-family array controllers mounted in SHxzz–zz shelves. Storage devices are housed in SHDZZ–ZZ shelves. StorageWorks HS-family array controllers use the Small Computer System Interface 2 (SCSI–2) interface as the communication path with the host computer. The SCSI–2 interface is used as the storage device bus in all subsystems. SH043 controller/storage cabinets can be configured with up to four controllers in redundant pairs and with up to nine storage shelves.

Refer to the *StorageWorks BA350–EA Modular Storage Shelf User's Guide* for further information on HS-family array controllers and their installation.

WARNING

While working in the cabinet interior, ac power must be removed from cabinet components. Failure to do so may result in personnel injury as a result of electric shock.

Prior to performing any of the procedures in this chapter, remove ac power from the cabinet components. If the cabinet is installed and operating, spin down all disk drives and halt all tape drives in the cabinet. Switch the circuit breaker on the front panel of the cabinet's cable distribution units (CDUs) to the ◯ (OFF) position.

5.1 Cabinet Configuration

WARNING

Failure to install cabinet components in the proper order could result in cabinet instability, injury to personnel, and damage to equipment.

Note

To maintain FCC compliance and proper airflow, filler panels and air separation panels must be installed as specified for your particular cabinet configuration. See Section 5.2 for further information.

The order of shelf installation in SH043 controller/storage cabinets is predetermined to allow for cabinet loading and cable length factors. Figures 5–1 and 5–2 show the layout of both the front and rear of the controller/storage cabinet. To prevent cabinet instability, shelves must be installed in the order shown by the position numbers in the illustrations.

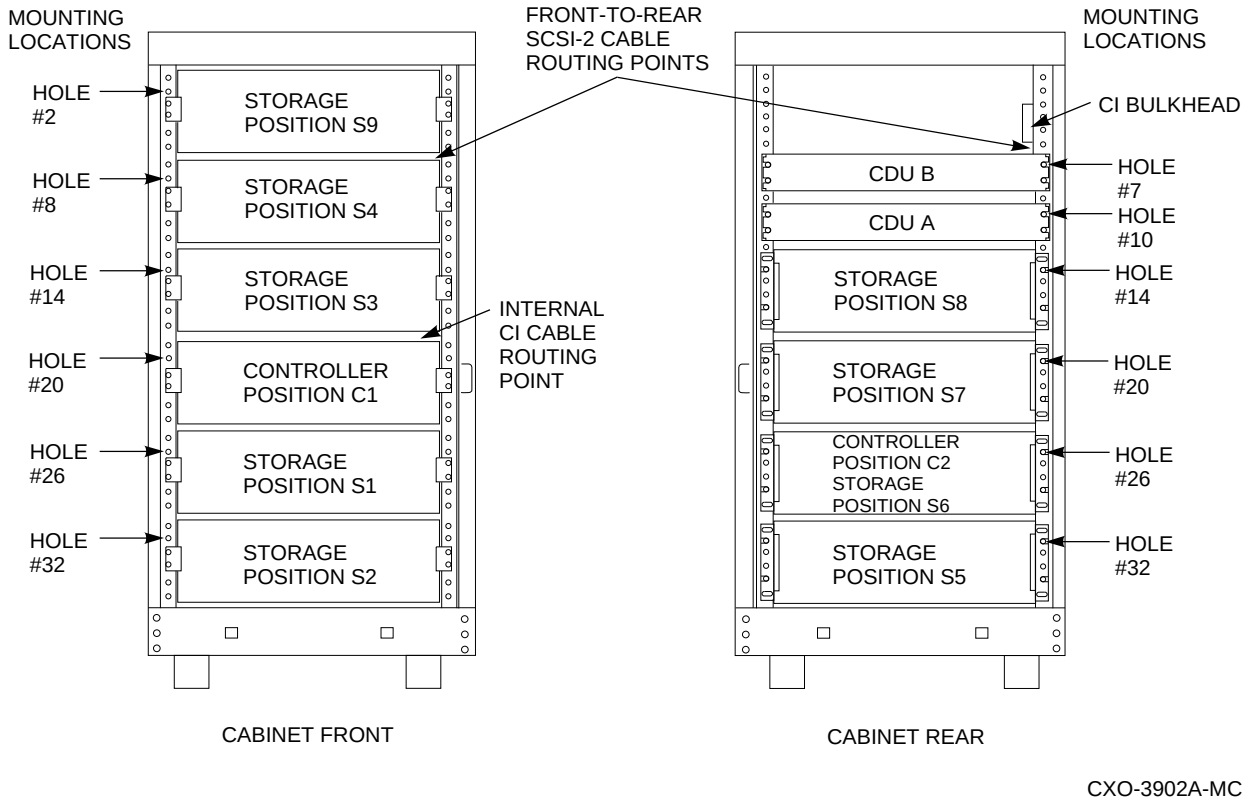
5.1.1 Shelf Locations

Figure 5–1 shows the proper cabinet rail mounting holes for each shelf location when TZLX-series tape drives are not installed. Note that storage position S7 may instead be used for the installation of a second controller shelf. Shelf mounting hole numbers are counted from the top of each rail. The hole number assignments shown in the figure identify the mounting holes for each shelf's *top* bracket screw. See Chapter 6 for detailed procedures pertaining to the mounting of StorageWorks shelves.

Note

The SHxzz–zz controller/storage shelf consists of a controller shelf with an attached storage shelf. In systems using SHxzz–zz shelves but not using tape drives, storage positions S1 and S6 are physically attached to and are dedicated to their respective controllers.

Figure 5–1 SH043 Controller/Storage Cabinet Shelf Locations



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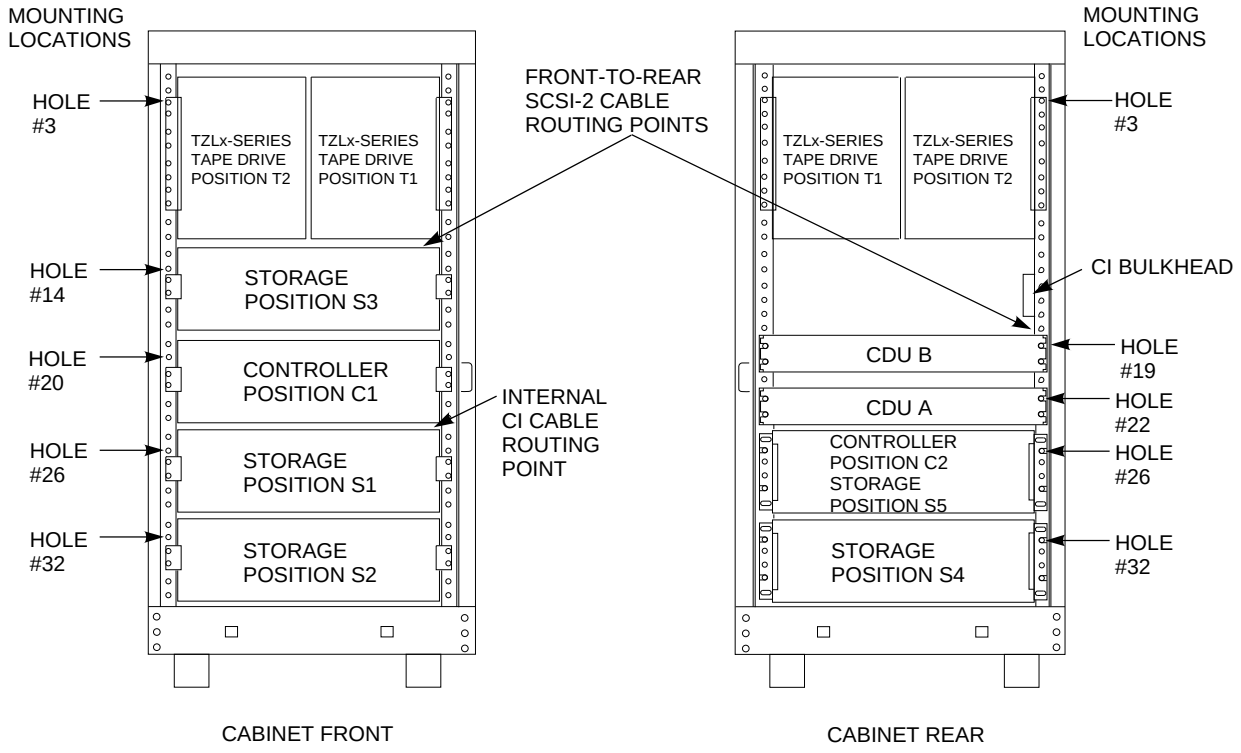
5.1.2 TZLX-Series Tape Drive/Shelf Locations

Figure 5–2 shows the proper cabinet rail mounting holes for each shelf location when TZLX-series tape drives are installed. Mounting hole numbers are counted from the top of each rail. The hole number assignments shown in the figure identify the mounting holes for each shelf's *top* bracket screw and for the *round standoff* slide locating hole for the TZLX-series tape drives. Refer to Chapter 6 for detailed procedures pertaining to the mounting of StorageWorks shelves. Refer to Chapter 7 for detailed procedures pertaining to the mounting of TZLX-series tape drives. Note that the TZLX-series tape drive extends from the front to the rear of the SH043 cabinet and utilizes the upper two shelf mounting positions on each side.

Note

The SHxzz–zz controller/storage shelf consists of a controller shelf with an attached storage shelf. In systems using SHxzz–zz shelves and TZLX-series tape drives, storage positions S1 and S4 are physically attached to and are dedicated to their respective controllers.

Figure 5–2 SH043 Controller/Storage Cabinet Shelf and Tape Drive Locations



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5.2 Filler and Air Separation Panels

Note

To maintain FCC compliance and proper airflow, filler panels and air separation panels must be installed as specified for your particular cabinet configuration and in accordance with the following guidelines.

Filler panels can be installed in empty shelf positions to control air flow and electromagnetic emissions and for the purpose of cosmetics. Filler panels are normally supplied and installed based on the specific configuration of the SH043 controller/storage cabinet ordered. At least two filler panels are shipped with each cabinet. Install filler panels using the following guidelines:

- If a particular filler panel configuration is specified for your cabinet, install the panels exactly as specified.
- If a particular filler panel configuration is not specified for your cabinet, use filler panels in all open slots *below* the highest shelf installed. Repeat for each side of the cabinet.
- To ensure proper cooling air flow, never install filler panels *above* the highest shelf installed in the cabinet.

Refer to Chapter 6 for details on the installation of filler panels.

Two air separation panels are supplied with each cabinet. Install an air separation panel just above the upper-most shelf in each side of the cabinet. Air separation panels are not required above TZLX-series tape drives. Refer to Chapter 6 for details on the installation of air separation panels.

5.3 Power Configuration

The power in SH043 controller/storage cabinets can be configured in any of the forms described in Section 1.3. Refer to Chapter 8 for detailed procedures on configuring power within SH043 controller/storage cabinets.

5.4 Host SCSI–2 Signal Cabling and Routing

The SCSI–2 interface cables used to communicate with the host are routed directly from the controller to the host. A intermediate bulkhead is not used.

5.4.1 Host SCSI–2 Signal Cable Routing

Route the host SCSI–2 interface cables as follows:

1. Route host SCSI–2 cables into SH043 controller/storage cabinets through the openings in the rear edges of the base pan of the cabinet.
2. Route host SCSI–2 cables destined for rear controllers directly up the rear right-hand vertical rail to the rear controller shelf.
3. Route host SCSI–2 cables destined for rear controllers along the base pan to the rear right-hand vertical rail and upward to the pass-through location shown in either Figure 5–1 or 5–2.

