RAID Array 3000 Storage Subsystem Expansion Pedestal Option

Installation Guide

EK–SM3KA–IG. A01

Digital Equipment Corporation
Maynard, Massachusetts

First Edition, January, 1998

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Revision Record

This Revision Record provides a concise publication history of this guide. It lists the revision levels, release dates, and summary of changes.

The following revision history lists all revisions of this publication and their effective dates. The publication part number is included in the Revision Level column, with the last entry denoting the latest revision. This publication supports the StorageWorks RAID Array 3000 Expansion Pedestal Enclosure.

Revision Level	Date	Summary of Changes
EK–SM3KA–IG. A01	January, 1998	Original release

About This Guide

This section identifies the audience of this guide and describes the contents (chapter-by-chapter) and structure. In addition, this section includes a list of associated documents and the conventions used in this guide.

Intended Audience

This guide is intended for installers and operators of the RAID Array 3000 storage subsystem. Installing the subsystem requires a general understanding of basic SCSI terminology and product installation procedures.

Document Structure

This guide contains the following sections:

Chapter 1 Chapter 1 describes the Expansion Pedestal Option and how to install it.

1.0 Introduction Introduction provides a summaryof the content of this guide.

2.0 Product Description Product Description describes the major features of the expansion enclosure and its major components and how to convert the UltraSCSI bus in the base pedestal from a split-bus to a through–bus configuration.

Associated Documents

In addition to this guide, the following documentation is useful to the reader:

Table 1 Associated Documents

Document Title	Order Number
StorageWorks RAID Array 3000 Storage Subsystem Hardware User's Guide	*EK–SMCPO–UG*
StorageWorks RAID Array 3000 Configuration and Maintenance Guide	*EK–SMCS2–UG*
Installation Instructions for the RAID Array Replacement Controller – SWXRC-03	*EK–SMCPL–PN*

Conventions

This guide uses the following documentation conventions:

Table 2 Style Conventions

Style	Meaning
plain monospace type	Text
boldface type	For the first instance of terms being defined in text, or both.
italic type	*For emphasis, manual titles, chapter summaries, keyboard key names.*

Support and Services

Who to contact in the Americas

Information and Product Questions:	Local Sales Office / StorageWorks Hotline 1-800-786-7967
Installation Support:	Contact the DIGITAL Distributor where the Storage Solution was Purchased / Local Digital Sales Office.
DIGITAL Multivendor Customer Service (MCS):	
Installation	Contact the DIGITAL Customer Support Center (CSC).
Warranty	Contact the DIGITAL Customer Support Center (CSC) for warranty service after solution is installed and operating.
Remedial	Contact the DIGITAL Customer Support Center (CSC) **Note:** A Service Contract is recommended when the equipment is out of warranty. Contact the local DIGITAL Sales Office.
Customer Support Center (CSC)	1 800-354-9000

Who to contact in Europe

Information and Product Questions:	Contact the DIGITAL Distributor or reseller
Installation Support and Installation:	Contact the DIGITAL Distributor or reseller from whom the Storage Solution was purchased.
For Warranty Service	See the Warranty Card packaged with the product.
For Remedial Service	Contact the DIGITAL Distributor or reseller from whom the Storage Solution was purchased. **Note:** A Service Contract is recommended when the equipment is out of warranty.

Who to contact in Asia Pacific

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1

Expansion Pedestal Option

This guide describes how to install the Expansion Pedestal Option to expand the storage capability of the RAID Array 3000 subsystem. The guide provides a product description of the option and how to connect it to the base pedestal to create an enhanced storage subsystem.

1.0 Introduction

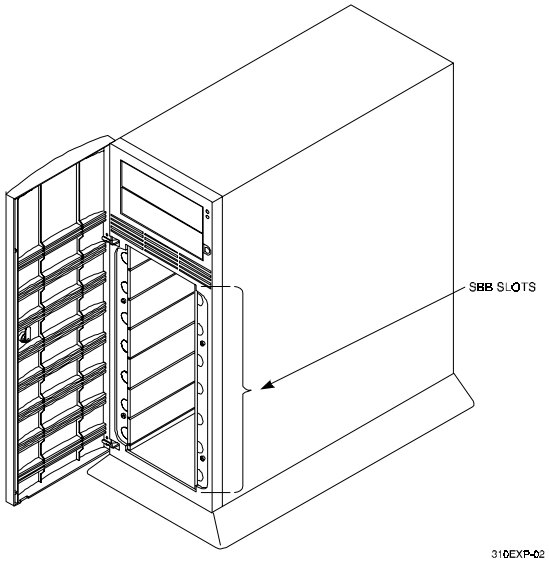
This guide contains installation instructions needed to interface the expansion pedestal to the base pedestal to create your expanded storage subsystem. The guide is divided into the following sections:

