

StorageWorks™

Solutions

7 Device, 16-Bit Deskside
Expansion Pedestals
(BA356-K Series)

User's Guide

Order Number: EK-356KB-UG. B01

This guide describes the procedures that install and operate the BA356-K series deskside expansion pedestals (BA356-KB).

December 1995

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Any changes or modifications made to this equipment may void the users authority to operate this equipment.

This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

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Preface

The *StorageWorks™ Solutions 16-Bit Deskside Expansion Pedestals (BA356–K Series) User’s Guide* describes the BA356 pedestals and compatible StorageWorks™ building block (SBB) shelves. 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.

This guide, the StorageWorks Solutions 7 Device, 16-Bit SBB Shelf User’s Guide, the StorageWorks Solutions Products Catalog, the StorageWorks Solutions 8-Bit I/O Module, and the StorageWorks Solutions 16-Bit I/O Module comprise the StorageWorks Solutions documentation set.

Intended Audience

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

Structure

This guide is organized as follows:

- | | |
|-----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Chapter 1 | An introduction to the 8-bit 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 |
| Chapter 4 | Describes how to improve pedestal air circulation by selecting and installing air flow control baffles |

Documentation Conventions

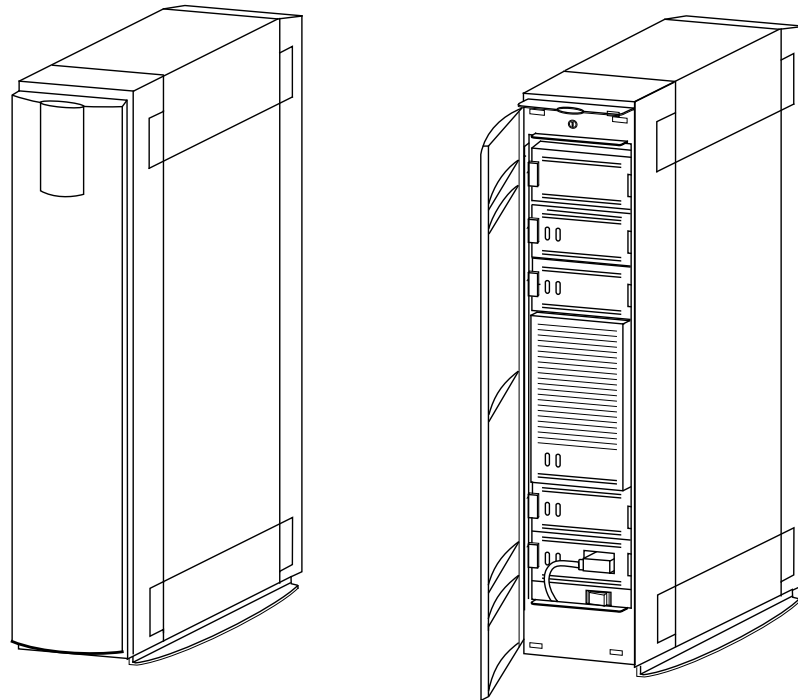
The following conventions are used in this guide:

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

Introducing the StorageWorks Pedestals

This chapter describes the **StorageWorks 16-bit (BA356 series) desktide expansion pedestals** (pedestal). This description includes features, specifications, and compatibility with other StorageWorks products, and **small computer system interface (SCSI) controllers**.

Figure 1–1 Typical Desktide Expansion Pedestal



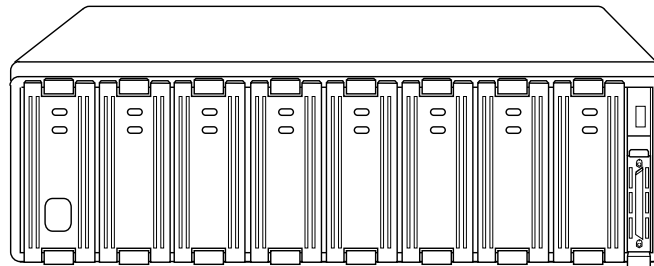
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1.1 Product Description

The pedestal kit encloses individual **StorageWorks (SBB shelves)** to create pedestals similar to the one shown in Figure 1–1.

This low-cost, mass storage solution enables you to design and configure 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 SBB (Figure 1–2).

Figure 1–2 Typical 16-Bit SBB Shelf



CXO-4319A-MC

These shelves can accommodate either 3.5-inch or 5.25-inch **SBBs** in various combinations to create a storage array specifically suited to your needs. The SCSI bus controller capabilities can restrict the number of SBBs, the SBB types, and the combination SBB types you install.

You have the option of using any of the StorageWorks compatible disk drives, tape drives, CD-ROMs, or other storage devices mounted in an SBB.

The shelf used determines the following:

- SCSI bus width (16-bit)
- Possible SCSI bus configurations
- Maximum SCSI cable lengths
- Device address bus

Note

You can use the DWZZB-series (16-bit) SCSI bus converter to connect a SCSI controller differential bus to a shelf single-ended bus.

The 16-bit shelves have FCC Class B certification. The SBB FCC certification determines where to use the pedestal. SBB with FCC Class B certification is for residential use; SBB FCC Class A certification is for commercial use.

1.2 Features

All StorageWorks pedestals have the following features:

- Locking front and rear bezels that prevent removal of SBBs
- Flexibility to design a **storage array subsystem** that meets your specific needs
- Low-cost SCSI device storage subsystems
- An ac distribution unit with switch-controlled ac outputs
- Capability of “daisy-chaining” the ac input power to multiple pedestals

The shelves and SBBs used in these pedestals have the following features:

- Capability to mix 3.5-inch and 5.25-inch form-factor storage devices in a single pedestal
- **Redundant power** option
- Optional **battery backup unit (BBU)**
- Redundant blower assemblies
- Visual shelf status (power, cooling) indicators
- Visual storage device status (operation, fault) indicators
- Easily removed and installed storage devices

1.3 Pedestal Components

Table 1-1 lists the components of the configure-to-order, 16-bit pedestals.

Table 1-1 16-Bit Pedestal Components

Nomenclature	BA356-KC
Baffles—Air Flow	1
Blower Assembly—Dual Speed	2
Pedestal with locking bezels	1
Power Cord	1
Power Distribution Unit	1
Power Supply—150W	1
SBB Shelf—16-bit	1

1.4 StorageWorks Building Blocks (SBBs)

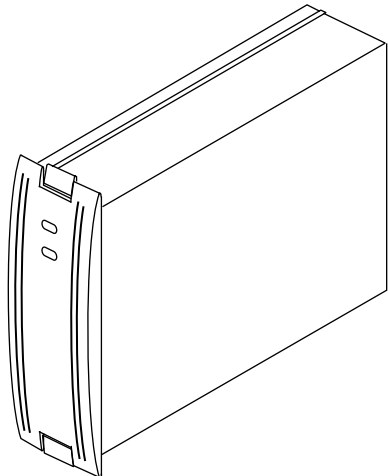
The primary factors in determining compatible storage devices are as follow:

- The SCSI controller must support all the SBBs.
- The SCSI controller must support all the combinations of devices on the same SCSI bus.
- You cannot install tape storage devices with a loader (for example, the TLZ6L-VA cartridge tape drive) in a pedestal.