4. Route the cables from the pass-through location to their respective controllers as follows:
   - Route the cable across the interior of the cabinet to an opening in the vertical cabinet rail behind the two right-hand shelf brackets of positions C1 and S3 (refer to Figures 5–1 and 5–2).
   - Pass the cable through the opening and out to the front of the cabinet through the space between the C1/S3 shelf brackets to the front controller in position C1.

5.5 Shelf Signal Cabling and Routing

5.5.1 Shelf SCSI–2 Cable Selection and Connection

Refer to the *StorageWorks Family Configuration Guide* and the *StorageWorks BA350-EA Modular Storage Shelf User's Guide* for details on the selection of SCSI–2 cables and their connection to the cabinet's shelves.

5.5.2 SCSI–2 Cable Routing

SCSI–2 cables from the front controller to the controller's associated front storage shelves are normally routed along the right-hand vertical cabinet rail to the right-hand side of each shelf. Half-meter, SCSI–2 cables are normally used to link adjacent shelves or tape drives to each other.

SCSI–2 cables connecting front shelves to rear shelves pass to the rear of the cabinet via the opening between the right-hand shelf brackets at positions S4 and S9 (refer to Figure 5–1). They pass through this opening and into the interior of the cabinet through the opening in the vertical cabinet rail behind the S4/S9 brackets. They then pass across the interior of the cabinet to the unused shelf position above the CDUs. They pass through the right-hand side of the unused shelf position and along the right-hand cabinet rail to the appropriate rear shelves.

When TZLX-series tape drives are installed, there is a space between the bottom of the drives and shelf position S3 (refer to Figure 5–2). This space is normally used for the routing of SCSI–2 cables from the rear to the front of the cabinet.

Table 5–1 specifies the SCSI–2 cable length required to connect each controller position with its companion shelves in SH043 controller/storage cabinets.

Table 5–1 SH043 Controller/Storage Cabinet SCSI–2 Cable Lengths

Controller Position	Storage Shelf Position	Cable Length Required
C1	S1, S2, S3, S4, S9	1.00 m (3.28 ft)
C1	S5, S6, S7, S8	2.00 m (6.56 ft)
C1	T1, T2	2.00 m (6.56 ft)
C2	S5, S6, S8	1.00 m (3.28 ft)

Following are some standard SCSI–2 bus configurations:

Shelf connections for single-controller systems with no tape drives are as follow (refer to Figure 5–1):

- Single storage shelf

  C1–S1 C1–S2 C1–S3 C1–S4 C1–S5 C1–S6

- Serially cabled multiple storage shelves

  C1–S1–S2 C1–S3–S4 C1–S5 C1–S6 C1–S7

Shelf connections for single-controller systems with tape drives are as follow (refer to Figure 5–2):

C1–S1 C1–S2 C1–S3 C1–S4 C1–S5 C1–T1–T2

Shelf connections for dual-controller systems with single storage shelves are as follows (refer to Figure 5–1):

C1–S1 C1–S2 C1–S3 C1–S4 C1–S9 C2–S6 C2–S8

5.6 General Signal Cable Routing Rules

Cables should be routed and installed with the following rules in mind:

WARNING

Cabinet rail edges may be sharp and can slice or abrade skin or cable insulation.

- Cables should be routed in a manner that allows the shortest overall cable length.
- Signal cables should be kept away from power cables.
- Care should be taken to avoid sharp cable bends.
- Cables should be routed to allow SBBs and controller modules to be freely inserted and removed from their shelves.
- Cables should not be routed tightly against the metal edges of the cabinet.
- Signal cable bundling along the outside of the cabinet rails should be done to allow the doors to easily close.
- Cables should be fastened along cabinet rails using cable ties or nylon cable clamps, U-nuts, and screws. Added cables should be included in existing cable clamps where possible.

6

Installing StorageWorks Shelves

This chapter describes the details of the installation of StorageWorks shelves into SH043-series cabinets. Procedures for front and rear shelf installation are presented. The installation of filler panels and air separation panels in both the front and rear of the cabinet are also covered.

6.1 General Shelf Mounting Considerations

Note

In the following descriptions and procedures, the terms *front* and *rear* are references to locations in the cabinet. The terms *inner* and *outer* are references to positions on the shelf brackets.

Each StorageWorks shelf is mounted in the cabinet with a bracket set (BA35x–RB) (Refer to Figure 1–2.) Each bracket set consists of a pair of shelf brackets, stop brackets, and locking brackets. (A typical bracket set is shown in Figure 6–2.) The stops are attached to the inner portion of the shelf brackets to position the shelf within the bracket. The locking brackets fix the shelf in place. Various combinations of stop positions and locking bracket size are necessary to situate a particular shelf for proper clearance from the cabinet doors.

The same shelf bracket and stop bracket parts are used to mount all types of StorageWorks shelves in all locations. The bracket set for shelves mounted in various positions in the cabinet differs only in that the locking brackets are unique parts sized for specific cabinet positions.

Filler panels are installed in some unused shelf positions in the cabinet. Filler panels are normally installed after shelf installation

An air separation panel is required in both the front and rear of the cabinet to prevent the recirculation of heated air to the cabinet's shelves. The air separation panels are mounted just above the upper-most shelf in each side of the cabinet. Air separation panels are normally installed after shelf installation.

WARNING

While working in the cabinet interior, ac power must be removed from cabinet components. Failure to do so may result in personnel injury as a result of electric shock.

Prior to performing any of the procedures in this chapter, remove ac power from the cabinet components. If the cabinet is installed and operating, spin down all disk drives and halt all tape drives in the cabinet. Switch the circuit breaker on the front panel of the cabinet's CDUs to the ◯ (OFF) position.

6.2 Accessing the Cabinet Rack Space

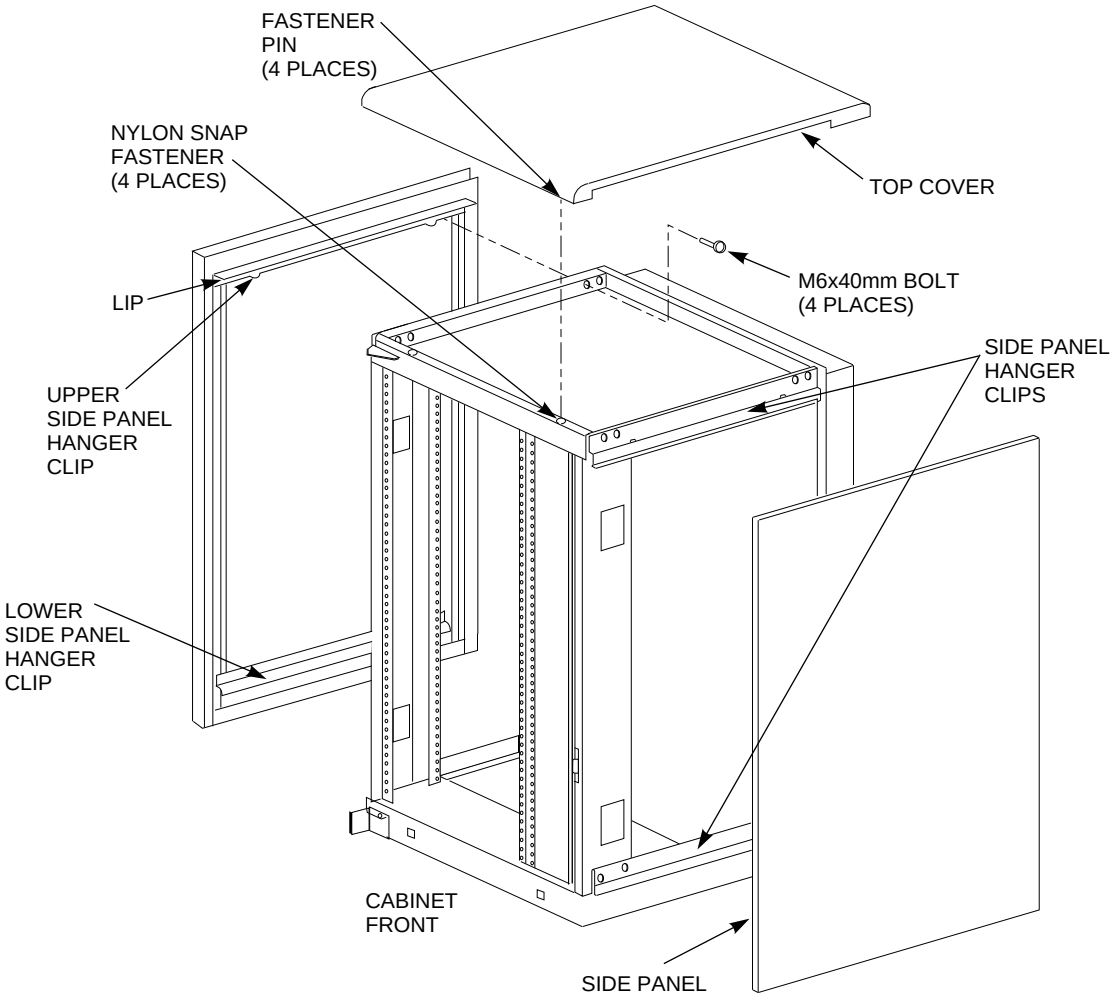
In maximum configurations where access to the interior of the cabinet is limited, external cabinet panels may need to be removed before shelves can be installed or reconfigured. Section 6.2.1 presents procedures for removing exterior cabinet panels.

The front and rear cabinet doors are held closed by locks mounted near the top and bottom of each door. The locks are released by turning them counterclockwise with a 5/32-inch hex wrench.

6.2.1 Removing the Exterior Cabinet Panels

As shown in Figure 6–1, there are two side panel hanger clips on each side of the cabinet. A matching set of hanger clips are attached to each side panel. Remove the side panels as follows:

Figure 6–1 Exterior Cabinet Panel Removal and Installation



NOTE: FRONT AND REAR DOORS NOT SHOWN FOR CLARITY

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1. Move the cabinet away from adjacent enclosures as necessary.
2. Loosen the top cover by pushing up on its front and rear edges until it snaps free of its fasteners.

WARNING

The top cover is heavy and awkward to lift. Removing it is a two-person task. Failure to use sufficient personnel may result in injury or equipment damage.

3. Using two persons, lift the top cover from the cabinet and set it aside.
4. Remove the bolts attaching the side panels to the top side rails of the cabinet.
5. Grasp a panel along its front and rear edges and lift up until the hanger clips disengage. Lift the panel away from the cabinet.
6. Repeat the previous step to remove the other panel.

6.3 Installing the Shelves

Shelf bracket installations for front and rear shelves are shown in Figures 6–2 and 6–3. Using the illustrations as a guide, install shelf brackets as follows:

WARNING

Cabinet rail edges may be sharp and can slice or abrade skin or cable insulation.

Note

Two small ESD grounding posts are provided with the cabinet. One is located on a front vertical cabinet rail, and one on a rear rail. Should an ESD grounding post interfere with the installation of a shelf, move the post out of the way to any free hole on the cabinet.

