

AlphaServer 8400 Installation Guide

Order Number EK-T8430-IN. A01

This guide is intended for use by Digital customer service engineers and self-maintenance customers installing a Digital AlphaServer 8400 system.

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Preface

Intended Audience

This manual is written for Digital customer service engineers and self-maintenance customers who require information to install an AlphaServer 8400 system.

Document Structure

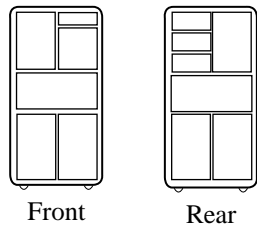
This manual uses a structured documentation design. Topics are organized into small sections for efficient on-line and printed reference. Each topic begins with an abstract. You can quickly gain a comprehensive overview by reading only the abstracts. Next is an illustration or example, which also provides quick reference. Last in the structure are descriptive text and syntax definitions.

This manual has nine chapters, as follows:

- **Chapter 1, Installation Overview**, provides a flowchart which summarizes the installation process.
- **Chapter 2, Installing the System Cabinet**, shows how to unpack and install the system cabinet.
- **Chapter 3, Installing Expander and Battery Cabinets**, explains how to install one or more expander cabinets, if present.
- **Chapter 4, Making Console, SCSI, Ethernet, and FDDI Connections**, shows how to connect the console, SCSI, Ethernet, and FDDI devices to the system.
- **Chapter 5, Connecting to a CI OpenVMS Cluster**, shows how to connect to a CI OpenVMS cluster.
- **Chapter 6, Powering Up the System**, explains how to start the system by applying main power.
- **Chapter 7, System Self-Test**, describes the system self-test and its results.
- **Chapter 8, Diagnostics and Utilities**, describes how to verify system operation using diagnostics and utilities.

Conventions Used in This Document

Icons. Icons similar to those shown below are used in illustrations for designating part placement in the system described. A shaded area in the icon shows the location of the component or part being discussed.



Documentation Titles

Table 1 lists the books in the AlphaServer 8200 and 8400 documentation set. Table 2 lists other documents that you may find useful.

Table 1 AlphaServer 8200 and 8400 Documentation

Title	Order Number
Hardware User Information and Installation	
<i>Operations Manual</i>	EK-T8030-OP
<i>Site Preparation Guide</i>	EK-T8030-SP
<i>AlphaServer 8200 Installation Guide</i>	EK-T8230-IN
<i>AlphaServer 8400 Installation Guide</i>	EK-T8430-IN
Service Information Kit	
<i>Service Manual</i> (hard copy)	EK-T8030-SV
<i>Service Manual</i> (diskette)	AK-QKNFA-CA

Table 1 AlphaServer 8200 and 8400 Documentation (Continued)

Title	Order Number
Reference Manuals	
<i>System Technical Manual</i>	EK-T8030-TM
<i>DWLPA PCI Adapter Technical Manual</i>	EK-DWLPA-TM
Upgrade Manuals for Both Systems	
<i>KN7CC CPU Module Installation Card</i>	EK-KN7CC-IN
<i>MS7CC Memory Installation Card</i>	EK-MS7CC-IN
<i>KFTHA System I/O Module Installation Guide</i>	EK-KFTHA-IN
<i>KFTIA Integrated I/O Module Installation Guide</i>	EK-KFTIA-IN
Upgrade Manuals: 8400 System Only	
<i>AlphaServer 8400 Upgrade Manual</i>	EK-T8430-UI
<i>BA654 DSSI Disk PIU Installation Guide</i>	EK-BA654-IN
<i>BA655 SCSI Disk and Tape PIU Installation Guide</i>	EK-BA655-IN
<i>DWLAA Futurebus+ PIU Installation Guide</i>	EK-DWLAA-IN
<i>DWLMA XMI PIU Installation Guide</i>	EK-DWLMA-IN
<i>DWLPA PCI PIU Installation Guide</i>	EK-DWL84-IN
<i>H7237 Battery PIU Installation Guide</i>	EK-H7237-IN
<i>H7263 Power Regulator Installation Card</i>	EK-H7263-IN
<i>H9F00 Power Upgrade Manual</i>	EK-H8463-UI
<i>KFMSB Adapter Installation Guide</i>	EK-KFMSB-IN
<i>KZMSA Adapter Installation Guide</i>	EK-KXMSX-IN
<i>RRDCD Installation Guide</i>	EK-RRDRX-IN
Upgrade Manuals: 8200 System Only	
<i>DWLPA PCI Shelf Installation Guide</i>	EK-DWL82-IN
<i>H7266 Power Regulator Installation Card</i>	EK-H7266-IN
<i>H7267 Battery Backup Installation Card</i>	EK-H7267-IN

Table 2 Related Documents

Title	Order Number
General Site Preparation	
<i>Site Environmental Preparation Guide</i>	EK-CSEPG-MA
System I/O Options	
<i>BA350 Modular Storage Shelf Subsystem Configuration Guide</i>	EK-BA350-CG
<i>BA350 Modular Storage Shelf Subsystem User's Guide</i>	EK-BA350-UG
<i>BA350-LA Modular Storage Shelf User's Guide</i>	EK-350LA-UG
<i>CIXCD Interface User Guide</i>	EK-CIXCD-UG
<i>DEC FDDIcontroller 400 Installation/Problem Solving</i>	EK-DEMFA-IP
<i>DEC FDDIcontroller/Futurebus+ Installation Guide</i>	EK-DEFAA-IN
<i>DEC FDDIcontroller/PCI User Information</i>	EK-DEFPA-IN
<i>DEC LANcontroller 400 Installation Guide</i>	EK-DEMNA-IN
<i>DSSI VAXcluster Installation/Troubleshooting Manual</i>	EK-410AA-MG
<i>EtherWORKS Turbo PCI User Information</i>	EK-DE435-OM
<i>KZPSA PCI to SCSI User's Guide</i>	EK-KZPSA-UG
<i>RF Series Integrated Storage Element User Guide</i>	EK-RF72D-UG
<i>StorageWorks RAID Array 200 Subsystem Family Installation and Configuration Guide</i>	EK-SWRA2-IG
<i>StorageWorks RAID Array 200 Subsystem Family Software User's Guide for OpenVMS AXP</i>	AA-Q6WVA-TE
<i>StorageWorks RAID Array 200 Subsystem Family Software User's Guide for DEC OSF/1</i>	AA-Q6TGA-TE
Operating System Manuals	
<i>Alpha Architecture Reference Manual</i>	EY-L520E-DP
<i>DEC OSF/1 Guide to System Administration</i>	AA-PJU7A-TE
<i>Guide to Installing DEC OSF/1</i>	AA-PS2DE-TE
<i>OpenVMS Alpha Version 6.2 Upgrade and Installation Manual</i>	AA-PV6XC-TE

Chapter 1

Installation Overview

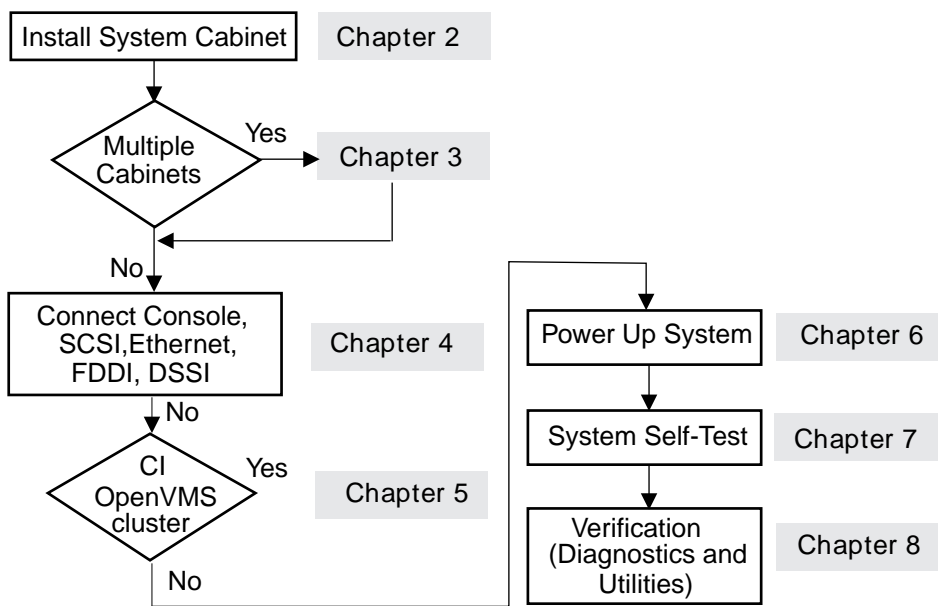
This chapter provides a quick overview of the installation procedure and relates the steps of the procedure with chapters in this manual. It consists of one section:

- Installation Flowchart

1.1 Installation Flowchart

In general, a system is installed as shown in Figure 1-1.

Figure 1-1 Installation Flowchart



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In general, the procedure is as follows (Figure 1-1):

1. Install the system cabinet as described in Chapter 2.
2. If the system has one or more expander cabinets, refer to Chapter 3 for installation instructions.
3. Connect the console, and, if appropriate, make SCSI, Ethernet, FDDI, and DSSI connections as described in Chapter 4.
4. If connecting to a CI OpenVMS cluster, refer to Chapter 5 for installation instructions.
5. Power up the system as described in Chapter 6.
6. Check the system self-test display as described in Chapter 7.
7. Familiarize yourself with the system configuration, adjust the configuration if necessary, and verify system operation as described in Chapter 8.

Chapter 2

Installing the System Cabinet

This chapter describes how to install a system cabinet. The system cabinet contains the CPU, memory, and optional I/O, disk, or battery plug-in units (PIUs).

If your system has one or more expander cabinets, unpack the cabinet(s) and remove them from their pallet(s) as described in the first four sections of this chapter. Then skip to Chapter 3 for further instructions.

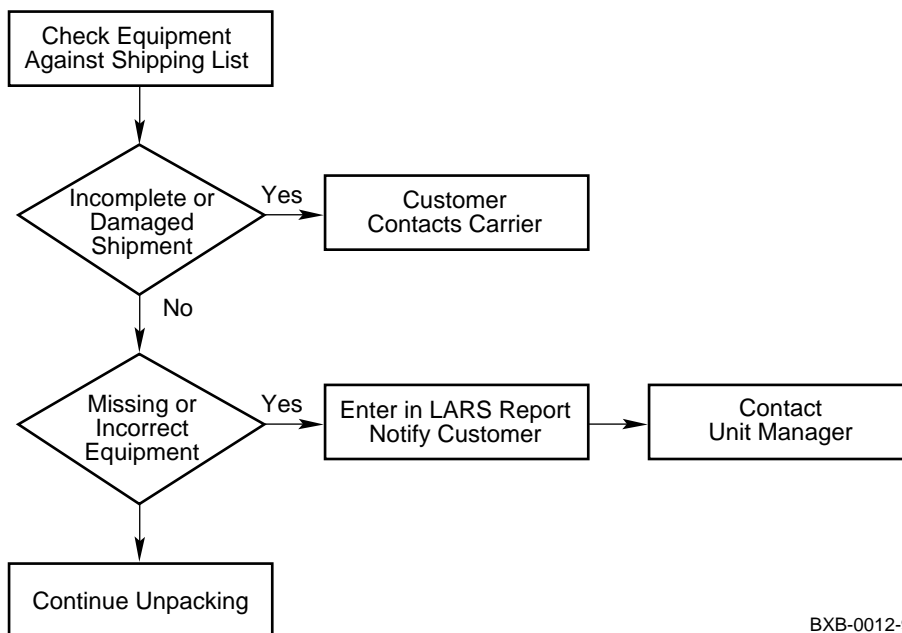
Sections in this chapter include:

- Inspect the Shipment
- Collect Tools and Resources
- Remove Carton and Packing Material
- Remove from the Pallet
- Level the Cabinet
- Assemble and Install Side Skirts
- Assemble and Install Front Skirt

2.1 Inspect the Shipment

Check to ensure that all system equipment is at the installation site.

Figure 2-1 Inspection Flowchart



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NOTE: Physically inspect the system to be sure parts have not become loose during shipment.

If you find a damaged container or package, notify the customer. Wait until the customer contacts the insurance company and gives you permission to continue unpacking.

Compare items listed on the Product Delivery Document (in a slip envelope on the shipping box) with the packing slip contained in a plastic envelope on the shipping box. Items should be compared throughout the installation procedure as boxes are unpacked and cabinets are opened.

It is important to record information on damaged or opened containers on the Labor Activity Reporting System (LARS) form.

2.2 Collect Tools and Resources

You will need the items listed in Table 2-1 to unpack and install the system cabinet. The removal of the cabinet from the pallet requires at least two people.

Table 2-1 Tools and Resources

Item	Use
Product Delivery Document and packing slip	To verify that all hardware has been delivered
Utility knife	To remove straps from cabinet shipping boxes
Adjustable wrench	To remove pallet brackets and to adjust leveler feet
Level	To verify that the cabinet is properly leveled
Socket wrench set	To remove and install bolts
Digital voltmeter	To check AC and DC voltages
Table or bench	Work space for unpacking and installation

Review requirements such as power, environmental, and space requirements for the system.

NOTE: Since the cabinet is heavy and has a high center of gravity, removing it from the pallet requires at least two people.

If the system also includes an expander cabinet, additional tools you will need are listed in Table 2-2.

Table 2-2 Expander Cabinet Tools

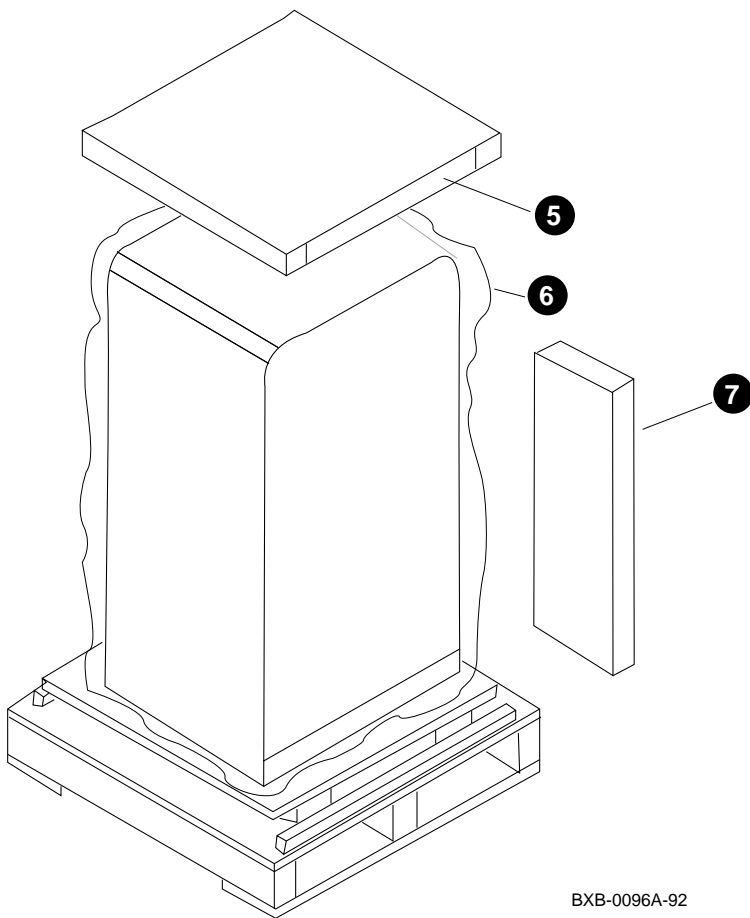
Tool	Use
Large Phillips screwdriver	To remove and install screws and to remove the 1/4 turn skirt fasteners
Flathead screwdriver	For installation of I/O port module cable(s)

For more information:
Site Preparation Guide

2.3 Remove Carton and Packing Material

Take off the carton and remove all packing material to prepare the system cabinet for removal from the pallet.

Figure 2-2 Packing Material



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Use the following procedure to unpack the system cabinet:

1. Position the carton so that the front faces an open space with enough clearance to allow the cabinet to be rolled down ramps. The system should be placed on a firm level floor, not on a carpet. Table 2-3 lists the dimensions and weights of the system and expander cabinets.
2. Using a utility knife, cut the shipping straps from the carton.
3. Remove the outside top cardboard cover.
4. Remove the outside shipping box. This is typically done by using a 7/16" socket wrench to remove two bolts that hold the box together.
5. Remove the inside top cardboard cover.
6. Remove the protective plastic wrapping by slipping it up and over the cabinet.
7. Locate the box that contains the ramp kit and open it (see Figure 2-2).
8. Locate and remove the two control panel keys. The keys are typically tie-wrapped to the cabinet's rear grill. Insert one key into the control panel and put the other key away in a safe place.

NOTE: It's a good idea to save all packing materials intact in case the system needs to be shipped in the future.

Table 2-3 Shipping Dimensions and Weights

Cabinet	Height cm (in)	Width cm (in)	Depth cm (in)	Weight kg (lbs) ¹
8400 System	195 (76.8)	109.5 (43.1)	121 (47.5)	454–682 (1000–1500) ²
8400 Expander	195 (76.8)	109.5 (43.1)	121 (47.5)	499–726 (1100–1600) ²

¹ Weights are based on a fully configured cabinet.

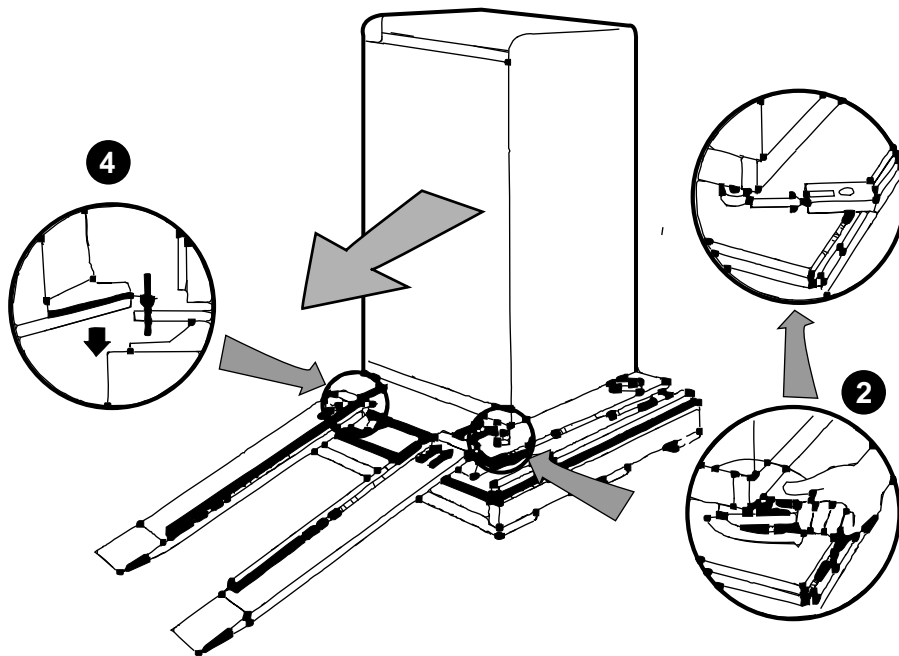
² For systems with 4 batteries add 62 kg (137 lbs), for systems with 8 batteries add 124 kg (274 lbs), and for systems with 12 batteries add 186 kg (401 lbs).

2.4 Remove from the Pallet

Check the cabinet for external damage. Remove the four shipping brackets that attach the cabinet to the pallet. Insert the ramps on the front of the pallet and remove the cabinet.

WARNING: At least two people are required to remove the cabinet from the pallet.