Mounting a storage device in a **modular carrier** creates an SBB. These carriers are available in two form-factors—3.5-inch (see Figure 1–3) and 5.25-inch (see Figure 1–4). All power supplies and battery backup units are 3.5-inch SBBs.

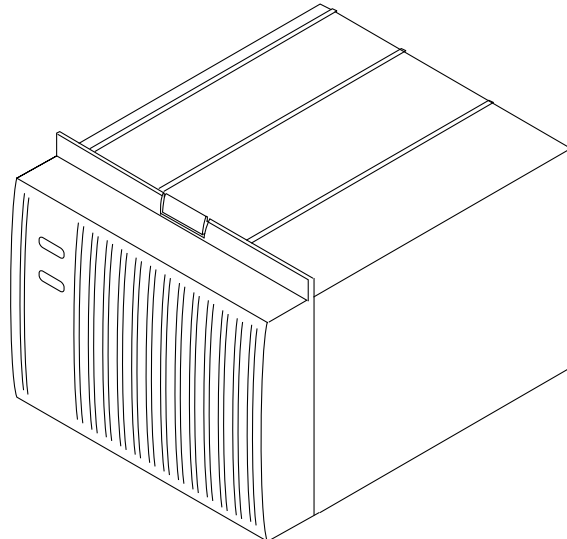
- Review the *StorageWorks Solutions Product Catalog* to determine the available SBBs.

Figure 1–3 Typical 3.5-Inch SBB



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Figure 1–4 Typical 5.25-Inch SBB



CXO-4800A-MC

CAUTION

The SCSI controller capability determines the 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 (**hot swap**), you may corrupt or lose the data.

Digital controllers, such as the HSJ™-series, have switches for deactivating (quiescing) individual buses. Quiescing the bus without turning the SBB shelf power off and replace an SBB is a **warm swap**.

1.5 Cooling

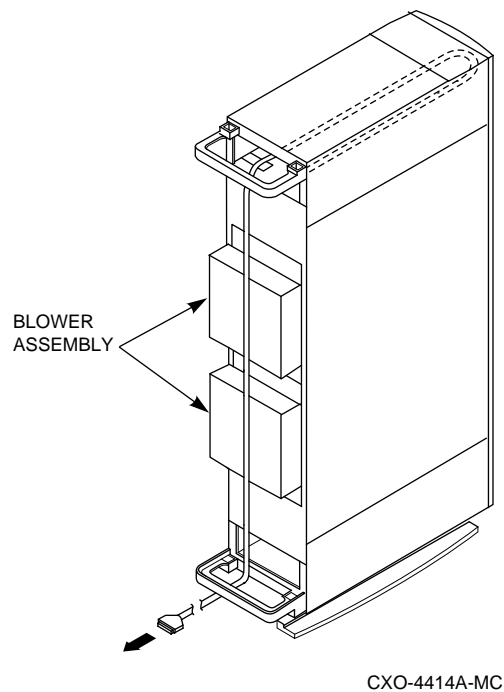
The two blower assemblies on the back of the SBB shelves cool the pedestal by moving air from the front of the pedestal, through the SBBs and shelf, and out the rear. Digital™ recommends you replace a defective blower immediately, even though one blower provides enough air flow to keep the devices operating. Installing air flow control baffles (see Section 2.2) improves cooling within the pedestal.

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

CAUTION

Install *either* single-speed or dual speed blowers in an 8-bit shelf. Install *only* dual speed blowers in a 16-bit shelf. **Do not** install a single speed *and* a dual speed blower in the same shelf.

Figure 1–5 Blower Assembly Location



1.6 Power

AC power passes through the ac distribution unit to the shelf power supply SBB. 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 1–6)
 - One 4.0 amp power cord for second pedestal (see Figure 1–7)
- User-selected, country-specific power cords (see Table 1-2)

Note

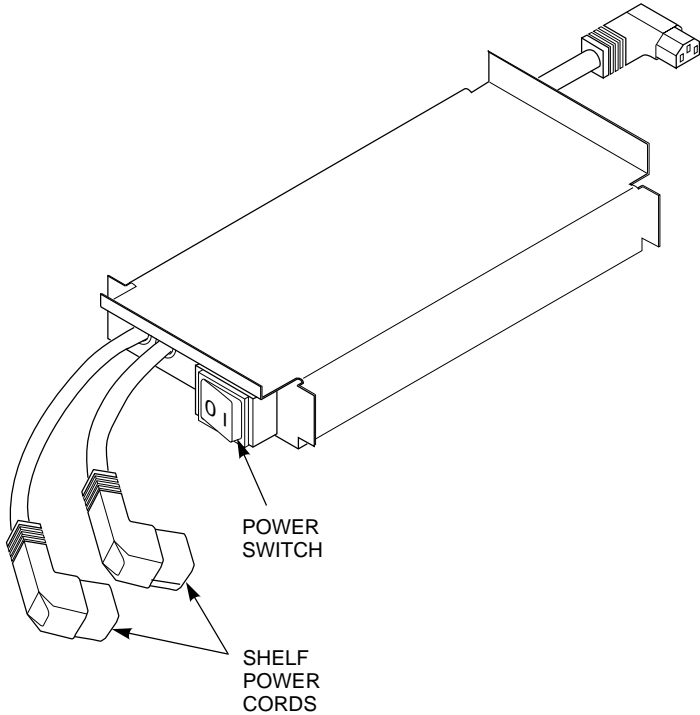
The pedestal kit does not contain any external power cords.

For proper operation of a pedestal, you must have either one of the recommended country-specific power cords listed in Table 1-2 or an equivalent.