1. Turn the cabinet power off as described in Section 6.1.
2. Determine the correct shelf mounting locations and corresponding cabinet rail mounting holes for the shelf bracket. Refer to the chapter in this document pertaining to your specific cabinet configuration for this information.
3. Position the shelf bracket at the correct mounting holes just behind the outer flange of the vertical cabinet rail, as shown.
4. Using the shelf bracket as a template, mark the two U-nut mounting holes on the inner flange of the cabinet rail.
5. Remove the shelf bracket and install two U-nuts along the inner flange of the cabinet rail at the holes marked in step 4.
6. Position and fasten the shelf bracket to the outer flange of the cabinet rail with two screws, as shown.
7. Fasten the bracket to the U-nuts with two screws.

8. Using Table 6–1, determine the correct stop bracket position for the shelf type being installed.

Table 6–1 Shelf Stop Bracket Positions

StorageWorks Shelf Type	Front Shelf Stop Bracket Position	Rear Shelf Stop Bracket Position
SHDZZ–ZZ	4	1

9. Insert the tab on the stop bracket into the slot at the correct stop position on the shelf bracket. Fasten the stop bracket to the shelf bracket, as shown.
10. Repeat steps 2 through 9 to mount the companion shelf bracket on the opposite cabinet rail. To ensure proper alignment of the brackets, use care to mount the bracket to the correct rail mounting holes.
11. With the power supply end of the shelf to the left and the blowers facing the cabinet, slide the shelf into the shelf brackets until it contacts the inner stop brackets. The shelf should slide smoothly into the brackets. If it binds, remove it and check the alignment of the shelf brackets. The shelf bracket mounting screws may need to be loosened slightly to allow the brackets to align with the shelf. Retighten the screws when the shelf brackets are properly aligned.
12. Using Table 6–2, verify that you have the correct locking bracket part number for the shelf type and position (front or rear) being installed.

Table 6–2 Shelf Locking Bracket Part Numbers

StorageWorks Shelf Type	Front Shelf Locking Bracket Part No.	Rear Shelf Locking Bracket Part No.
SHDZZ–ZZ	74–46441–01	74–46439–01

13. Once the shelf is positioned within the shelf brackets, install the shelf's locking brackets to both shelf brackets with screws, as shown. Push the locking bracket against the shelf to seat it before tightening the screws.

Figure 6–2 Horizontal Shelf Bracket Installation

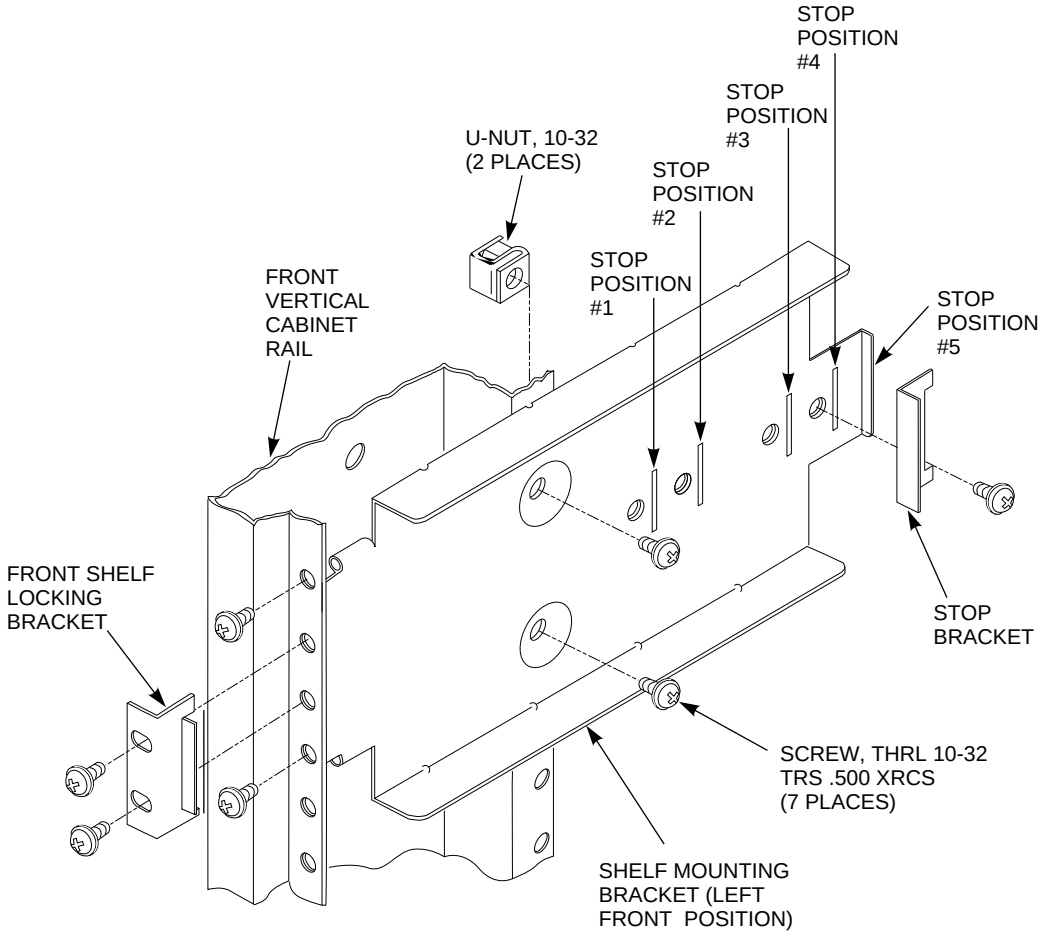
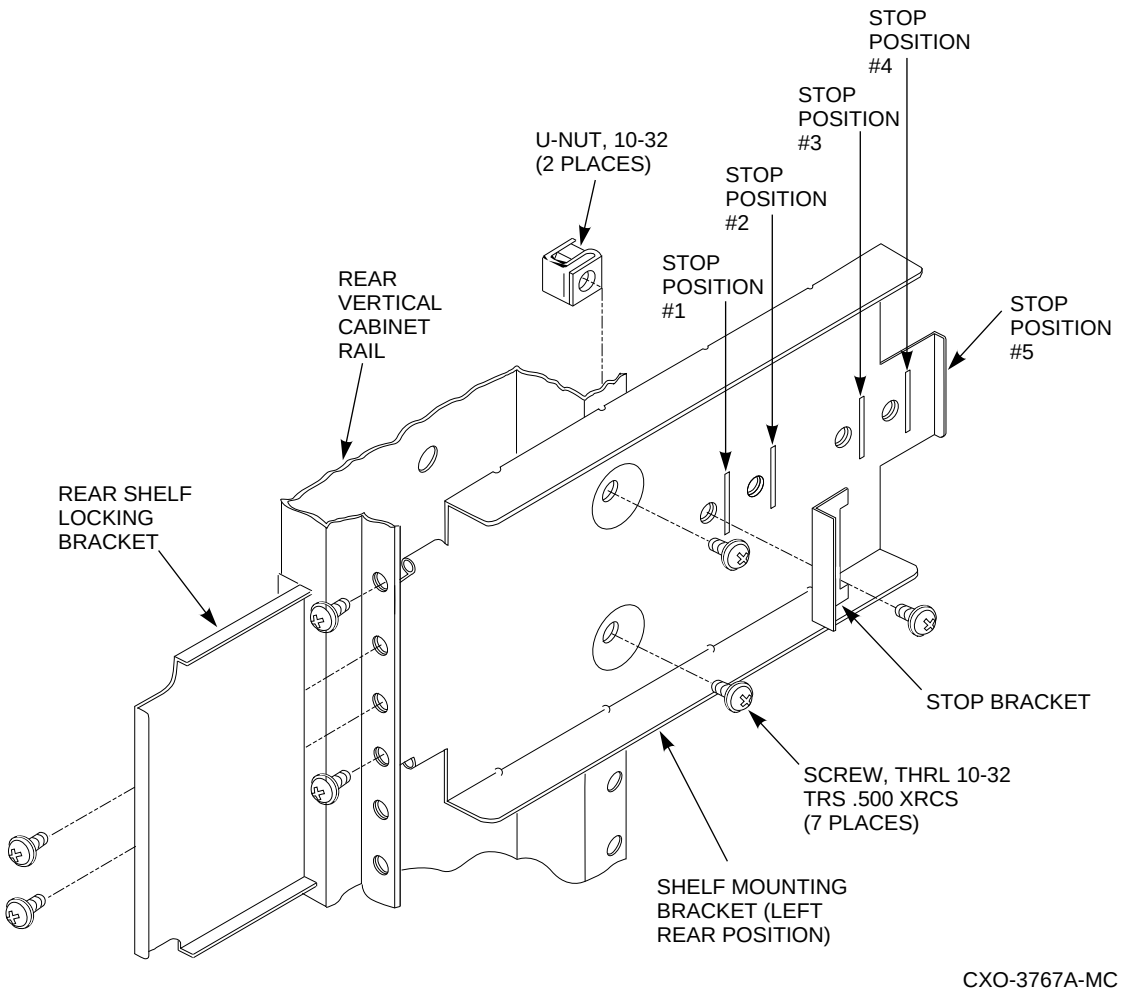


Figure 6–3 Rear Shelf Bracket Installation



6.4 Filler Panel Installation

Filler panels are attached to the cabinet with four screws and U-nuts. Install a filler panel in an unused shelf location as follows:

- Place the filler panel against the cabinet rails in the shelf position to be covered.
- Use the panel as a template to mark the U-nut locations on the cabinet rails.
- Remove the filler panel from the cabinet rails.
- Install four, 10-32 U-nuts on the cabinet rails in the locations marked in step 2.
- Mount the filler panel to the cabinet rails using four, 10-32 screws.

6.5 Air Separation Panel Installation

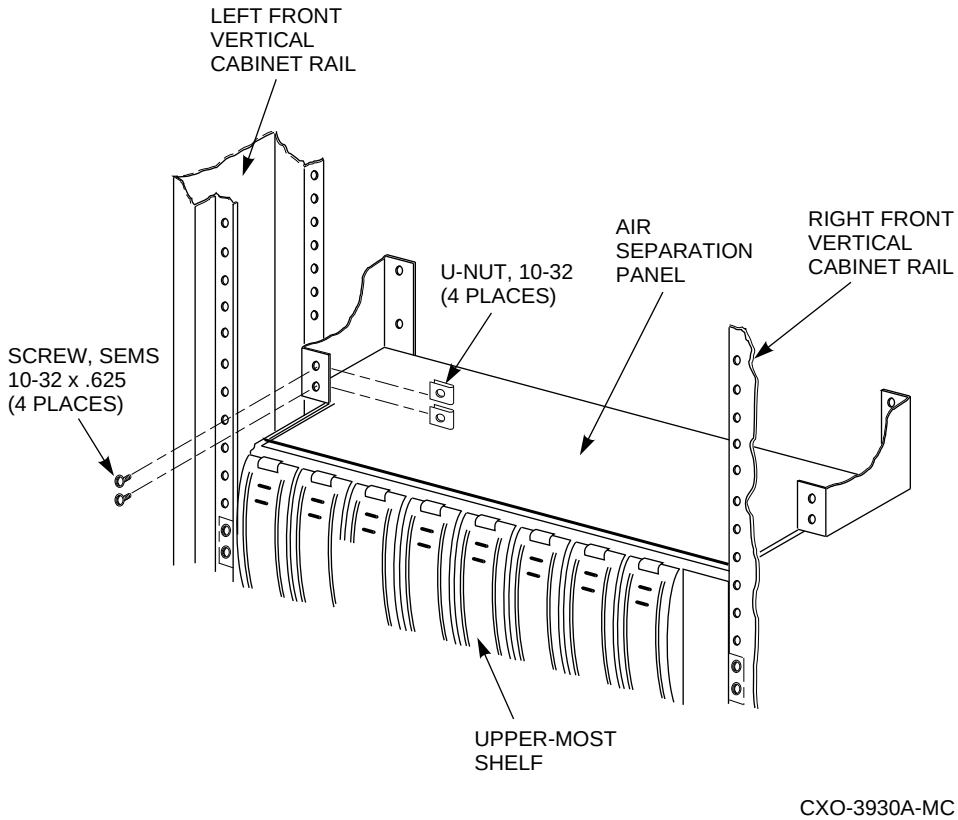
Once the cabinet's shelves are configured, the air separation panels must be installed. The front and rear air separation panels are identical parts, but they are positioned in different ways depending upon where in the cabinet they are installed. Install the air separation panels in both the front and rear of the cabinet as described in Sections 6.5.1 and 6.5.2.

