# DIGITAL StorageWorks
# 16-Bit Pedestal (BA356-Series)

# User's Guide

**March 1997**

This guide describes the procedures to install, and operate a deskside expansion pedestal (BA356–K series).

# Contents

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# Preface

The *DIGITAL StorageWorks 16-Bit Pedestals (BA356–K Series) User's Guide* describes the BA356 pedestals and compatible StorageWorks™ components. This guide discusses some of the basic pedestal applications. The information in this document supplements, but does not replace, the information in the SBB shelf user's guides.

## Intended Audience

This document is for use by personnel responsible for designing, configuring, assembling, installing, and operating pedestals.

## Structure

The organization of this publication is as follows:

| | |
|---|---|
| Chapter 1 | An introduction to the pedestals that includes product description, features, shelves, building blocks, power, blower assemblies, and product specifications. |
| Chapter 2 | Detailed procedures for installing a pedestal including planning the installation, selecting and routing SCSI cables, pedestal power and cooling, and testing the pedestal. |
| Chapter 3 | Procedures for determining pedestal and SBB operational status and basic replacement procedures |

## Documentation Conventions

The documentation conventions used in this publication are as follows:

| | |
|---|---|
| **boldface type** | Boldface type indicates the first instance of terms being defined in the t both. |
| *italic type* | Italic type indicates emphasis and complete guide titles. Italic type in the glossary indicates a cross-reference. |

# Related Documents

The following is a list of other StorageWorks user documents that are applicable to pedestals.

| Document Title | Order Number |
|---|---|
| *16-Bit SBB User's Guide* | EK-SBB16-UG |
| *StorageWorks Solutions BA356 16-Bit Shelf and SBB User's Guide* | EK–BA356–UG |
| *StorageWorks Solutions SBB Shelf I/O Module User's Guide* | EK-SBBIO-UG |
| *StorageWorks Solutions SBB User's Guide (8-Bit)* | EK-SBB35-UG |

# 1

# Introducing the StorageWorks Pedestal

This chapter is a general description of the StorageWorks™ BA356-series 16-bit pedestal. This description includes features, components, StorageWorks building blocks (SBBs), power, cooling, and specifications. Subsequent chapters describe installation and operation.

**Figure 1–1  Typical Deskside Expansion Pedestal**

CXO-4371A-MC

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™    Trademark of Digital Equipment Corporation
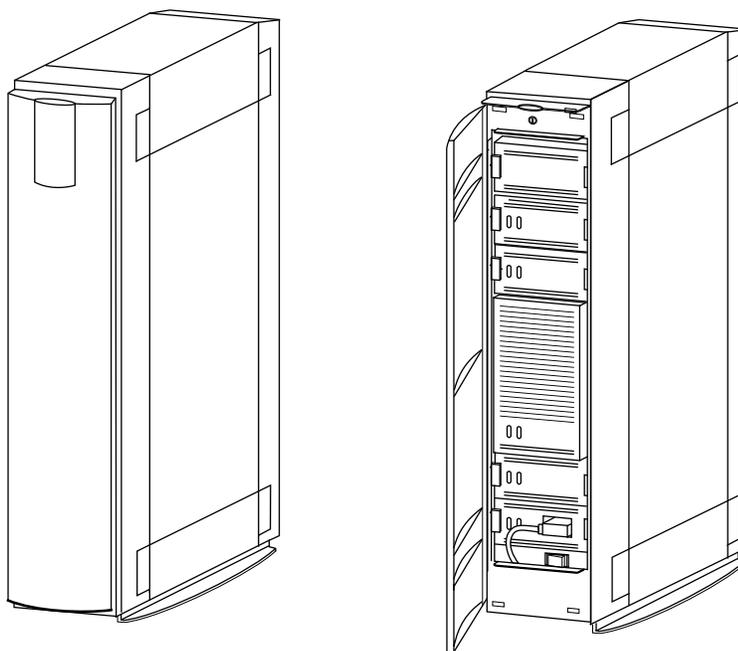
## Product Description

The pedestal (see Figure 1–1) encloses a **StorageWorks building block shelf** (**SBB shelf**).  This low-cost, mass storage solution enables you to design an extremely flexible storage array to meet both your current and future needs.  The basic component of the deskside expansion pedestal is a 16-bit, single ended SCSI bus shelf (see Figure 1–2).

**Figure 1–2  Typical 16-Bit SBB Shelf**



CXO-4319A-MC
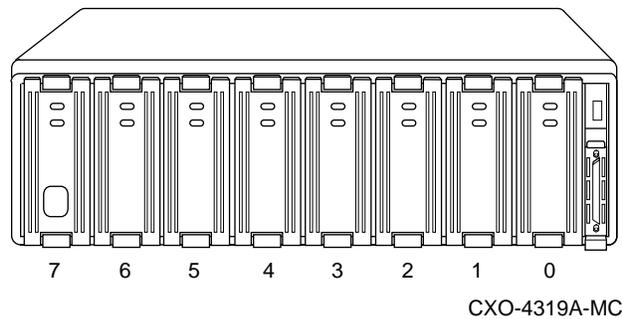
This shelf can accommodate either 3.5-inch or 5.25-inch StorageWorks building blocks (SBBs) in various combinations to create a storage array specifically suited to your needs.  You have the option of using any StorageWorks compatible disk drive, tape drive, CD-ROM, or other SBB storage device.  However, the SCSI bus controller capabilities and the pedestal physical limitations can restrict the number of SBBs, the SBB types, and the combination of SBB types you install in a pedestal or on a single SCSI bus.

The shelf capability determines the following:

- Possible SCSI bus configurations

- Maximum SCSI cable lengths

- Device address range

The 16-bit shelf has both CE-Mark and FCC Class B certification.  The SBB FCC certification therefore determines the pedestal location.  You can use an SBB with FCC Class B certification in a home environment.  When you install Class A certified SBBs in pedestal you can only use the pedestal in a commercial environment.

_____ **Caution** _____

There is no provision for installing a **controller shelf** in a pedestal.  DIGITAL neither supports nor recommends such a configuration.
_____

## Features

All StorageWorks pedestals have the following features:

- Locking front and rear bezels that prevent unauthorized removal of SBBs.

- Flexibility to design a **storage array subsystem** that meets your specific needs.

- An ac distribution unit with switch-controlled ac outputs.

- You can connect, or "daisy-chain," the ac power from one pedestal to another.

The shelf and SBB features include the following:

- You can mix 3.5-inch and 5.25-inch SBBs in a single pedestal.

- You can install a second shelf power supply, the **redundant power** option.

- Redundant blower assemblies, either one of which can cool the pedestal should the other blower fail.

- You can "daisy-chain" the ac power to multiple pedestals.

- The power supply SBBs provide a visual display of shelf status (power, cooling).

- The device SBB LEDs provide a visual display of storage device status (operation, fault).

Table 1–1 is a synopsis of the basic features of the 16-bit pedestal.

**Table 1–1  16-But SBB Shelf Features**

| Feature | Description |
|---|---|
| SCSI Buses Supported | 8-Bit Single Ended<br>    16-Bit, Single Ended |
| Device Address | 0-15 |
| SCSI Cable I/O Module Connectors | Two 16-bit shelf expander I/O module 68-pin, high-density (VHDCI) |
|  | Two 16-bit shelf I/O module 68-pin, high-density (SCSI "P") |
|  | Two 8-bit shelf I/O module 50-pin, high-density (SCSI "A") |
| SCSI Bus Configurations | Single Bus |
|  | Split Bus |
| SCSI Bus Configuration Control | Terminator Board (BA35X-ME) |
|  | Jumper Board (BA35X-MF) |
|  | 16-Bit SBB Shelf Expander I/O Module, Single Ended (BA35X-FA, BA35X-FB) |
|  | 16-Bit SBB Shelf I/O Module (BA35X-MH) |
|  | 8-Bit SBB Shelf 1/O Module (BA35X-MG) |
| Supported Storage Devices | 3.5-Inch SBB |
|  | 5.25-Inch SBB |
| Supported Shelf Power Supplies | ac input |
| Blower Assemblies | Dual Speed (BA35X-MD) |

_____ **Note**_____

The pedestal does not support either dc power supplies or 5.25-inch tape drives with a loader.
_____

# Product Specifications

Figure 1–3 and Table 1–2 show the basic pedestal specifications.