Table 1-2 Recommended Country-Specific AC Power Cords

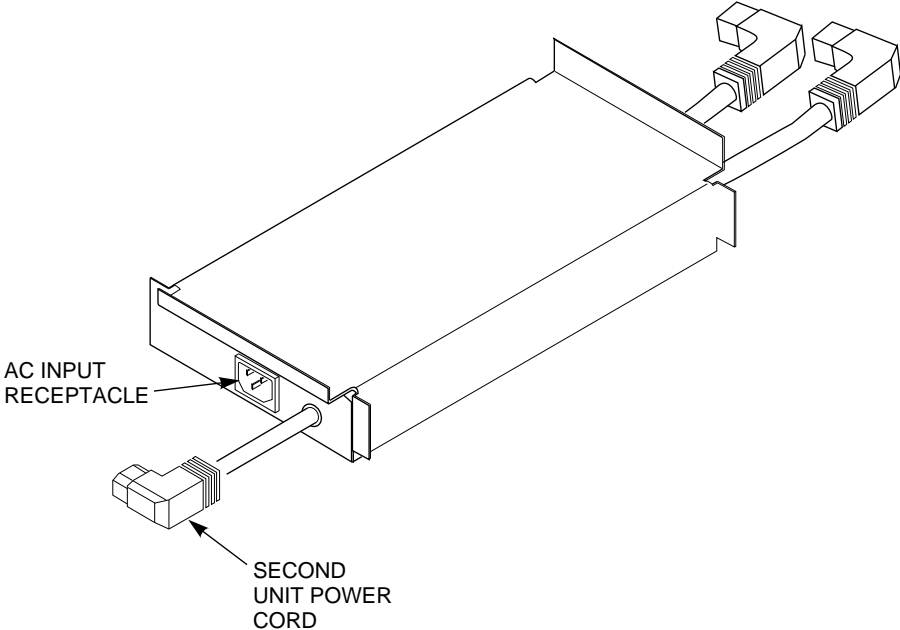
Country	Voltage	Amps	Connector Type	Plug Type	Length		Order No.
					M	Ft	
Australia	250 V ac	10 A	IEC 320 C13, C14	AS3112–1981	2.5	8.2	BN19H–2E
Central Europe	250 V ac	10 A	IEC 320 C13, C14	CEE 7/7 (Schuko)	2.5	8.2	BN19C–2E
Denmark	250 V ac	10 A	IEC 320 C13, C14	Afsnit 107	2.5	8.2	BN19K–2E
India	250 V ac	10 A	IEC 320 C13, C14	BS 546	2.5	8.2	BN19S–2E
Ireland	250 V ac	10 A	IEC 320 C13, C14	BS 1363	2.5	8.2	BN19A–2E
Israel	250 V ac	10 A	IEC 320 C13, C14	SI 32	2.5	8.2	BN18L–2E
Italy	250 V ac	10 A	IEC 320 C13, C14	CEI 213–16/VII	2.5	8.2	BN19M–2E
Japan	125 V ac	15 A	IEC 320 C13, C14	NEMA 5–15	3.0	9.8	BN27S–03
New Zealand	250 V ac	10 A	IEC 320 C13, C14	AS3112–1981	2.5	8.2	BN19H–2E
South Africa	250 V ac	10 A	IEC 320 C13, C14	BS 546	2.5	8.2	BN19S–2E
Switzerland	250 V ac	10 A	IEC 320 C13, C14	SEV 1011	2.5	8.2	E0–BN19H–2E
United Kingdom	250 V ac	10 A	IEC 320 C13, C14	BS 3163	2.5	8.2	BN19A–2E
United States	125 V ac	15 A	IEC 320 C13, C14	NEMA 5–15	3.0	9.8	BN27S–03

Figure 1-6 Power Distribution Unit—Front View



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Figure 1-7 Power Distribution Unit—Rear View



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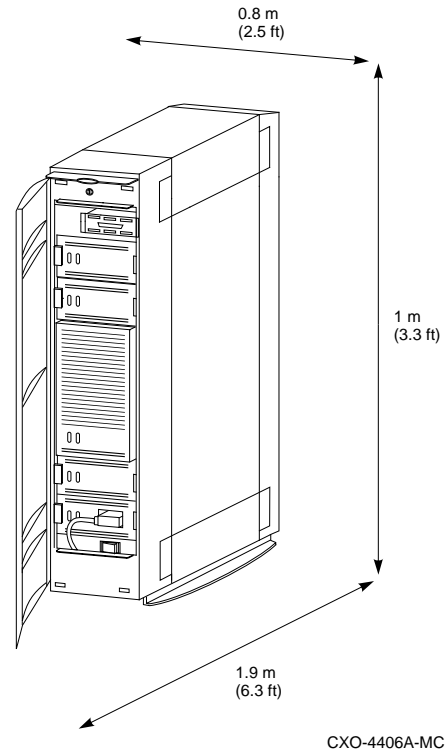
1.7 Product Specifications

Table 1-3 and Figure 1-8 show the basic pedestal specifications.

Table 1-3 Typical Pedestal Specifications

Physical Specifications		
Nominal Dimensions		
Item	Metric	English
Height	0.6 m	2.0 ft
Width	0.15 m	.05 ft
Depth	0.4 m	1.3 ft
Weight (no devices)	17.0 kg	37.0 lb
Rear clearance (air exhaust)	0.3 m	1.0 ft
Front clearance (door opening)	0.3 m	1.0 ft
Dimensions with Service Areas		
Front service area	0.8 m	2.6 ft
Rear service area	0.8 m	2.6 ft
Vertical service area	0.4 m	1.3 ft
Height	1.0 m	3.3 ft
Width	0.8 m	2.6 ft
Depth	1.9 m	6.2 ft
Pedestal Power		
Nominal Output Voltages	Power Supply	
	150 W	
Mode 1		
+5 V d	8.4 A	
+12 V dc	9.0 A	
Mode 2		
+5 V dc	15.0 A	
+12 V dc	6.25 A	
Disk spinup (minimum)	4 second interval	

Figure 1-8 Pedestal Dimensions



Assembling a Pedestal

The factory assembles the pedestals prior to shipment. These procedures are presented for your information. Chapter 3 describes the procedures for installing a BA356-K series pedestal.

Note

The user supplies the SBB shelf, storage SBBs, power SBBs, and the pedestal power cord.

2.1 Preparations

Complete the following procedures before starting to assemble a pedestal:

1. Determine the device address for each storage SBB.
2. Determine the shelf location for each storage SBB.
3. Set the SBB device address switches (5.25" devices only).
4. Determine the shelf SCSI bus configuration (single or split) and
 - Install the jumper as required on the 8-bit shelf I/O module and install the 16-bit backplane terminator when configuring for a split bus.
 - or set the bus configuration switches on the 16-bit shelf I/O module and install the backplane terminator when configuring for a split bus.
5. Determine the optimum routing for the SCSI cables (shortest possible distance).
6. Select the base baffle for the 16-bit shelf (see Section 2.2).

2.2 Selecting the Air Flow Control Baffles

The foam block shown in Figure 2-1 has four precut air flow control baffles (A, B, C, and D). These baffles improve SBB cooling by controlling the circulation of the blower exhaust air within the pedestal. See Figure 2-2 through Figure 2-4 to determine where to install these baffles.

Note

An 8-bit pedestal requires the BA35X-MJ 8-bit pedestal dual speed blower upgrade kit, to install a 7200 rpm device

Figure 2-1 Air Flow Control Baffles

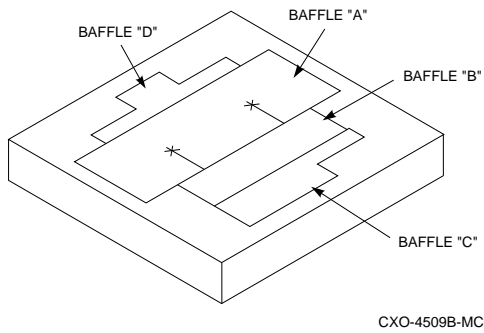
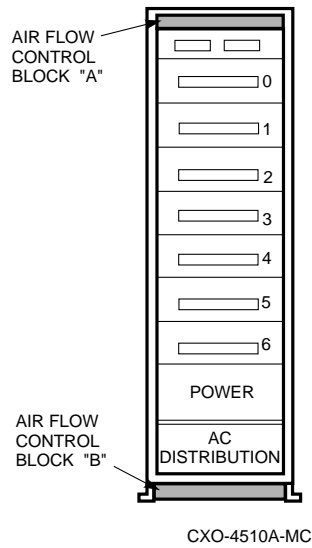