6.5.1 Installing the Front Air Separation Panel

Install the front air separation panel as follows (see Figure 6–4):

1. Install four U-nuts on the air separation panel, as shown.
2. Position the air separation panel just behind the front vertical cabinet rails, as shown. Position the panel as closely as possible to the top of the upper-most front cabinet shelf.
3. Fasten the air separation panel to the front vertical cabinet rails with four screws, as shown.

Figure 6–4 Front Air Separation Panel Installation



6.5.2 Installing the Rear Air Separation Panel

The rear air separation panel is installed just above the upper-most shelf in the rear of the cabinet. If CDU A is in this position, the air separation panel is installed against its front panel. Install the rear air separation panel as follows (see Figures 6–5 and 6–6):

1. If CDU A is mounted in the position just above the upper-most shelf in the rear of the cabinet, support the CDU in position against the rear vertical cabinet rails while removing its mounting screws, as shown in Figure 6–5.

   If the position just above the upper-most shelf is open, install four U-nuts on the vertical cabinet rails, as shown in Figure 6–6.

2. Position the air separation panel against the front panel of CDU A or the four U-nuts, as shown in either Figure 6–5 or 6–6, respectively.

3. Fasten the air separation panel (along with CDU A, if appropriate) to the rear vertical cabinet rails with four screws, as shown.

Figure 6–5 Rear Air Separation Panel Installation (Shelf installed directly below CDU A)

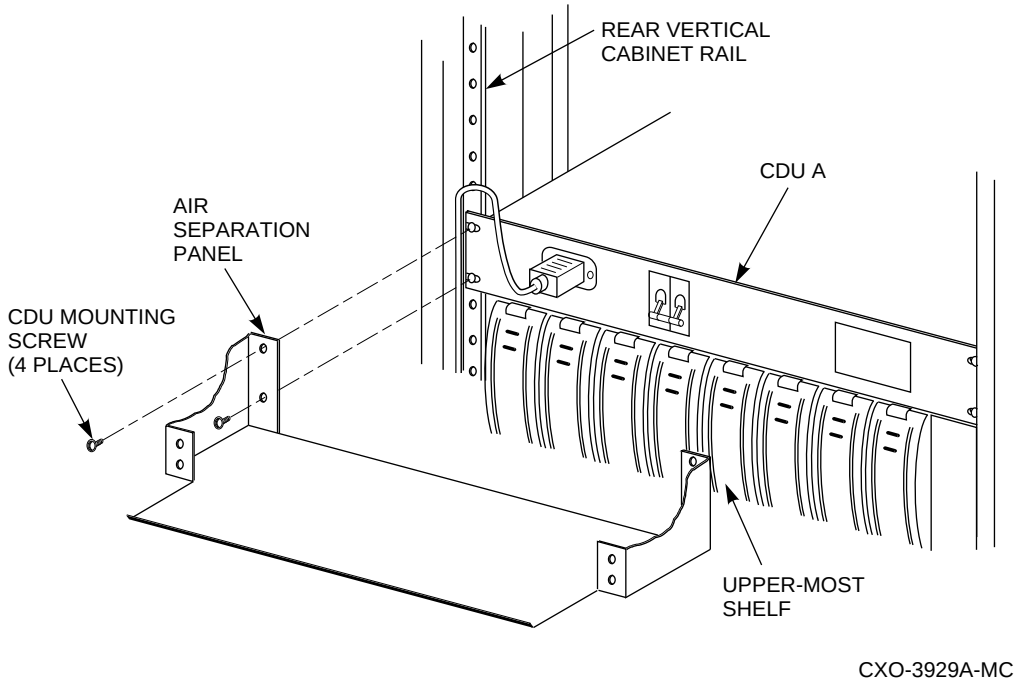
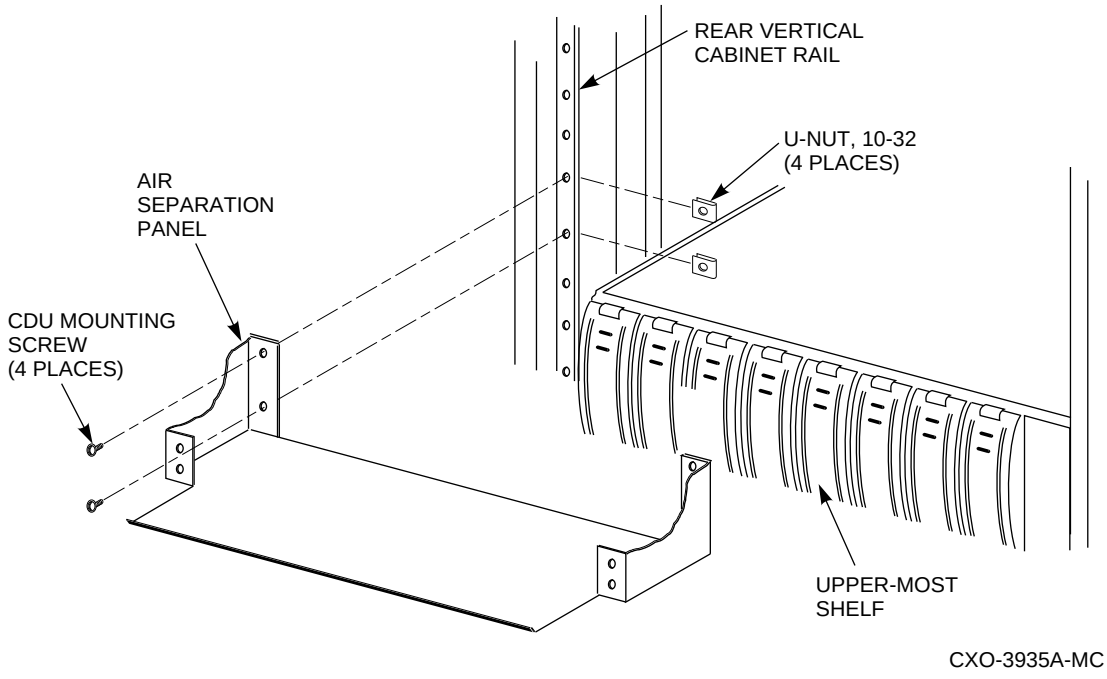


Figure 6–6 Rear Air Separation Panel Installation (Empty shelf position directly below CDU A)



6.6 Reinstalling Exterior Cabinet Panels

Once the cabinet rack space is configured as desired, the exterior cabinet panels may be reinstalled. Refer to Figure 6–1 and reinstall the exterior cabinet panels as follows:

1. Position a side panel against the cabinet with the lip above the upper hanger clips just over the upper edge of the side of the cabinet.
2. Ensure that the entire surface of the side panel rests firmly against the side of the cabinet.
3. Allow the panel to slide downward, catching the two hanger clips as it moves.
4. Install the side panel bolts into the side panel through the holes in the top side rails of the cabinet.
5. Repeat steps 1 through 4 to install the other side panel.
6. Locate the four inset nylon snap fasteners on the top cabinet rails.

WARNING

The top cover is heavy and awkward to lift. Installing it is a two-person task. Failure to use sufficient personnel may result in injury or equipment damage.

7. Position the top cover over the cabinet. Position the cover as shown in Figure 6–1 such that the front end of the panel with the shorter overhang is oriented toward the rear of the cabinet.

8. Align the pins on the underside of the top cover with the inset nylon fasteners on the top cabinet rails.

WARNING

Be careful not to catch your fingers between the cabinet and the top panel when snapping the panel to the cabinet.

9. Lower the cover onto the cabinet and press it down, ensuring that the pins snap into the top panel fasteners.
10. If the cabinet was moved to access the side panels, place it in its original position.

7

Installing TZLX-Series Tape Drives

This chapter describes the mounting and power cabling of TZLX-series tape drives in SH043-series cabinets.

7.1 General Installation Considerations

The TZLX-series tape drive is mounted in the SH043 cabinet with one chassis rail, as shown in Figure 7–1. The chassis rail is attached to the cabinet's internal vertical rails, and it supports the TZLX-series tape drive from one side. Grooves machined into the side of the tape drive enclosure mate with flanges along the sides of the chassis rail, allowing the tape drive to be slid onto the chassis rail from the front of the cabinet. Once installed, the tape drive enclosure extends from the front to the rear of the SH043 cabinet.

Two TZLX-series tape drives can be mounted side-by-side at a given vertical position in the cabinet. The chassis rail hardware is the same for both the left and right mounting positions. Only the orientation of the hardware differs between the two mounting positions. There is no mechanical connection between two tape drives mounted side-by-side in the cabinet.