**Figure 1–3  Pedestal Dimensions**



CXO-4406A-MC
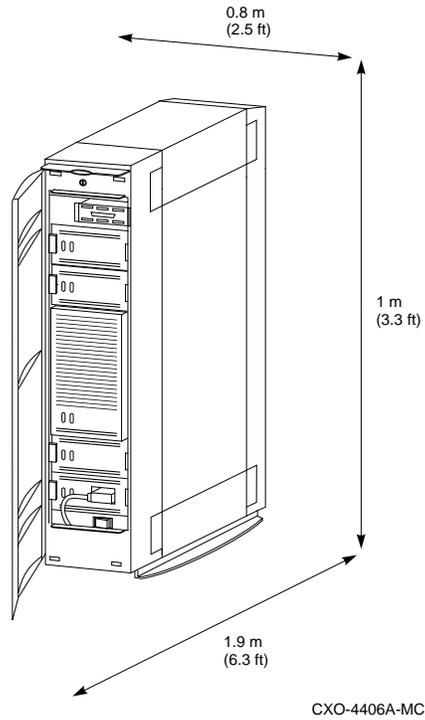
**Table 1–2  Typical Pedestal Specifications**

| Dimension | Metric | English |
|---|---|---|
| **Dimensions (Without Service Areas)** | | |
| Height | 0.6 m | 2 ft |
| Width | 0.3 m | 1 ft |
| Depth | 0.4 m | 1.3 ft |
| Weight (No SBBs) | 17 kg | 37 lb |
| Door Clearance (Front and Rear) | 0.3 m | 1 ft |
| Ventilation (Front and Rear) | 0.3 m | 1 ft |
| **Dimensions (Including Service Areas)** | | |
| Height | 1 m | 3.3 ft |
| Width | 0.8 m | 2.5 ft |
| Depth | 1.9 m | 6.3 ft |
| **Power—150 W Power Supply** | | |
| Nominal Output Voltages | +5 V dc @ 8.4 A<br>+12 V dc @ 9.0 A | |
| Disk spinup interval | 4 second (minimum) | |

## StorageWorks Building Blocks (SBBs)

The following factors determine the compatible storage devices:

- The *individual SBBs* that the SCSI controller supports (see the controller release notes).

- The *combinations* of SBBs on the same SCSI bus that the SCSI controller supports (see the controller release notes).

- You cannot install tape storage devices with a loader (for example, the TLZ7L–VA cartridge tape drive) in a pedestal.

**Figure 1–4  Typical 3.5-Inch SBB**　　　　**Figure 1–5  Typical 5.25-Inch SBB**
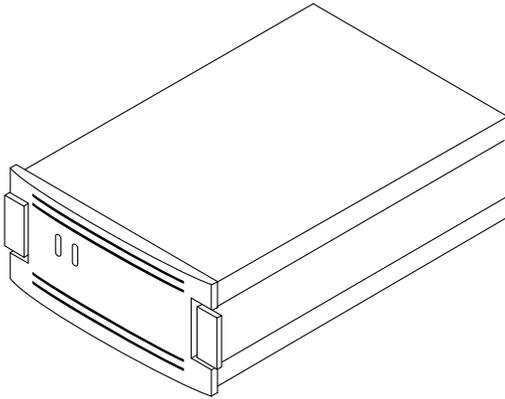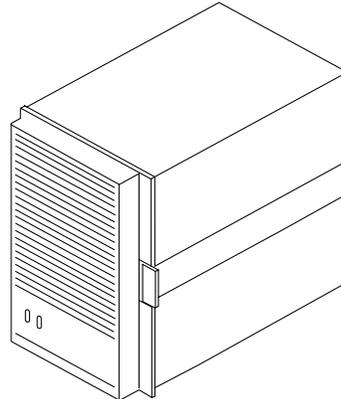
CXO-4379A-MC　　　　　　　　　　　　　　CXO-4380A-MC

## Power

The power distribution unit distributes ac power to shelf SBB power supplies and other pedestals. The ac distribution unit has the following features:

- Universal ac input (100–240 V ac, 50–60 Hz)

- Switch controlled ac outputs

    — Two 2.0 amp shelf power cords (see Figure 1–8)

    — One 4.0 amp power cord for second pedestal (see Figure 1–9)

- User-selected, country-specific power cords (see Table 1–3)

**Figure 1–6 Typical 3.5-Inch SBB**     **Figure 1–7 Power Distribution Unit—Rear View**
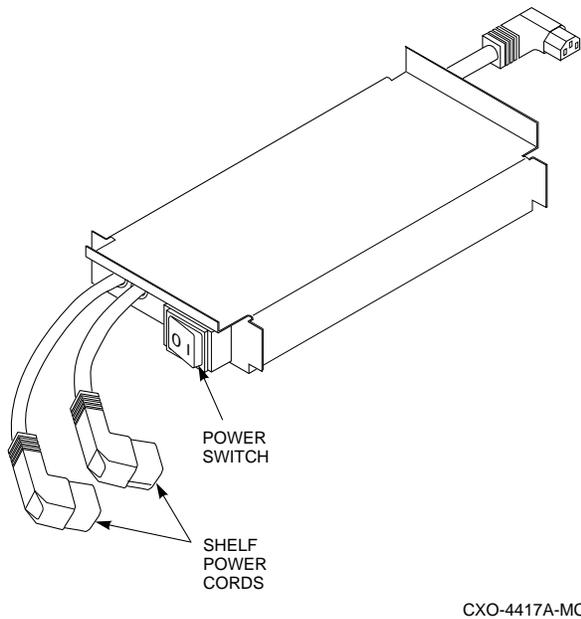
POWER
SWITCH

SHELF
POWER
CORDS

AC INPUT
RECEPTACLE

SECOND
UNIT POWER
CORD

CXO-4418A-MC

CXO-4417A-MC
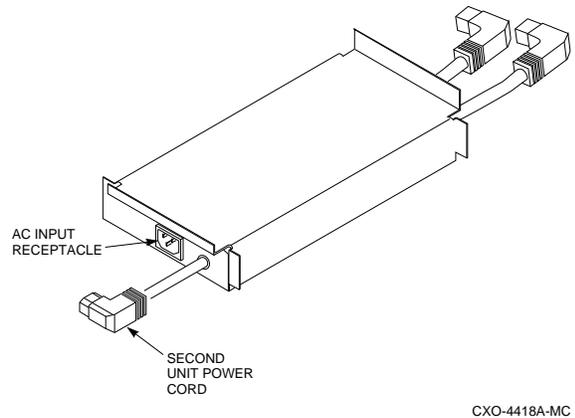
_____ **Note** _____

For proper operation of a pedestal, you must have either one of the recommended country-specific power cords listed in Table 1–3 or an equivalent.