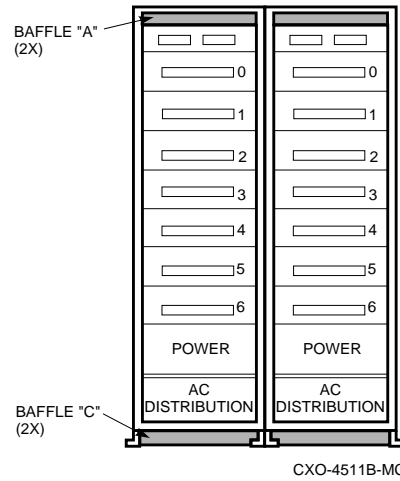
Figure 2-2 Baffles A and B

Baffle A	Install this baffle in the top of all pedestals as shown. It has two slits for inserting the SCSI cables.
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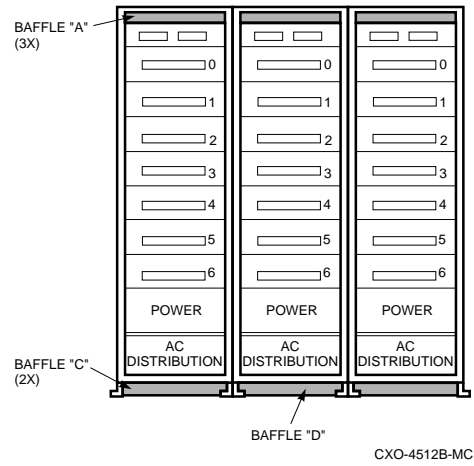
Baffle B	Install this baffle in the base of a single pedestal.
-----------------	-------------------------------------------------------

Figure 2-3 Baffles A and C



Baffle C	Install this baffle in the base when using a multiple pedestal configuration.
-----------------	-------------------------------------------------------------------------------

Figure 2-4 Baffles A, C, and D



Baffle D	Install this baffle when using a multiple pedestal configuration (three or more pedestals).
-----------------	---------------------------------------------------------------------------------------------

2.3 Assembling the Pedestal

Special tools, test equipment, or techniques are *not required* to assemble a pedestal.

Figure 2-5 shows the pedestal components, and Table 2-1 lists the components and identifies those that are part of the pedestal kit and those that the user supplies.

Refer to Figure 2-5 and complete the following procedure to assemble a pedestal.

CAUTION

The two *u-shaped* bezel support brackets on the base and top are not handles. *Do not* use them to move the pedestal.

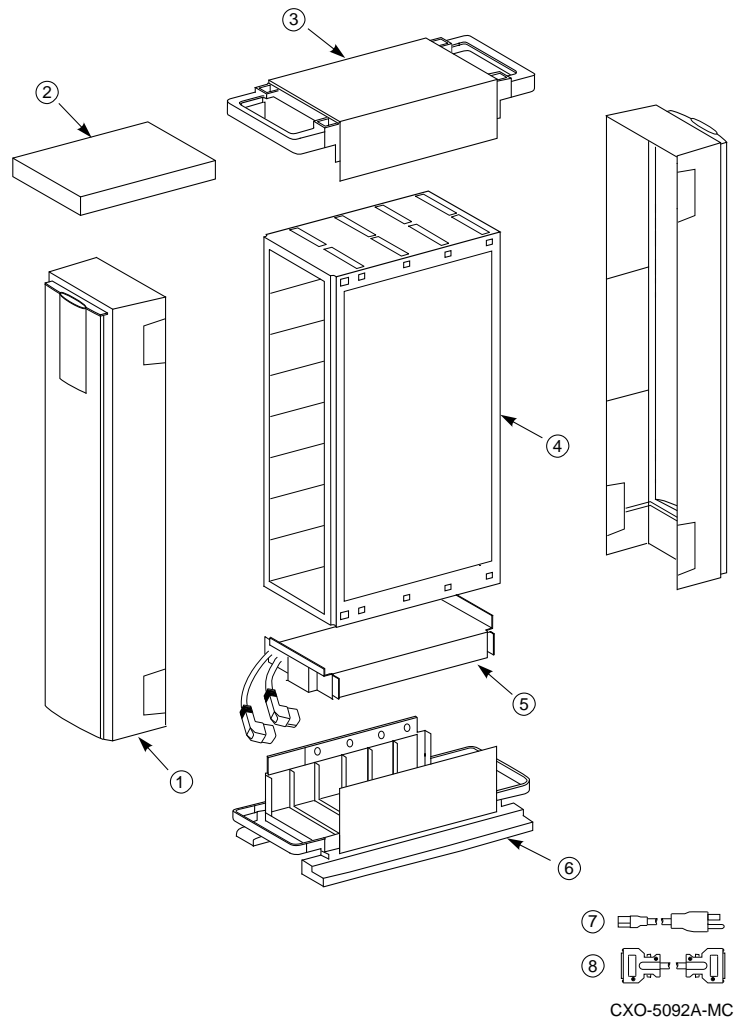
1. Position the base baffle (refer to Section 2.2) midway between the front and rear of the base. The baffle must completely block air flow through the base. Be sure that the baffle is not bent or folded.
2. Install the feet.
3. Place the base in the selected installation area with the *dimple strips* at the rear.
4. Press the **O** switch on the ac distribution unit to turn off the ac output. Insert the distribution unit in the base with the power switch to the front.
5. Carefully align the SBB shelf mounting slots with the dimples at the REAR of the base and insert the **empty** SBB shelf in the base with Slot 7 at the bottom. Push down until it snaps into place.
6. Install the shelf SBB power supply in the bottom shelf slot (Slot 7).
7. Connect one of the ac distribution unit power cords to the shelf SBB power supply.
8. If there is a redundant shelf SBB power supply or battery backup unit (BBU) install it in Slot 6. Connect the second ac distribution unit power cord to the redundant shelf SBB power supply.
9. Connect the SCSI input cable to shelf connector JA1 (leftmost connector).
10. Connect the SCSI output cable to shelf connector JB1 (rightmost connector) for a split bus or dual shelf configuration.
11. Insert the SCSI cables into Baffle **A**.
12. Position Baffle **A** near the center of the top between a set of ribs. Be sure that the baffle is neither bent or folded.
13. Align the dimple strips in the top with mounting holes in the shelf.
14. Press down on the top until it snaps into place.
15. Install the storage device SBBs starting with the lowest open slot (Slot 6 or Slot 5).
16. Make sure the lock on the bezel is in the unlocked position.

17. Carefully engage the locking tabs at the bottom of the bezel with the base.
18. Carefully rotate the top of the bezel in towards the pedestal until it mates with the top.
19. Be sure that the bezel is firmly seated and that the top and bottom of the bezel are the same distance from the edge of the shelf.
20. Lock the bezel.
21. Repeat steps 16 to 20 on the other end of the enclosure.

Figure 2-5 Pedestal—Exploded View

Table 2-1 Pedestal Components

Pedestal Kit Components	
No.	Description
①	Front and rear bezel with door, bezel lock with key, and 4 bezel clips
②	Baffles foam block
③	Top
⑤	AC distribution unit
⑥	Base with feet
User Supplied Components	
No.	Description
④	SBB shelf with blower assemblies, shelf power supply, and storage SBBs
⑦	AC input power cord
⑧	SCSI cables



Installing a Pedestal

This chapter describes the procedures for installing either an 8-bit or a 16-bit BA356 series pedestal. Subjects include planning the installation; initial installation procedures, storage device security, replacing storage devices, testing the pedestal, connecting the SCSI cables to the SCSI controller, and connecting the power cables.