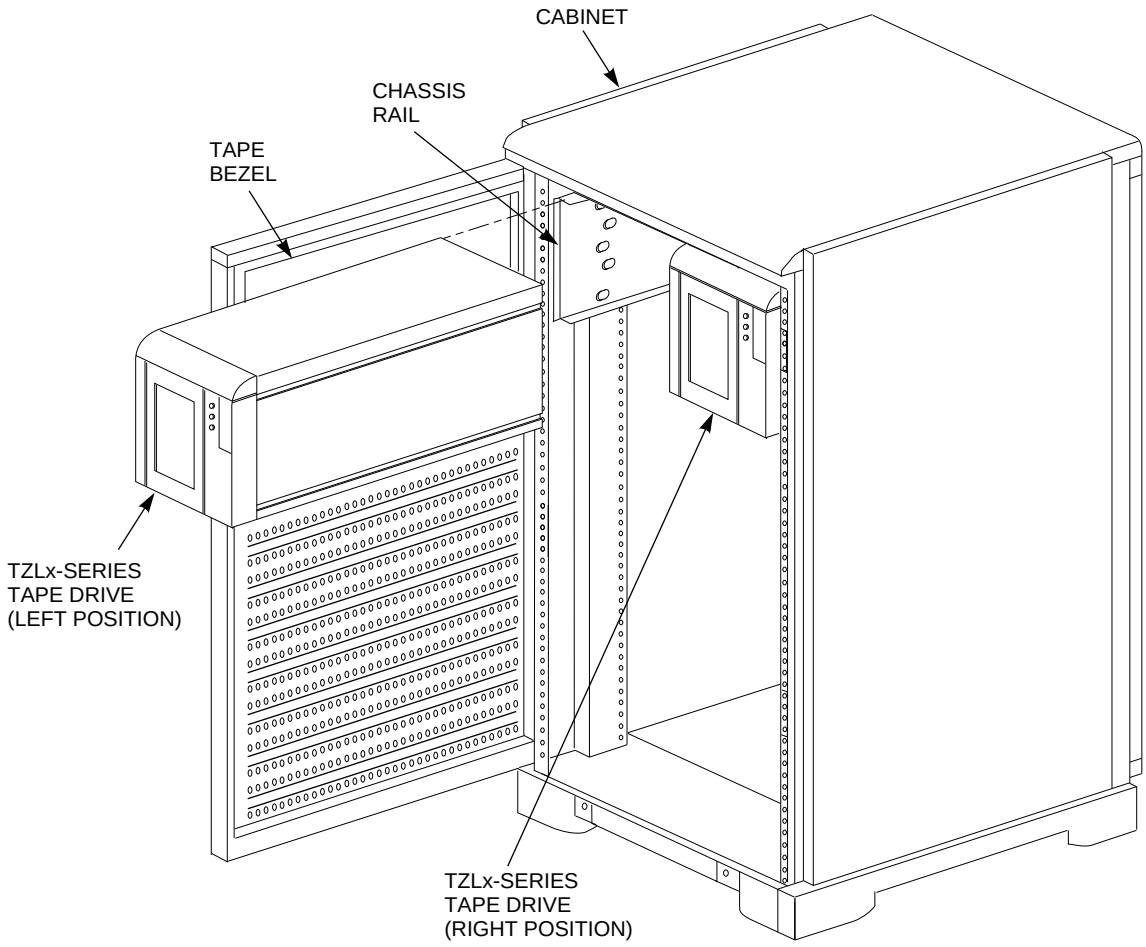
In situations where only one TZLX-series tape drive is being installed at a given vertical position in the cabinet, the tape drive must be installed in the right mounting position. This will ensure that the front panel of the tape drive mates with the correct opening in the tape bezel in the cabinet door. A filler panel in the tape bezel covers the left mounting position in this case.

WARNING

While working in the cabinet interior, ac power must be removed from cabinet components. Failure to do so may result in personnel injury as a result of electric shock.

Prior to performing any of the procedures in this chapter, remove ac power from cabinet components. If the cabinet is installed and operating, spin down all disk drives and halt all tape drives in the cabinet. Switch the circuit breaker on the front panel of the cabinet's CDU(s) to the ◯ (OFF) position.

Figure 7–1 TZLX-Series Tape Drive Installation



7.2 Accessing the Cabinet Rack Space

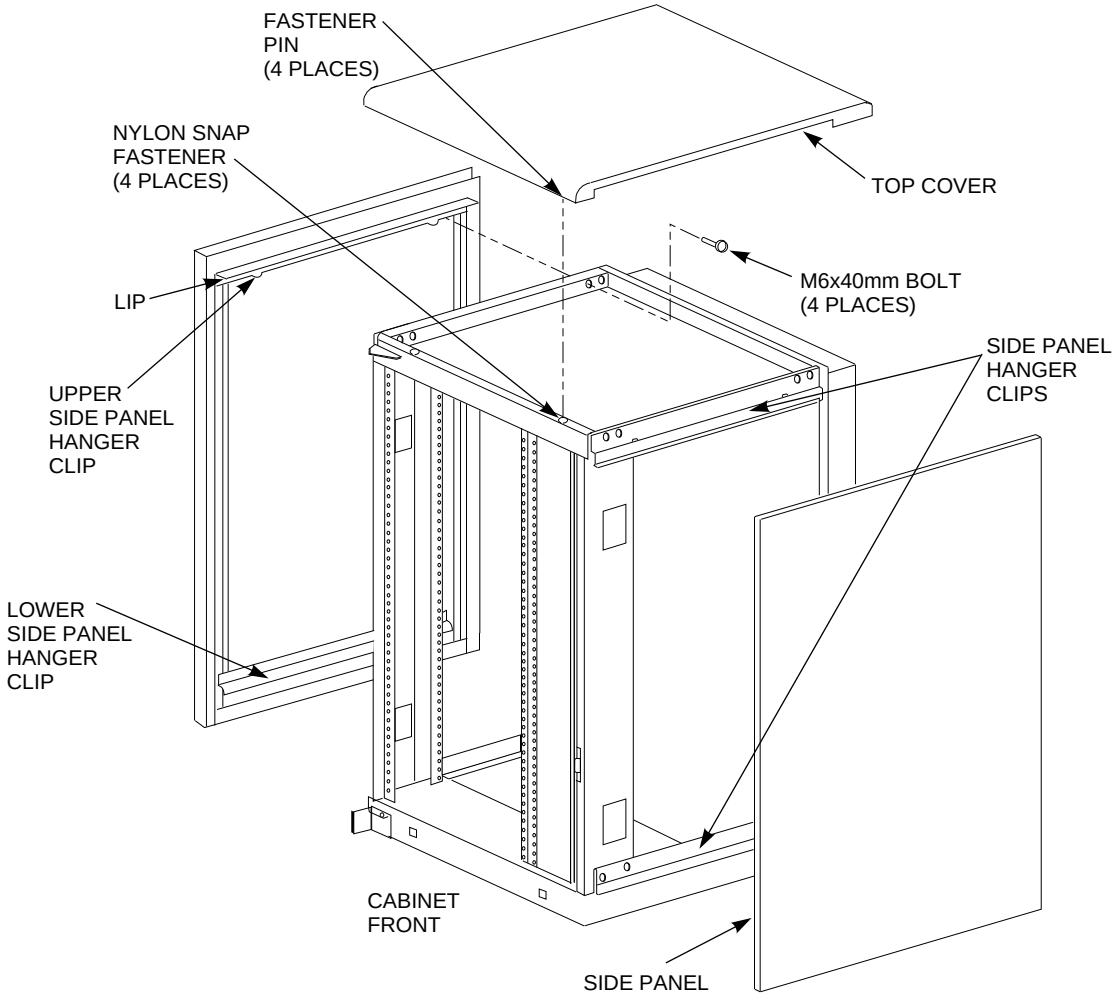
TZLX-series tape drives can normally be installed without removing cabinet side panels. To route the cabling in configurations where access to the interior of the cabinet is limited, however, cabinet side panels may need to be removed. Sections 7.2.1 and 7.8 present procedures for removing and replacing exterior cabinet panels.

The front and rear cabinet doors are held closed by door locks mounted on each door. The locks are released by turning counterclockwise with a 5/32-inch hex wrench.

7.2.1 Removing the Cabinet Side Panels

As shown in Figure 7–2, there are three side panel hanger clips on each side of the cabinet. A matching set of hanger clips are attached to each side panel. Remove the side panels as follows:

Figure 7–2 Cabinet Side Panel Removal and Installation



NOTE: FRONT AND REAR DOORS NOT SHOWN FOR CLARITY

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1. Move the cabinet away from adjacent enclosures as necessary.
2. Loosen the top cover by pushing up on its front and rear edges until it snaps free of its fasteners.

WARNING

The top cover is heavy and awkward to lift. Removing it is a two-person task. Failure to use sufficient personnel may result in injury or equipment damage.

3. Using two persons, lift the top cover from the cabinet and set it aside.
4. Remove the bolts attaching the side panels to the top side rails of the cabinet.
5. Grasp a panel along its front and rear edges and lift up until the hanger clips disengage. Lift the panel away from the cabinet.
6. Repeat the previous step to remove the other panel.

7.3 Chassis Rail Installation

To allow the length of the chassis rail to be adjusted to fit the cabinet, one end of the rail is extendable using a sliding rail bracket. Two round standoffs are used to locate the chassis rail along the vertical cabinet rails. The round standoffs are inserted into front and rear chassis rail locating holes to position the chassis rail while it is fastened to the cabinet.

Chassis rail component assembly and installation procedures for both left and right tape drive mounting positions are presented in Sections 7.3.1, 7.3.2, and 7.3.3.

Note

Two small ESD grounding posts are provided with the cabinet. One is located on a front vertical cabinet rail, and one on a rear rail. Should an ESD grounding post interfere with the installation of the chassis rail, move the post out of the way to any free hole on the cabinet.

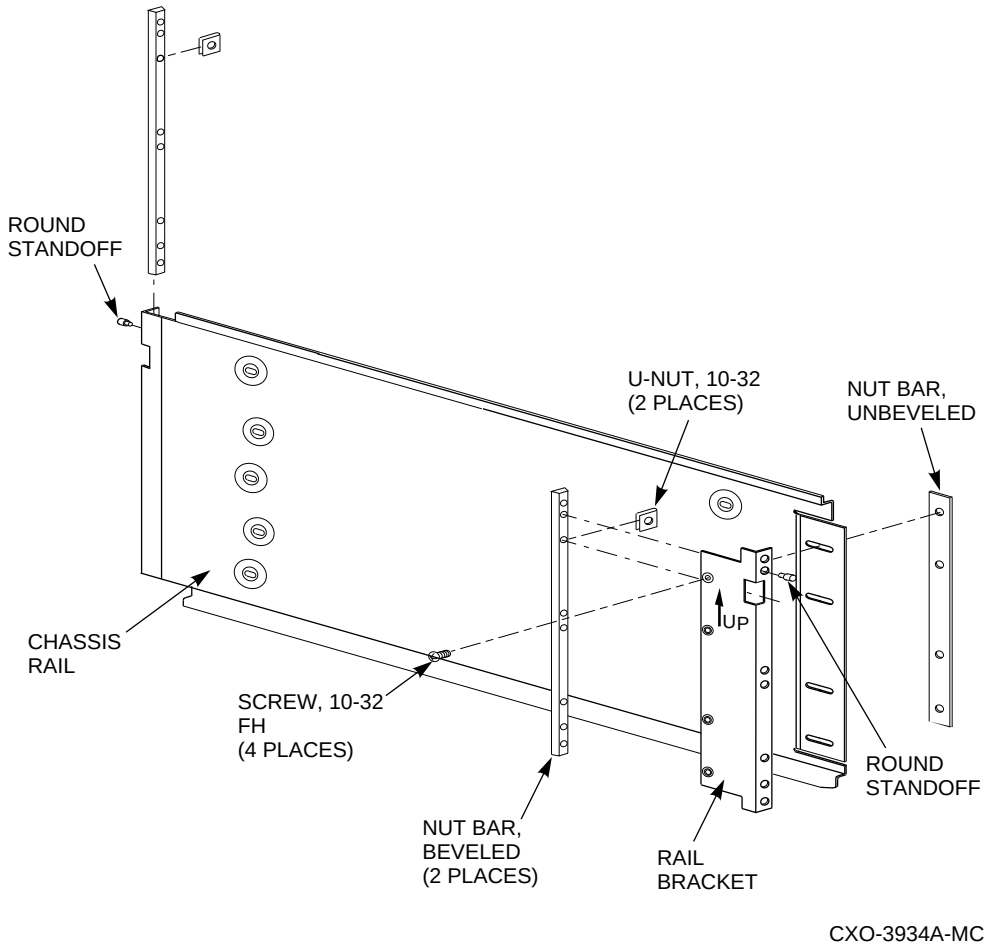
7.3.1 Chassis Rail Assembly

Before the chassis rail components can be mounted in the cabinet, they must be assembled. Assemble the chassis rail components as follows (see Figure 7–3):

1. Position the rail bracket against the chassis rail, as shown in the illustration.
2. Fasten the rail bracket to the chassis rail with the unbeveled nut bar and four screws, as shown. Leave the screws loose enough to allow the rail bracket to be moved along the chassis rail.
3. Install a U-nut in the groove near the end of each of the beveled nut bars. The flat side of the U-nuts must be installed on the *beveled* side of the nut bar.
4. Install the beveled nut bars on the chassis rail and rail bracket, using the round standoffs to hold them in place. The beveled side of the nut bars must face the flanges on the chassis rail and rail bracket.