_____

**Table 1–3  Recommended Country-Specific AC Power Cords**

| Country | V ac | A | Connector Type | Plug Type | M | Ft | Part No. |
|---|---|---|---|---|---|---|---|
| Australia | 250 | 10 | IEC 320 C13, C14 | AS3112-1981 | 2.5 | 8.2 | BN19H-2E |
| Central Europe | 250 | 10 | IEC 320 C13, C14 | CEE 7/7 (Schuko) | 2.5 | 8.2 | BN19C-2E |
| Denmark | 250 | 10 | IEC 320 C13, C14 | Afsnit 107 | 2.5 | 8.2 | BN19K-2E |
| India | 250 | 10 | IEC 320 C13, C14 | BS 546 | 2.5 | 8.2 | BN19S-2E |
| Ireland | 250 | 10 | IEC 320 C13, C14 | BS 1363 | 2.5 | 8.2 | BN19A-2E |
| Israel | 250 | 10 | IEC 320 C13, C14 | SI 32 | 2.5 | 8.2 | BN18L-2E |
| Italy | 250 | 10 | IEC 320 C13, C14 | CEI 213-16/VII | 2.5 | 8.2 | BN19M-2E |
| Japan | 125 | 15 | IEC 320 C13, C14 | NEMA 5-15 | 3.0 | 9.8 | BN27S-03 |
| New Zealand | 250 | 10 | IEC 320 C13, C14 | AS3112-1981 | 2.5 | 8.2 | BN19H-2E |
| South Africa | 250 | 10 | IEC 320 C13, C14 | BS 546 | 2.5 | 8.2 | BN19S-2E |
| Switzerland | 250 | 10 | IEC 320 C13, C14 | SEV 1011 | 2.5 | 8.2 | E0-BN19H-2E |
| United Kingdom | 250 | 10 | IEC 320 C13, C14 | BS 1363 | 2.5 | 8.2 | BN19A-2E |
| United States | 125 | 15 | IEC 320 C13, C14 | NEMA 5-15 | 3.0 | 9.8 | BN27S-03 |

**Figure 1–8  Typical 3.5-Inch SBB**



POWER SWITCH

SHELF POWER CORDS

CXO-4417A-MC
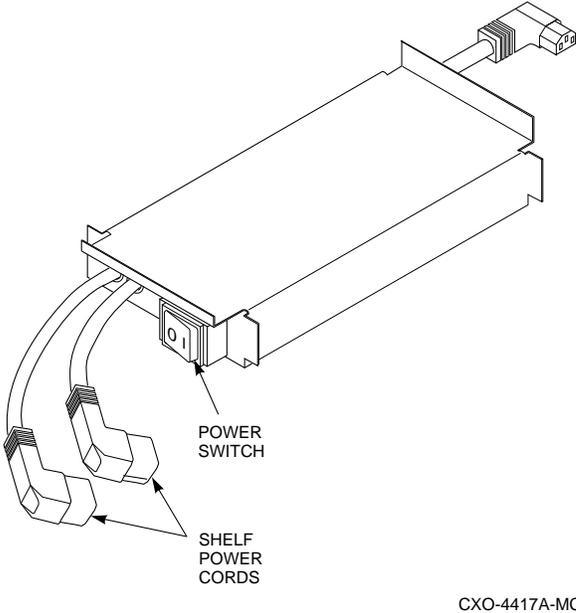
**Figure 1–9  Power Distribution Unit—Rear View**



AC INPUT RECEPTACLE

SECOND UNIT POWER CORD

CXO-4418A-MC
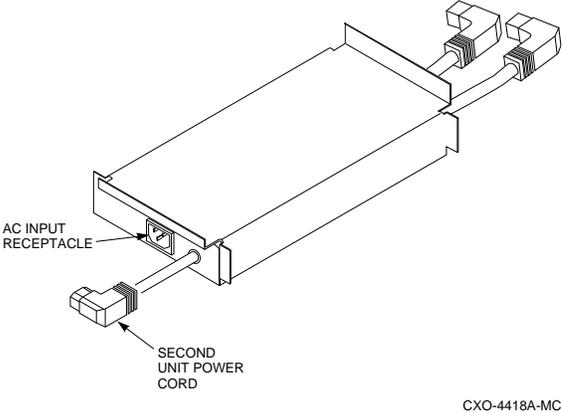
# Cooling

The two dual speed, 7200 RPM blower assemblies on the back of the SBB shelves cool the pedestal by moving air from the front of the pedestal, through the SBBs and the shelf, and out the rear. The air flow control baffles in the base and in the top prevents the exhaust air from circulating within the pedestal. DIGITAL recommends you replace a defective blower immediately, even though one blower provides enough air flow to keep the devices operating.

A safety screw and two "press-to-release" mounting tabs secure each blower assembly to the shelf.

**Figure 1–10  Blower Assemblies Locations**



BLOWER
ASSEMBLY
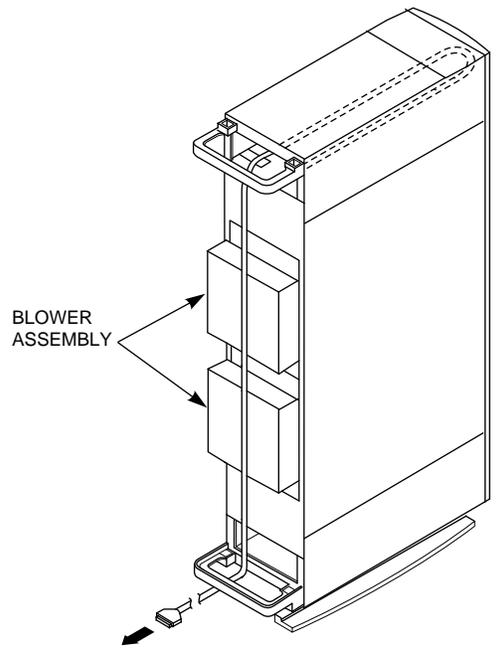
CXO-4414A-MC

# 2
# Installing a Pedestal

This chapter describes the procedures for installing a pedestal.  Subjects include planning the installation; initial installation procedures; storage device security; replacing storage devices; testing the pedestal; connecting the SCSI cables; and connecting the power cables.

## Planning the Installation

Planning the installation involves the following processes:

- Determining the approved installation environment (commercial or home)

- Selecting an area that provides sufficient space

- Considering the SCSI bus restrictions

The location of the pedestal depends upon the SBBs used.  The pedestal and shelves are Class B devices, and can be installed in a home environment.  However, installing a Class A certified device, such as an RRD45-VA CD-ROM restricts installation to a commercial or office environment.  The device certification label (see Figure 2–1) lists the device certification.

**Figure 2–1  Typical Device Certification Label**
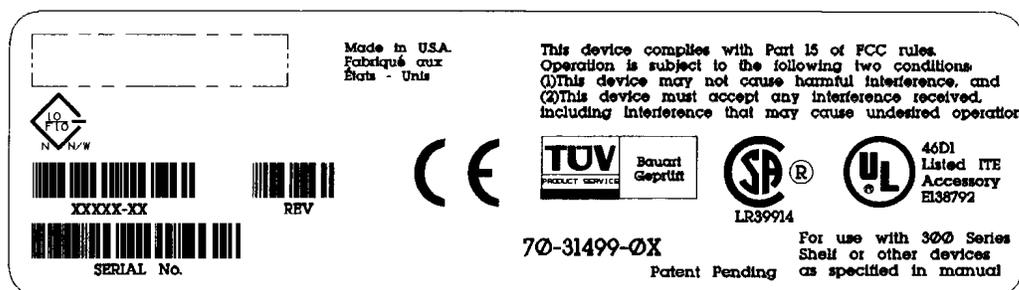


CXO-5000A-PH

- All SBBs meet FCC Class A standards for use in a commercial environment.

- You can install FCC Class B SBBs in a home environment.

- Use in a home environment requires that *all SBBs* be FCC Class B certified.