3.1 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
- All SBBs meet FCC Class B standards for use in a commercial or home environment

3.2 Unpacking Pedestals

Complete the following procedure to unpack a pedestal (see Figure 3–1):

WARNING

To prevent injury, use two people to unpack pedestals.

CAUTION

Carefully check the shipping container and all components for any shipping damage. Report damaged components to your Digital account representative.

1. Carefully remove all packing materials and components.
2. Remove components from shipping container.
3. Remove components from plastic shipping bags.
4. Replace all packing material, including plastic bags, in shipping container.
5. Store the shipping container for future use.

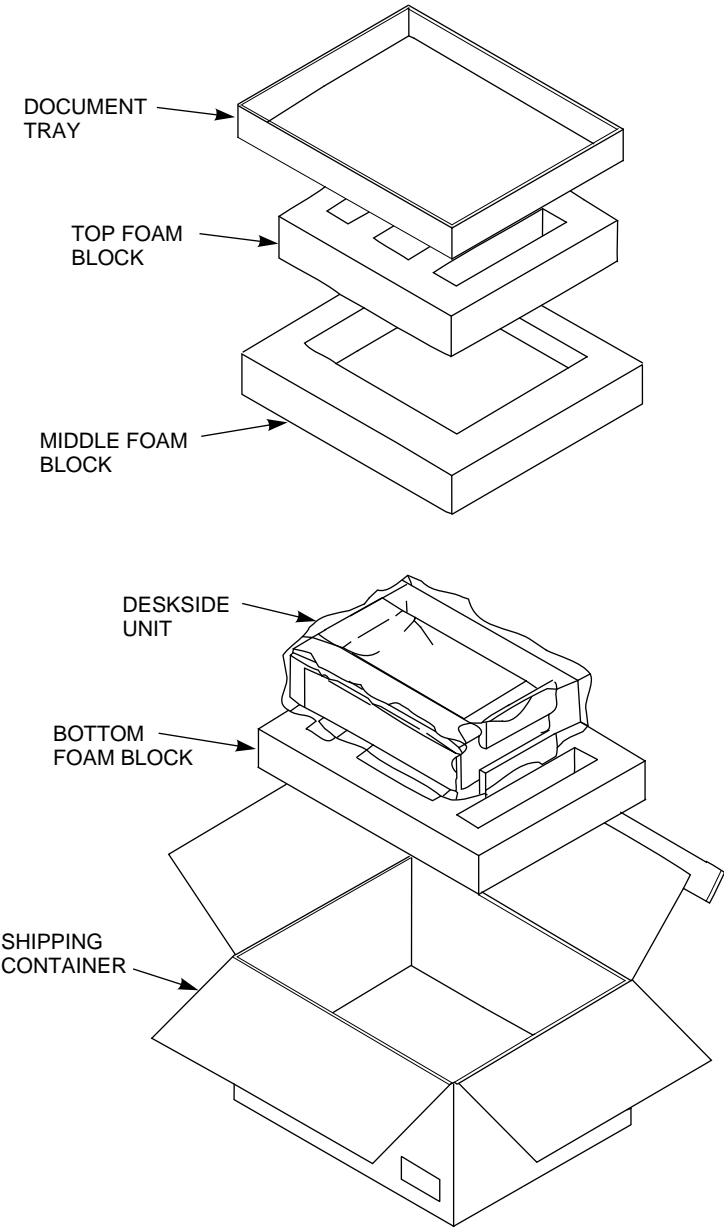
Note

Retain all packing materials for future use. Shipping pedestals without using the proper packing materials can cause damage to the pedestal.

Complete the following procedure to pack a pedestal (see Figure 3–1):

1. Remove the packing material from the shipping container.
2. Place the components in the plastic bags.
3. Place bottom foam block in the shipping container.
4. Place the pedestal on top of the foam block.
5. Place the middle foam block over the pedestal.
6. Place the top foam block on the pedestal.
7. Place the cardboard tray on top of the foam block.
8. Seal the shipping container.

Figure 3-1 Deskside Expansion Pedestal Packing



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3.3 Selecting the Installation Area

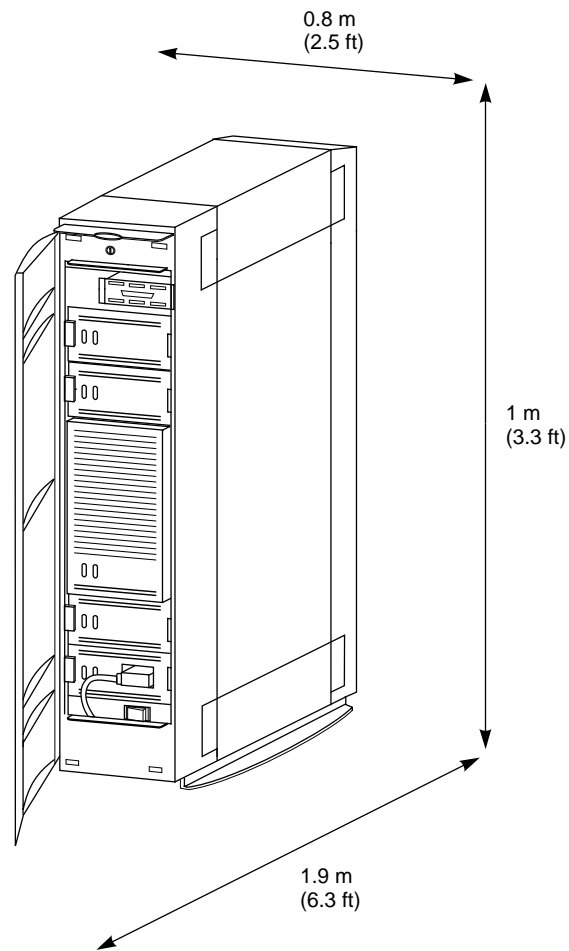
The location of the pedestal depends upon the following:

- The space required for the pedestal to include service areas.
- The length of the SCSI bus cable.
- The location of the ac power source.

The general guidelines for selecting the installation area are:

- Routine operations require a front service area of at least 0.8 m (31 in).
 - The pedestal requires at an area at least 0.3 m (1.0 ft) wide.
 - Proper air flow requires a rear service area of at least 0.3 m (1.0 ft)
 - Replacing a blower assembly on any pedestal or changing the 8-bit pedestal bus configuration requires a rear service area of at least 0.8 m (31.0 in) or that you move the pedestal.
 - For proper servicing the pedestal installation area should be at least 1 m (3.0 ft) high.

Figure 3–2 Pedestal Dimensions



3.4 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 Configuration Guide*
- *StorageWorks Solutions BA356–SB 16-Bit Shelf and SBB Users Guide*

Once you select the cable, you must determine the best route for the cable from the controller to the pedestal. In some cases, it may be necessary to relocate the pedestal.