- Product Description
- Expansion Cabinet and Components
- Reconfiguring the Base Pedestal UltraSCSI Bus

2.0 Product Description

The StorageWorks pedestal expansion option (Figure 1-1) is designed to expand the storage capacity of the RAID Array 3000 subsystem. When connected to the RAID Array 3000 base pedestal, the expansion option contains the basic components required to create a dual-pedestal storage array with a 16-bit, single-ended Ultra-SCSI bus. The option enables a user to add up to seven 3½-inch SBBs to create a 14-device storage array. The expanded array is controlled and operated in an identical fashion as the base RAID Array 3000 subsystem.

Figure 1–1 Expansion Pedestal



2.1 Expansion Pedestal Cabinet

The expansion pedestal cabinet is a modular free-standing storage cabinet that is completely self contained with dual fan-cooled power supplies, an internal UltraSCSI single-ended extender module, and an internal EMU circuit board. The cabinet dimensions are the same as the subsystem base pedestal which houses the controller and is normally installed within one meter of the base cabinet to facilitate the cable connections between the two units. Figure 1-2 identifies the expanded subsystem's SBB slots and they're corresponding SCSI Id addresses. Figure 1-3 identifies the items on the rear panel power supplies. The characteristics of the expansion pedestal cabinet are outlined below.

- The storage device capacity of the expansion pedestal is seven 3½-inch SBBs
- The pedestal slots are numbered 0 through 6 from top to bottom
- There are seven SCSI bus device addresses (target Ids) 8 through 14 which can be assigned to the 3½-inch SBBs
- There is a single 68-pin, VHDC female SCSI connector on the rear panel which interconnects the SBB expansion pedestal to the controller pedestal
- The rear panel contains an alarm switch and an external fault condition connector

- The expansion pedestal contains two interchangeable fan-cooled ac power supplies for redundant power
- The expansion pedestal is equipped with an internal configuration switch which selects one of the eight (0 through 7) subsystem configurations (set to the correct configuration setting at the factory to properly integrate the expansion pedestal to the controller pedestal)

Figure 1–2 Expansion Pedestal Slot Locations and ID Addresses

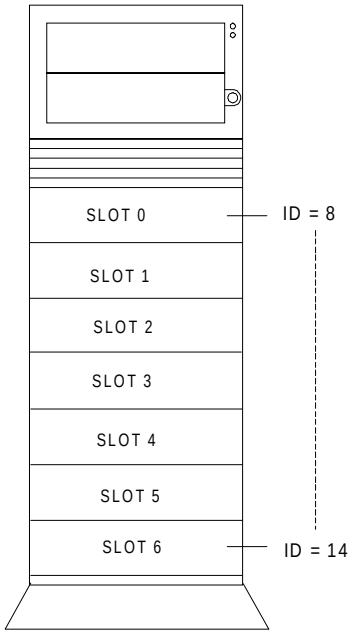
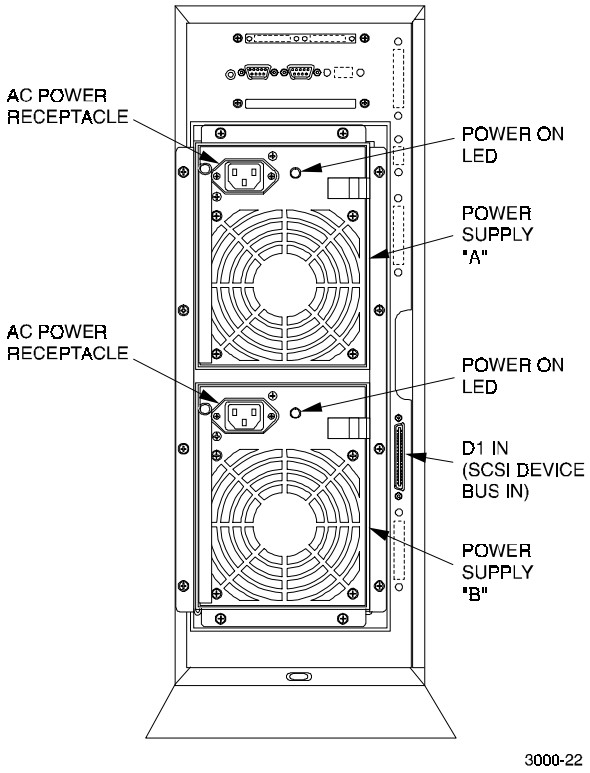