Figure 2-3 Preparation and Removal from Pallet



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WARNING: *Serious injury may result if the cabinet is improperly handled or proper safety conditions are not met. Check the cabinet sides, top, and front and rear doors for damage. If the cabinet is damaged, do the following:*

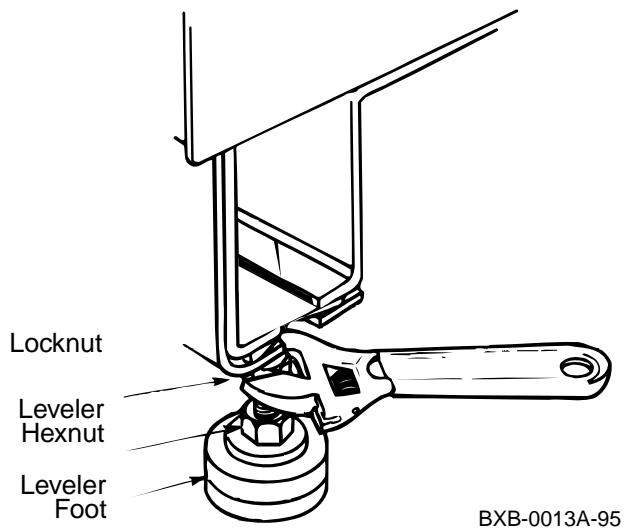
- a. Enter the location and extent of the damage on the LARS report.
 - b. Notify the customer and your unit manager.
 - c. Stop unpacking until the customer gives you permission to continue.
1. Using an adjustable wrench, remove the four bolts and shipping brackets that hold the cabinet leveler feet to the pallet (Figure 2-3).
 2. The leveler feet are lowered to the pallet surface for shipment. Using the adjustable wrench, raise the feet to the uppermost position before removing the system from the pallet (see Section 2.5).
 3. Attach the ramps by fitting the prongs into the holes on the front of the pallet. Place the ramps so that the runners are on the inside. Align the arrows on the ramps and pallet (see Figure 2-3).
 4. The plastic grills on the front and back doors are fragile. If you want to remove the doors to avoid damage to the grills, refer to Section 3.5 for more information.
 5. With two people working together (one in front and one in back), slowly roll the cabinet off the pallet down the ramps. Move the cabinet into position. This should be done on a firm level floor, not on a carpet.

NOTE: *Make sure the space under the cabinet is clear of any debris or extraneous materials.*

2.5 Level the Cabinet

Inspect the rubber leveler feet to be sure they have not been damaged during shipping. To level the cabinet, adjust the feet and check the cabinet with a bubble level.

Figure 2-4 Leveler Foot Adjustment

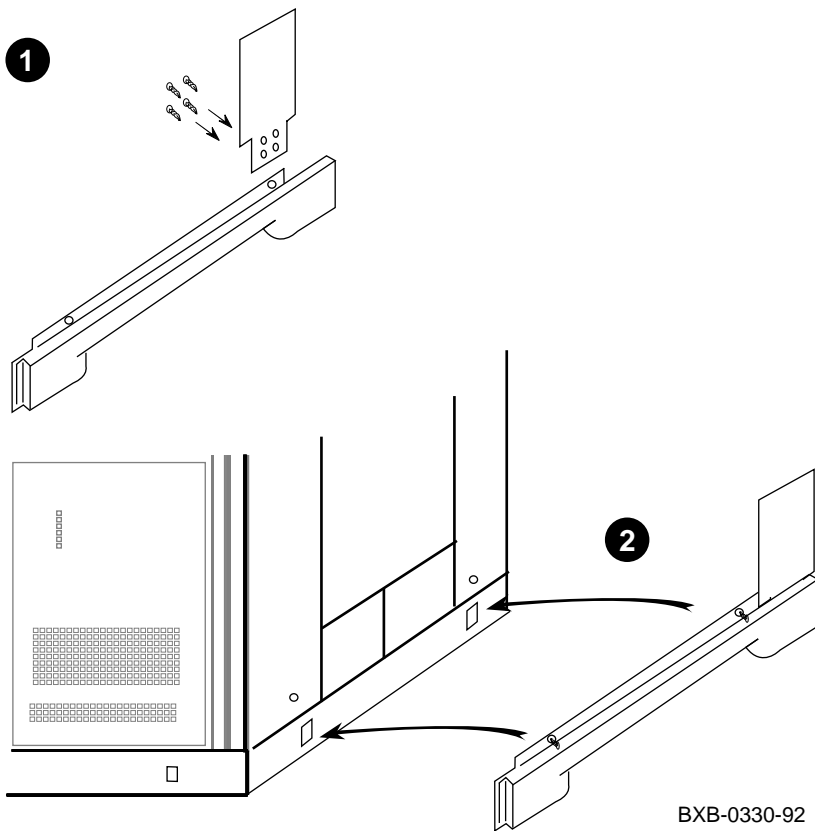


1. Using an adjustable wrench, lower and adjust the leveler feet. (A shipping bracket can also be used to lower the leveler feet. The bracket cutout and leveler feet hexnuts are the same size.) In order for the cabinet skirts to be installed properly later, the leveler feet must now be lowered sufficiently for the cabinet wheels to be off the floor.
2. Using a bubble level, check to see that the cabinet is properly leveled (side to side and front to rear).
3. Once the system is level, lock each of the leveler feet into place by tightening the locknut at the top of each foot.

2.6 Assemble and Install Side Skirts

Assemble and install side skirts for the cabinet.

Figure 2-5 System Cabinet Side Skirt Assembly and Installation

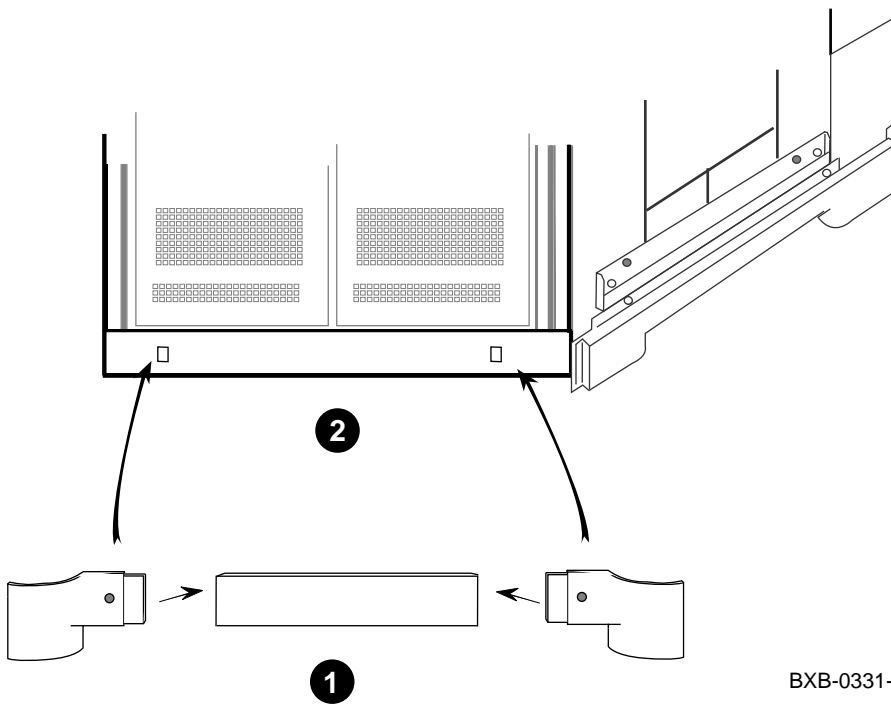


1. Assemble a side skirt by attaching a side skirt "upper" to a side skirt "main" with four self-tapping screws (all assembly components are contained in the installation kit) as shown in Figure 2-5.
2. Attach the side skirt to the outside base of the system cabinet (see Figure 2-5). This is done by aligning the two 1/4 turn Phillips fasteners in the skirt with the matching holes in the cabinet base. Then simply push the fasteners into the holes.
3. Repeat 1 and 2 for the other side of the system cabinet.

2.7 Assemble and Install Front Skirt

Assemble and install the front skirt for the cabinet.

Figure 2-6 System Cabinet Front Skirt Assembly and Installation



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1. Assemble a front skirt by inserting a left-hand endcap and a right-hand endcap into either end of a front center skirt piece (all assembly components are contained in the installation kit) as shown in Figure 2-6.
2. Attach the front skirt to the outside base of the front of a cabinet by aligning the two 1/4 turn Phillips fasteners in the skirt assembly with the matching holes in the cabinet base (see Figure 2-6). Then push the fasteners into the holes until they click and seat.

Chapter 3

Installing Expander and Battery Cabinets

This chapter explains how to install expander and battery cabinets. An expander cabinet provides room for I/O adapters, batteries, and optional storage capacity for the system. Battery cabinets provide UPS battery backup.

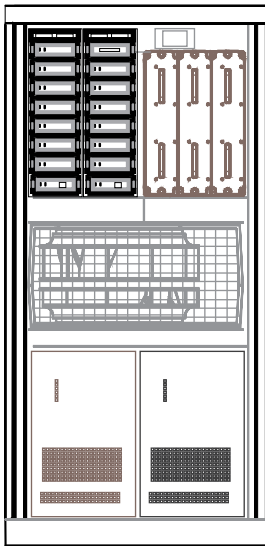
Sections in this chapter include:

- Unpack the Cabinet
- Expander Cabinet Positioning
- Expander and Battery Cabinet Positioning
- Remove Cabinet Top Covers
- Remove Front and Rear Doors
- Remove System Cabinet Side
- Install Side Spacers
- Level All Cabinets
- Install Top Spacers
- Install Bottom Spacers
- Assemble and Install Side Skirts
- Assemble and Install Front Skirts
- Install End Panels
- Identify and Route Battery Cables for H9B00
- Connect Battery Cables
- Install Battery Cable Connectors
- Connect the Power Control Cable
- Reinstall Cabinet Tops and Doors
- Connect the I/O Cable

3.1 Unpack the Cabinet

Unpack the expander cabinet in the same way you unpacked the system cabinet in Chapter 2.

Figure 3-1 Expander Cabinet (Front View)



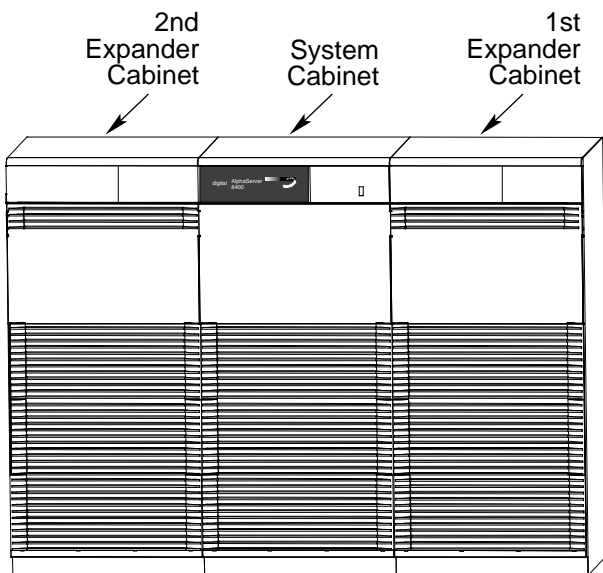
BX0452B-95

1. Inspect the shipment for the expander cabinet as done for the system cabinet (see Section 2.1).
2. Collect the tools and resources needed to install the expander cabinet (see Section 2.2).
3. Remove the carton and packing material from the expander cabinet (see Section 2.3). Identify and put aside the components of the installation kit which includes the side, top, and bottom spacers, screws, bolts, and skirt(s). Some parts from the system cabinet will need to be removed and installed on the expander cabinet.
4. Remove expander cabinet from the shipping pallet (see Section 2.4).

3.2 Expander Cabinet Positioning

Position the expander cabinet next to the system cabinet. The first expander cabinet is positioned to the right of the system cabinet, and the second to the left of the system cabinet (as viewed from the front).

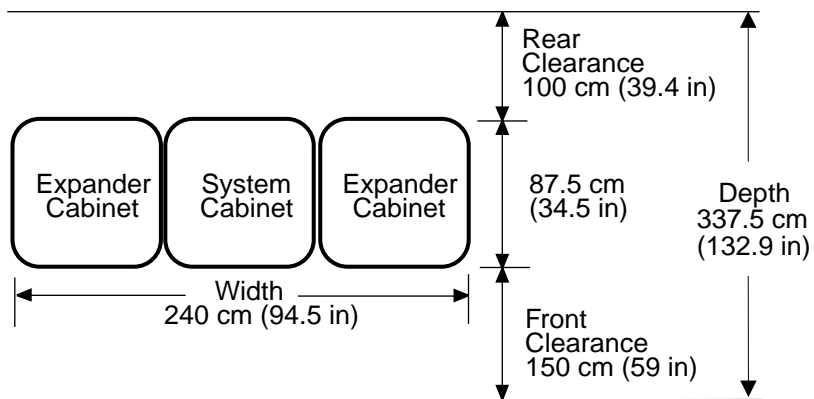
Figure 3-2 Expander Cabinet Positioning



BX-0492-95

1. As shown in Figure 3-2, position the first expander cabinet to the right of the system cabinet as viewed from the front of the system. Position the second expander cabinet to the left of the system cabinet as viewed from the front. A system can have a maximum of two expander cabinets. Figure 3-3 shows the footprint of a system with two expander cabinets.

Figure 3-3 AlphaServer 8400 Footprint



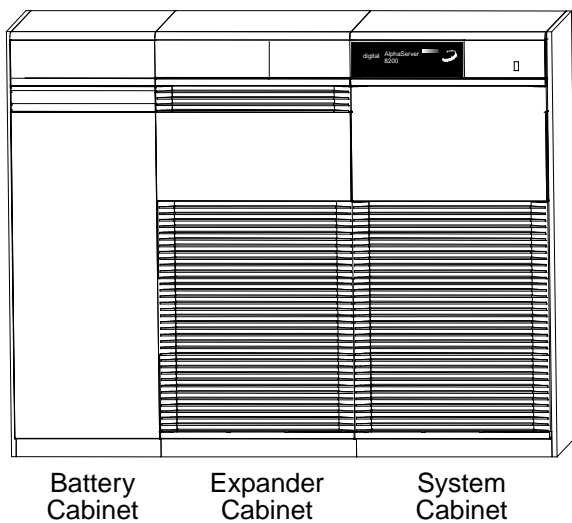
BX-0430-94

For more information:
Site Preparation Guide

3.3 Expander and Battery Cabinet Positioning

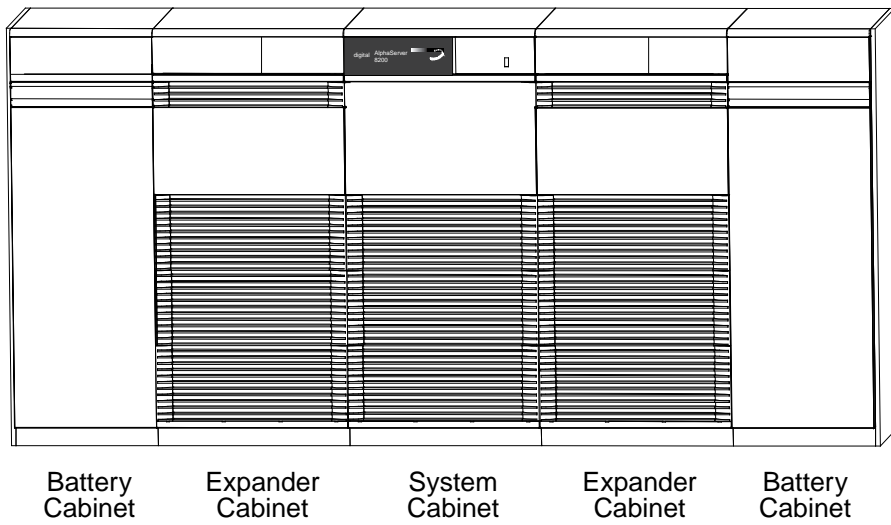
From left to right as viewed from the front, the cabinets are positioned battery, expander, system for the 3-cabinet system, and battery, expander, system, expander, battery for the 5-cabinet system. The battery cabinet is the H9B00-AF. This option is available for systems using three-phase power.

Figure 3-4 Cabinet Positioning for 3-Cabinet System



BX-0493-95

Figure 3-5 Cabinet Positioning for 5-Cabinet System



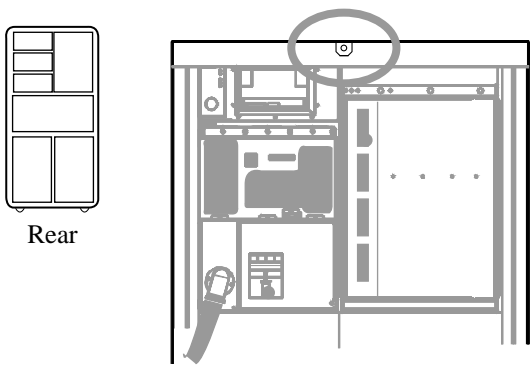
BX-0493A-95

Position the cabinets as illustrated in Figure 3-4 for the 3-cabinet system and as illustrated in Figure 3-5 for the 5-cabinet system.

3.4 Remove Cabinet Top Covers

Remove the top covers of the expander and system cabinets.

Figure 3-6 Cabinet Top Cover Removal



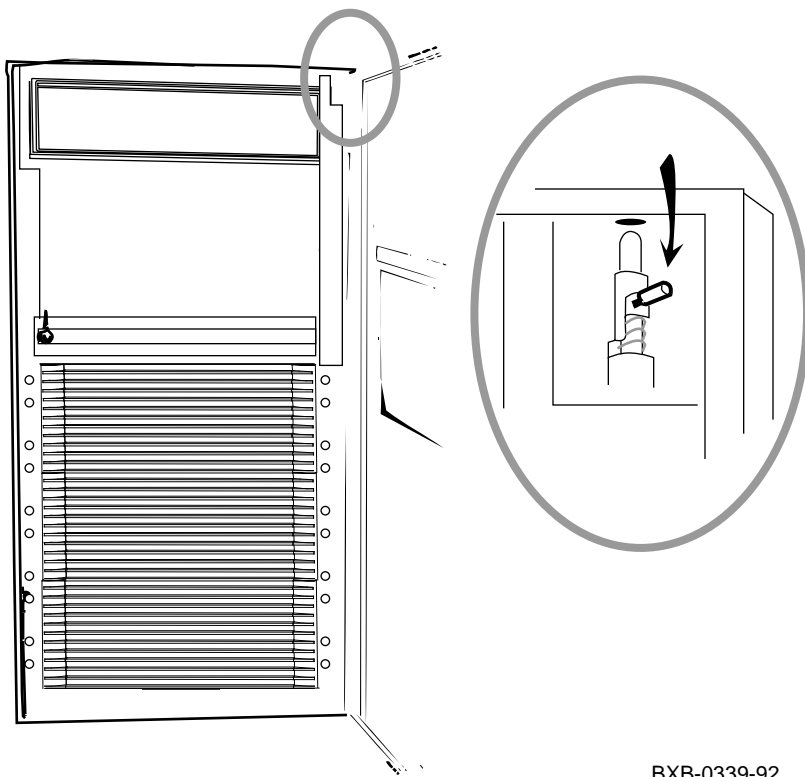
BXB-0340-92

1. Open the back door of a system or expander cabinet and locate a tab on the middle of the back underside of the top cover (see Figure 3-6). There is a screw in this tab which secures the top cover to the cabinet body. Remove the screw with a Phillips screwdriver.
2. Lift off the cabinet top cover and place it aside for now.
3. Repeat 1 and 2 for all top covers in the system.
4. The battery cabinet top cover is not secured with a screw. It simply lifts off. Remove the top cover(s) from the battery cabinets also.

3.5 Remove Front and Rear Doors

Remove the front and rear doors of all cabinets by locating and depressing the cabinet door spring bolts.