Note

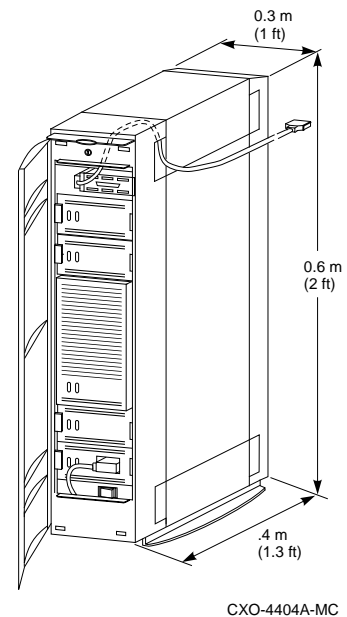
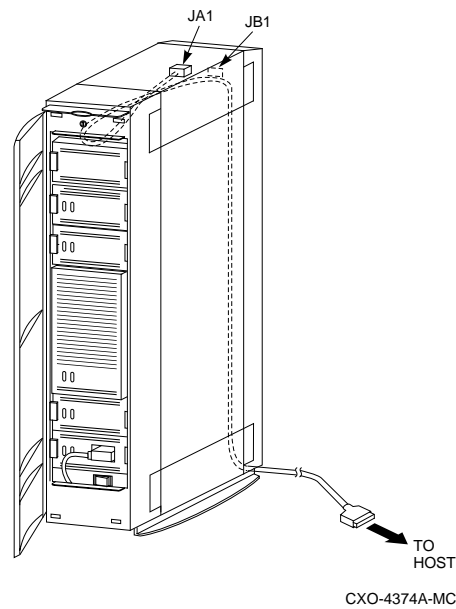
Remember that as much as 1 m (3 ft) of the SCSI cable is within the pedestal.

3.5 Installing the SCSI Cables

The SCSI cables connect to either the shelf backplane connectors (8-bit shelf) or the personality module connectors (16-bit shelf). You can install the cable either through the rear of the pedestal (the primary route) or through the top of the pedestal (the alternate route). The primary route (see Figure 3–3) or the alternate route (see Figure 3–4). The SCSI cables connect to the backplane connector on the 8-bit shelf (adjacent to Slot 0).

Figure 3–3 Primary SCSI Cable Route

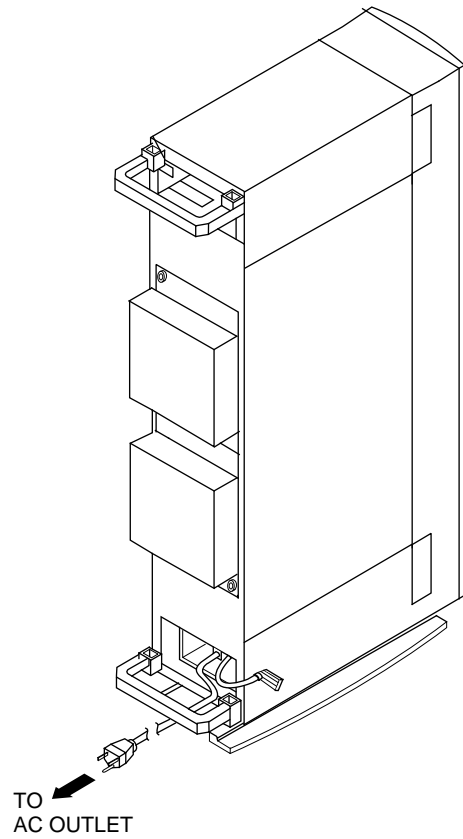
Figure 3–4 Alternate SCSI Cable Route



3.6 Installing the Power Cord

As shown in Figure 3-5, the pedestal power cable connects to the rear of the distribution unit.

Figure 3-5 Power Cord Routing



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3.7 Installing SBBs

The **universal ac input power supply** SBB is always mounted in the bottom shelf slot (Slot 7). Storage device SBBs can be installed in any of the other seven slots (Slots 0 through 6). Either a redundant power supply, a BBU, or a storage SBB can be installed in Slot 6.

The combination of the SBB guides, shelf slots, and backplane connectors preclude installing an SBB incorrectly; you can insert and seat an SBB only one way. Each 3.5-inch SBB occupies one shelf slot; each 5.25-inch SBB occupies three shelf slots.

Remove the front bezel to access the SBBs. You may need a key to remove the bezel.

Depending upon the SCSI controller used, you could have the option of removing and installing an SBB while power is applied to the shelf (warm swap).

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.

CAUTION

The procedure for removing or installing SBBs is determined by the SCSI controller. Check your SCSI controller documentation to determine the procedures supported.

Removing or installing an SBB while the SCSI bus is active, a **hot swap**, can result in corrupted or lost data if the controller does not support a hot swap.

Digital controllers, such as the HSJ-series, have switches for deactivating (quiescing) individual buses. Quiescing the bus without turning the SBB shelf power off and replace an SBB is a warm swap.

If you cannot quiesce the bus, you must turn off the power to all SBB shelves on the SCSI bus before you remove or install an SBB. This procedure is referred to as a **cold swap**.

3.8 Checking Pedestal Operation

When you order a pedestal, it is shipped with the storage SBBs and power SBBs installed. After you connect the ac power and SCSI cables, complete the following procedure to perform a functional test:

CAUTION

To prevent SCSI bus problems, complete pedestal test without connecting the SCSI cable to the host or SCSI controller.

1. Open the front door, turn pedestal power to ON, and observe the status light emitting diodes (LEDs) on the shelf power supply in Slot 7 (bottom slot) (see Figure 3–6).
 - The power supply status LED (on the right) lights immediately.
 - The green, shelf status LED (on the left) is on when both blowers are at the proper speed.
2. Observe the LEDs on each SBB (see Figure 3–7):
 - The green activity LEDs initially flash on, and then go off.
 - The amber fault LEDs should remain off.
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.

Figure 3–6 Shelf Status LEDs

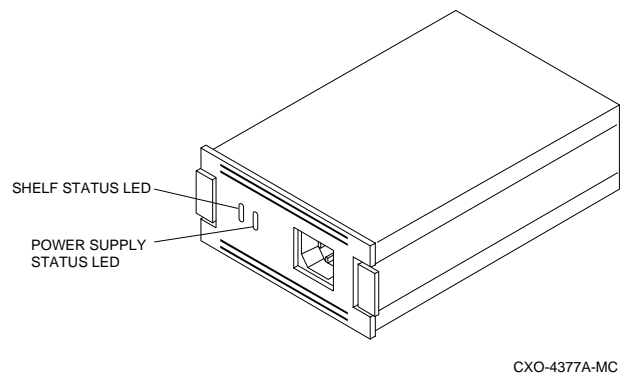
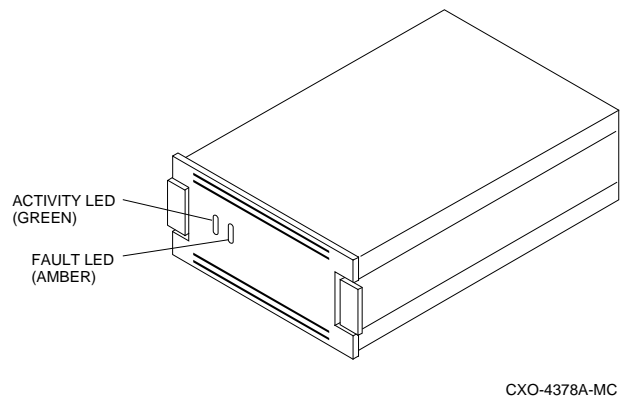


Figure 3–7 SBB Status LEDs



3.9 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. These procedures are described in the controller user documentation.