Figure 1–3 Rear Panel Power Supplies



2.2 Expansion Pedestal Components

The expansion pedestal contains a 16-bit, wide/differential UltraSCSI bus, an Environmental Monitor Unit (EMU), a SCSI bus extender module, and two universal 50/60 Hz, 100 – 240 Vac fan-cooled power supplies.

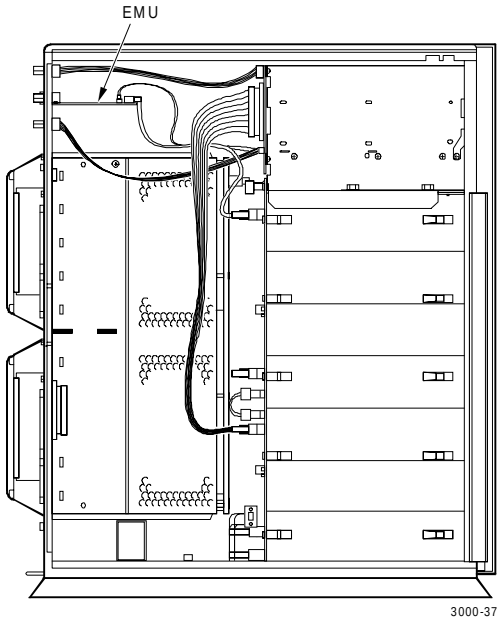
The single-ended UltraSCSI bus is factory-configured as one continuous bus that runs along the backplane between the disk drive connectors and the internal cables. These cables connect the drives to the connectors located on the rear panel of the expansion pedestal. The device addresses on the bus are set at the factory by an internal configuration switch. When set to a specific position, the switch controls the addresses of each SBB slot.

The SCSI bus extender module extends the allowable electrical length of the bus to accommodate longer physical SCSI cable connections between the base and expansion pedestals.

The EMU (Figure 1-4) is an internal circuit board, which monitors the operation of the pedestal. The EMU monitors power supply voltages, fans, temperatures that are reported to the user, and controls (turns on and off) the audible alarm and status LED on the front panel of the pedestal. It is connected to the SCSI bus and powered by internal cabling. The following external components on the rear panel of the expansion pedestal are part of the EMU board:

- The alarm switch (S1) that enables (up) or disables (down) the audible alarm
- The External Fault Condition connector allows the EMU to monitor the status of a user-selected device

Figure 1–4 EMU Circuit Board Location



2.3 Reconfiguring Base Pedestal UltraSCSI Bus

WARNING

Only qualified service personnel should reconfigure the base pedestal. Dangerous voltages are present within the subsystem. To prevent electrical shock, always turn the subsystem off and disconnect the power cords before removing the side panel.

The RAID Array 3000 base pedestal is factory-configured for split-bus operation. You must reconfigure the bus in the base subsystem from split-bus to a "through-bus" configuration prior to connecting the expansion cabinet to the base subsystem. The components needed to reconfigure the split-bus in the base subsystem are included with your pedestal expansion kit option.

CAUTION

To prevent electrostatic discharge (ESD) from damaging the controller, always wear an ESD wrist strap connected to a suitable ground whenever you handle any of the electronic components.