Figure 3-7 Door Removal



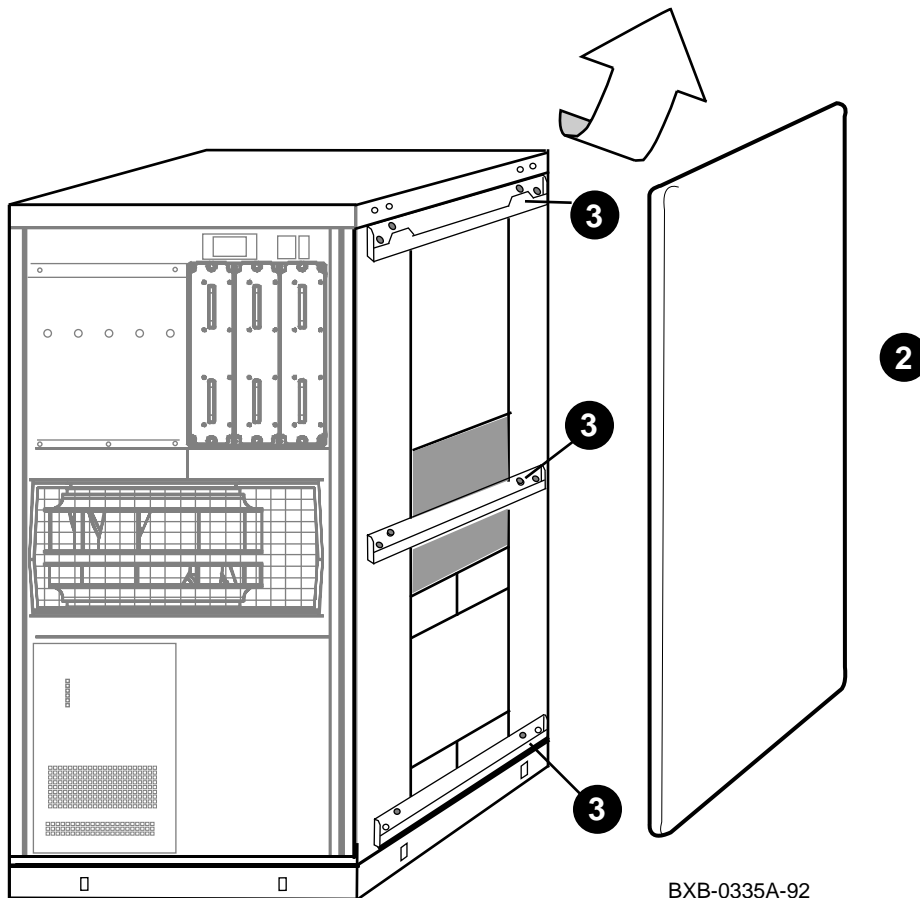
BXB-0339-92

1. To remove a door, pull it open and locate the spring bolt at the top inside corner of the door (Figure 3-7).
2. Depress the spring bolt and the door can be easily tilted away and lifted from the cabinet.
3. Repeat 1 and 2 for all doors in the system.

3.6 Remove System Cabinet Side

Remove the end panel and brackets from the system cabinet. These will later be installed on the outer side of the expander cabinet or battery cabinet if necessary.

Figure 3-8 System Cabinet Side Removal

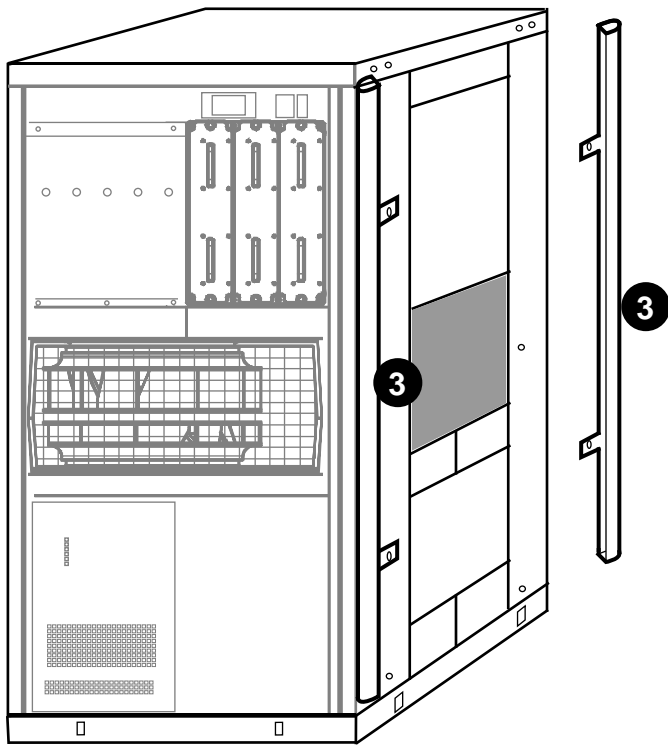


1. Using a 10 mm hex socket wrench, remove the two bolts on the inside top of the frame that attach the end panel to the cabinet.
2. Disengage the end panel from the mounting brackets on the frame by lifting the end panel upward. Then remove the end panel (see Figure 3-8).
3. Remove the three mounting brackets that previously secured the end panel to the cabinet. The brackets are located at the top, middle, and bottom of the cabinet frame. Each bracket is held to the frame with two screws. Use a Phillips screwdriver to remove all screws.
4. Put the brackets, screws, and end panel aside until they are needed for installation onto the expander cabinet.
5. Repeat 1 through 4 for the other side of the system cabinet if a second expander cabinet is to be installed.

3.7 Install Side Spacers

Install one side spacer in the front and one side spacer in the back of adjoining cabinets.

Figure 3-9 Installing Side Spacers



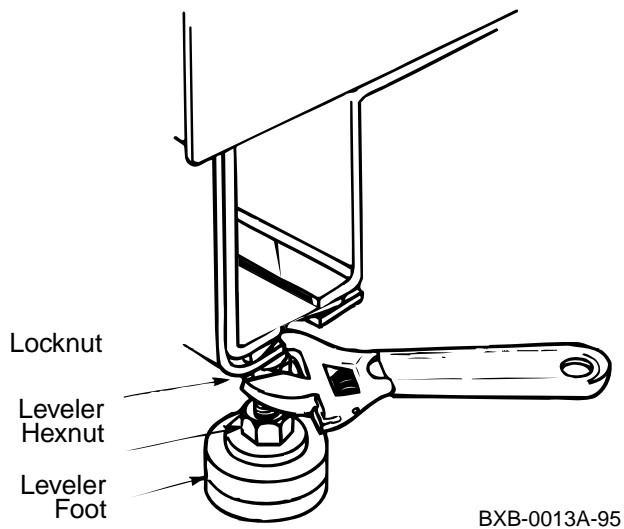
BXB-0336A-92

1. Locate two side spacers in the installation kit. Side spacers are long aluminum brackets that are installed vertically between adjoining cabinets.
2. As shown in Figure 3-9, align the holes in the side spacer tabs with the threaded inserts on a cabinet. For cosmetic purposes, make sure the finished side of the spacer faces the outside of the cabinet.
3. Use two screws from the installation kit to attach a spacer to a cabinet. Install one spacer in the front of the cabinet and one spacer in the rear of the cabinet (see Figure 3-9).
4. Repeat 1 through 3 for each pair of adjoining cabinets.

3.8 Level All Cabinets

Level the cabinets by adjusting the rubber feet on all the cabinets and checking the cabinets with a bubble level. All holes intended for intercabinet bolts must be aligned.

Figure 3-10 Leveler Foot Adjustment

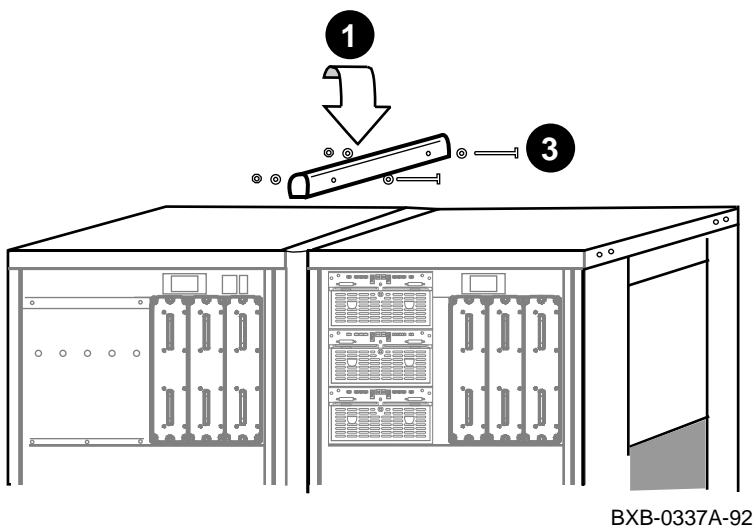


1. Use an adjustable wrench to lower and adjust the leveler feet. A shipping bracket can also be used to adjust the leveler feet, since the bracket cutout and leveler feet hexnuts are the same size.
2. Use a bubble level while adjusting the feet and make sure all cabinets are properly leveled in three dimensions (top to bottom, side to side, and front to rear). The operation is complete when all intercabinet bolt holes are aligned. Bolt holes are located at the tops of the cabinets and at the bottom door hinges of the cabinets.

3.9 Install Top Spacers

Insert top spacers and bolt the tops of the cabinets together.

Figure 3-11 Installing Top Spacers

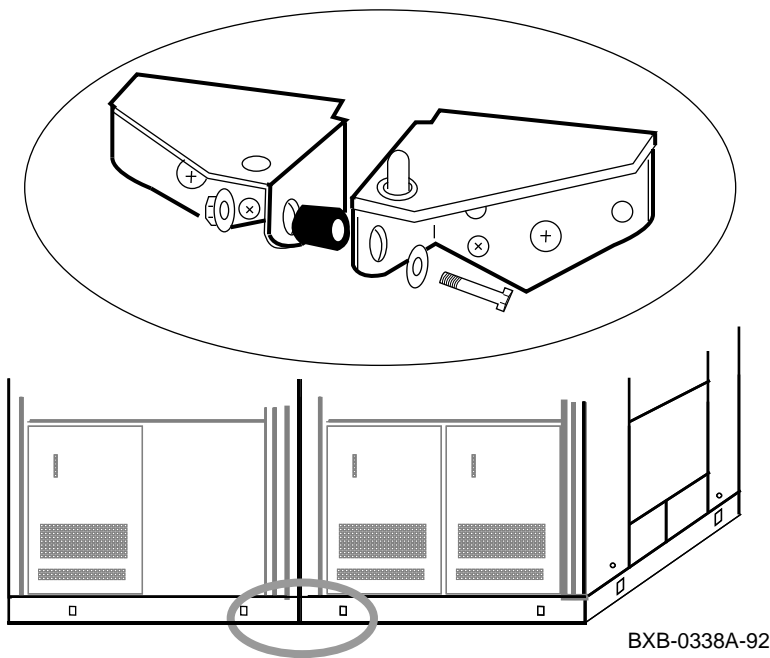


1. Locate a top spacer in the installation kit. A top spacer is a short aluminum bracket that is installed horizontally between the tops of adjoining cabinets (see Figure 3-11).
2. Align the two sets of holes in the top spacer with the two sets of holes in the tops of the frames of two adjoining cabinets.
3. Insert two 80 mm (3.15 in) long bolts from the installation kit (one bolt per set of holes), position accompanying washers properly, attach accompanying nuts, and tighten.
4. Repeat 1 through 3 for each pair of adjoining cabinets.

3.10 Install Bottom Spacers

Insert bottom spacers and bolt the bottoms of the cabinets together through the front and back bottom door hinges.

Figure 3-12 Installing Bottom Spacers

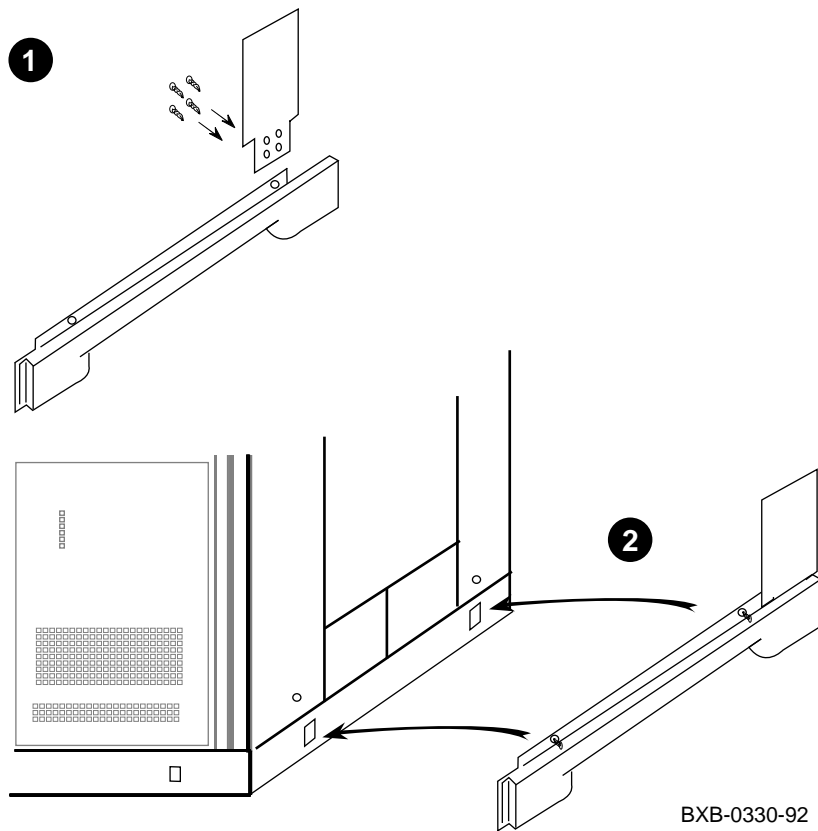


1. Locate two bottom spacers in the installation kit. Bottom spacers are small aluminum cylinders that are bolted between the two lower door hinges in the front and back of adjoining cabinets. In the kit, a bottom spacer is part of an assembly that includes the spacer, a 40 mm (1.6 in) long bolt, an accompanying nut, and washers.
2. Disassemble a bottom spacer assembly and insert the bolt through the holes in the lower door hinges in the front of the adjoining cabinets, making sure the bottom spacer and washers are positioned properly as you insert the bolt (see Figure 3-12).
3. Install nut and tighten.
4. Repeat 1 through 3 for the bottom spacer in the rear of the adjoining cabinets.
5. Repeat 1 through 4 if a second expander cabinet is present.

3.11 Assemble and Install Side Skirts

Assemble and install side skirts for the cabinet assembly.

Figure 3-13 Side Skirt Assembly and Installation

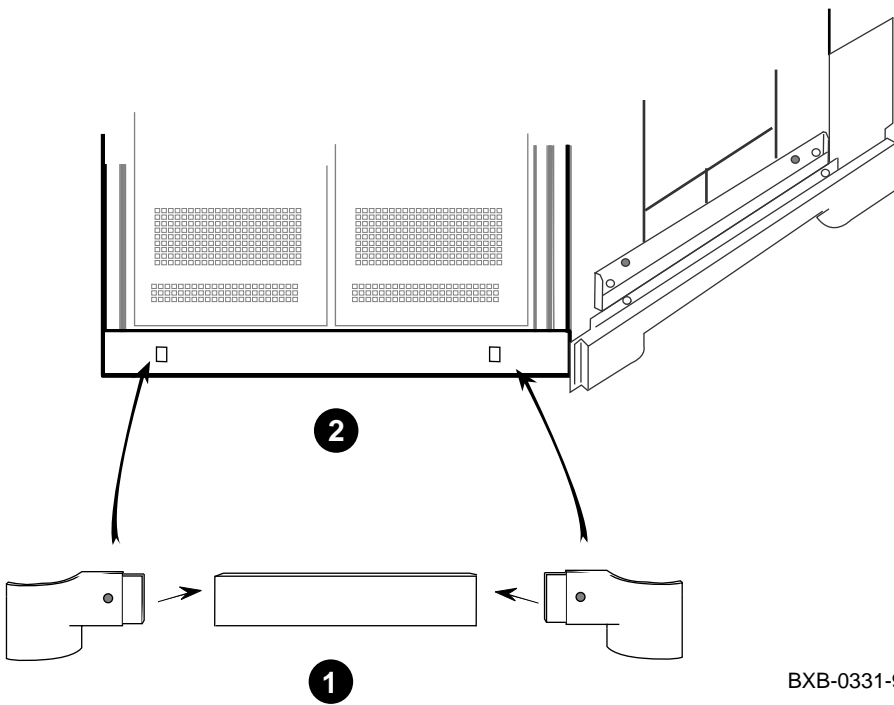


1. Assemble a side skirt by attaching a side skirt "upper" to a side skirt "main" with four self-tapping screws (all assembly components are contained in the installation kit) as shown in Figure 3-13.
2. Attach the side skirt to the outside base of the side of the cabinet assembly (see Figure 3-13). This is done by aligning the two 1/4 turn Phillips fasteners in the skirt with the matching holes in the cabinet base. Then simply push the fasteners into the holes.
3. Repeat 1 and 2 for the other side of the cabinet assembly.

3.12 Assemble and Install Front Skirts

Assemble and install front skirts for all cabinets in the cabinet assembly.

Figure 3-14 Front Skirt Assembly and Installation



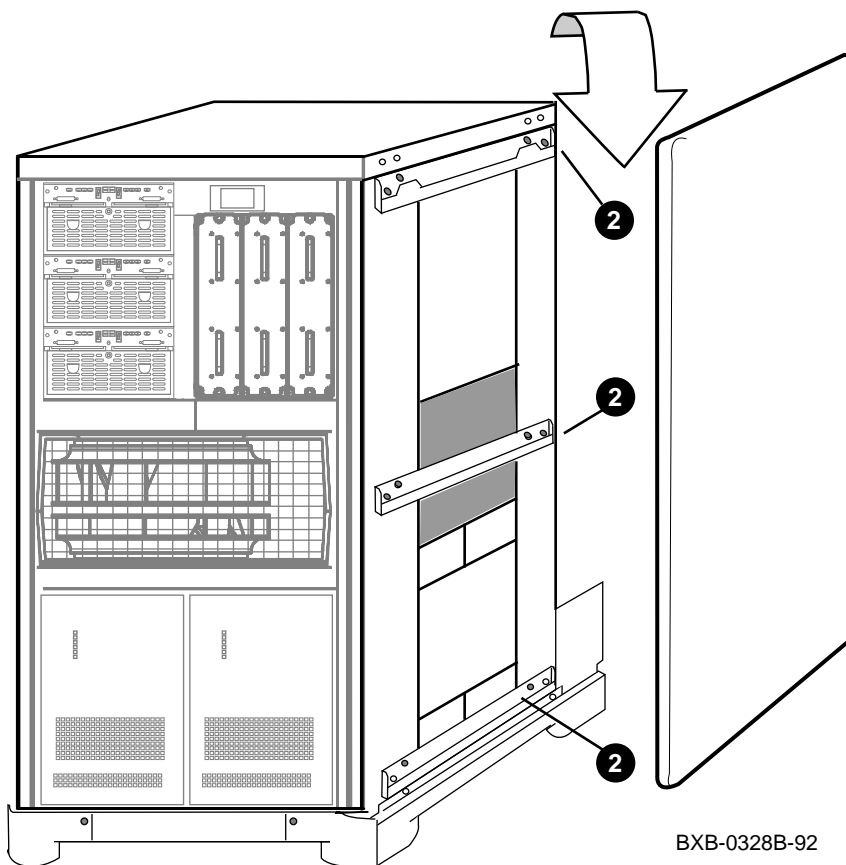
BXB-0331-92

1. Assemble a front skirt by inserting a left-hand endcap and a right-hand endcap into either end of a front center skirt piece (all assembly components are contained in the installation kit) as shown in Figure 3-14.
2. Attach the front skirt to the outside base of the front of a cabinet by aligning the two 1/4 turn Phillips fasteners in the skirt assembly with the matching holes in the cabinet base (see Figure 3-14). Then simply push the fasteners into the holes.
3. Repeat 1 and 2 for the fronts of all cabinets in the cabinet assembly.