3.10 Moving the Pedestal

Once you have installed the pedestal it may be necessary to move it for servicing. The rules for moving a pedestal are as follows:

WARNING

Use two people to move the pedestal when it weighs more than 18 kilograms (40 pounds).

- Disable the SCSI bus at the controller.
- Always turn the pedestal off and allow the devices to *spin down* to protect the disk drives.
- When necessary, disconnect the pedestal power cord and the SCSI cables.
- Do not lift the pedestal by the bezel or the door.

CAUTION

To prevent damaging the storage devices, always turn the pedestal off and wait for the devices to spin-down before moving the pedestal.

Operating a Pedestal

This chapter describes the procedures for detecting, isolating, and eliminating malfunctions in the pedestal. The pedestal has only one non-user replaceable component that can fail—the ac distribution unit. This is not a user replaceable unit, but one that can be replaced by a Digital customer service engineer.

All of 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, refer to the shelf user's guide.

4.1 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 LEDs, refer to the *SBB Shelf and User's Guide*.

To determine the status of a power supply:

- Observe the power supply status LEDs.
- When the ac input 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.

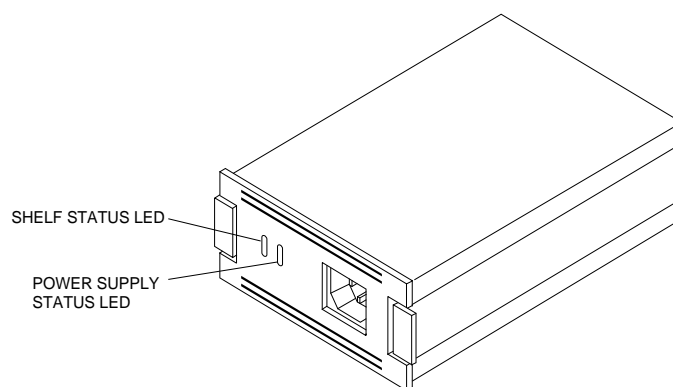
When there is a power supply error indication, complete the procedures in Section 4.2.

To determine the status of a blower:

- Observe the power supply status LEDs.
- When either blower assembly fails, the shelf status LED on the power SBB is off and the power supply status LED is on.

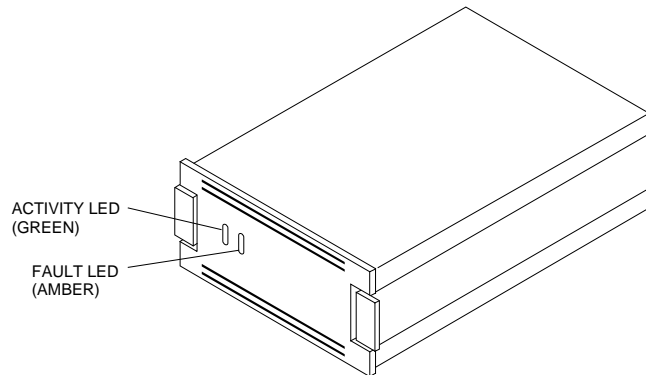
When there is a blower assembly error indication, complete the procedures Section 4.2.

Figure 4–1 Power Supply Status LEDs



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Figure 4–2 3.5-Inch SBB Status LEDs



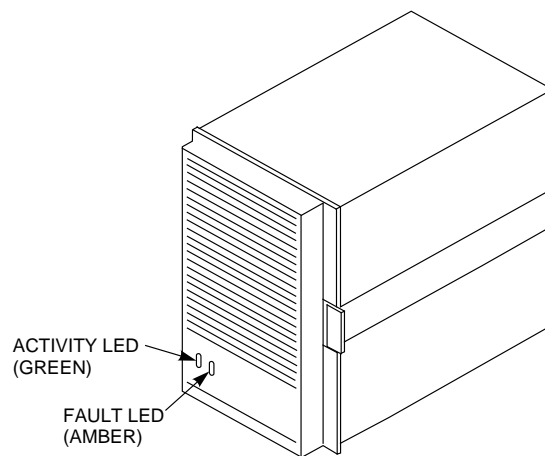
CXO-4378A-MC

To determine the status of an SBB:

- Observe the green activity LED and the amber fault LED.
- Normally the green activity LED is flashing (when the device is being accessed by the controller or the host) and the amber activity LED is off.

When these conditions are not met, complete the procedures in Section 4.3

Figure 4–3 5.25-Inch SBB Status LEDs



CXO-5089A-MC

4.2 Replacing an SBB

Similar procedures are required to replace either a storage device SBB or a power supply SBB. To replace a pedestal SBB, complete one of the following procedures (see Figure 4–4):

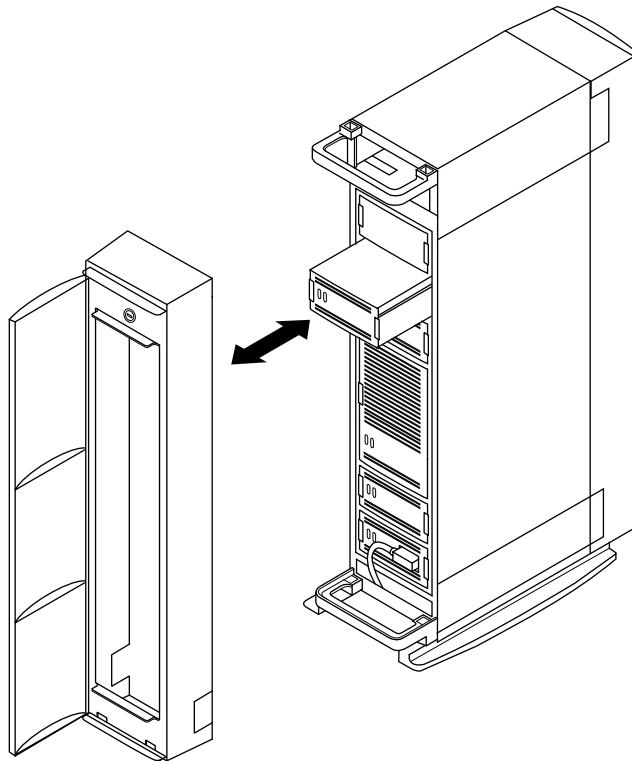
Complete the following procedure to replace an SBB:

1. Turn the SCSI bus off.
2. Remove the front bezel as described in Section 4.4.
3. Press the mounting tabs on the SBB bezel together and pull the SBB out (see Figure 4–4).
4. Insert the *same* model SBB in the slot and push it in until it is fully seated and the front panel mounting tabs expand and engage the shelf.
5. Replace the front bezel as described in Section 4.4.
6. Turn on the SCSI bus.
7. Check the SBB status LEDs for proper operation.

Complete the following procedure to replace a power supply:

1. Turn the SCSI bus off.
2. Turn the pedestal power off if the pedestal has only one power supply.
3. Remove the front bezel as described in Section 4.4.
4. Disconnect the shelf power cords.
5. Press the mounting tabs on the SBB bezel together and pull the power supply out as shown in Figure 4-4.
6. Install the replacement power SBB.
7. Connect the shelf power cord.
8. Replace the front bezel as described in Section 4.4.
9. Turn on the pedestal power.
10. Check the power supply status LEDs for proper operation.
11. Turn on the SCSI bus.