The user is responsible for installing the pedestal in the approved environment.

# Selecting the Installation Area

As shown in Figure 2–2, the pedestal requires an area:

- 1.9 m (6.3 ft) deep

- 0.8 m (2.5 ft) wide

- 1 m (3.3 ft) high

**Figure 2–2  Pedestal Installation Dimensions**



CXO-4406A-MC
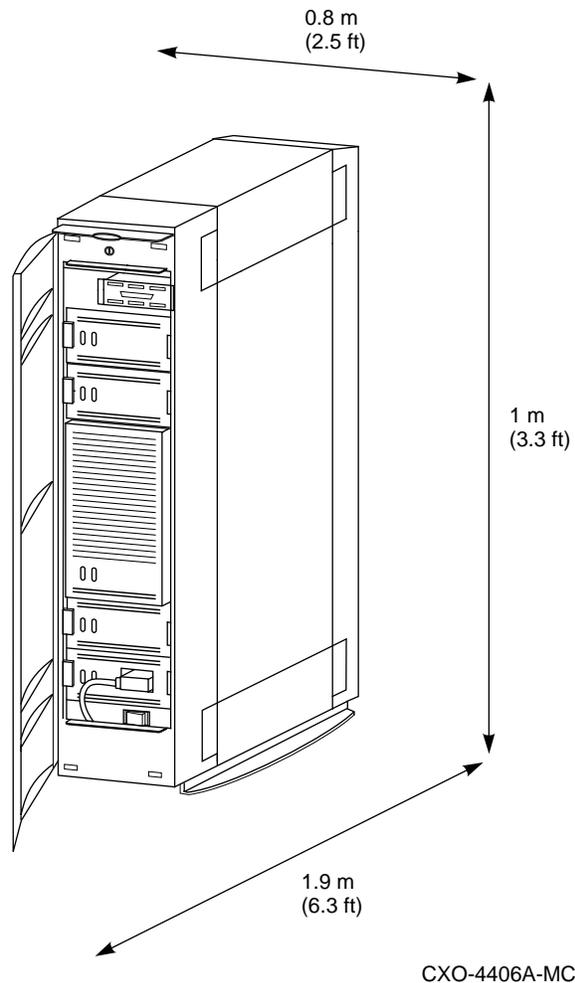
In addition to the space requirements, you should also consider the following factors:

- The locations of SCSI controller or host.

- The maximum bus length.

- The length of the SCSI bus cable.

- The routing of the SCSI bus cable.

- The location of the ac power source

## SCSI Cables

Selecting a SCSI cable requires you to:

- Determine the maximum cable length based upon the:

    — Bus type (single ended or differential)

    — bus speed

- Shelf connectors

Refer to the following publications for detailed information about the SCSI buses and cables.

- *StorageWorks Solutions BA356–SB 16-Bit Shelf and SBB User's Guide*

- *StorageWorks Solutions Shelf and SBB User's Guide* (8-bit shelves)

Once you have selected the cable you must determine the best path for the cable from the controller to the pedestal. In some cases it may be necessary to relocate the pedestal.

_____ **Note**_____

Remember that as much as 1 m (3 ft) of the SCSI cable can be within the pedestal.

_____

## Installing the SCSI Cables

The SCSI cables connect to the SBB shelf I/O module connectors. You can install the cable either through the rear of the pedestal (the primary path, see Figure 2–3) or through the side of the bezel (the alternate path, see Figure 2–4). The cable path you use depends on the SCSI bus cable length. The primary path is longer and requires you to insert the cables into the air flow baffle in the top.

**Figure 2–3  SCSI Cables—Primary Path**



JA1    JB1

To host

CXO4374A
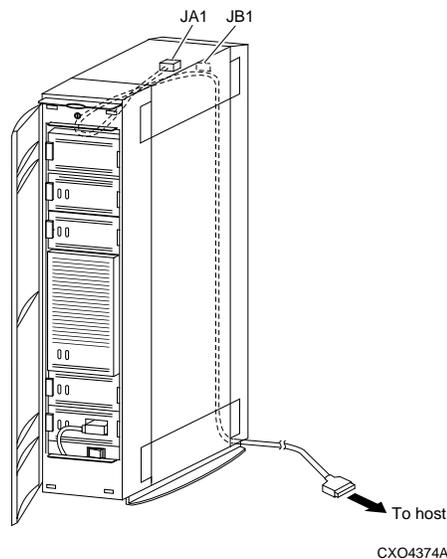
The alternate path is approximately 1 m (3.3 ft) shorter. To use it, remove one of the bezel clips from the top of the front bezel.

**Figure 2–4  SCSI Cables—Alternate Path**



CXO-4404A-MC
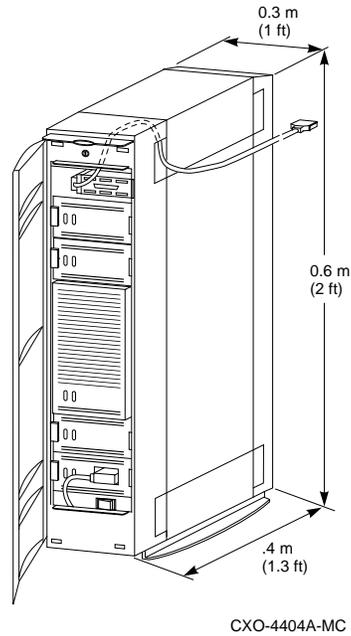
The SCSI cables attach to one the I/O shown in Figure 2–5, Figure 2–6, or

Figure 2–7.

**Figure 2–5  16-Bit Expander I/O Module**        **Figure 2–6  16-Bit SBB Shelf I/O Module**
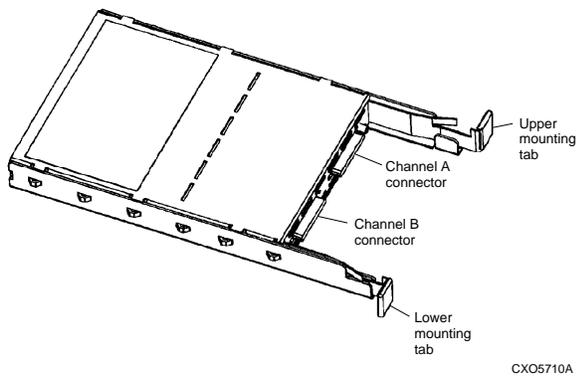


CXO5710A



CXO-4415A-MC
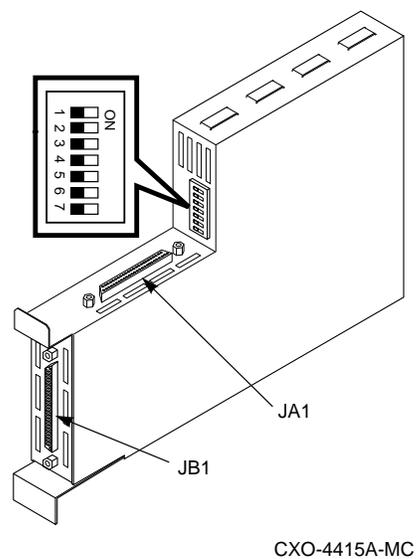
**Figure 2–7  8-Bit SBB Shelf I/O Module**
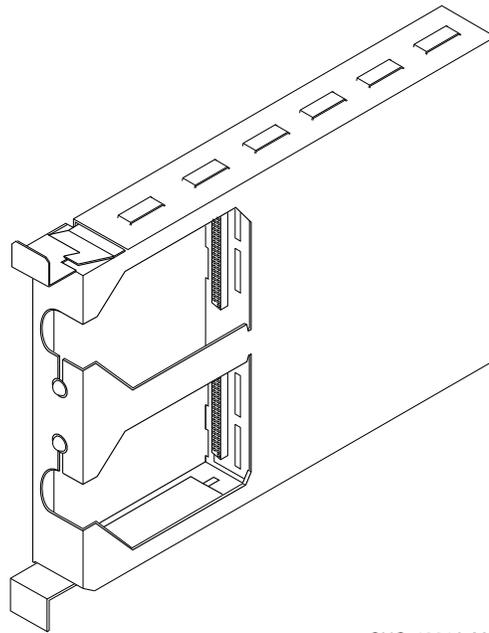


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# Installing the Power Cord

As shown in Figure 2–8, the pedestal input power cable connects to the rear of the distribution unit.