5. The chassis rail assembly is now ready to be installed in the cabinet.

Figure 7–3 Chassis Rail Assembly



7.3.2 Right Position Chassis Rail Assembly Installation

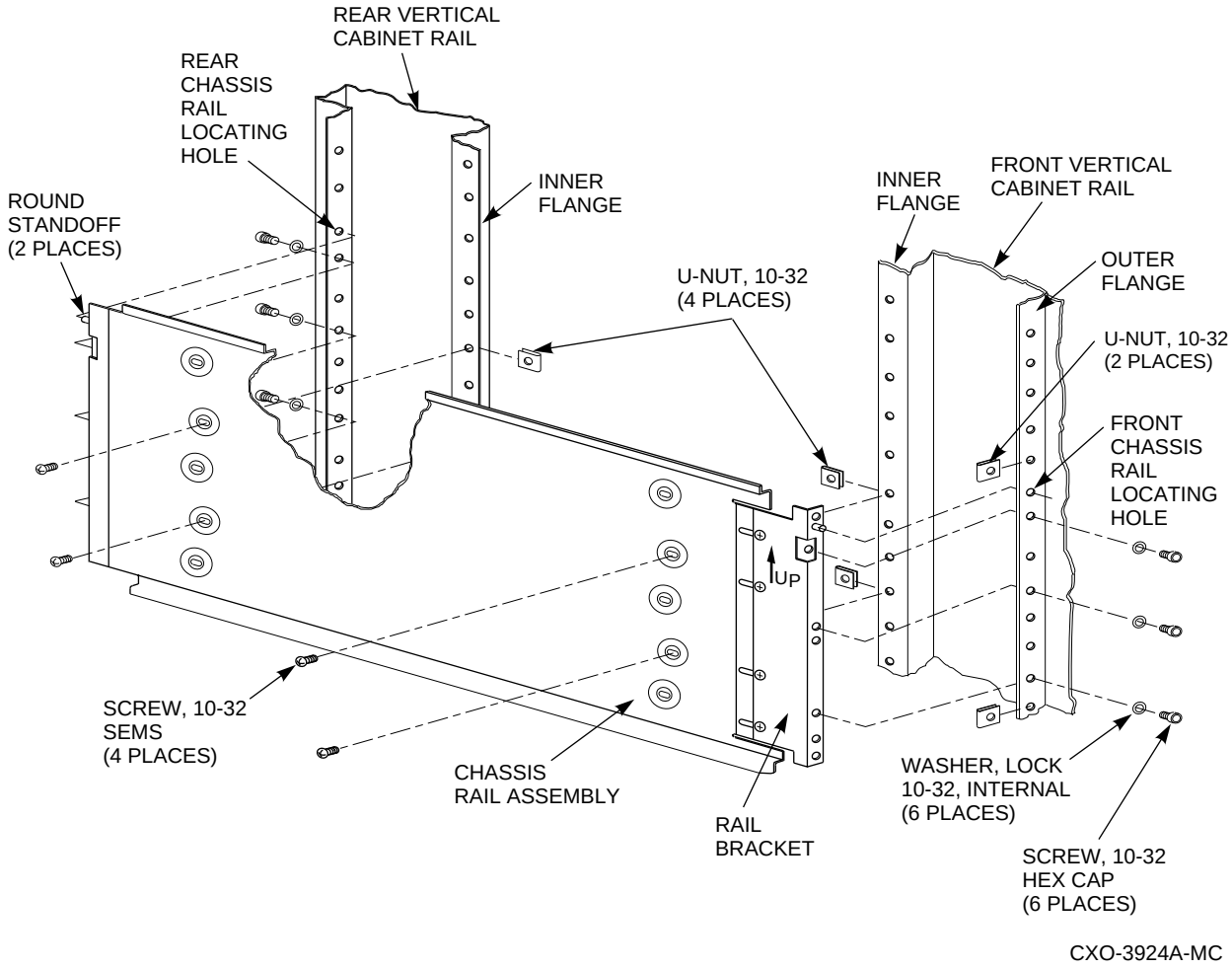
Install the chassis rail assembly in the right position within the cabinet as follows (see Figure 7–4):

WARNING

Cabinet rail edges may be sharp and can slice or abrade skin or cable insulation.

1. Turn the cabinet power off as described in Section 7.1.
2. Determine the correct tape drive mounting locations and corresponding cabinet rail mounting holes for the chassis rail assembly. Refer to the chapter in this document pertaining to your specific cabinet configuration for this information. The tape mounting hole specified for each position is the chassis rail locating hole shown in Figure 7–4.

Figure 7–4 Right Position Chassis Rail Assembly Installation



WARNING

Use care in supporting the chassis rail assembly. It is heavy and awkward to position within the cabinet. If possible, use two persons to support and position the chassis rail assembly. The chassis rail assembly may cause personnel injury and equipment damage if dropped during installation.

Note

To ensure proper alignment of the chassis rail assembly, use care to position the round standoffs in the correct front and rear chassis rail locating holes.

3. From the front of the cabinet, position the chassis rail assembly at the correct mounting holes, as shown. Ensure that the rail bracket is positioned toward the front of the cabinet, and that the arrow on the rail bracket points up.
4. Insert the rear round standoff into the rear chassis rail locating hole.
5. Support the chassis rail against the rear vertical cabinet rail and maintain the rear round standoff in its locating hole. Extend the rail bracket to insert the front round standoff into its correct front chassis rail locating hole.
6. Using the shelf bracket as a template, mark the four U-nut mounting holes on the inner flanges of both the front and rear vertical cabinet rails. Make sure to use the correct set of holes in the chassis rail.
7. Temporarily remove the chassis rail assembly and install four U-nuts along the inner flanges of the front and rear vertical cabinet rails at the holes marked in step 6.
8. Reposition the chassis rail assembly as directed in steps 3 through 5.
9. Fasten the chassis rail to the inner flanges of the front and rear vertical cabinet rails with four screws, as shown.
10. Fasten the rail bracket to the front vertical cabinet rail with its beveled nut bar and three screws, as shown.
11. Fasten the chassis rail to the rear vertical cabinet rail with its beveled nut bar and three screws, as shown.
12. Tighten the screws fastening the rail bracket to the chassis rail.
13. Install two U-nuts along the outer flange of the front vertical cabinet rail. Install one U-nut at the hole just above the front chassis rail locating hole and the other at the eighth hole below the locating hole.

7.3.3 Left Position Chassis Rail Assembly Installation

Note

Install the chassis rail assembly in the left mounting position only if a tape drive is also installed in the right position. The front cabinet door tape bezel openings are designed to allow a single tape drive to be installed only in the right position.

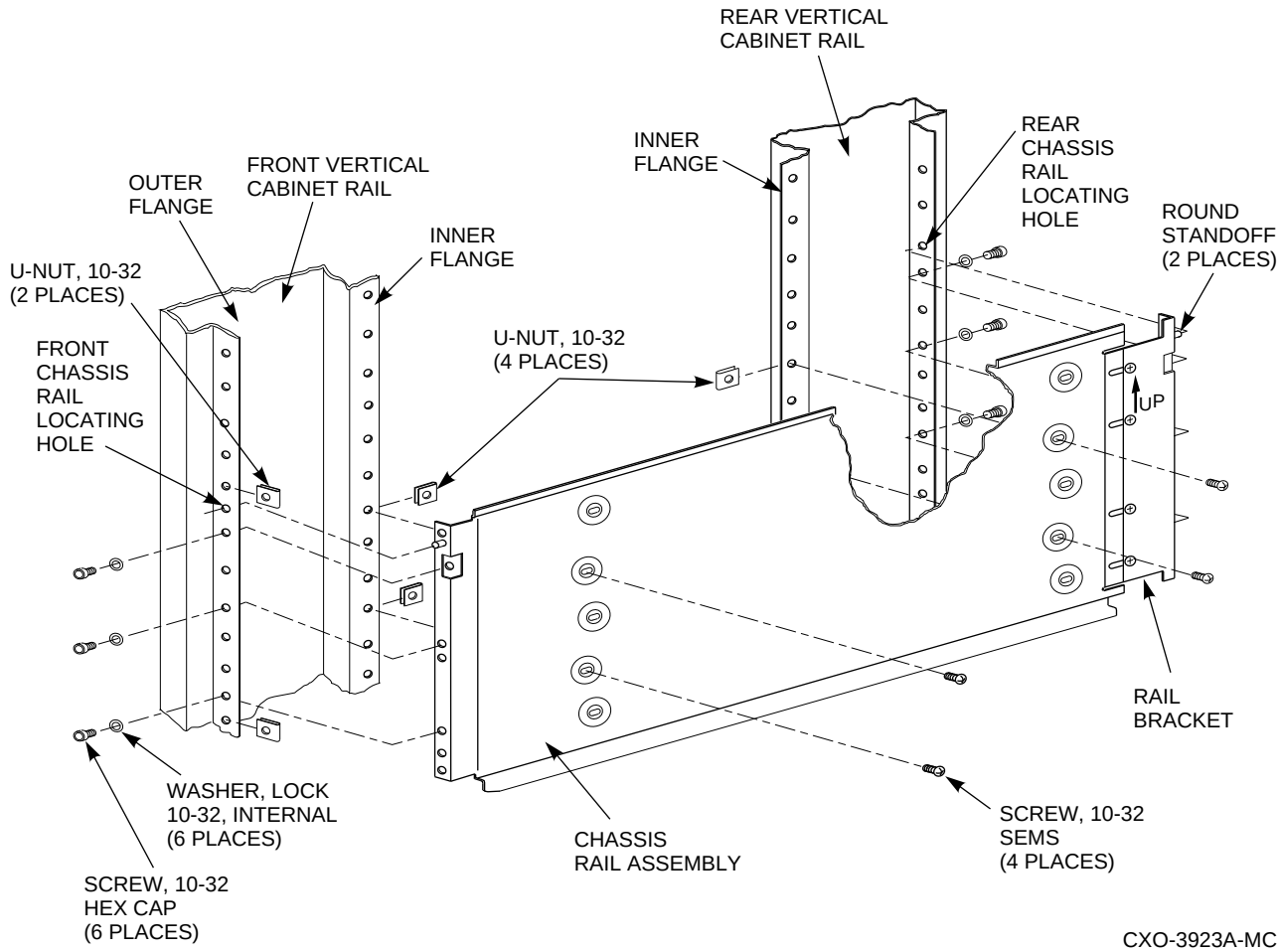
Install the chassis rail assembly in the left position within the cabinet as follows (see Figure 7–5):

WARNING

Cabinet rail edges may be sharp and can slice or abrade skin or cable insulation.