Perform the following procedure to reconfigure the SCSI bus in the base pedestal from a "split-bus" to a "through-bus" configuration:

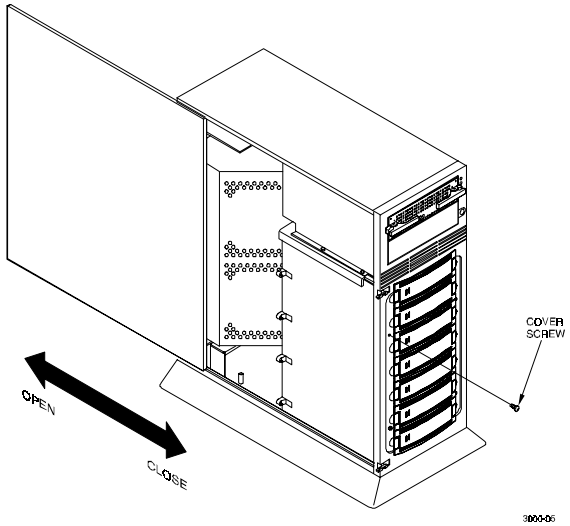
1. Perform an inventory of the bus conversion items supplied with the pedestal expansion kit option. The items should consist of:
   - SCSI bus jumper cable 17-04166-03
   - SCSI cable 17-04454-01
2. Quiesce the host bus by shutting down the host system.

CAUTION

To allow the UPS to supply power while the cache is being flushed to disk, do not unplug the base pedestal from the UPS.

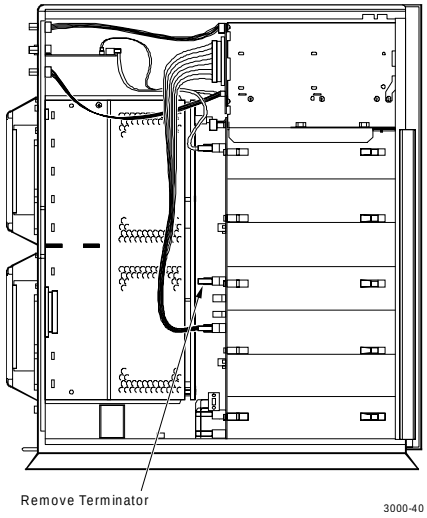
2. Unplug the base power cord from the wall outlet.
3. Unplug the UPS power cord from the wall outlet, the UPS will now signal the controller to flush the cache.
4. Wait until the UPS shuts down completely (this may take several minutes).
5. Power off the base pedestal and plug the UPS into the wall outlet.
6. Remove the side cover from the base pedestal (Figure 1-5).

Figure 1–5 Remove Side Cover from Base Pedestal



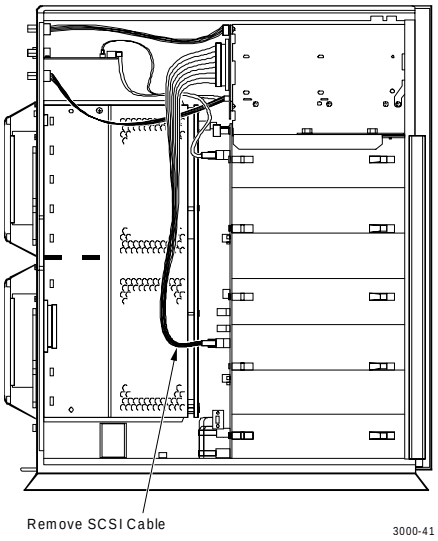
8. Remove the bus terminator from backplane connector J11 (Figure 1-6).

Figure 1–6 Remove SCSI Bus Terminator



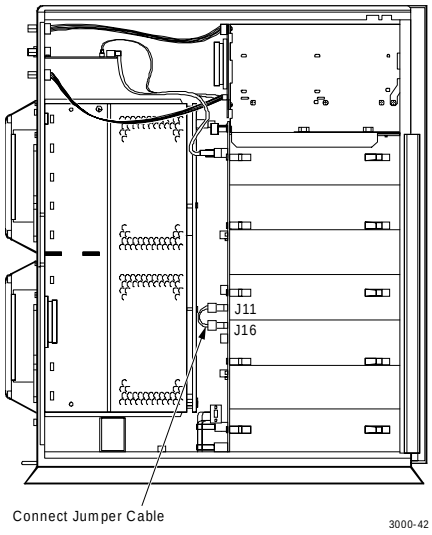
9. Remove the SCSI cable from device # 1 connector and backplane connector J16 (see Figure 1-7).