3.13 Install End Panels

If necessary install the end panel and brackets onto the ends of the cabinet.

Figure 3-15 End Panel Installation

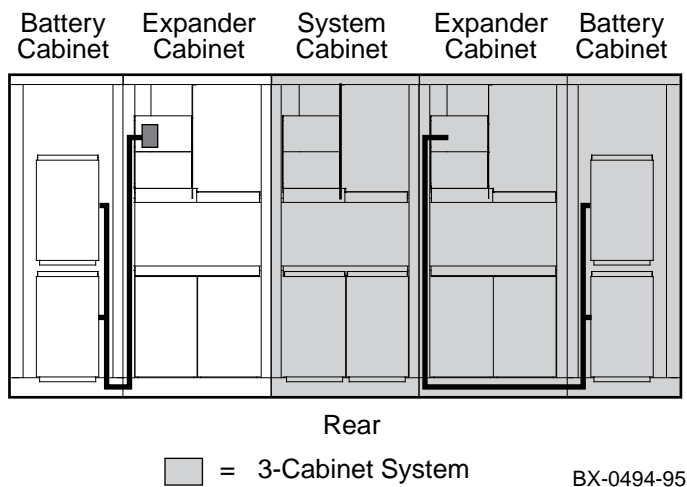


1. Retrieve the three end panel mounting brackets and associated screws you removed from the side of the system cabinet in Section 3.6.
2. Attach the three brackets to the expander cabinet frame exactly as they appeared on the system cabinet frame. That is, the wide bracket is at the top, and the other two are at the middle and bottom of the frame. Each bracket has a "lower lip" which should be facing upward to properly engage the end panel in the next step. Align the holes in each bracket with the corresponding threaded inserts in the frame. Then attach each bracket to the frame with two screws as illustrated in Figure 3-15.
3. Retrieve the end panel and its two associated 40 mm (1.6 in) long bolts and washers you removed from the system cabinet in Section 3.6.
4. Position the end panel so that it is centered with respect to the front and back of the cabinet assembly.
5. Lift the end panel and lower it while doing the following three things simultaneously:
 - a. Engage the tabs of the top bracket with the corresponding holes in the end panel;
 - b. Engage the lip of the middle bracket with the corresponding groove in the end panel; and
 - c. Engage the lip of the lower bracket with the corresponding groove in the end panel. When properly installed, the end panel should be tight and flush against the cabinet frame.
6. Insert the two bolts with washers from the inside of the frame through the holes in the cabinet frame and into the matching threaded inserts in the end panel.
7. Carefully tighten the bolts with a 10 mm hex socket wrench, preferably a torque wrench. Recommended maximum torque is 20 in-lbs. Do not overtighten the bolts or bumps on the end panel exterior will appear.
8. Repeat 1 through 7 for the other side of the cabinet assembly if an expander cabinet is installed.

3.14 Identify and Route Battery Cables for H9B00

If your system does not have the optional UPS battery backup system, skip to Section 3.17. Take heed of warnings and cautions associated with the batteries. Identify and route cables from battery cabinet(s) to expander cabinet(s).

Figure 3-16 Battery Cable Routing



WARNING: *Batteries present a risk of electrical shock and high short circuit current. Remove watches, rings, necklaces, and any other conductive items that might accidentally short circuit a battery. Use gloves and tools with insulated handles such as those in the power safety tool kit (22-00518-02).*

WARNING: *Batteries are sealed and therefore gas or liquid emission is unlikely. If batteries should rupture, however, leaking electrolyte may be exposed and if the rupture is due to operational failure, highly dangerous and corrosive mist or fumes may also be expelled. If electrolyte is exposed because of battery case damage, remove all power from the local area, mask or insulate the terminals of the undamaged batteries, remove the damaged battery or batteries, and clean the immediate area. If, however, there is any possibility of mist or fumes having been expelled,*

evacuate all personnel immediately, shut down the power to the site, and disable all air circulation equipment. If appropriate, quarantine the site and start an environmental disaster recovery process. Avoid touching anything without proper protective clothing. If electrolyte contacts the skin, WASH IT OFF IMMEDIATELY and use the appropriate Customer Service Process for follow-up medical treatment. If electrolyte contacts the eyes, FLUSH IMMEDIATELY AND THOROUGHLY WITH WATER FOR 15 MINUTES and follow the recommended Digital Health and Safety Group procedure.

CAUTION: *Before starting, make sure that the battery cable connectors in the battery cabinets (see Figure 3-18 for locations) are all disconnected. Also disconnect all power regulators in the expander cabinet(s) by backing them out of their slots approximately 1 to 2 inches. Failure to follow these precautionary steps may lead to damage of the regulators and/or fuses. Do not reinstall regulators until battery cables have all been installed. Do not defeat the operation of the stop tabs on the regulators.*

The battery cables are tie-wrapped together in a coil at the bottom of a battery cabinet. There are six large diameter battery power cables (three orange and three blue) terminated with metal ring terminals and one group of smaller diameter battery sense cables terminated with a square 9-pin connector.

The six large diameter battery power cables are grouped as three pairs of orange (+) and blue (-) connections. Each pair is to be connected to a corresponding power regulator in the expander cabinet. The end of each pair has a color coded label attached to it as shown in Table 3-1. The label text indicates to which regulator the pair must be connected (A, B, or C).

Table 3-1 Battery Cable Labeling

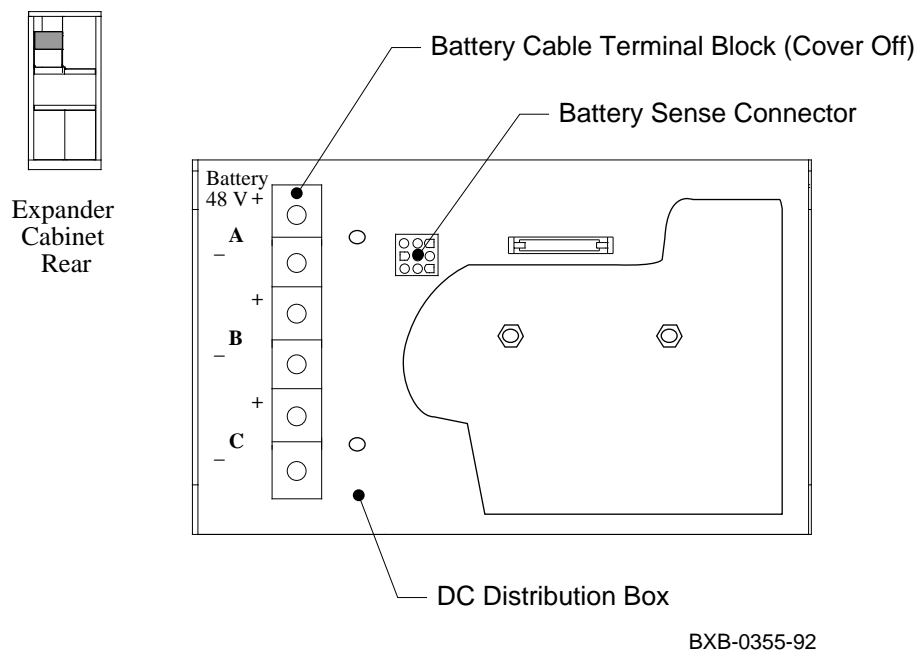
Label Text	Label Color
A	Green
B	Blue
C	White

Route the cables from a battery cabinet to the DC distribution box in an expander cabinet as illustrated in Figure 3-16.

3.15 Connect Battery Cables

Connect the battery power cables to the terminals of the battery cable terminal block and connect the battery sense cable.

Figure 3-17 Battery Cable Connections



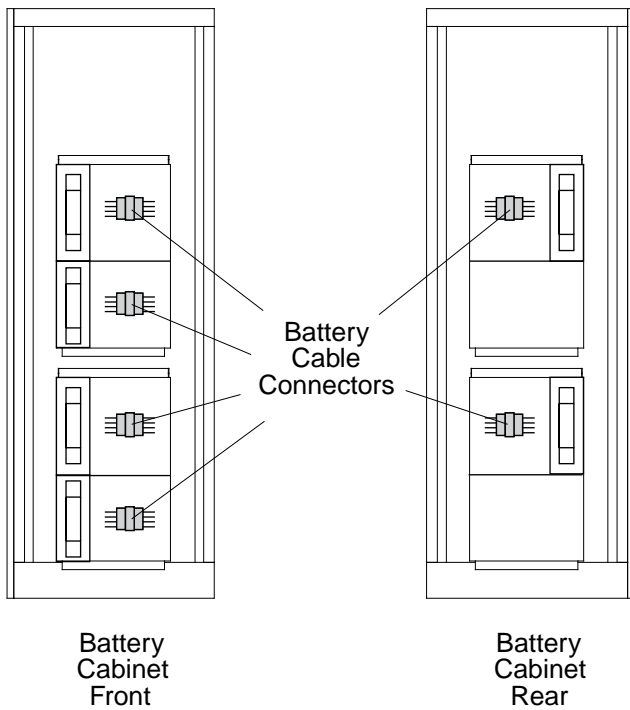
WARNING: *Observe proper polarity when connecting battery cables. Failure to do so can cause severe power system damage, overheating, and emission of smoke. ORANGE wires are POSITIVE (+) polarity, and BLUE wires are NEGATIVE (-) polarity.*

1. Locate the DC power distribution box in the rear of an expander cabinet (see Figure 3-17). Remove the plastic cover of the battery cable terminal block by unscrewing two nuts.
2. Observe the labeling of the battery cable terminal block. Connect the + and – leads of the cable pair labeled "A" (green label) to the top two terminals labeled + and – (see Figure 3-17). The positive (+) lead has a special ring lug that prevents its attachment to a negative (–) terminal. When attaching this ring lug, make sure it is properly aligned to allow contact with the battery cable terminal block. Use a 13 mm socket wrench or nutdriver to tighten each connection (a maximum of 10 in-lbs is recommended).
3. Connect the cable pairs labeled "B" to the center two terminals labeled + and – (see Figure 3-17).
4. Connect the cable pairs labeled "C" to the bottom two terminals labeled + and – (see Figure 3-17).
5. Plug the male 9-pin connector of the battery sense cable into the female 9-pin connector near the battery cable terminal block (see Figure 3-17).
6. Replace the cover of the battery cable terminal block and secure it by screwing in the two nuts you removed in step 1. The cover has a cut-out in its left side through which the six battery power cables and the sense cable pass.

3.16 Install Battery Cable Connectors

Install battery cable connectors in all battery cabinets. These connectors are shipped disconnected from the factory.

Figure 3-18 Battery Cable Connector Locations



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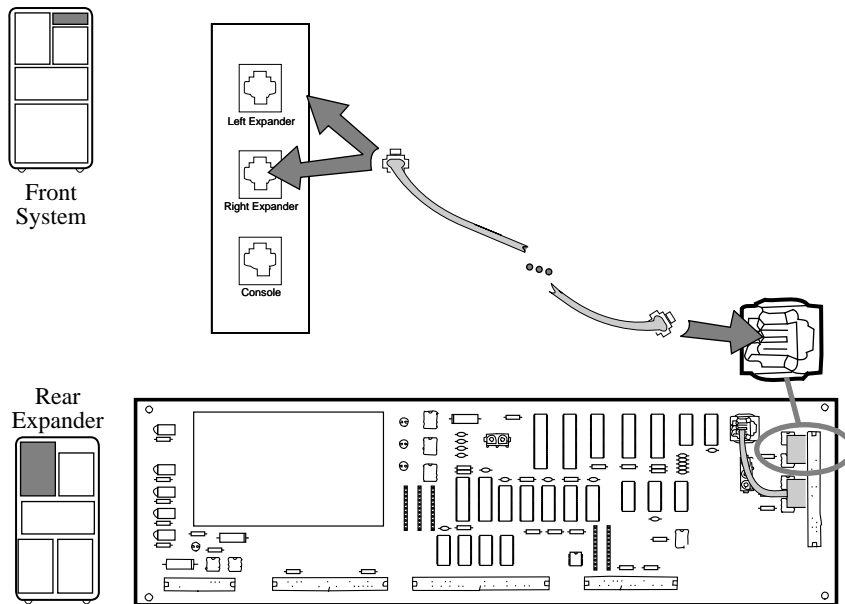
Install battery cable connectors as follows:

1. Remove all battery PIU covers in all battery cabinets. This is done by using a low-profile ratchet Phillips screwdriver to unscrew two 1/4 turn fasteners at the top of a battery PIU cover. When the two 1/4 turn fasteners pop up, tilt away and remove the battery PIU cover.
2. Locate and connect all battery cable connectors. Their locations are as shown in Figure 3-18. Each battery cabinet has four battery cable connectors accessible from the front and two from the back.
3. Replace all battery PIU covers.
4. From the front of the expander cabinet(s), reinstall all power regulators by pushing them in until the stop tab on top of a power regulator is reached. Wait 30 seconds, lift the stop tab, and push the regulator in all the way. Tighten the two Phillips head screws on the regulator to complete the installation.

3.17 Connect the Power Control Cable

Connect the power control cable from the control panel on the system cabinet to the cabinet control logic (CCL) module in the expander cabinet.

Figure 3-19 Power Control Cable



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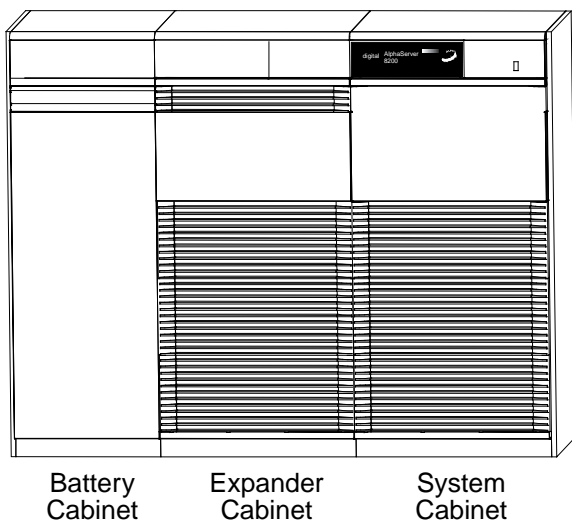
WARNING: Before beginning this procedure, ensure that the system is powered off.

1. Plug one end of the power control cable into the jack marked Right Expander located on the top right of the system cabinet as viewed from the front. If a second expander cabinet is being installed, plug another power control cable into the jack marked Left Expander.
2. Route each power control cable through the cable trough to the rear of the system cabinet and into the top of the expander cabinets.
3. Plug the other end of each power control cable into jack J2 located on the upper right of the CCL module (located in the top section of the expander cabinet).

3.18 Reinstall Cabinet Tops and Doors

Replace the tops and doors of all cabinets.

Figure 3-20 Cabinet Tops and Doors



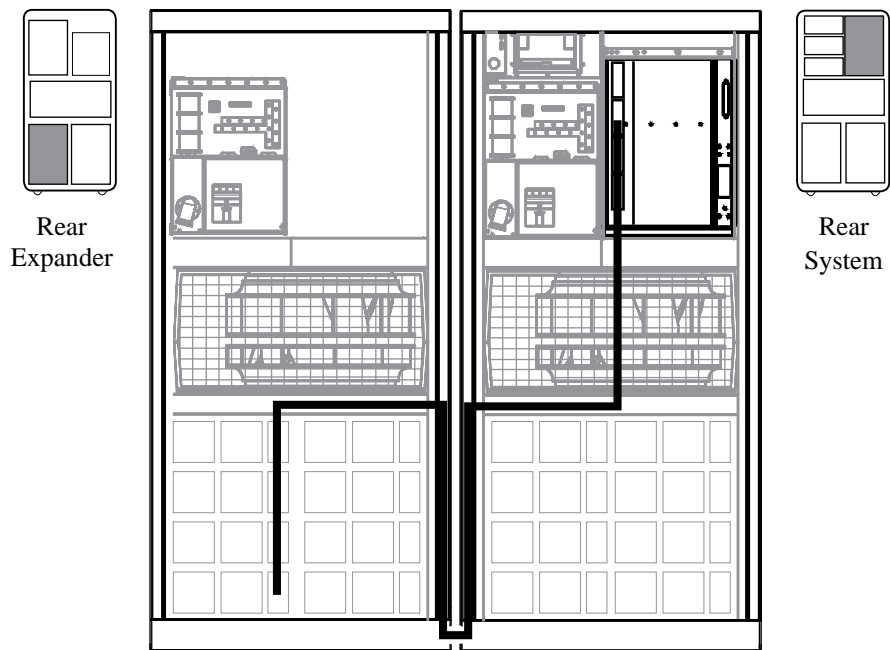
BX-0493-95

1. Retrieve all front and rear doors you removed in Section 3.5.
2. To replace a door, first position the door so that the pin in the bottom hinge is inserted into the corresponding hole at the bottom of the door.
3. Lift and position the door while depressing the spring bolt until the bolt lines up with the hole in the top hinge.
4. Release the spring bolt to insert it into the top hinge.
5. Repeat 2 through 4 for all doors in the system.
6. Retrieve all cabinet tops and associated screws you removed in Section 3.4.
7. Replace a cabinet top by placing it on top of a cabinet so that the tab faces the rear of the cabinet; then press down.
8. Use the screw previously removed from a top to reattach the top to a cabinet frame.
9. Repeat 6 and 7 for all cabinet tops in the system. See Figure 3-20.

3.19 Connect the I/O Cable

Connect the I/O cable(s) between the system and expander cabinets.

Figure 3-21 I/O Cable Connections



BXB-0032C-95

1. Open the rear doors of the system and expander cabinets.
2. Using a flathead screwdriver, install the unlabeled end of the I/O cable (DEC P/N 17-03085-02) to the topmost open KFTHA or KFTIA connector on the rear of the TLSB card cage in the system cabinet (as shown in Figure 3-21). Tighten the two thumbscrews to hold the I/O cable in place.
3. Bend the I/O cable 90° downward.
4. Route the I/O cable through the cable trough in the center of the blower to the expander cabinet as shown in Figure 3-21.
5. Using a flathead screwdriver, install the end of the I/O cable labeled PIU to the PIU bulkhead connector (located in lower PIU quadrant). Tighten the two thumbscrews to hold the I/O cable in place.