1. Turn the cabinet power off as described in Section 7.1.
2. Determine the correct tape drive mounting locations and corresponding cabinet rail mounting holes for the chassis rail assembly. Refer to the chapter in this document pertaining to your specific cabinet configuration for this information. The tape mounting hole specified for each position is the chassis rail locating hole shown in Figure 7–5.

Figure 7–5 Left Position Chassis Rail Assembly Installation



WARNING

Use care in supporting the chassis rail assembly. It is heavy and awkward to position within the cabinet. If possible, use two persons to support and position the chassis rail assembly. The chassis rail assembly may cause personnel injury and equipment damage if dropped during installation.

Note

To ensure proper alignment of the chassis rail assembly, use care to position the round standoffs in the correct front and rear chassis rail locating holes.

3. From the rear of the cabinet, position the chassis rail assembly at the correct mounting holes, as shown. Ensure that the rail bracket is positioned toward the rear of the cabinet, and that the arrow on the rail bracket points up.
4. Insert the front round standoff into the front chassis rail locating hole.
5. Support the chassis rail assembly against the front vertical cabinet rail and maintain the front round standoff in its locating hole. Extend the rail bracket to insert the rear round standoff into its correct rear chassis rail locating hole.
6. Using the chassis rail as a template, mark the four U-nut mounting holes on the inner flanges of both the front and rear vertical cabinet rails. Make sure to use the correct set of holes in the chassis rail.
7. Temporarily remove the chassis rail assembly and install four U-nuts along the inner flanges of the front and rear vertical cabinet rails at the holes marked in step 6.
8. Reposition the chassis rail assembly as directed in steps 3 through 5.
9. Fasten the chassis rail assembly to the inner flanges of the front and rear vertical cabinet rails with four screws, as shown.
10. Fasten the rail bracket to the rear vertical cabinet rail with its beveled nut bar and three screws, as shown.
11. Fasten the chassis rail to the front vertical cabinet rail with its beveled nut bar and three screws, as shown.
12. Tighten the screws fastening the rail bracket to the chassis rail.
13. Install two U-nuts along the outer flange of the front vertical cabinet rail. Install one U-nut at the hole just above the front chassis rail locating hole and the other at the eighth hole below the locating hole.

7.4 Mounting the TZLX-Series Tape Drive Enclosure

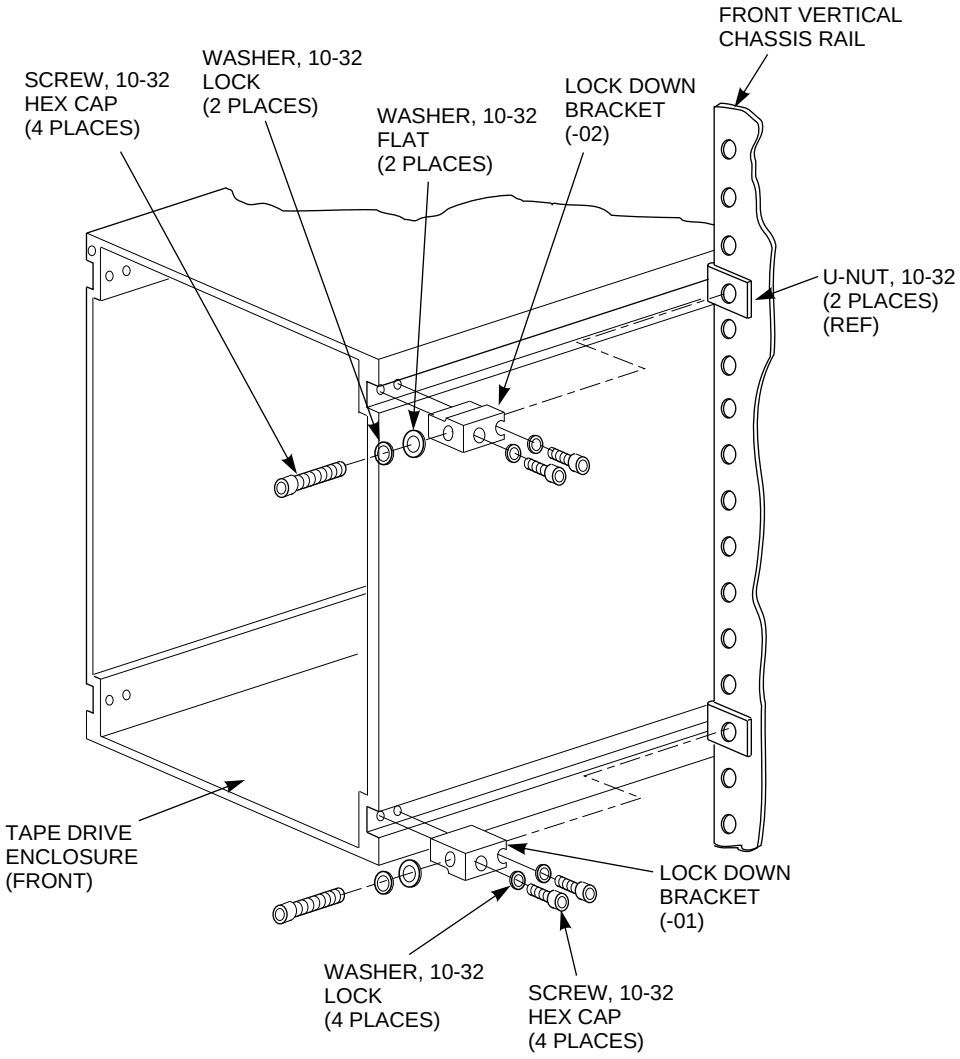
Once the chassis rail is installed in the cabinet, the tape drive enclosure can be mounted on it. Mount the TZLX-series tape drive to the chassis rail as follows:

Note

The lock down brackets are mirror images of each other, and they are identified as the -01 and -02 versions. They must be installed with the orientation shown in the illustration.

1. Install the the two lock down brackets on the side of the tape drive enclosure near the front end, as shown in either Figure 7–6 or 7–7. Figure 7–6 shows the installation for the right mounting position, and Figure 7–7 shows the installation for the left mounting position.

Figure 7–6 Right Position Tape Drive Mounting



NOTE: TAPE DRIVE INTERNAL COMPONENTS NOT SHOWN FOR CLARITY.

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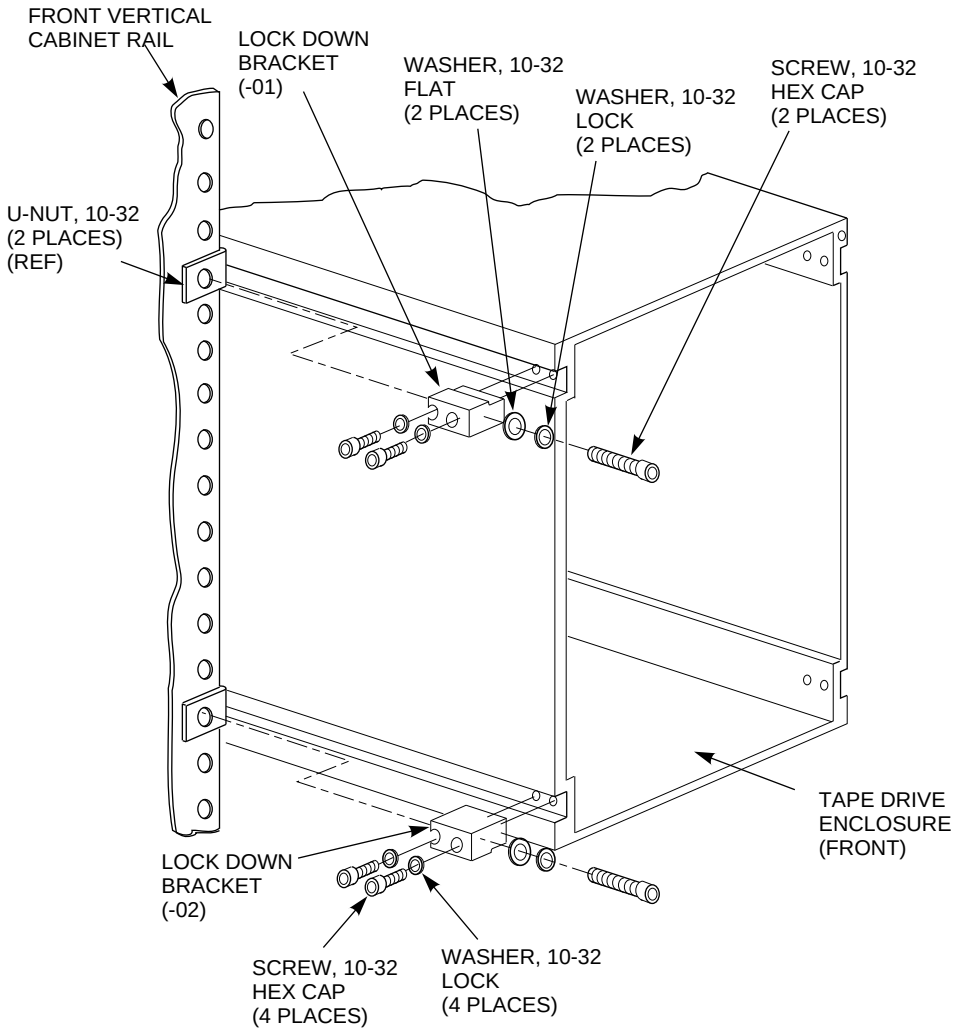
Figure 7–7 Left Position Tape Drive Mounting



NOTE: TAPE DRIVE INTERNAL COMPONENTS NOT SHOWN FOR CLARITY.

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WARNING

Use two persons to lift the TZLX-series tape drive. The unit is heavy and awkward to lift. Failure to use two persons to lift the tape drive may result in injury or damage to equipment.

2. From the front of the cabinet and using two persons, position the tape drive such that the machined grooves in the side of the tape drive enclosure mate with the upper and lower edges of the chassis rail.

CAUTION

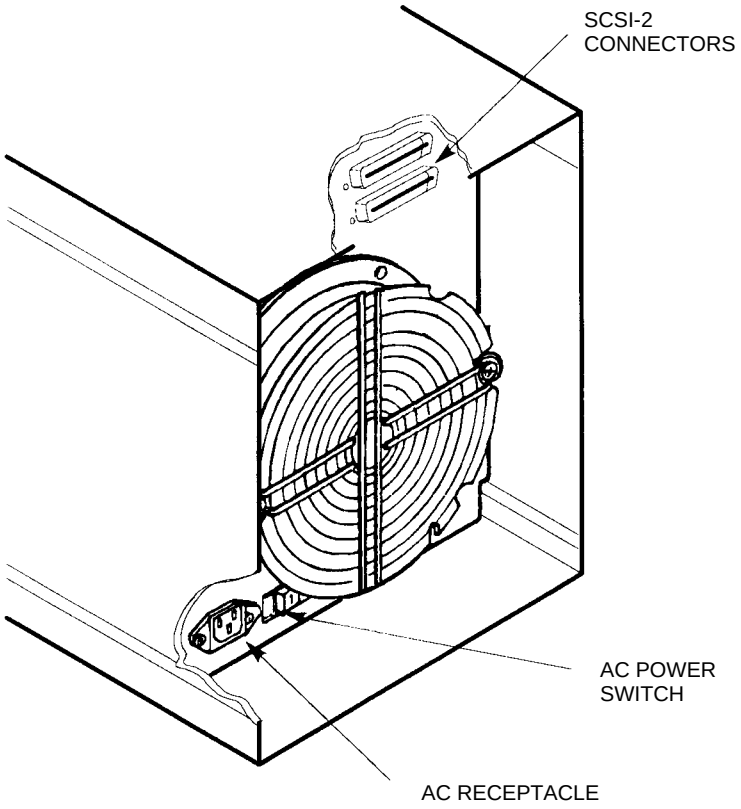
Use care when sliding the tape drive into the cabinet. Do not allow the tape drive enclosure to pull or pinch cables that may be routed through the cabinet interior. Failure to use care when mounting the tape drive may result in equipment damage.