Figure 1–7 Disconnect SCSI Cable



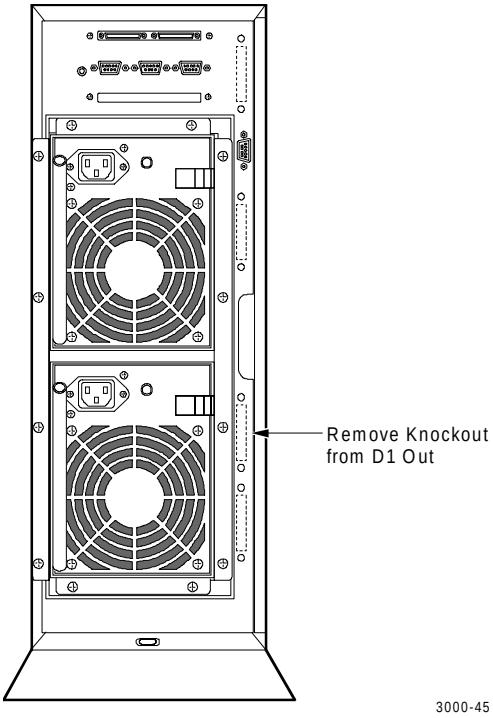
10. Connect jumper cable 17-04166-03 between the backplane connector J11 and the backplane connector J16 (see Figure 1-8).

Figure 1–8 Connect SCSI Jumper



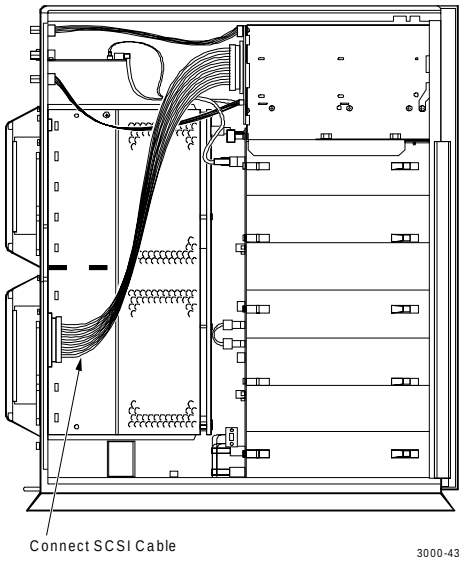
11. Remove the “knock-out” plate located above the D1 OUT label on the rear panel of the base pedestal (see Figure 1-9).

Figure 1–9 Remove Connector Knockout Plate



12. Connect cable assembly 17-04454-01 between the D1 OUT bulkhead opening and the device # 1 backplane connector (see Figure 1-10). Secure the bulkhead connector by tightening the two 6-32 SEM screws.

Figure 1–10 Connect SCSI Cable



13. Set the bus configuration switch to “7” (see Figures 1-11 and 1-12). Figure 1-13 shows the reconfigured SCSI bus addresses of the expanded subsystem.