Chapter 4

Making Console, SCSI, Ethernet, FDDI, and DSSI Connections

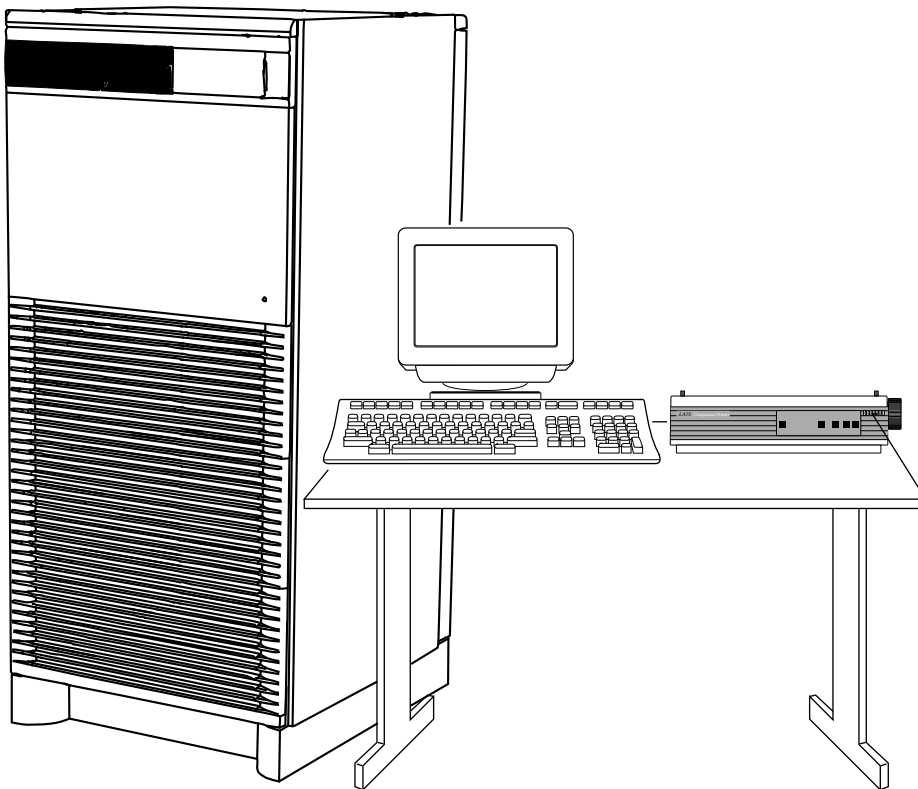
This chapter describes how to connect a console terminal and how to make SCSI, Ethernet, FDDI, and DSSI connections. It consists of the following sections:

- Connect the Console Terminal
- Connect the SCSI Cables
- Connect Ethernet Cables
- Connect the FDDI Cables
- Connect the DSSI Cables

4.1 Connect the Console Terminal

Figure 4-1 shows a system cabinet with a console terminal. Connect the console terminal to the console terminal port in the system cabinet as shown in Figure 4-2.

Figure 4-1 System Cabinet, Console Terminal, and Printer

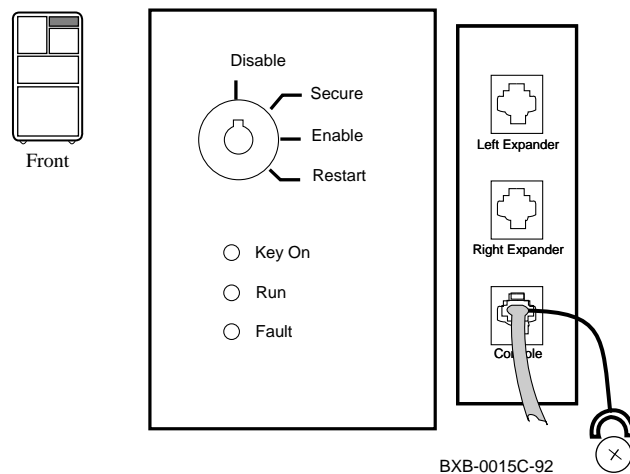


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CAUTION: The system cabinet, console terminal, and printer should all use the same power distribution source to ensure a common ground.

1. Unpack the VT510 console terminal if one came with the system. The console terminal signal cable is shipped in the loose piece box and consists of a 17-01364-02 cable and H8575-A adapter. (The customer may be providing a terminal. In which case use the cable provided with the terminal.)
2. Connect one end of the 17-01364-02 cable to the connector to the right of the control panel. Connect one end of the cable ground wire to the cabinet grounding screw nearby (see Figure 4-2). Connect the other end of the cable to the H8575-A, which connects to a 25-pin D-subminiature connector on the console terminal. Connect the other end of the cable ground wire to one of the screws on the H8575-A.
3. If a printer is not present, skip this step. Unpack the printer. Connect the BC16E-25 signal cable to the printer and to the console terminal. Plug in the printer.
4. The following are the default terminal characteristics. If the terminal does not have these characteristics, they must be set accordingly:
 - Baud rate = 9600 (transmit = receive)
 - 8 bits, no parity
 - 1 Stop Bit
 - Xoff at 64

Figure 4-2 Control Panel and Console Terminal Port



4.2 Connect the SCSI Cables

SCSI cable connections depend upon the customer order. Connecting and routing cables are situation dependent. Read the information provided and install any cables you need to install.

Figure 4-3 System and Expander Cabinets

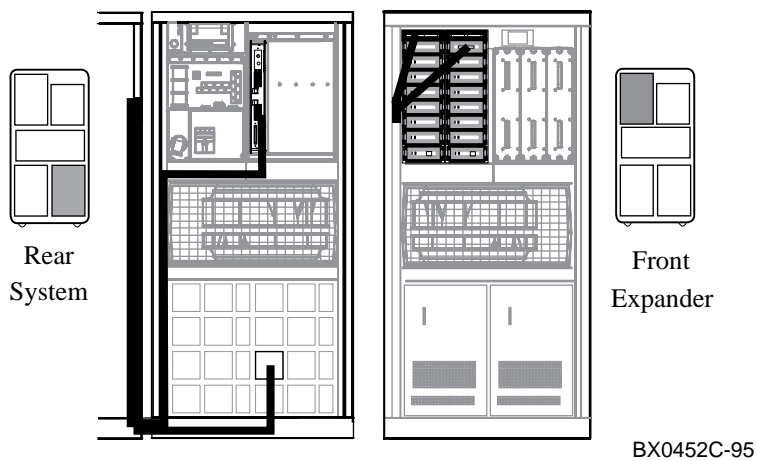
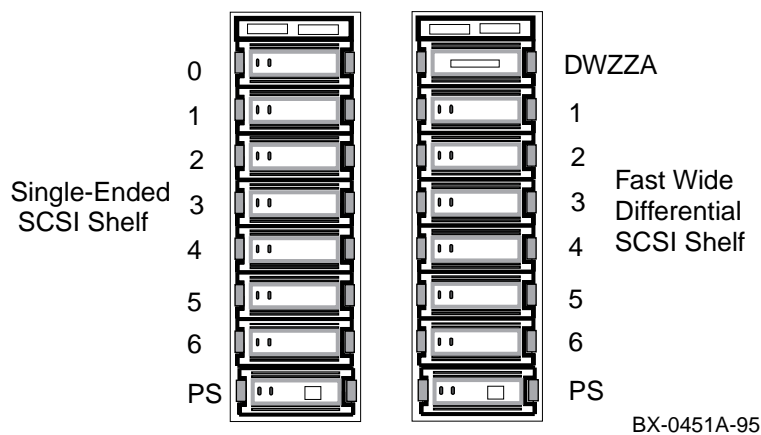


Figure 4-4 SCSI Disks in StorageWorks Shelves



Multiple SCSI configurations are possible both inside system and expander cabinets and outside either cabinet. Manufacturing will connect all SCSI devices it can in both system and expander cabinets. Inter-cabinet connections are the responsibility of system installers. There is space to pass signal cables from front to back in the expander cabinet. You can assume that loose SCSI cables provided with a system go from device adapters in either cabinet to devices not in the same cabinet. Figure 4-3 shows an example of cable routing from the system cabinet to an expander cabinet. Figure 4-4 shows a single-ended and a fast wide differential SCSI shelf.

The following rules apply:

1. FWD SCSI ports on the KFTIA have "Y" cables (BN20W-0B) plugged into them. Cables to devices plug into these "Y" cables.
2. All SCSI buses must be terminated at both ends. The terminators used for the AlphaServer 8400 are interchangeable and are the H879 or the H8863.
3. All cables exit and enter cabinets at the bottom back.
4. Signal cables should be routed away from the power cables.
5. The SCSI cables should not be routed in front of power supply fans.

Table 4-1 lists SCSI cables used in AlphaServer 8400 systems.

Table 4-1 SCSI Cables

Cable Number	From	To	Length (meters)
BN21H-02	KFTIA	BA350 rear	2
BN21H-0H	KFTIA	RRDCD-CA	.75
BN21H-03	KFTIA	BA350 (front)	3
	KFTIA	BA350 (rear E ²)	
	DWLPA (M ¹)	BA350 (front)	
BN21H-01	DWLPA	BA350 adjacent	1
BN21K-02	KFTIA	DWZZA, BA350 (rear)	2
BN21K-03	KFTIA	DWZZA, BA350 (front)	3
	KFTIA	DWZZA, BA350 (rear E)	
¹ M = In main or system cabinet			
² E = In expander cabinet.			

4.3 Connect Ethernet Cables

The system includes two Ethernet ports on the KFTIA. Connect the Ethernet cable to the KFTIA in slot 8 and to the Ethernet transceiver. Ethernet ports are also available through PCI or XMI I/O subsystems. To connect to the Ethernet through a subsystem, connect the Ethernet cable to the PCI adapter or to the I/O bulkhead panel and the Ethernet transceiver.

Figure 4-5 KFTIA

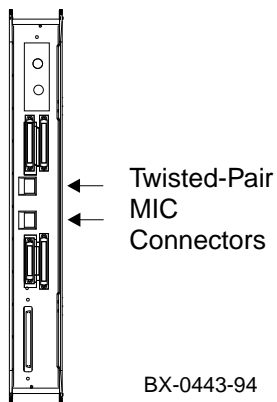
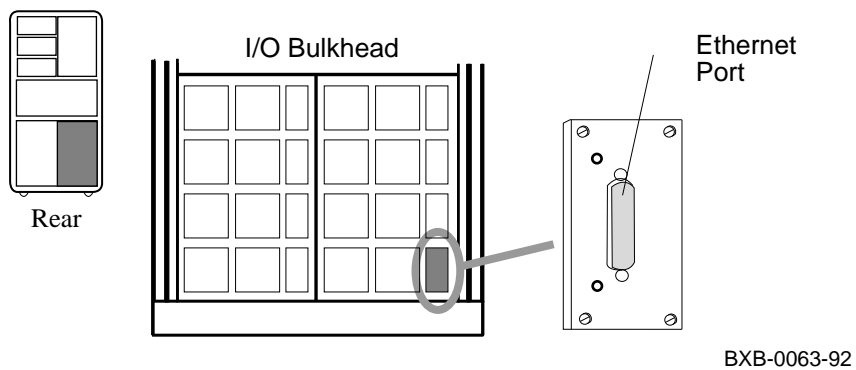


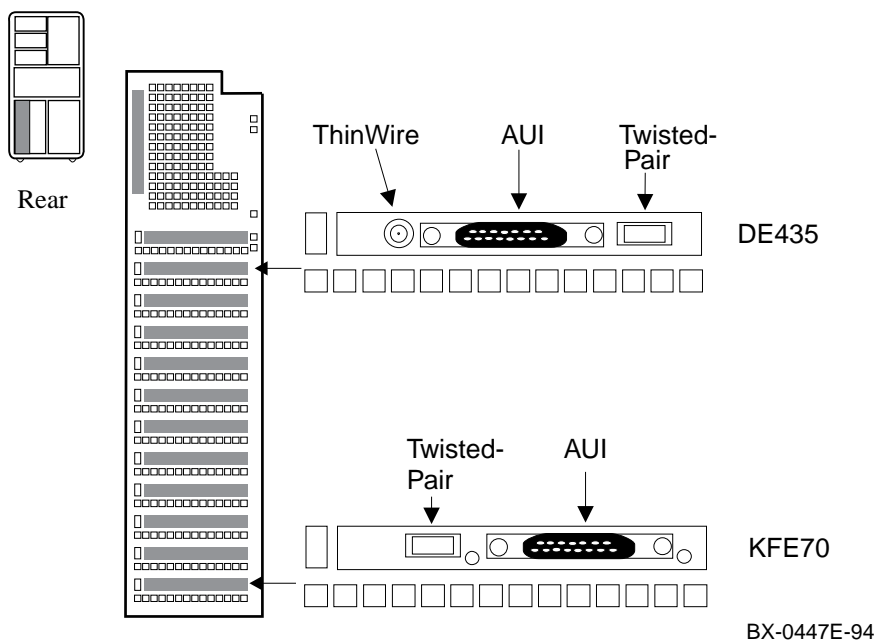
Figure 4-6 I/O Panel-Ethernet Port



Two DECchip 21040-AA Ethernet chips on the KFTIA are twisted-pair. They are connected to the Ethernet by a BN25G or a BN26M transceiver cable. The DEC LANcontroller 400 (DEMNA) adapter available on an XMI I/O subsystem connects to the Ethernet via a BN3x or BN4x transceiver cable also. Two PCI options currently provide Ethernet support: the DE435-AA and the KFE70.

1. Connect the transceiver cable (BN25G-xx (unshielded) or BN26M-xx (shielded)) to an Ethernet port on the KFTIA (see Figure 4-5).
2. Connect the other end of the cable to an Ethernet transceiver or to an appropriate conversion box. See the appropriate Ethernet transceiver manual for more information.
3. If there is a DEMNA on an XMI I/O subsystem, remove the rear panel shield and connect the transceiver cable (E0-BNE3H-xx) to the Ethernet port on the I/O bulkhead panel (see Figure 4-6).
4. If there is a DE435-AA or a KFE70, connect appropriate cables to the PCI module (see Figure 4-7). The DE435 has ThinWire, twisted-pair, or AUI type connectors. The KFE70 has twisted-pair or AUI.

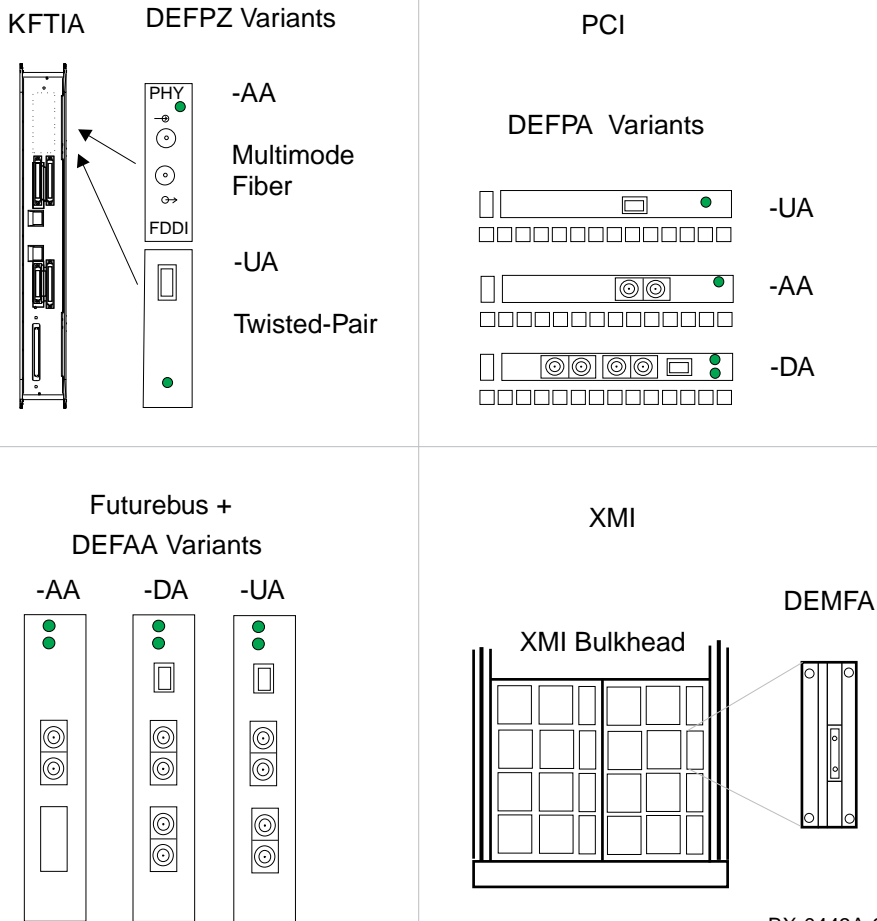
Figure 4-7 Ethernet Connectors on PCI Adapters



4.4 Connect the FDDI Cables

If the system includes an FDDI port, connect the FDDI cable to the KFTIA or to the I/O bulkhead panel and to the FDDI transceiver.

Figure 4-8 Possible FDDI Ports



BX-0443A-94

Two variants of the FDDI option are available on the KFTIA; there is an XMI-to-FDDI controller (DEMFA); there are three FDDI option variants available on the PCI bus; and three option variants on the Futurebus+. Table 4-2 shows the FDDI options and the cables associated with them. Install the appropriate cable(s) as needed.

Table 4-2 FDDI Options and Cables

Option	Description	Location	Cable
DEFPZ -AA	Multimode fiber	KFTIA	BN24D-xx BN24E-xx
-UA	Twisted-pair (UTP)	KFTIA	BN26M-xx BN26S-xx
DEFPA -AA	Single attachment station, multimode fiber	PCI PIU	BN34A-xx BN34B-xx BN34D-xx
-DA	Dual attachment station, multimode fiber	PCI PIU	BN34A-xx BN34B-xx BN34D-xx
-UA	Single attachment station, twisted-pair (UTP)	PCI PIU	BN26M-xx BN26S-xx
DEMFA	Single attachment with fiber MIC connector	XMI PIU	BN24B-xx
DEFAA -AA	Single attachment station	FBUS+	Since there are multiple cable possibilities, refer to DEFAA documentation.
-DA	Dual attachment station	FBUS+	
-UA	DEFXS single mode fiber PMD DEFXM multimode fiber PMD DEFXU twisted-pair PMD	FBUS+	

1. If you have an FDDI option, determine where it is. Figure 4-8 shows connectors for each option and its variants on each bus.
2. Connect the appropriate transceiver cable to the FDDI port.
3. Connect the other end of the cable to the FDDI network. See the appropriate FDDI manual for details.

4.5 Connect the DSSI Cables

Two DSSI options are available: the KFMSB on the XMI and the KFESB on an EISA bus. If the system has either of these options and manufacturing has not cabled them because the placement of the adapter and the devices are in different cabinets, cable the devices to the adapter.

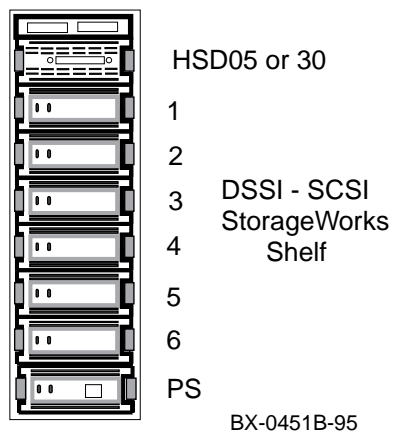
Figure 4-9 DSSI Cable Connection



BX0452D-95

1. If there is a KFMSB, attach one end of the DSSI cable (PN 17-03451-01) to the XMI PIU bulkhead connector in the rear of the system cabinet (see Figure 4-9). If necessary, install a terminator (PN 12-31281-01) to terminate this end of the DSSI cable.
2. If there is a KFESB, attach one end of the DSSI cable (BC29R-xx or BC29S-xx) to the KFESB connector in the rear of the system cabinet (see Figure 4-9). If necessary, install a terminator to terminate this end of the DSSI cable.
3. Route the DSSI cable out of the system cabinet and through the upper cable trough on the right rear of the expander cabinet to the front of the expander cabinet.
4. Attach the end of the DSSI cable to the connector on the HSD05 or HSD30. (The HSD05 and HSD30 are array controllers that allow connectivity between the DSSI bus and the StorageWorks family of products (SCSI).) Figure 4-10 shows the placement of the HSDxx and its connector.
5. If necessary, configure the DSSI bus. (See accompanying KFMSB or KFESB documentation.)

Figure 4-10 StorageWorks Shelf with DSSI Controller



Chapter 5

Connecting to a CI OpenVMS Cluster

The CIXCD adapter connects the system through the XMI bus to an OpenVMS cluster. If your system connects to a DSSI or a SCSI subsystem, those installations must be done before the CI connections (see Chapter 4).