**Figure 2–8  Power Cord Routing**



INPUT POWER
CORD TO
SECOND UNIT

TO
AC OUTLET

INPUT AC
POWER CORD
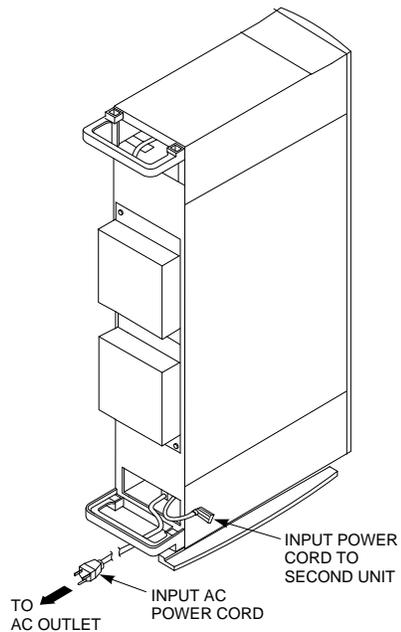
CXO-4375A-MC

# Installing SBBs

The basic rules for installing SBBs are as follows:

- You always install the **primary ac power supply** SBB in the bottom shelf slot, Slot 7.

- You can install either a redundant power supply, or a storage SBB in Slot 6.

- You can install storage device SBBs in any of the remaining slots (Slots 0 through 5).

_____ **Note** _____

To increase stability, DIGITAL recommends that you install SBBs starting at the bottom of the pedestal (slot 6).

_____

The combinations of the SBB guides, shelf slots, and backplane connectors preclude installing an SBB incorrectly. Each 3.5-inch SBB occupies one shelf slot; each 5.25-inch SBB occupies three shelf slots.

Removing or replacing any SBB requires that you remove the front bezel. You may need a key to unlock the bezel. When you insert an SBB in a slot and fully seat it, the two tabs on the front panel expand and engage the shelf, thereby securely mounting the SBB. To remove an SBB you press the two tabs in and remove the SBB.

# Checking Pedestal Operation

After you assemble the pedestal you must test its basic functionality.

_____Caution _____

You should complete the pedestal test *before* connecting the SCSI cable to the host or SCSI controller to avoid causing SCSI bus problems.

_____

**Table 2–4  To Check Pedestal Operation**

| | |
|---|---|
| 1. Open the front door and turn on the pedestal power. Observe the status light emitting diodes (LEDs) on the shelf power supply in Slot 7 (bottom slot).<br><br>• The power supply status LED (on the right) lights immediately.<br><br>• The shelf status LED (on the left) is on when both blowers are at the proper speed. | SHELF STATUS LED<br><br>POWER SUPPLY STATUS LED<br><br>CXO-4377A-MC |
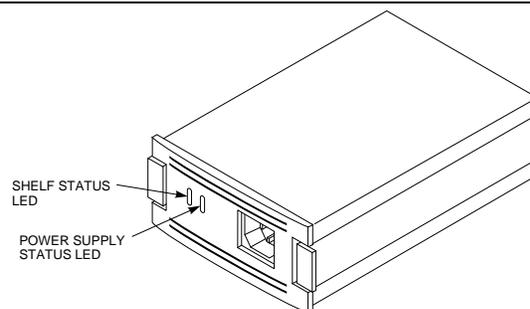
2.  Observe the LEDs on each SBB.

    - The green activity LEDs initially flash on, and then go
      OFF

    - The amber fault LEDs should remain OFF..

ACTIVITY LED
(GREEN)

FAULT LED
(AMBER)
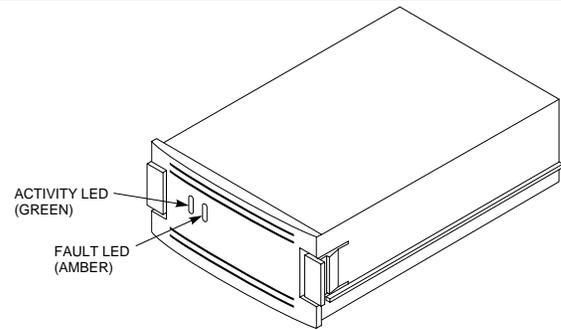
CXO-4378A-MC

3.  Once the initial "spin-up" is complete, the device activity LEDs should flash only when the controller is addressing the device

4.  Turn off the pedestal power before connecting controller SCSI bus cable.

## Connecting the Controller

The final phase of the installation is connecting the pedestal to the SCSI controller.

_____ **Caution** _____

Connecting SCSI cables with power applied to either the pedestal or the controller
can generate signals that will "**hang**" the SCSI bus.  Therefore, always turn off
the power on the pedestal and the host controller before connecting the host SCSI
bus cable.
_____

Once you have connected the pedestal to the controller, apply power to the pedestal and the
controller, and use the SCSI controller to test all devices for proper operation.

## Moving the Pedestal

It may be necessary to move  the pedestal for servicing.  The rules for moving a pedestal are as
follows:

_____ **WARNING** _____

**Use two people to move  pedestal since it weighs more than 18 kilograms
(40 pounds) with SBBs and power supplies installed.**
_____

1.  Disable the SCSI bus at the controller.

_____ **Caution** _____

Always turn the pedestal off and allow the devices allowed to **spin down** before
moving the pedestal.  This will prevent damaging the storage devices.
_____

1.  When necessary, disconnect the pedestal power cord and the SCSI cables.

2.  Do not lift the pedestal by the bezel or the door.

# 3

# Operating a Pedestal

This chapter describes the procedures for operating a pedestal to include detecting, isolating, and eliminating malfunctions. This description does not include configuring the RAID subsystem. The controller documentation includes the complete a complete description of these procedures.

The pedestal has only one component that can fail—the ac distribution unit. All the replaceable components are part of the shelf and the associated SBBs. It is possible, but unlikely, that there would be a failure of the SCSI cables or the ac power cords. The following sections describe error indications and the possible causes. For a detailed description of possible problems and recommended solutions, please refer to your shelf user's guide.