Figure 1–11 Set Configuration Switch to 7

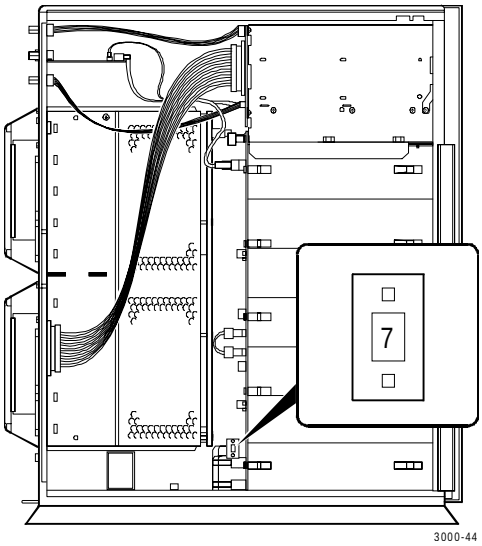


Figure 1–12 Configuration Switch

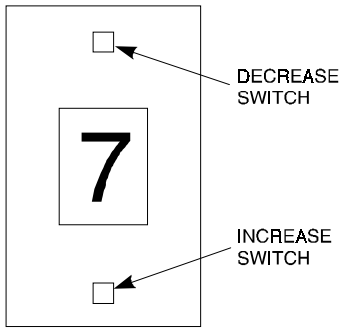
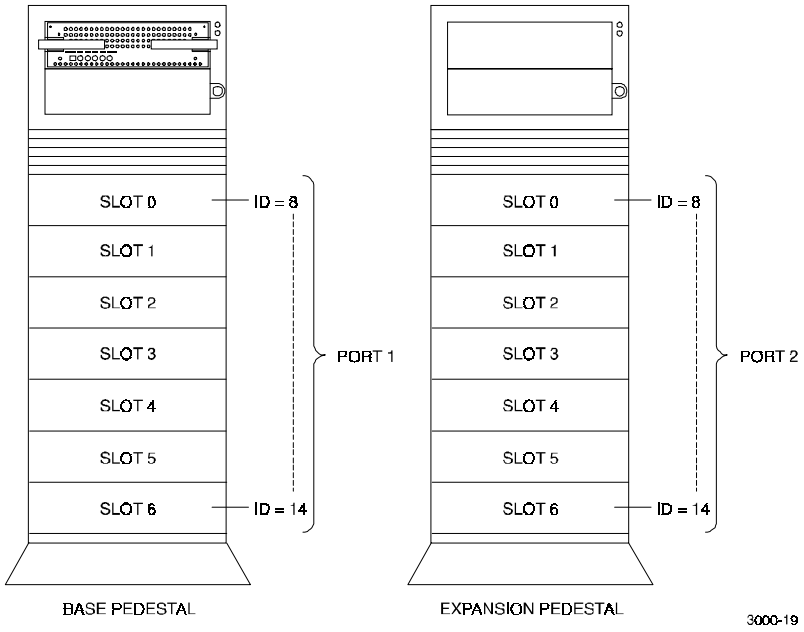
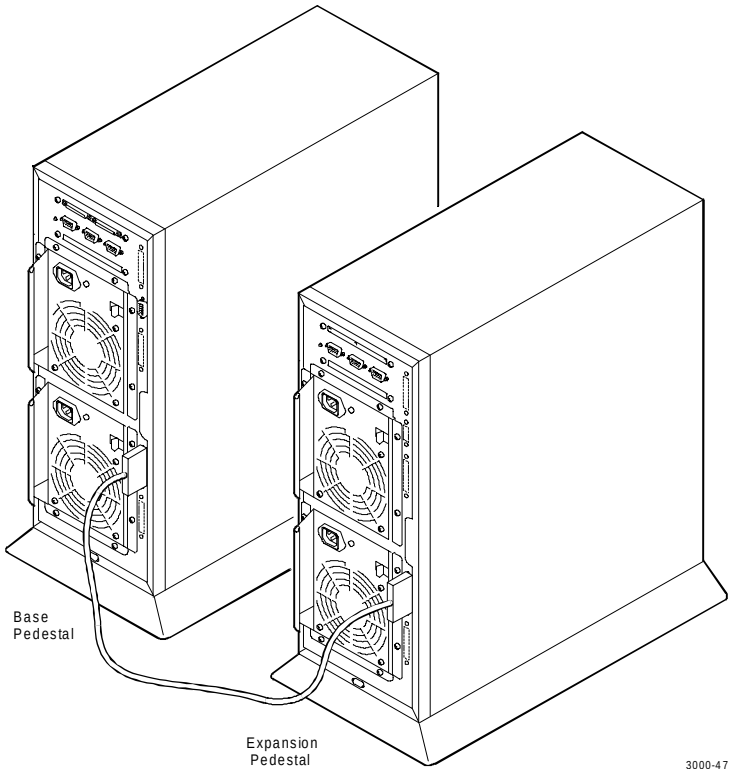