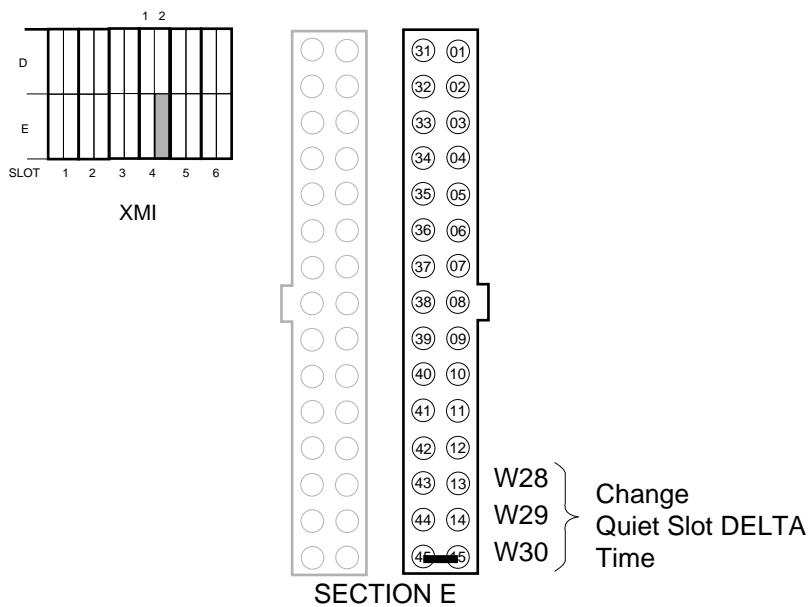
Sections in this chapter include:

- CIXCD Installation Configuration Rules
- Setting CIXCD Parameters
 - Setting the Cluster Node Address (Mandatory)
 - Verifying Quiet Slot DELTA Time = 10 (Mandatory)
 - Setting Boot Time (Optional)
 - Setting Extend Header, Extend ACK Timeout, and Disable Arbitration (Optional)
 - Setting Cluster Size (Optional)
- Cabling the System to a Star Coupler

5.1 CIXCD Installation Configuration Rules

Follow these rules to install a CIXCD adapter for the HSC, adapters on other CI nodes, and the CIXCD itself. The key parameter to be set is the Quiet Slot DELTA Time; you must use jumpers or switches to set this parameter to 10, rather than accepting the default value of 7.

Figure 5-1 CIXCD Jumper to Set Quiet Slot DELTA Time



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To install a system with a CIXCD adapter into an existing cluster, there are mandatory steps. The first four steps apply to the OpenVMS cluster configuration.

1. Ensure that the LINK module on the HSC has a Quiet Slot DELTA Time of 10. If it does not, you must change it to 10 using a switch, wire, or board replacement and switch, depending on the model of the HSC. Check the *HSC Installation Manual* for details.
2. Set the Quiet Slot DELTA Time to 10 on all nodes installed on the cluster. Every CI node must have Quiet Slot DELTA Time set to 10.
3. Check that the OpenVMS version running on all nodes is compatible with the new version of OpenVMS being installed. This is done by checking the OpenVMS versions against the Software Product Description or the required OpenVMS version for your system.
4. Check the HSC microcode and LINK module against required versions in the Cluster Revision Matrix. Update the required version level as needed.
5. Set the Quiet Slot DELTA time on the CIXCD to 10. Install a jumper between pins E15 and E45 on the XMI backplane's CIXCD segment.

You cannot leave a **default** configuration. You must **change** the Quiet Slot DELTA Time to 10. The default configuration for a system without jumpers installed is:

- CI Node Address = 0
- Quiet Slot DELTA Time = 7 (**must be set to 10**)
- Boot Time = 1500 seconds
- Normal CI Arbitration
- Normal Header systems in the cluster
- Cluster Size = 16
- Short ACK Timeout

CAUTION: Failure to follow these configuration rules may result in unreliable operation.

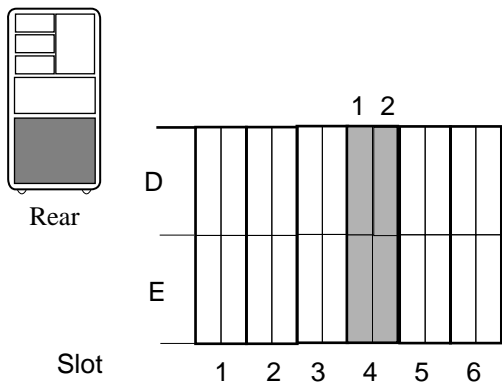
For more information:

HSC Installation Manual

5.2 Setting CIXCD Parameters

To set parameters for the CIXCD adapter to other than default values, you must install jumpers on the backplane. Note that these jumpers are only placed in segments D2 and E2.

Figure 5-2 XMI Backplane Segments D and E



BXB-0038-92

Refer to Figure 5-2 to determine which jumper corresponds to which backplane pin. The XMI backplane contains 29 pins that may need jumpers on the backplane in sections D and E. The corresponding jumpers are denoted W1 through W30, with W9 being reserved.

The module functions that can be modified by jumper placement are the following:

- Set CI port address (mandatory)
- Set Quiet Slot DELTA Time to 10 (mandatory)
- Boot time
- Disable arbitration
- Extend header
- Cluster size
- Extend ACK timeout

The general procedure for installing jumpers is as follows:

1. Open the rear cabinet door and the I/O bulkhead door. Use a flashlight for best visibility.
2. Find the XMI backplane slot corresponding to the CIXCD module. The internal cables are connected to the pins on the leftmost section of the module as seen from the rear. The jumpers are installed on the pins of the rightmost segment of the module.
3. Install jumpers between backplane pins to set the desired module parameters.
4. Close the I/O bulkhead door and the cabinet door.

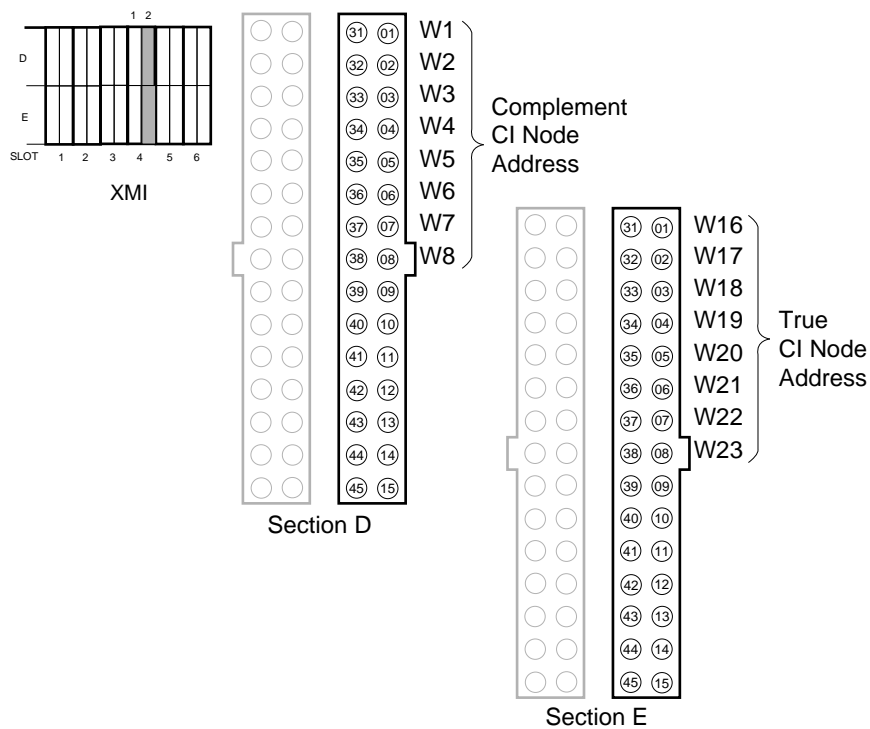
For more information:

CIXCD Interface User Guide

5.2.1 Setting the Cluster Node Address (Mandatory)

The CI port address is obtained from the CIXCD port adapter module's backplane slot, with both the CI port address and its complement configured exactly the same. To configure the jumpers for the port address, see Table 5-1 and Table 5-2.

Figure 5-3 Jumper Locations for CI Port Address



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Table 5-1 CI Port True Address

CI Node Addr (10)	W16 E1/31	W17 E2/32	W18 E3/33	W19 E4/34	W20 E5/35	W21 E6/36	W22 E7/37	W23 E8/38
0	OUT	OUT	OUT	OUT	OUT	OUT	OUT	OUT
1	OUT	OUT	OUT	OUT	OUT	OUT	OUT	IN
2	OUT	OUT	OUT	OUT	OUT	OUT	IN	OUT
.								
.								
.								
223	IN	IN	OUT	IN	IN	IN	IN	IN

Table 5-2 CI Port Complement Address

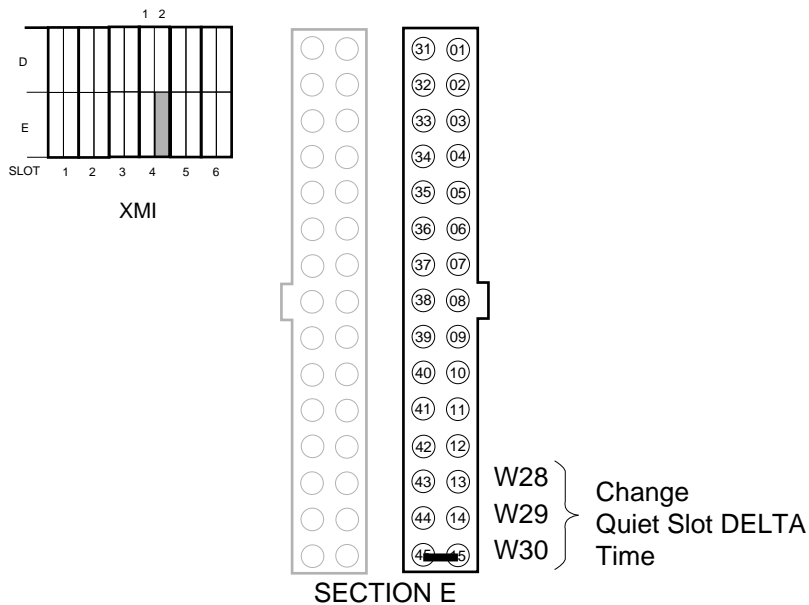
CI Node Addr (10)	W1 D1/31	W2 D2/32	W3 D3/33	W4 D4/34	W5 D5/35	W6 D6/36	W7 D7/37	W8 D8/38
0	OUT	OUT	OUT	OUT	OUT	OUT	OUT	OUT
1	OUT	OUT	OUT	OUT	OUT	OUT	OUT	IN
2	OUT	OUT	OUT	OUT	OUT	OUT	IN	OUT
.								
.								
.								
223	IN	IN	OUT	IN	IN	IN	IN	IN

NOTE: CI node addresses 224–255 are reserved for Digital.

5.2.2 Verifying Quiet Slot DELTA Time = 10 (Mandatory)

The Quiet Slot DELTA Time must be set to 10. Check the backplane at segment E. Jumper these pins if they are not already jumpered. These bits force the LINK module to increase the Quiet Slot DELTA Time. See Table 5-3.

Figure 5-4 Set Quiet Slot DELTA Time Jumpers



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NOTE: The Quiet Slot DELTA Time must be set to 10 on all systems in a cluster when any one system uses a CIXCD adapter.

For new systems just being installed, manufacturing should have jumpered pins E45 and E15 (see Figure 5-4). Check the backplane at segment E. Jumper these pins if they are not already jumpered.

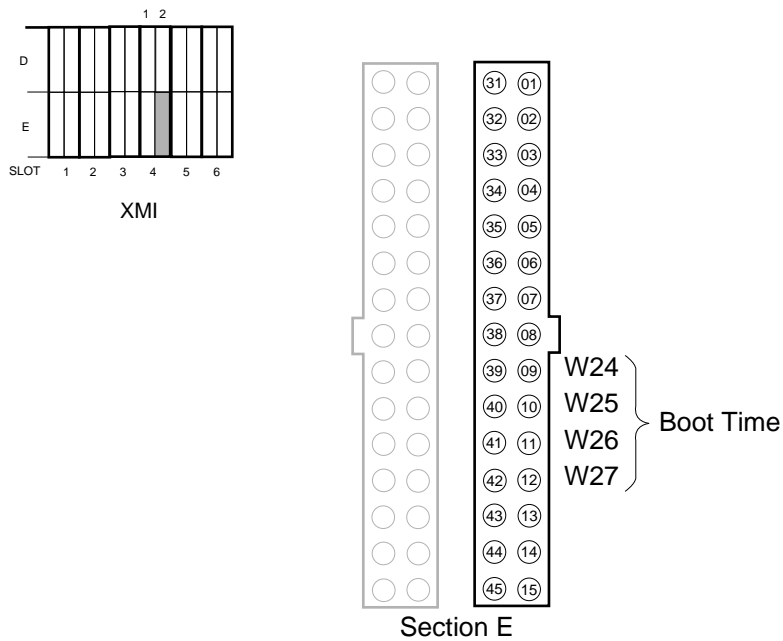
Table 5-3 Quiet Slot DELTA Time Backplane Jumpers

Quiet Slot Count	W28 E13/43	W29 E14/44	W30 E15/45
7	OUT	OUT	OUT
10	OUT	OUT	IN
Reserved	OUT	IN	OUT
Reserved	OUT	IN	IN
Reserved	IN	OUT	OUT
Reserved	IN	OUT	IN
Reserved	IN	IN	OUT
Programmable	IN	IN	IN

5.2.3 Setting Boot Time (Optional)

Boot time is the length of time the port waits after power-up to exit the UNINIT state. See Table 5-4. The default setting has all jumpers set to out, with 1500 seconds as the boot time.

Figure 5-5 Jumper Locations for Boot Time



BXB-0080-92

Table 5-4 Boot Time Backplane Jumpers

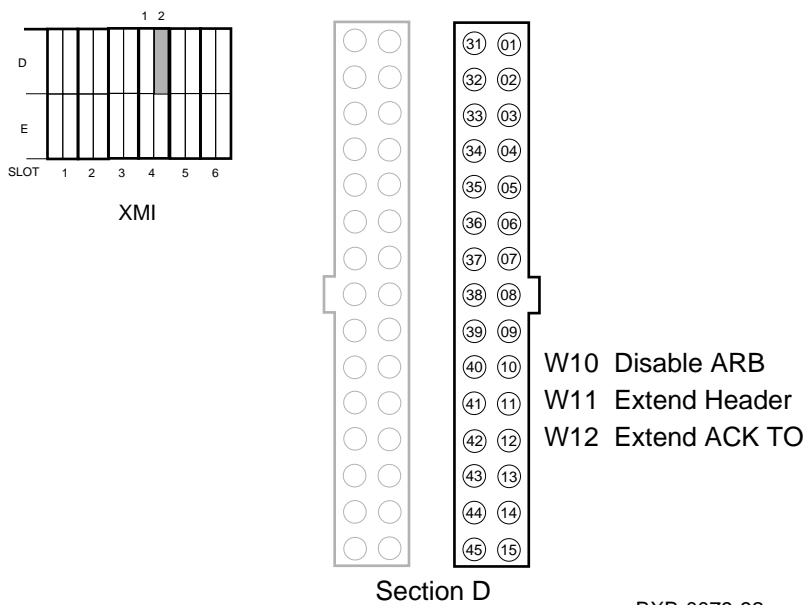
Time (seconds)	W24 E9/39	W25 E10/40	W26 E11/41	W27 E12/42
1500	OUT	OUT	OUT	OUT
1400	OUT	OUT	OUT	IN
1300	OUT	OUT	IN	OUT
1200	OUT	OUT	IN	IN
1100	OUT	IN	OUT	OUT
1000	OUT	IN	OUT	IN
0900	OUT	IN	IN	OUT
0800	OUT	IN	IN	IN
0700	IN	OUT	OUT	OUT
0600	IN	OUT	OUT	IN
0500	IN	OUT	IN	OUT
0400	IN	OUT	IN	IN
0300	IN	IN	OUT	OUT
0200	IN	IN	OUT	IN
0100	IN	IN	IN	OUT
0000	IN	IN	IN	IN

For more information:
HSC Installation Manual

5.2.4 Setting Extend Header, Extend ACK Timeout, and Disable Arbitration (Optional)

Each of these parameters is set by the absence or presence of a single jumper. The specific jumpers are detailed in this module.

Figure 5-6 Jumper Pins for Extend Header, Extend ACK Timeout, and Disable Arbitration



Extend Header Selection

Jumper W11 (D11/41) controls the extend header bit, which when set, allows the LINK module to extend the number of bit-synchronous characters in the header.

Jumper OUT = Normal header (default)
Jumper IN = Extended header

Extend ACK Timeout Selection

The extend ACK timeout bit forces the LINK module to increase the timeout period for an ACK return. The jumper representing this bit is W12 (D12/42).

Jumper OUT = Short timeout (default)
Jumper IN = Long timeout

Disable Arbitration Selection

The disable arbitration selection bit when set, defeats the normal arbitration sequence and allows the LINK module to transmit after waiting only one basic Quiet Slot DELTA Time. The jumper that controls this bit is W10 (D10/40).

Jumper OUT = Normal CI arbitration (default)
Jumper IN = Disable normal CI arbitration

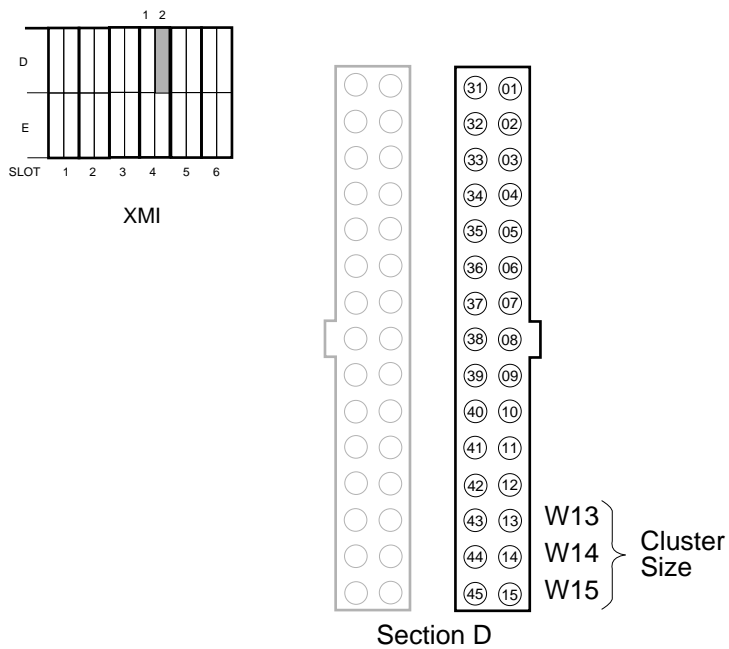
For more information:

HSC Installation Manual

5.2.5 Setting Cluster Size (Optional)

The cluster size bits cause the arbitration logic to arbitrate for more than 16 nodes (which is the default). See Table 5-5.