## Operational Status

LEDs on the SBB bezels indicate the operational status of the shelf power and cooling and the storage device SBBs. Open the front door for a better view of the LEDs. For a detailed description of the SBB status LED, refer to either the *SBB User's Guide* (8-bit SBBs) or the *16-Bit SBB User's Guide.*

**Table 3–1  Status LEDs**

**To determine the status of a power supply or the blowers**

| | |
|---|---|
| 1. | Observer the power supply status LEDs |
| 2. | When the ac power is missing, or either the +5 V dc or the +12 V dc power  supply voltages are incorrect, both the shelf status and the power status LEDs are off. |
| 3. | When either blower assembly fails, the shelf status LED on the power SBB is off and the power supply status LED is on. |
| 4. | When there is an error indication, complete the procedures in Table 3–4. |

SHELF STATUS LED

POWER SUPPLY STATUS LED
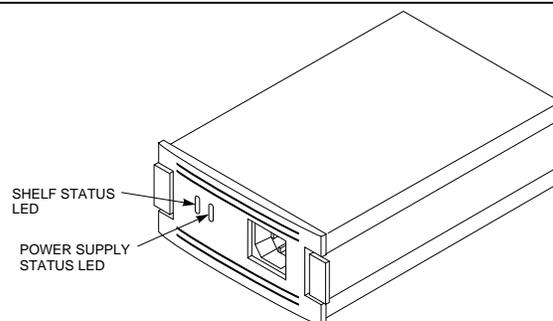
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_____ **Note** _____

The LED positions and functions are identical for both the 3.5-inch and the
5.25-inch SBBs.
_____

**Table 3–2  Status LEDs (Continued)**

| **To determine the status of the SBBs** |
| --- |

1.  Observe the individual SBB green activity LED and the amber
    fault LED.
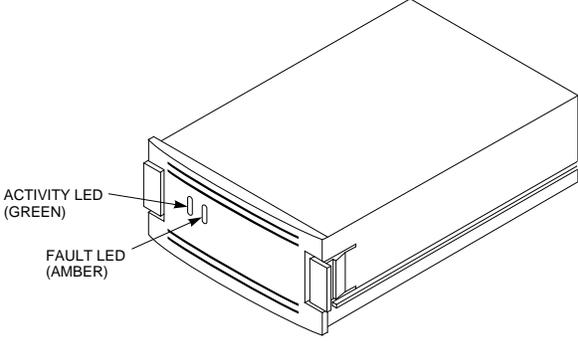
2.  Normally the green activity LED is flashing the and amber
    fault LED is off.

3.  When there is an error indication complete the procedures in

4.  The power supply certification label lists the power supply
    model number and power rating.

ACTIVITY LED
(GREEN)

FAULT LED
(AMBER)

CXO-4378A-MC
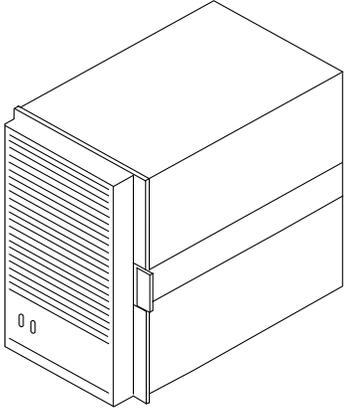
CXO-4380A-MC

# Replacing SBBs and Power Supplies

The procedure for replacing either a storage device SBB or a power supply is almost identical.
Complete the procedure in Table 3–3 to replace an SBB.  To replace a power supply, complete the
procedures in Table 3–4.

_____**Caution** _____

The SCSI controller determines the correct procedure for removing and replacing
("swapping") an SBB.  Check your SCSI controller documentation to determine
the procedures supported.
Unless the controller supports removing or installing an SBB while the SCSI bus
is active, a hot swap**,** you may corrupt or lose the data.
DIGITAL controllers, such as the HSZ-series, have switches for deactivating
(quiescing) individual buses.  Quiescing the bus without turning the SBB shelf
power off to replace an SBB is a warm swap.
_____

**Table 3–3  To Replace an SBB**

1. If your controller supports hot swap go to Step 2.

   If your controller does not support hot swap, quiesce the SCSI bus.

   If you cannot quiesce the SCSI bus, turn the controller off.

2. Open the door and unlock the bezel.

3. Grasp the bezel at the bottom.  Rotate the bezel out and away until the locking tabs disengage the base.

4. Press the SBB mounting tabs together and remove the defective SBB.
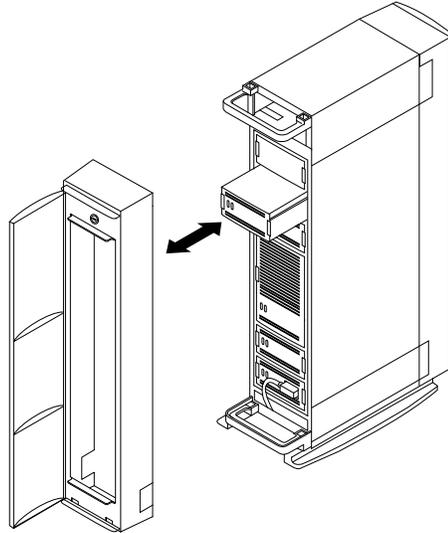


CXO-4376A-MC

5. Check the SBB label on the front of both SBBs and verify that items ①, ②, ⑥, ⑦, ⑧, and ⑨ are identical.
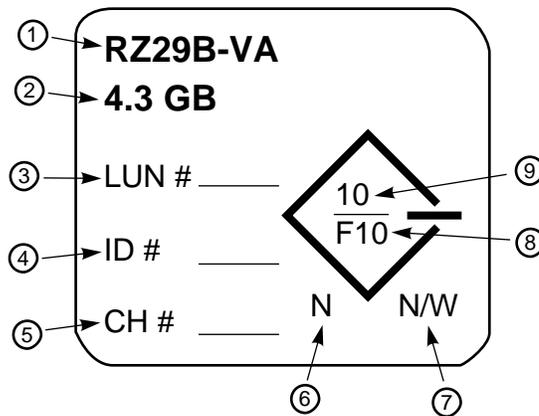


CXO-5370A-MC

   Transcribe the item ③, ④, and ⑤ information to the replacement SBB label.

6. Insert the replacement SBB and press it firmly into the slot until it is fully seated and the bezel mounting tabs engage the shelf.

7. Carefully engage the bezel bottom locking tabs with the base.

8. Carefully rotate the top of the bezel in towards the pedestal until it mates with the top.

9. Firmly seat the bezel and ensure that the top and bottom of the bezel are the same distance from the edge of the shelf.

10. Lock the bezel.

11. Apply power, start the SCSI bus, and check that the pedestal is operating correctly.

12. Check the SBB status LEDs for proper operation.

_____**Caution** _____

StorageWorks ac power supplies are available in wide range of power ratings (watts).  You can replace a lower rated supply with a higher rated supply.  For example, you can replace a 150 W supply with a 180 W supply.  The reverse is not true.  DIGITAL does support replacing a higher rated supply with a lower rated supply.
The power supply certification label lists the power supply model number and power rating.

_____

### Table 3–4  To Replace a Power Supply

1. Turn the pedestal power off.  Open the door and unlock the bezel.

2. Grasp the bezel at the bottom.  Rotate the bezel out and away until the locking tabs disengage the base.

3. Disconnect the shelf power cords.

4. Press the power supply bezel  mounting tabs together and remove  the power supply.

5. Observe the power supply certification label on both the defective and replacement power supply and ensure that they are the same model.

6. Install the replacement power SBB.

7. Connect the shelf power cord.

8. Carefully engage the bezel bottom locking tabs with the base.

9. Carefully rotate the top of the bezel in towards the pedestal until it mates with the top.

10. Firmly seat the bezel and ensure that the top and bottom of the bezel are the same distance from the edge of the shelf.

11. Lock the bezel.

12. Apply power, start the SCSI bus, and check that the pedestal is operating correctly.

13. Turn on the SCSI bus.

# Replacing a Blower Assembly

Failure of either blower assembly turns OFF the power supply green shelf status LED; the green power supply status LED remains ON. Complete the following procedure to replace a defective blower:

### Table 3–5  To Replace a Blower Assembly

1. Turn off power to the pedestal.

2. Unlock the rear bezel.

   Grasp the rear bezel at the bottom. Rotate the bezel out and away until the locking tabs disengage the base.