3. Slide the tape drive onto the chassis rail until the lockdown brackets contact the U-nuts on the front vertical cabinet rail.
4. Fasten the lock down brackets to the front vertical chassis rail with two hex cap screws, as shown in Figure 7–6 or 7–7.

7.5 Installing the Power Cord

AC power for the TZLX-series tape drive is obtained from CDU A. Connect the female end of the tape drive's power cord to the power connector on the rear panel of the drive (see Figure 7–8.) Route the power cord inside the cabinet to CDU A, avoiding signal cabling where possible. Connect the male end to a free power connector on the rear panel of the CDU. Switch the power switch on the rear panel of the tape drive to the | (ON) position to allow the CDU to control the unit's power.

Figure 7–8 TZLX-Series Tape Drive Rear Panel



7.6 SCSI–2 Signal Cabling

Refer to the *StorageWorks Family Configuration Guide* and the *StorageWorks Family User's Guide* for details on the selection of SCSI–2 cables and their connection to the TZLX-series tape drive.

7.7 Installing the Cabinet Door Tape Bezel Kit

To allow operator access to the TZLX tape drive, the front cabinet door tape bezel kit must be installed. To install the tape bezel kit, see the *Instructions for Installation of the Tape Bezel Kit on SF400 Series Cabinets* provided with the kit. The SF400 installation instructions also apply to SH043-series cabinets.

If the tape bezel kit is already installed, you need only remove its filler panel to accomodate a tape drive in the left mounting position.

7.8 Reinstalling Exterior Cabinet Panels

Once the cabinet rack space is configured as desired, the exterior cabinet panels may be reinstalled. Refer to Figure 7–2 and reinstall the exterior cabinet panels as follows:

1. Position a side panel against the cabinet with the lip above the upper hanger clips just over the upper edge of the side of the cabinet.
2. Ensure that the entire surface of the side panel rests firmly against the side of the cabinet.
3. Allow the panel to slide downward, catching the three hanger clips as it moves.
4. Install the side panel bolts into the side panel through the holes in the top side rails of the cabinet.
5. Repeat steps 1 through 4 to install the other side panel.
6. Locate the four inset nylon snap fasteners on the top cabinet rails.

WARNING

The top cover is heavy and awkward to lift. Installing it is a two-person task. Failure to use sufficient personnel may result in injury or equipment damage.

7. Position the top cover over the cabinet. Position the cover as shown in Figure 7–2 such that the end of the panel with the shorter overhang is oriented toward the front of the cabinet.
8. Align the pins on the underside of the top cover with the inset nylon fasteners on the top cabinet rails.

WARNING

Be careful not to catch your fingers between the cabinet and the top panel when snapping the panel to the cabinet.

9. Lower the cover onto the cabinet and press it down, ensuring that the pins snap into the top panel fasteners.
10. If the cabinet was moved to access the side panels, place it in its original position.

8

Power Configuration

This chapter discusses the configuration of primary power within SH043-series cabinets. Additional information on power configuration options can be found in Section 1.3.

8.1 General Considerations

WARNING

While working in the cabinet interior, ac power must be removed from cabinet components. Failure to do so may result in personnel injury as a result of electric shock.

Prior to performing any of the procedures in this chapter, remove ac power from the cabinet components. If the cabinet is installed and operating, spin down all disk drives and halt all tape drives in the cabinet. Switch the circuit breaker on the front panel of the cabinet's cable distribution units (CDUs) to the ◯ (OFF) position.

8.2 Cable Distribution Units

The 887–E CDU is used with SH043-series cabinets and is designed for both 230 volt, 50 Hz and 120 volt, 60 Hz applications. The unit provides ac power to the cabinet's components via 12 Molex output connectors on its rear panel. Two International Electrotechnical Commission (IEC) output connectors are also provided for utility purposes.

WARNING

If the leakage current of the cabinet is above 3.5 mA after installation, Digital recommends that power cables with industrial type B, IEC 950 connectors be installed. Failure to reduce the leakage current can result in equipment performance degradation and personnel injury due to electric shock.

Table 8–1 lists the power cables used with the 887–E CDU.

Table 8–1 CDU Power Cable Variations

Cable Part No.†	Country Usage	Comments‡
17–01255–01	Europe, Japan	IEC 309 plug and cordage (220/240 volt)
17–00083–57	United States	NEMA 5–20P twist-lock plug (120 volt)

†The SH043–ZZ cabinet version for Europe and Japan is shipped with the either the 17–01255–01 or 17–00083–57 power cable, depending upon customer requirements.

‡All power cables are supplied with a female plug compatible with the IEC input connector on the front panel of the CDU.

8.3 Utility Power Cord

Each SH043 cabinet is furnished with one additional power cord for the purpose of powering monitors, printers, or other devices. The power cord is connected to the rear panel of the CDU and may be found coiled up in the base of the cabinet.

8.4 Single CDU Configurations

Using one CDU, cabinet power can be configured with both single and dual power supplies in each shelf. Refer to Sections 1.3.1 and 1.3.2 for further information on these configurations.

8.4.1 Single Cabinet Power Configuration

Unless options are specified, SH043-series cabinets are shipped with a single CDU and single-shelf power supplies. For ease of upgrade, the cabinet is supplied with 10 black and 10 gray preinstalled ac power cords. One black and one gray power cord is routed to each usable front and rear shelf position. These cords are used to supply ac power to shelves as they are added to the cabinet. The black cord at each newly added shelf's mounting position needs only to be plugged into the shelf's power supply to complete the shelf's installation.

8.4.2 Dual Shelf Power Configuration

In the dual shelf power configuration, a second ac power supply is necessary for each shelf. (Refer to Figure 1–5.) Configure each shelf for dual ac power supplies as follows:

1. Power the cabinet down as described in Section 8.1.
2. Plug in a second ac power supply (B) next to the existing ac power supply (A) in each shelf.
3. Plug the gray ac power cord at each shelf position into the connector on the newly added ac power supply.
4. Connect the CDU primary power cable to its power source.
5. Using the procedures appropriate to your system, turn on the cabinet and initialize it.

8.5 Dual Cabinet Power Configuration

The dual cabinet power configuration requires two CDUs for power distribution. The second CDU (CDU B) is installed immediately above CDU A in the rear of the cabinet. Refer to the *StorageWorks SH043-Series Data Center Cabinet Cable Distribution Unit Installation Guide* for procedures pertaining to the installation of dual CDUs. The installation guide is shipped as part of the dual power option kit.

A

Environmental Stabilization

A.1 Environmental Stabilization

To ensure proper operation of Digital storage devices, the StorageWorks building block (SBB) temperature must be within 18–29°C (65–85°F). Table A–1 specifies the time required to thermally stabilize SBBs based on the ambient shipping temperature.

Table A–1 Thermal Stabilization Specifications

Ambient Temperature Range °C	Ambient Temperature Range °F	Minimum Stabilization Time
60 to 66	140 to 151	3 hours
50 to 59	122 to 139	2 hours
40 to 49	104 to 121	1 hour
30 to 39	86 to 103	30 minutes
18 to 29	65 to 85	None
10 to 17	50 to 64	30 minutes
0 to 9	32 to 49	1 hour
–10 to –1	14 to 31	2 hours
–20 to –11	–4 to 13	3 hours
–30 to –21	–22 to –5	4 hours
–40 to –31	–40 to –21	5 hours

CAUTION

Always stabilize storage devices in the operating environment prior to installation or operation. Otherwise, the media or associated electronics may be damaged when power is applied to the unit.

If condensation *is visible* on the outside of the storage device:

Stabilize the device and the SBB in the operating environment for 6 hours or until the condensation is no longer visible, whichever is longer. Do not insert the storage device into the shelf until it is fully stabilized.

If condensation *is not visible* on the outside of the storage device:

Thermally stabilize the device for the amount of time specified in Table A–1.

Glossary

ac power supply

A power supply designed to produce dc power from an ac input.

air separation panel

A small baffle that mounts just above the upper-most shelf in a cabinet to prevent heated cabinet air from being drawn down between the cabinet door and the shelf.

American National Standards Institute

See *ANSI*.

ANSI

American National Standards Institute. An organization that develops and publishes electronic and mechanical standards.

blower

An airflow device mounted in a StorageWorks shelf.

cabinet

The enclosure portion of the SH043-series cabinet, including the exterior panels and the doors. This term may also be used to refer to an enclosure configured with internal storage components.

cable distribution unit

See *CDU*.

CDU

Cable distribution unit. The power entry device for StorageWorks SH043-series cabinets. The unit provides the connections necessary to distribute ac power to cabinet shelves and fans.

chassis rail

A slide rail used to support the TZLX-series tape drive within the cabinet.

controller

A hardware/software device that manages peripheral device communications on behalf of a host system.

data center cabinet

A generic reference to the large cabinets, such as the SW800-series, in which StorageWorks components can be mounted.

dual cabinet power configuration

A cabinet ac power configuration in which two ac sources and two ac power supplies are used to supply dc power to the cabinet's SBB shelves.

dual shelf power configuration

A cabinet ac power configuration in which one ac source and two ac power supplies are used to supply dc power to the cabinet's SBB shelves.

fan

An airflow device mounted in a StorageWorks cabinet.

filler panel

A sheet metal or plastic panel used to cover unused mounting areas in StorageWorks cabinets and shelves.

host

The primary or controlling computer to which a storage subsystem is attached.

SBB

StorageWorks building block. The basic building block of the StorageWorks product line. A device conforming to StorageWorks shelf mechanical and electrical standards and installed in a 3½-inch or 5¼-inch carrier. Typical SBBs are disk drives, tape drives, optical storage devices, and CD-ROMs.

SBB shelf

A StorageWorks shelf, such as the SHDZZ–ZZ, designed to house plug-in SBB modules.

SCSI–2

Small Computer System Interface 2. An ANSI interface standard that defines the physical and electrical parameters of a parallel I/O bus used to connect a controller with up to 7 devices. The StorageWorks implementation of SCSI uses the SCSI-2 standard to provide for the synchronous transfer of 8-bit data at rates of up to 10 MB/s.

shelf brackets

Sheet metal components designed to attach and position StorageWorks shelves in their associated enclosures.

single cabinet power configuration

A cabinet ac power configuration in which only one ac source and one ac power supply is used to supply dc power to the cabinet's SBB shelves.

skirt

A trim panel designed to mount around the base of the cabinet.

Small Computer System Interface 2

See *SCSI–2*.

StorageWorks

Digital's line of data storage products that allows customers to design and configure their own storage subsystems. StorageWorks products consist of modular storage and power components and the enclosures necessary to house them. Storage devices and array controllers can be integrated to form storage subsystems.

StorageWorks building block

See *SBB*.

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