Figure 5-7 Cluster Size Jumpers



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Table 5-5 Cluster Size Backplane Jumpers

Node Count (decimal)	W13 E13/43	W14 E14/44	W15 E15/45
16	OUT	OUT	OUT
32	OUT	OUT	IN
64	OUT	IN	OUT
128	OUT	IN	IN
224	IN	OUT	OUT
Reserved	IN	OUT	IN
Reserved	IN	IN	OUT
Reserved	IN	IN	IN

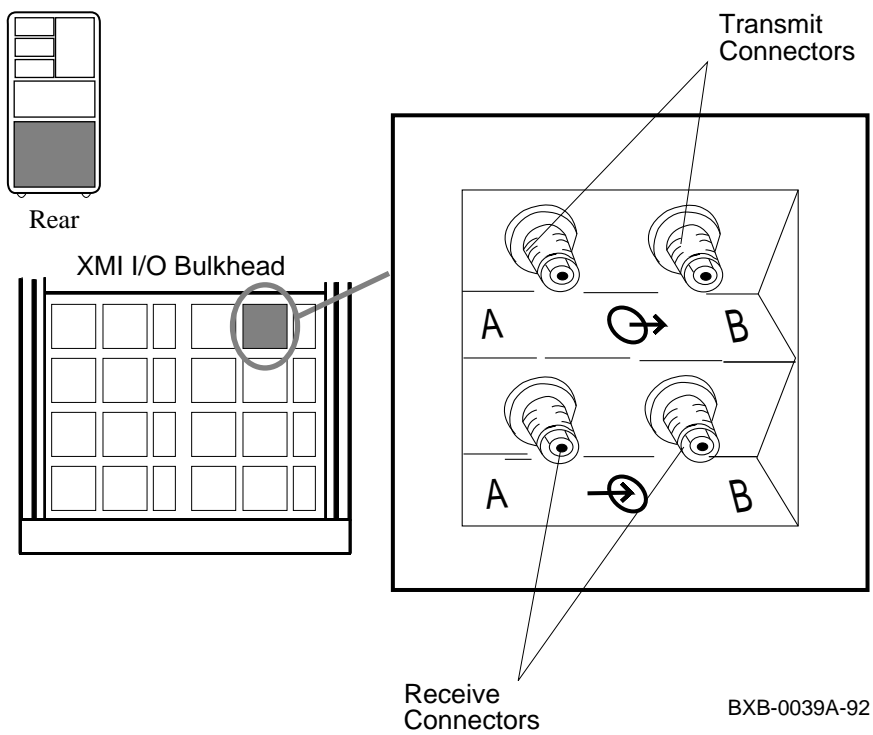
For more information:

HSC Installation Manual

5.3 Cabling the System to a Star Coupler

Attach two pairs of BNCIA cables to the XMI I/O panel for the OpenVMS cluster connection. Figure 5-8 shows the connectors on the OpenVMS cluster port.

Figure 5-8 OpenVMS Cluster Port Connectors



At the rear of the system cabinet:

1. Open the door.
2. Attach the cables to the OpenVMS cluster port by hand. Screw the TNC type connectors into the receptacles and label the cables.
3. Route the cables to the SC008.

BNCIA cables can be ordered in these lengths:

- BNCIA-10 10 m (32 ft)
- BNCIA-20 20 m (65 ft)
- BNCIA-45 45 m (145 ft)

For more information:

SC008 Star Coupler User's Guide

Chapter 6

Powering Up the System

This chapter provides an overview of the power-up procedure for the system. The AlphaServer 8400 can be powered by single-phase or three-phase AC power.

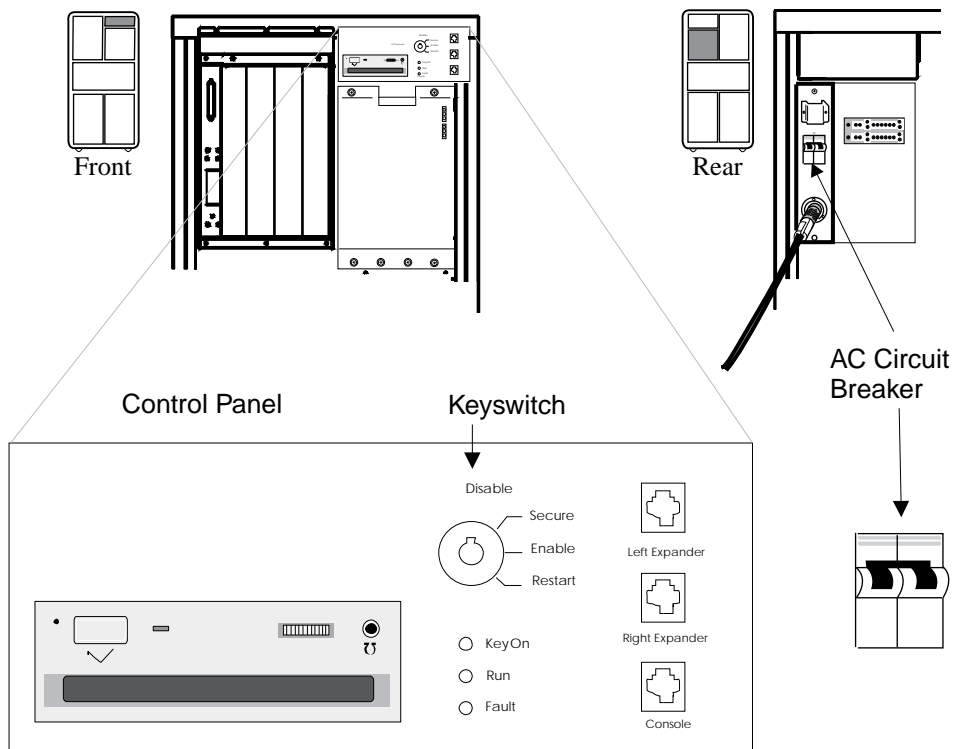
Sections include:

- For single-phase power
 - Prepare to Check the AC Power
 - Measure the AC Power
 - Turn the Power On and Check Indicators
- For three-phase power
 - Prepare to Check the AC Power
 - Measure the AC Power
 - Turn the Power On and Check Indicators

6.1 Prepare to Check the Single-Phase AC Power

As a preliminary step before checking the AC power, make sure that the power cord is not plugged in and that the breaker switch is off.

Figure 6-1 Circuit Breaker for Single-Phase AC Power



BX-0440D-95

1. At this point, the AC power cord should still be unplugged.
2. Pull down the circuit breaker handle on the AC input box (see Figure 6-1).
3. At the control panel, make sure the keyswitch is in the Disable position.

The circuit breaker controls power to the system. For normal operation, the circuit breaker handle must be in the on or up position. To shut the circuit breaker off, push the handle down.

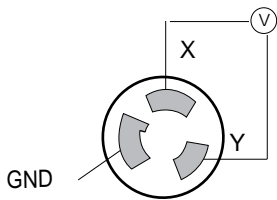
For safety current overload causes the circuit breaker to trip to the off position removing all power from the system.

6.2 Measure the Single-Phase AC Power

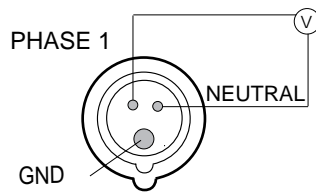
With a digital multimeter, check the AC power supplied at the receptacle at the installation site. There are two types of receptacle; one for Europe and the other for other parts of the world.

Figure 6-2 Measuring System Power

202/208 V NOMINAL (30A)
U.S. & Japanese Version
NEMA L6-30R (50 - 60Hz)



230 V NOMINAL (32 A)
IEC 309 Type (50 - 60Hz)



BX-0441A-94

1. Check that the receptacle provided is correct. This should have been done during site preparation.
2. Using a voltmeter, measure the voltages between each line as shown in Figure 6-2. Verify that the voltages are within the range specified in Table 6-1. If the voltages are out of range, contact an electrician.
3. Plug the power cord into the receptacle.

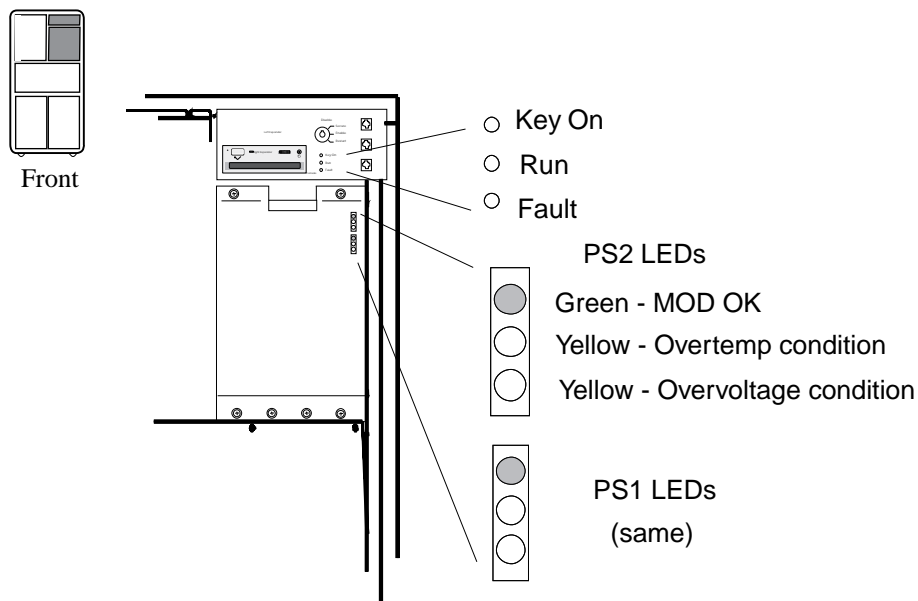
Table 6-1 AC Input Voltage Specifications

Voltage Measurement	208V Nominal	220/240V Nominal
line to line	208	220–240
line to ground	120	220–240
neutral to ground	NA	0

6.3 Turn the Power On and Check Indicators on Single-Phase Power

Power up the system by pushing up the circuit breaker handle on the AC input box. Place the keyswitch in the Enable position; then monitor the state of the system as it is powering up.

Figure 6-3 CCL and Control Panel LEDs for Single-Phase Power



BX0442C-94

1. Turn the power on by pushing the circuit breaker handle up (see Figure 6-1).
2. Go to the front of the cabinet and check that the green power regulator LED(s) are blinking.
3. Place the control panel keyswitch in the Enable position. The following should occur (see Figure 6-3):
 - a. The yellow Fault indicator on the control panel blinks indicating power sequencing is taking place.
 - b. The blower turns on.
 - c. The yellow Fault indicator stays on continuously for a short time indicating self-test is taking place. Module self-test LEDs light as described in Section 7.1 and a self-test console display appears on the console terminal as described in Section 7.2. The console prompt appears at the end of a successful self-test display. The yellow Fault indicator goes out when self-test passes for all modules in the system.

Go to the rear of the cabinet and check the CCL LEDs (see Figure 6-6).

The cabinet control logic (CCL) module has four LEDs that are visible through a shield slot when the rear door is opened. These LEDs verify that the enable signals have been sent to the four PIU power regulators. The LEDs are numbered one to four.

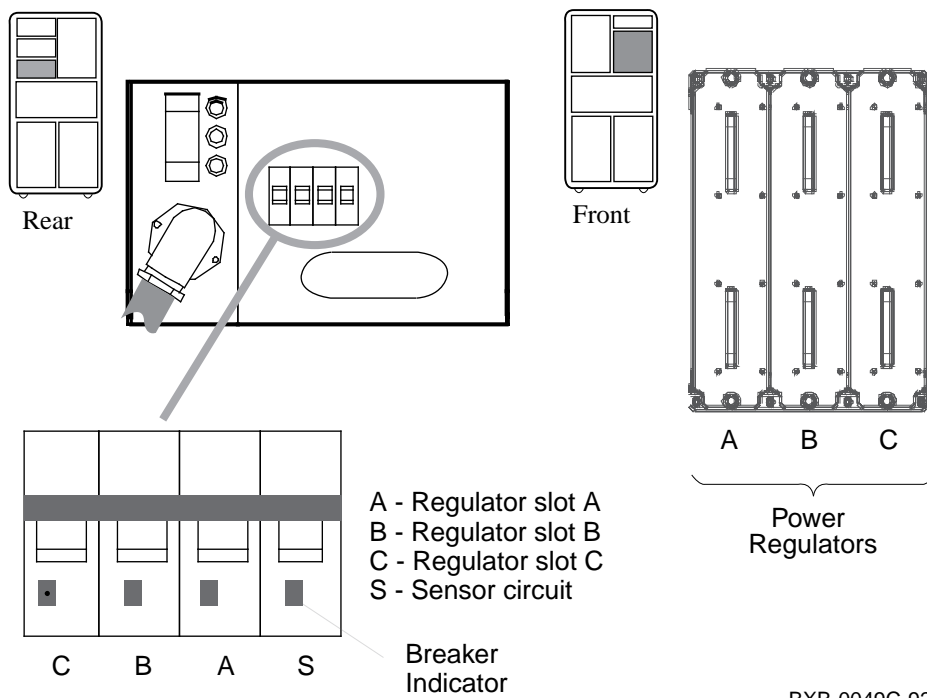
The LEDs are lit if a PIU is present and power sequencing has been completed. If a LED is not lit, the PIU is not present, the PIU is not cabled correctly, or the CCL module has not enabled the PIU. Turn on the power switches on the individual PIUs as needed.

The CCL module also has a power LED that lights when the circuit breaker is turned on; the LED indicates that 5 VDC is present on the CCL module.

6.4 Prepare to Check the Three-Phase AC Power

As a preliminary step before checking the AC power, make sure that the power cord is not plugged in and that the breaker switch is off.

Figure 6-4 Circuit Breaker



BXB-0049C-92

1. At this point, the AC power cord should still be unplugged.
2. Pull down the circuit breaker handle on the AC input box (see Figure 6-1).
3. At the control panel, make sure the keyswitch is in the Disable position.

The circuit breaker controls power to the system. For normal operation, the circuit breaker must be in the on position, in which the handle is pushed up. To shut the circuit breaker off, push the handle down.

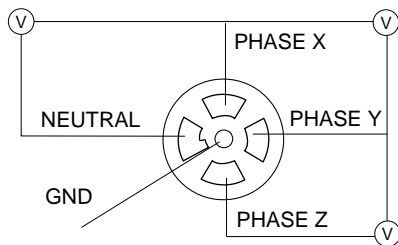
Current overload causes the circuit breaker to trip to the off position, so that power to the system is turned off.

6.5 Measure the Three-Phase AC Power

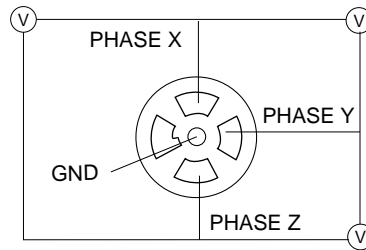
With a digital multimeter, check the AC power supplied at the receptacle at the installation site.

Figure 6-5 Measuring System Power

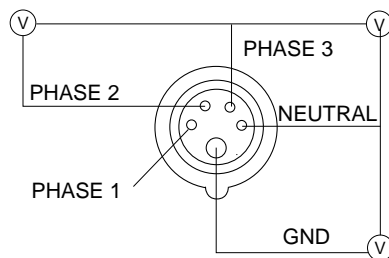
A 50-60 Hz (120/208 V NOMINAL)
NEMA L21-30R



B 50-60 Hz (202 V NOMINAL)
NEMA L21-30R



C 50-60 Hz (380-415 V NOMINAL)
IEC 309 TYPE



BXB-0040-92

1. Check that the receptacle provided is correct. This should have been done during site preparation.
2. Using a voltmeter, measure the voltages between all three phases and each phase to neutral (see Figure 6-5). Verify that the voltages are within the range specified in Table 6-2. If the voltages are out of range, contact an electrician.
3. Plug the power cord into the receptacle.

Table 6-2 AC Input Voltage Specifications

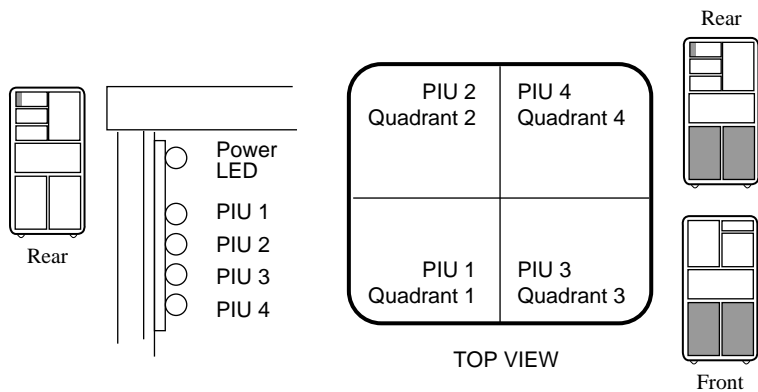
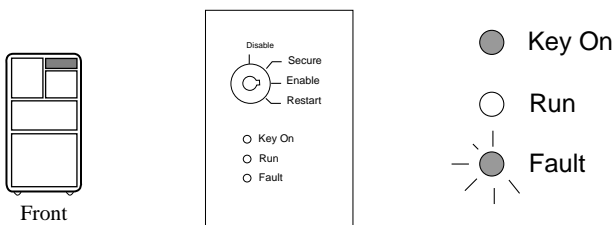
Voltage Measurement	208V A Nominal	202V B Nominal	380V C Nominal	415V C Nominal
phase–phase	180–220V	180–220V	331–407V	360–443V
phase–neutral	104–128V	None	190–235V	208–256V

NOTE: In some installations, power regulators must be balanced so the AC power distribution system will not be overloaded. Balancing means connecting AC power so that the loads from the regulators are evenly distributed among the AC phases. This ensures that any one phase does not draw excessive power. Power regulators may be moved to different slots to balance the load among AC phases.

6.6 Turn the Power On and Check Indicators on Three-Phase Power

Power up the system by pushing up the circuit breaker handle on the AC input box. Place the keyswitch in the Enable position; then monitor the state of the system as it is powering up.

Figure 6-6 CCL and Control Panel LEDs



BXB-0044F-92

1. Turn the power on by pushing the circuit breaker handle up.
2. Go to the front of the cabinet and check that the green power regulator LED(s) are blinking.
3. Place the control panel keyswitch in the Enable position. The following should occur (see Figure 6-6):
 - a. The yellow Fault indicator on the control panel blinks indicating power sequencing is taking place.
 - b. The blower turns on.
 - c. The yellow Fault indicator stays on continuously for a short time indicating self-test is taking place. Module self-test LEDs light as described in Section 7.1 and a self-test console display appears on the console terminal as described in Section 7.2. The console prompt appears at the end of a successful self-test display. The yellow Fault indicator goes out when self-test passes for all modules in the system.

Go to the rear of the cabinet and check the CCL LEDs (see Figure 6-6).

The cabinet control logic (CCL) module has four LEDs that are visible through a shield slot when the rear door is opened. These LEDs verify that the enable signals have been sent to the four PIU power regulators. The LEDs are numbered one to four.

The LEDs are lit if a PIU is present and power sequencing has been completed. If a LED is not lit, the PIU is not present, the PIU is not cabled correctly, or the CCL module has not enabled the PIU. Note that when an XMI, which occupies two quadrants, is present only one PIU LED lights; the one that indicates enabling signals to the card cage.

The CCL module also has a power LED that lights when the circuit breaker is turned on; the LED indicates that 5 VDC is present on the CCL module.

Chapter 7

System Self-Test

On power-up, the system runs an automatic self-test. Self-test results are indicated by module LEDs, the self-test display at the console terminal, and the Fault light on the control panel.