Figure 1–13 Reconfigured SCSI Bus Addresses



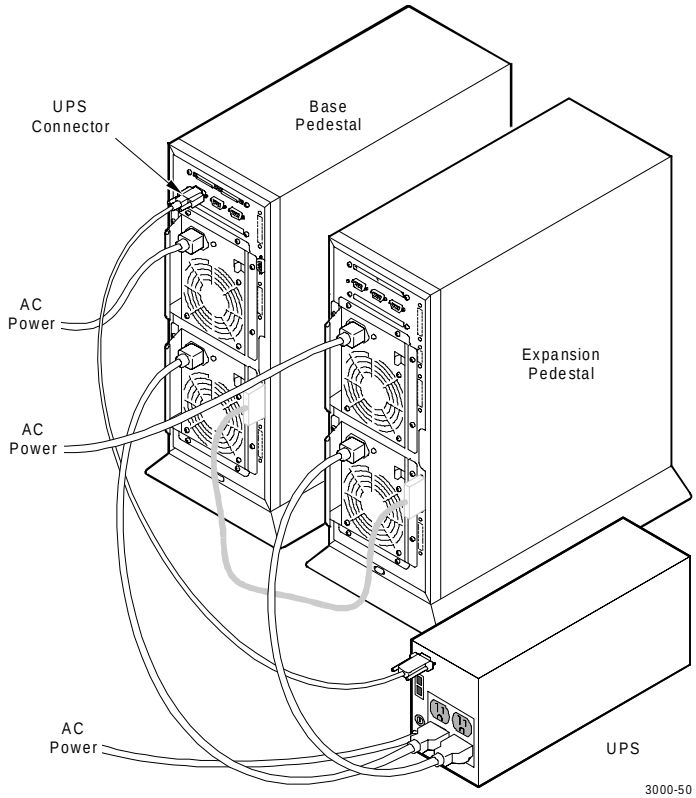
14. Reinstall the side panel on the base pedestal.
15. Connect the HD68-to-HD68 SCSI cable from the D1 OUT connector on the base pedestal to the D1 IN connector on the rear of the expansion pedestal as shown in Figure 1-14.

Figure 1–14 Connect SCSI Cable Between Pedestals



16. Make the power cable connections between the expansion pedestal, the UPS, and the ac power source (see Figure 1-15).

Figure 1–15 Power Cable Connections

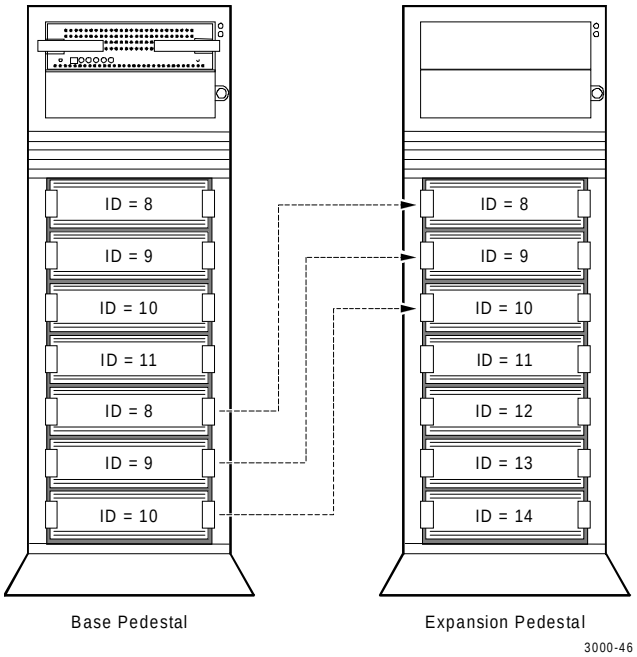


CAUTION

If you want to maintain the existing RAID level configuration, three drives must be relocated from the base pedestal to specific slots in the expansion pedestal as described in step 17.

17. Transfer the bottom three disk drives (slots 4, 5, and 6) from the base pedestal to the top three slot locations (slots 0, 1, and 2) in the expansion pedestal as shown in Figure 1-16.

Figure 1–16 Transfer Drives from Base to Expansion Pedestal



18. Install the new drives in the remaining slots each pedestal to complete the installation.
19. Power up the UPS and the two pedestals and then proceed to StorageWorks RAID 3000 Configuration and Maintenance Guide to configure the expanded subsystem.

Reader's Comments

Manual Order Number:

EK–SM3KA–IG. A01___

RAID Array 3000 Expansion Pedestal Option Installation Guide

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Manual Rating	**Excellent**	**Good**	**Fair**	**Poor**
Accuracy (correct presentation of facts)	[ ]	[ ]	[ ]	[ ]
Completeness (adequate information)	[ ]	[ ]	[ ]	[ ]
Clarity (easy to understand)	[ ]	[ ]	[ ]	[ ]
Organization (logical sequence of information)	[ ]	[ ]	[ ]	[ ]
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