3. Locate the blower that is not running and remove the safety screw.
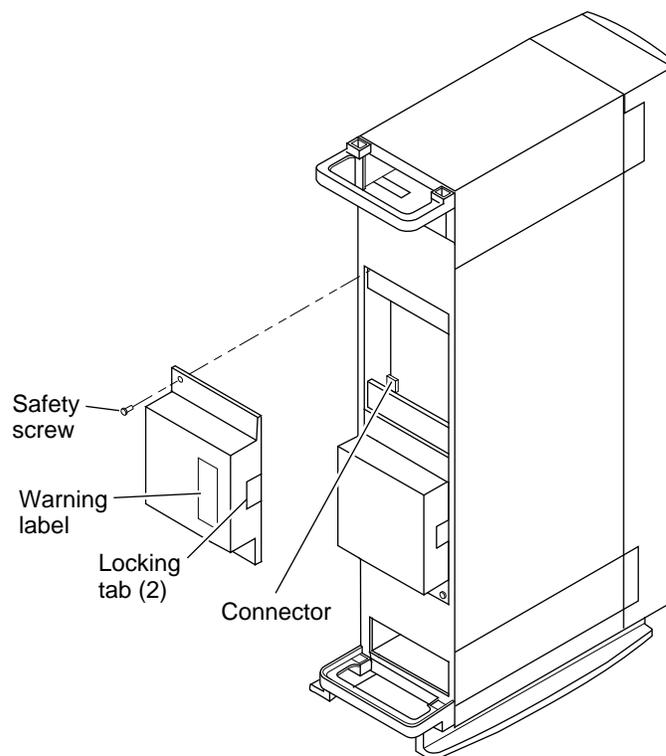


CXO4405A

4. Press in on the two mounting tabs and remove the blower assembly.

5. Align the connector guide on the replacement blower assembly with the connector on the shelf.

6. Push in on the blower assembly to fully seat it and the locking tabs engage the shelf.

7. Install the safety screw.

8. Carefully engage the bezel bottom locking tabs with the base.

9. Carefully rotate the top of the bezel in towards the pedestal until it mates with the top.

10. Firmly seat the bezel and ensure that the top and bottom of the bezel are the same distance from the edge of the shelf.

11. Lock the bezel.

12. Turn on the power. The blower begins operating and both shelf status LEDs are on.

# Disassembling a Pedestal

Almost all maintenance procedures require you to remove and replace the pedestal bezel. The procedure in Table 3–6 is the same whether you are removing the front or rear bezel.

### Table 3–6  Removing and Installing a Bezel

1. Open the door and unlock the bezel.
2. Turn the bus off either at the controller or by turning off the pedestal power.
3. Grasp the bezel at the top. Rotate the bezel out and down from the pedestal until the bottom locking tabs disengage from the base.
4. Once you have removed the bezel, you can remove SBBs, install cables, or complete all other maintenance procedures
5. Carefully engage the bezel bottom locking tabs with the base.
6. Carefully rotate the top of the bezel in towards the pedestal until it mates with the top.
7. Firmly seat the bezel and ensure that the top and bottom of the bezel are the same distance from the edge of the shelf.
8. Lock the bezel.
9. Apply power, start the SCSI bus, and check that the pedestal is operating correctly.
10. Close the front door.

### Table 3–7  To Replace a Shelf

1. Turn off power for both the pedestal and the controller.
2. Open the pedestal door and unlock the bezel.
3. Grasp the bezel at the top. Rotate the bezel out and down from the pedestal at the bottom of the bezel disengage from the base.
4. Disconnect all power cords:
5. Record the slot location of each SBB.
6. Remove all SBBs.
7. Disconnect the SCSI cables.

_____ **Note** _____

The shelf fits tightly into the base and top. You must pull hard to remove the top from the shelf or the shelf from the base.
_____

8. Hold the shelf in place and lift up on the front of the top to disengage it from the shelf.
9. Hold the base in place and lift up on the shelf to disengage it from the base.
10. Carefully align the replacement shelf mounting slots with the base dimple strips at the REAR of the base and fully seat the shelf.
11. Carefully align the dimple strips at the rear of the top with the shelf mounting slots and fully seat it.
12. Connect the SCSI cables to the shelf.
13. Install the shelf power supply.
14. Install the SBBs.
15. Connect the power cords.

16. Install the front and rear bezel.

17. Apply power and check pedestal operation.

18. Start the SCSI controller and check that both the controller and the SBBs are operating properly.

# Glossary

**ac distribution**

The method of distributing ac power in a cabinet.

**ac distribution unit**

The deskside expansion pedestal ac input device.

**ac power supply**

*See* **shelf power supply**.

**adapter**

*See* **SCSI signal bus converter**.

**backplane**

The electronic printed circuit board mounted in the rear of the shelf.  This board contains the SBB, power supply, and terminator connectors.

**blower assembly**

An airflow device mounted in a StorageWorks shelf.

**building block shelf**

*See* **SBB shelf**.

**carrier**

*See* **modular carrier**.

**certified device**

A storage device that has been tested and found to be in compliance with either an FCC or a CE certification standard.

**channel**

Another term for a SCSI bus.

**cold swap**

A method of device replacement that requires that power be removed from one or more shelves in a cabinet thereby affecting other devices therein.  User applications that are not dependent upon the devices being swapped continue to function.  Use this method when you cannot use either the "warm swap" or the "hot swap" method.  Usually, you use this method only when installing or upgrading a StorageWorks subsystem.

*See also* **warm swap** and **hot swap**.

### compatible device

A storage device that has been tested in a specific enclosure and found to be compatible.

### controller

A hardware–firmware device that manages communications on behalf of host systems over the SCSI bus to devices, such as the HSC–series, HSJ–series, and HSZ–series controllers.  Controllers typically differ by the host interface type and provide functions beyond those the devices support.

### controller shelf

A StorageWorks shelf containing a maximum of two controller with cache memory modules and two shelf power supplies.  For example, a BA350–M series shelf.

### CE-Mark

A European Economic Community (EEC) certification label that identifies electronic devices authorized for sale within member nations.

### CE-Mark Class A

Similar to, but more stringent than the FCC Class A certification, this certification label appears on electronic devices that can only be used in a commercial environment.  You can also use a CE-Mark certified device in the United States.

### CE-Mark Class B

Similar to, but more stringent than the FCC Class B certification, this certification label appears on electronic devices that can only be used in either a home or a commercial environment. You can also use a CE-Mark certified device in the United States.

### daisy chain

A common method of connecting ac power or SCSI buses from the source through a shelf or enclosure to another shelf or enclosure.

### dc power supply

*See* **shelf power supply**.

### deskside expansion unit

An enclosure, commonly referred to as a pedestal, that houses a StorageWorks shelf in a vertical position.  You can assemble a pedestal with a pedestal kit, and a user supplied SBB shelf, storage SBBs, and an ac power cord.  The factors that determine the number of devices you can use, the SCSI buses supported, and the pedestal location are the SBB shelf type, the storage SBBs, and the SCSI controller.

### disk

A storage device supporting random access to fixed size blocks of data.

**dual power configuration**

*See* **redundant power configuration**.

**DWZZB**

The 16-bit single ended compatible SCSI bus signal converter.

*See also* **SCSI bus signal converter**.

**electromagnetic interference**

*See* **EMI**.

**electrostatic discharge**

*See* **ESD**.

**EMI**

Electromagnetic interference.  The impairment of a signal by an electromagnetic disturbance.

**ESD**

Electrostatic discharge is the discharge of a potentially harmful static electric voltage as a result of improper grounding.

**FCC**

Federal Communications Commission.  The federal agency responsible for establishing standards and approving electronic devices within the United States.

**FCC Class B**

This certification label appears on electronic devices that can only be used in either a home or a commercial environment within the United States. .  A CE-Mark certified device can be used in the United States in the same environment as the equivalent FCC certification..