Figure 4-4 Removing an SBB



CXO-4376A-MC

4.3 Replacing a Blower Assembly

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

Caution

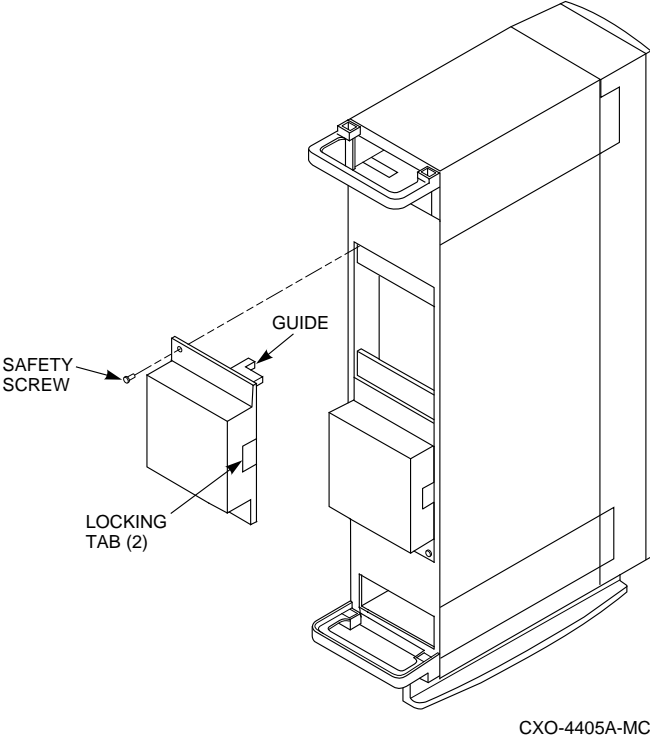
Blower assemblies can be replaced without turning off the pedestal power. However, if you have to move the pedestal to replace the blower, you must quiesce the bus and turn power off to the pedestal to prevent damaging the storage devices when moving the pedestal.

WARNING

Service procedures described in this guide that involve blower removal or access to the rear of the shelf must be performed only by qualified service personnel. To reduce the risk of electrical energy hazard, disconnect the power cables from the shelf power supplies before removing shelf blower assemblies or performing service in the backplane area, such as modifying the SCSI bus.

1. Remove the rear bezel as described in Section 4.4.
2. Locate the blower that is not running and remove the safety screw (see Figure 4–5).
3. Press in on the two mounting tabs and remove the blower assembly.
4. Align the connector on the replacement blower assembly with the connector on the shelf.
5. Push in on the blower assembly until it is fully seated and the locking tabs engage the shelf.
6. Install the safety screw.
7. Turn on the power. The blower begins operating and shelf status LEDs are both on.
8. Replace the rear bezel as described in Section 4.4.

Figure 4-5 Blower Assembly Replacement



4.4 Disassembling a Pedestal

Most maintenance procedures require you to remove and replace the pedestal bezel. The following procedure is the same for removing the front or rear 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 and rotate the bezel out and down from the pedestal until the locking tabs at the bottom of the bezel disengage 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 locking tabs at the bottom of the bezel with the base.
6. Carefully rotate the top of the bezel in towards the pedestal until it mates with the top.
7. Be sure that the bezel is firmly seated and 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, activate the SCSI bus, and check that the pedestal is operating correctly.
10. Close the front door.

Complete the following procedure to replace a shelf:

1. Remove both bezels as described in Section 4.4
2. Disconnect all power cords:
3. Record the slot in which each SBB is installed.
4. Remove all SBBs.
5. Disconnect the SCSI cables.

Note

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

6. Hold the shelf in place and lift up on the front of the top to disengage it from the shelf.
7. Hold the base in place and lift up on the shelf to disengage it from the base.
8. Carefully align the replacement shelf mounting slots with the base dimple strips at the REAR of the base and fully seat the shelf.
9. Carefully align the dimple strips at the rear of the top with the shelf mounting slots and fully seat it.
10. Connect the SCSI cables to the shelf.
11. Install the shelf power supply.
12. Install the SBBs.
13. Connect the power cords.
14. Install the front and rear bezel as described in Section 4.4.
15. Apply power and check pedestal operation.

Glossary

ac distribution unit

The deskside expansion pedestal ac input device.

battery backup unit

See **BBU**.

BBU

Battery backup unit. Extends power availability after the loss of primary ac power, or a power supply to protect against the corruption or loss of data.

blower assembly

An airflow device mounted in a StorageWorks shelf.

building block shelf

See **SBB shelf**.

cold swap

A method of device replacement that requires that power be removed from all shelves in a cabinet. This method is used when conditions preclude the use of the warm swap or hot swap methods.

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

controller

A hardware/software device that facilitates communications between a host and one or more devices. A controller translates bus protocols and hardware interfaces and adds functionality to the host/device communications.

controller and SBB shelf

A generic reference to a StorageWorks shelf that can contain both controller SBBs and storage SBBs (for example, a BA356–S shelf).

controller shelf

A StorageWorks shelf designed to contain controller and cache memory modules.

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.

pedestal kit

The enclosure, ac distributions unit, and universal ac shelf power supply used to create a deskside expansion pedestal. Also referred to as a pedestal kit.

deskside expansion pedestal

An enclosure, commonly referred to as a pedestal, that houses a StorageWorks shelf in a vertical position. This pedestal is assembled from a pedestal kit, and a user supplied SBB shelf, storage SBBs, and an ac power cord. The number of devices that can be used, the SCSI buses supported, and the location of the pedestal is determined by the SBB shelf, the storage SBBs, and the SCSI controller used. Also referred to as a pedestal.

host computer

Commonly referred to as the host, this is the primary or controlling computer to which a storage subsystem is attached.

hot swap

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

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

modular carrier

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

redundant power option

The capability of StorageWorks shelves to have either a primary and secondary shelf power supply. Should one supply fail, the second supply provides the power required for proper operation. Implementing this option extends the operational time of the shelf.

Note

Having a primary power supply and a battery backup unit (BBU) does not provide redundant power. The BBU only provides enough power to allow the devices to spin-down, thereby preventing data corruption.

SBB

StorageWorks building block. A device housed in a standard StorageWorks SBB carrier. An SBB has a standard physical and electrical interface that is compatible with those of StorageWorks shelves and enclosures.

SBB shelf

StorageWorks building block shelf. A StorageWorks shelf, such as the BA356-S, designed to house plug-in SBB modules.

SCSI

Small computer system interface. An ANSI interface defining the physical and electrical parameters of a parallel I/O bus used to connect hosts to a maximum of seven devices. The StorageWorks device interface is implemented according to the SCSI-2 standard, allowing the synchronous transfer of 8-bit data at rates of up to 10 MB/s.

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

The 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 subsystem

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

StorageWorks

Digital's family of modular data storage products that allows customers to design and configure their own storage subsystems. Components include power, packaging, cabling, devices, controllers, and software. Customers can integrate devices and array controllers in StorageWorks enclosures to form storage subsystems.

StorageWorks building block

See **SBB**.

universal ac input power supply

A StorageWorks power supply that produces +5 V dc and +12 V dc power from an ac input.

warm swap

A controller function that allows devices to be added, removed, or replaced while the subsystem remains operational. All activity on the device's SCSI bus must normally be halted for the duration of the warm swap operation.

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

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