**host**

The primary or controlling computer (in a multiple computer network) to which you attach storage systems.

**host computer**

*See* **host**.

**hot swap**

A method of device replacement whereby the complete system remains on-line and active during device removal or insertion.  The device being removed or inserted is the only device that cannot perform operations during this process.

*See also* **cold swap** and **warm swap**.

**IEC**

International Electrotechnical Committee.  An organization that develops and publishes electronic and mechanical standards.

**initiator**

A SCSI device (usually a host system) that requests by another SCSI device (a target) to perform an operation.

**International Electrotechnical Committee**

*See* **IEC**.

**logical bus**

A single ended, physical bus connected to a differential, physical bus by a SCSI bus signal converter.

**logical units**

A group of devices addressable as a virtual unit.

**modular carrier**

The StorageWorks compatible plastic container in which you can install storage devices or power supplies to form SBBs. Modular carriers are available in both 3.5-inch and 5.25-inch form-factors.

**pedestal**

The common name for a deskside expansion unit.

*See also* **deskside expansion unit**.

**pedestal kit**

A kit for converting a customer-supplied StorageWorks shelf into a deskside expansion unit or pedestal.

**physical bus**

Two SCSI terminators separated by cables, connectors, and backplane circuitry.

**port**

(1) A logical route for data in and out of a controller. A port can contain one or more channels, all of which contain the same type data. (2) The hardware and software that connects a host controller to a CI, SCSI, or SDI bus.

**qualified device**

*See* **supported device**.

**quiesce**

To make a bus inactive or dormant. For example, you must quiesce SCSI bus operations when warm swapping an SBB.

**quiescent**

Inactive or still, dormant.

**radio frequency interference**

*See* **RFI**.

**RAID**

Redundant array of independent disks. A set of storage techniques devised to increase the performance and availability of a storage subsystem.

**redundant power configuration**

A capability of StorageWorks cabinet and shelves to ensure there is no single point of power failure. (1) For a cabinet two ac power sources and two CDUs distributed primary and redundant ac power to shelf power supplies. (2) For a shelf, the primary and redundant shelf SBB power supplies ensure the dc power is available even when there is a failure of one supply, one ac source, or one CDU. Implementing the redundant power configuration provides protection against the loss or corruption of data.

### RFI

Radio frequency interference. The impairment of a signal by an unwanted radio signal or radio disturbance.

### SBB

StorageWorks building block. The basic building block of the product line. Any device conforming to shelf mechanical and electrical standards installed in either a 3.5-inch or 5.25-inch carrier is considered to be an SBB, whether it be a storage device, a power supply, or other device.

### SBB shelf

The common name for a StorageWorks storage device shelf. This shelf also contains shelf power supply SBBs.

### SCSI

Small computer system interface. This ANSI interface defines the physical and electrical parameters of a parallel I/O bus used to connect computers and a maximum of seven devices. The StorageWorks subsystem implementation uses SCSI–2, for the synchronous transfer of 8-bit data at rates of up to 10 MB/s.

### SCSI bus signal converter

Sometimes referred to as an adapter. (1) A connecting device that permits the attachment of accessories or provides the capability to mount or link units. (2) The device that connects a 16-bit, differential SCSI bus operating in the 8-bit mode to an 8-bit, single ended SCSI bus. (3) The device that connects a 16-bit, differential SCSI bus operating in the 8-bit mode to an 16-bit, single ended SCSI bus.

### SCSI busing connection

A connection in the SCSI bus between two terminators such as the SBB shelf SCSI input connector.

### SCSI device

A host computer adapter, a peripheral controller, or an intelligent peripheral that can be attached to the SCSI bus.

### SCSI device ID

The bit-significant representation of the SCSI addressing referring to one of the signal lines numbered 0 through 7 for an 8-bit bus or 0 through 15 for a 16-bit bus. Also referred to as "target ID".

**SCSI device-side device address**

The 8 (0 through 7) or 16 (0 through 15) device addresses (target IDs) assigned to the SCSI controller and the devices it controls.

*See also* **SCSI host-side device address**.

**SCSI end-bus position**

The physical location of a controller, a SCSI bus controller, or a device that contains the bus terminator.

**SCSI host-side device address**

The eight device addresses (target IDs) assigned to the host device and the SCSI controllers and the devices it controls.

*See also* **SCSI device-side device address**.

**SCSI midbus position**

The physical location of a controller or a device that the SCSI bus passes through enroute to the controller or device that contains the SCSI bus termination.

**SCSI port**

(1) Software: The channel that controls communications to and from a specific SCSI bus in the system.  (2) Hardware: The name of the logical socket at the back of the system unit to which a SCSI device is connected.

**SCSI stubbing connection**

A connection in the SCSI bus path between a terminator and a connector, such as a trilink connector, that is used to place a controller in the midbus position.

**SCSI–A cable**

A 50-conductor (25 twisted pair) cable used for single ended, SCSI–2 bus connections.

**SCSI–P cable**

A 68-conductor (34 twisted pairs) cable used for differential bus connections.

**shelf power supply**

The power supply that provides +5 V dc and +12 V dc to the StorageWorks shelves.  These supplies can be either ac input (120 V ac) or dc (48 V dc).

**signal converter**

*See* **SCSI bus signal converter**.

**single ended SCSI bus**

A bus in which each signal's logic level is determined by the voltage of a single wire in relation to ground.

**Small Computer System Interface**

*See* **SCSI**.

**split bus**

A single SBB shelf SCSI bus that is configured as two individual buses (a four-device bus and a three-device bus) is commonly referred to as a split bus.

**spin down**

The process that begins when power is removed from a storage device and data transfer halts, and ends when the device is stopped and can be moved.  In the case of disk drives, the heads are retracted and the media is stopped.

**spin up**

The process that begins when power is applied to a storage device, and ends when the device is determined to be operational and ready for data transfer operations.

**storage array**

An integrated set of storage devices.

**storage array subsystem**

*See* **storage subsystem**.

**storage sets**

A grouping of disk drives that make up a new distinct container.

**storage subsystem**

The controllers, storage devices, shelves, cables, and power supplies that form a mass storage subsystem.

**StorageWorks**

The DIGITAL set of enclosure products that allows customers to design and configure their own storage subsystem.  Components include power, packaging, and interconnections in a StorageWorks shelf.  SBBs and array controllers are integrated therein to form storage subsystems.  System-level enclosures to house the shelves and standard mounting devices for SBBs are also included.

**StorageWorks building block**

*See* **SBB**.

**subsystem array strategy**

A strategy, including packaging, devices, and controllers, that provides an integrated storage subsystem solution.

**supported device**

(1) A device that has been fully evaluated in an "approved" StorageWorks configuration (that is, shelf, cabinet, power supply, cabling, and so forth) and is in complete compliance with country-specific standards (for example, FCC, CE-Mark, CSA, TÜV, VDE, and so forth) and with all DIGITAL standards.  (2) A device supported by a controller or host operating system.

**tape**

A storage device supporting sequential access to variable sized data records.

**tape controller**

*See* **controller.**

**target**

A SCSI device that performs an operation requested by an initiator.

**target ID**

*See* **SCSI device ID**.

**UL**

Underwriters Laboratories.  An organization that tests and certifies electrical devices.

**Underwriters Laboratories**

*See* **UL**.

**universal ac input power supply**

*See* **shelf power supply**.

**warm swap**

A method of device replacement whereby the complete system remains on-line during device removal or insertion.  The system bus may be halted for a brief period of time, during device insertion or removal.  No booting or loading of code is permitted except on the device being inserted.  User applications that are not dependent upon the devices on the "affected SCSI bus" are not noticeably impacted.

*See also* **cold swap** and **hot swap**.