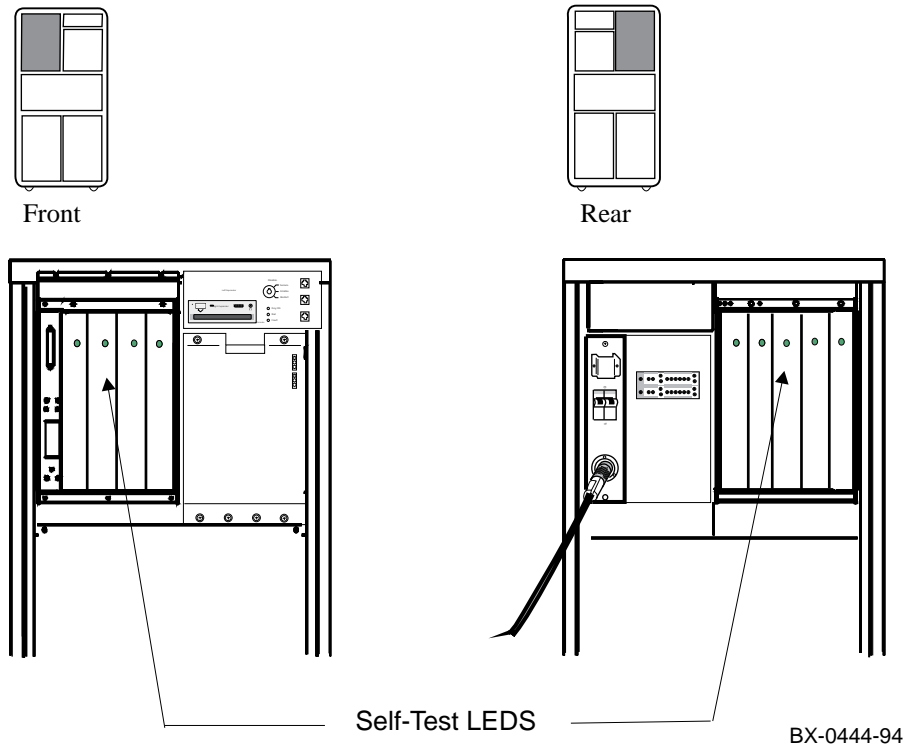
Sections in this chapter include:

- Check Module Status LEDs
- Check the Self-Test Display

7.1 Check Module Status LEDs

Check the system module status LEDs for self-test success. If the LEDs indicate failure, refer to the *Operations Manual* for more information.

Figure 7-1 Powering Up and Checking the LEDs



Processor and memory modules have a green LED that lights when the module passes or completes self-test. These LEDs can be viewed through holes in the shield of the module enclosure from the front and rear of the cabinet when the doors are open (see Figure 7-1). I/O modules have different LED patterns as shown in Table 7-1. The I/O module LEDs can also be seen through holes in the PIU enclosure shield. The DWLMA (XMI) has a yellow self-test LED and four others which after successful start-up are all lit. The DWLAA (Futurebus+) has two LEDs both of which are lit after successful start-up: the yellow one is the self-test LED. The DWLPA (PCI) has four green LEDs three of which are lit when self-test is passed. The fourth LED lights when there is a hose error.

Table 7-1 LEDs After Self-Test

Module	Self-Test Passed	Self-Test Failed
Processor	Green ON	Green OFF ¹
Memory	Green ON	Green OFF or ON ²
I/O (KFTIA, KFTHA)	Green ON	Green OFF
DWLMA	Yellow ON Green ON Green ON Red OFF Red OFF	Yellow OFF
DWLAA	Yellow OFF Green ON	Yellow ON Green ON
DWLPA	Green ON Green ON Green ON Green Off	Green ON Green OFF Green ON Green Off or ON
<p>¹The green LED on the processor module indicates that a single CPU chip on a uni-processor module passed self-test or both CPU chips on a dual-processor module passed. The LED will be OFF if there is any failure on the module though it may be configured into the system.</p> <p>²The green LED on the memory module indicates that self-test completed, not passed.</p>		

7.2 Check the Self-Test Display

Self-test results are displayed on the console terminal. The pass (+) or fail (-) status of each module is indicated.

Example 7-1 Self-Test Results

```

F E D C B A 9 8 7 6 5 4 3 2 1 0 NODE # ❶
      A M . . . . . P P TYP ❷
      O + . . . . . ++ -+ ST1 ❸
      . . . . . EE EB BPD ❹
      O + . . . . . ++ -+ ST2 ❸
      . . . . . EE EB BPD
      + + . . . . . ++ -+ ST3 ❸
      . . . . . EE EB BPD

      . + + + . + + + C0 PCI +❺
      + . . . . + . . . . + + + C1 XMI +

      . A0 . . . . . ILV
      .128 . . . . . 128MB
AlphaServer 8400 Console V1.0 SR0M V1.0 APR 1 1995 00:00:00

```


❶ The NODE # line lists the (hexadecimal) node numbers on the TLSB and I/O buses. Node numbers and slot numbers are identical. Nodes 0 through 3 reflect the right-to-left position of the TLSB slots as viewed from the front of the cabinet. Nodes 4 through 8 reflect the right-to-left position of the TLSB slots as viewed from the rear of the cabinet. XMI entries use nodes 1 - E, PCI entries use nodes 0 - B except for the internal PCI on the KFTIA which uses nodes 0 - 7, and Futurebus+ entries use 1 - A.

❷ The TYP line indicates the type of module at each TLSB node:

- An adapter: the I/O port module (A) is a KFTIA or a KFTHA
- A memory module (M)
- A processor (P)

A period (.) indicates the slot is empty or the module is not reporting.

❸ The ST1–ST3 lines show the results of the testing. The self-test fail bit in the TLCNR register of each module contains this information. For the KN7CC dual processor one CPU may pass, another fail. Entries are:

- + (pass)
- – (fail)
- o (does not apply). In this example, the I/O port module has "o" because there is no module-resident self-test.

❹ The BPD line indicates boot processor designation. The results on this line indicate:

- The boot processor (B)
- Processors eligible to become the boot processor (E)
- Processors ineligible to become the boot processor (D)

The BPD line is printed three times. After the first determination of the boot processor, the processors go through two more rounds of testing. Since it is possible for a processor to pass self-test at line ST1 and fail ST2 or ST3 testing, the processors again determine the boot processor following each round of tests.

❺ The I/O channel line C0 indicates the state of the internal PCI I/O channel on the KFTIA and shows that devices at nodes 0, 1, 2, 4, 5, and 6 all passed self-test. Line C1 indicates the self-test results for the DWLMA and XMI adapters at nodes 1, 2, 3, 8, and D. Had one or more KFTHAs been present, channel lines C0 through C3 would have been shown for each.

Chapter 8

Diagnostics and Utilities

After the system passes self-test, you must verify proper system operation. First verify the presence of SCSI devices, then verify the boot device load path. After the path is verified, you can boot the operating system and use operating system-based test programs (such as VET) to complete system verification.

The system is tested automatically during power-up; no off-line loadable diagnostics are required or provided. The Loadable Firmware Update (LFU) Utility is currently the only supported off-line loadable program. It is used to update firmware on any module residing on the system that has updatable firmware.

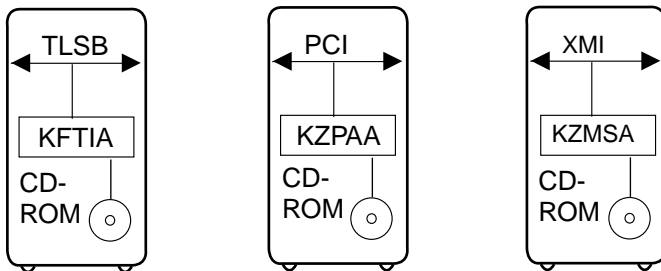
Sections in this chapter include:

- Console Load Devices
- Verification Overview
- Diagnostics Overview
- Run System Self-Test
- Show Commands for Installation
- Verify SCSI Devices
- If Necessary, Run the RAID Configuration Utility
- If Necessary, Run the EISA Configuration Utility
- Booting Factory Installed Software
- Booting OpenVMS from a CD-ROM
- Booting Digital UNIX from a CD-ROM
- Set Commands for Booting
- Booting LFU with a CD-ROM
- Running the System Exerciser VET

8.1 Console Load Devices

The compact disk (CD) drive is the in-cabinet console load device. During system installation the console load device is used to load software and boot various utilities like the Loadable Firmware Update (LFU) Utility.

Figure 8-1 Console Load Device Configurations



BX-0410-94

The console load device is used for:

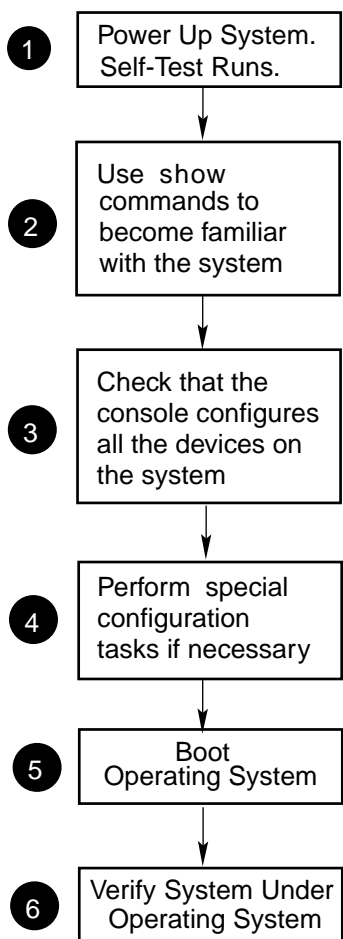
- Installing or updating software
- Loading a backup utility program
- Interchanging user data
- Updating module firmware

The compact disk (CD) drive is the console load device for this system. It is installed in the system cabinet and used to access software and online documentation. The CD-ROM is likely to be installed through a KFTIA. Two other configurations are possible and are shown in Figure 8-1.

8.2 Verification Overview

The following process is used to verify the system after installation.

Figure 8-2 Verification Procedure



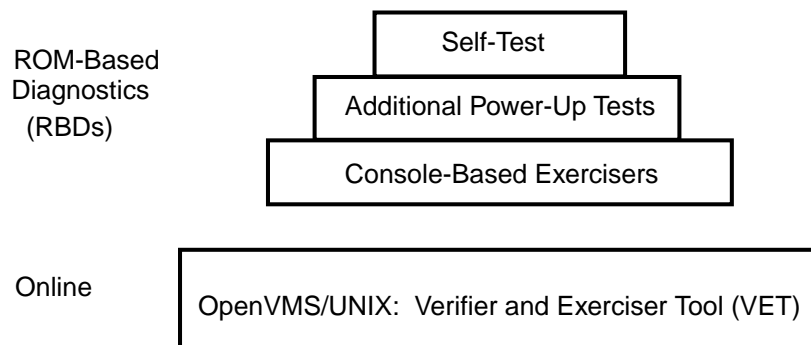
BX-0490-94

- ❶ When the system powers up, self-test runs. Verify that all tests have passed by checking the results in the self-test display.
- ❷ Use the **show configuration** and **show device** commands to determine the self-test status for the I/O adapters and devices. Identify the load device. Note what the console configures.
- ❸ Check that the console configured all the hardware on the system.
- ❹ Run configuration utilities if necessary.
- ❺ Boot the factory installed operating system.
- ❻ Verify the system under the installed operating system.

8.3 Diagnostics Overview

Self-tests and additional ROM-based diagnostics are run automatically at power-up. Console-based exercisers can be run from the console in User Mode. The system Verifier and Exerciser Tool is run under the operating system.

Figure 8-3 Diagnostic Overview



BXB-0065A-94

Table 8-1 lists diagnostics provided. Tests in the first two groups run at power-up. The console-based exercisers can be run from the console.

Table 8-1 Diagnostics

Test Group	Test
Self-test	CPU self-test
	Memory array self-test
	XMI device adapter self-test
	Futurebus+ adapter self-test ¹
	PCI adapter self-test ¹
	Device peripheral self-test
	Power subassembly self-test
Additional power-up tests	CPU/Memory interaction tests
	Multiprocessor tests
	KFTIA and KFTHA tests
	PCI tests
	DWLMA tests
Console-based exerciser	Cache/Memory exerciser
	Disk exerciser ²
	Floating-point exerciser
	Network exerciser ²
¹ Self-test on Futurebus+ and PCI adapters is optional. If the device has and performs self-tests, they are reported by the console. ² Run in internal loopback (at I/O adapter) mode only.	

NOTE: To run console-based diagnostics and utilities using the **set host** and **test** commands, see the Service Manual.

8.4 Run System Self-Test

Gather adapter self-test and address information using self-test results as shown in Example 8-1.

Example 8-1 Self-Test Display

```

F E D C B A 9 8 7 6 5 4 3 2 1 0 NODE #
      A A M . . . M M P TYP
      O O + . . . + + -+ ST1 ❶
      . . . . . . . . EB BPD
      O O + . . . + + -+ ST2 ❷
      . . . . . . . . EB BPD
      + + + . . . + + -+ ST3 ❷
      . . . . . . . . EB BPD
      . + + + + + + + C0 PCI +❸
      . + + . . . + . . . + C1 PCI +
      . . . . . . . . EISA +
      + . . + . . + . . + + C4 XMI +
      . . . . . . . . C5
      . . . . . . . . C6
      . . . . . . . . C7
      . . A1 . . . A0 B0 . ILV
      . .128 . . .128128 . 384MB
AlphaServer 8400 Console V1.0,SROM V1.0 Apr 1 1995 00:00:00

```

- ❶ Check the ST1 line in the self-test results to see that all CPU and memory modules passed self-test. Note that on a system with dual-processor modules, failing processors are disabled and appear in the ST1 line. Were both processors to fail, the module would not appear on the ST1 line. There is minimal TLSB traffic during these tests.
- ❷ Check the ST2 line to see that memory and the CPU(s) passed their interaction tests and check the ST3 lines to see that all three types of modules on the TLSB passed their tests.
- ❸ Check the C0 through Cn lines to determine which modules on whatever I/O subsystem is present passed self-test. The example shows both PCI and XMI I/O subsystems on a system that has a KFTIA and a KFTHA.

Check that all installed options show up on the self-test display.

NOTE: If any module is badly broken, the console may not get a response or be able to read whether a device passed self-test. Under such conditions, self-test does not indicate a failure but instead indicates that the slot is empty.

8.5 Show Commands for Installation

Use show commands to obtain information on the system configuration.

Example 8-2 Show Configuration

P01>>> show configuration ❶

	Name	Type	Rev	Mnemonic
TLSB				
1++	KN7CC-AB	8014	0000	kn7cc-ab0
4+	MS7CC	5000	0000	ms7cc0
5+	MS7CC	5000	0000	ms7cc1
6+	MS7CC	5000	0000	ms7cc2
7+	KFTHA	2000	0002	kftha0
8+	KFTIA	2020	0B01	kftia0
C0	Internal PCI connected to kftia0			pci0
0+	ISP1020	10201077	0001	isp0
1+	ISP1020	10201077	0001	isp1
2+	DECchip 21040-AA	21011	0023	tulip0
3+	DEC PCI FDDI	F1011	0000	pfi0
4+	ISP1020	10201077	0001	isp2
5+	ISP1020	10201077	0001	isp3
6+	DECchip 21040-AA	21011	0023	tulip1
C1	PCI connected to kftia0			pci1
0+	SIO	4828086	0003	sio0
5+	DECchip 21040-AA	21011	0023	tulip3
9+	ISP1020	10201077	0001	isp4
B+	DAC960	11069	0000	dac0
	Controllers on SIO			sio0
0+	DECchip 21040-AA	21011	0000	tulip2
1+	FLOPPY	2	0000	floppy0
2+	KBD	3	0000	kbd0
3+	MOUSE	4	0000	mouse0
	EISA connected to pci1 through sio0			eisa0
C4	XMI connected to kftha0			xmi0
3+	DEMNA	C03	0803	demna0
4+	CIXCD	C2F	0311	cixcd0
5+	KZMSA	C36	5156	kzmsa0
8+	DWLMA	102A	0104	dwlma0
E+	KFMSB	C31	0110	kfmsb0

Example 8-3 Show Device

```
P01>>> show device ❷
polling for units on isp0, slot 0, bus 0, hose0...
polling for units on isp1, slot 1, bus 0, hose0...
polling for units on isp2, slot 4, bus 0, hose0...
polling for units on isp3, slot 5, bus 0, hose0...
dkd100.1.0.5.0 DKD100                RRD44 0000
polling for units on floppy0, slot 0, bus 1, hose1...
dva0.0.0.1100.1 DVA0                 RX26
polling for units on isp4, slot 9, bus 0, hose1...
polling for units on cixcd0, slot 4, bus 0, xmi0...
New node HSC011 HSC V835 HS70 cixcd_a.11.0.4.4
dua1.11.0.4.4 $1$DUA1 ()             RZ26L 440C
dua3.11.0.4.4 $1$DUA3 ()             RZ26L 440C
. . .
dua114.11.0.4.4 $1$DUA114 ()         RZ26L 440C
polling for units on kzmsa0, slot 5, bus 0, xmi0...
dkg100.1.1.5.4 DKG100                RZ26L 440C
dkg200.2.1.5.4 DKG200                RZ26L 440C
polling for units on kfmsb0, slot 14, bus 0, xmi0...
New node R4BDGP RFXX T329 RF73 kfmsb_d.1.1.14.4 1
New node R1HBEC RFXX V254 RF31 kfmsb_d.2.1.14.4 2
dud1.1.1.14.4 DID1                   RF73
dud2.2.1.14.4 DID2                   RF31
P01>>>
```

- ❶ Use the **show configuration** command to see a listing of the modules in the system. This command shows the module TLSB and XMI slot number, module name, module type, revision, mnemonic, and if self-test passed.
- ❷ The **show device** command displays information about each I/O device. Polling checks all I/O buses for device configurations. The next line contains the console device name, the name of the device given by the device controller, and the device type.
- ❸ The **show network** command, not shown in the example, displays information about network connections.
- ❹ The **show power** command, also not shown, displays information about the status of three-phase power only.

8.6 Verify SCSI Devices

8.6.1 Check SCSI Devices Using Console Commands

To verify SCSI devices, issue the console command `show device`. Check the output against the physical SBBs (storage building blocks). Nodes are defined by the physical position of the SBB and do not have to be set.

Example 8-4 Checking SCSI Devices

```

Initializing...
F E D C B A 9 8 7 6 5 4 3 2 1 0 NODE #
      A A M . . . M M P TYP
      o o + . . . + + ++ ST1 ①
      . . . . . . . . EB BPD
      o o + . . . + + ++ ST2 ②
      . . . . . . . . EB BPD
      + + + . . . + + ++ ST3 ②
      . . . . . . . . EB BPD
      . . . . . + + + + + C0 PCI + ③
      . + + . . . + . . . + C1 PCI +
      . . . . . . . . . . EISA +
      + . + . . + . . + + + . C4 XMI +
      . . . . . . . . . . . . . C5
      . . . . . . . . . . . . . C6
      . . . . . . . . . . . . . C7
      . . A1 . . . A0 B0 . ILV
      . .128 . . .128128 . 384MB
AlphaServer 8400 Console V1.0,SROM V1.0 Apr 1 1995 00:00:00
P01>>> show device

polling for units on kzmsa0, slot 13, xmi0...
dka0.0.0.13.0   DKA0           ②           RZ26L  440C  ③
dka100.1.0.13.0 DKA100          RZ26L  440C
dka200.2.0.13.0 DKA200          RZ26L  440C
dka300.3.0.13.0 DKA300          RZ26L  440C
dka400.4.0.13.0 DKA400          RZ26L  440C
dka500.5.0.13.0 DKA500          RZ26L  440C
dka600.6.0.13.0 DKA600          RZ26L  440C
dkb0.0.1.13.0   DKB0           ②           RZ26L  440C
dkb100.1.1.13.0 DKB100          RZ26L  440C
dkb200.2.1.13.0 DKB200          RZ26L  440C
dkb300.3.1.13.0 DKB300          RZ26L  440C
dkb400.4.1.13.0 DKB400          RZ26L  440C
dkb500.5.1.13.0 DKB500          RZ26L  440C
dkb600.6.1.13.0 DKB600          RZ26L  440C  ③
  
```

Basics:

- There are several ways to attach to SCSI devices on the AlphaServer 8400. Among them are:
 - KZMSA, an XMI adapter with two SCSI ports
 - KZPSA, a PCI adapter with a single SCSI port
 - ISP1020, a PCI chipset on the KFTIA provides four SCSI ports
- Each port has a maximum of eight nodes per bus, including the initiator or host.
- Each BA655 PIU can have one or two shelves; each modular storage shelf (BA350) has a power supply and can hold seven 3.5" SBBs (such as RZ26s or TLZ06s), two 5.25" SBBs (such as the RZ73 drives), a PCI, or a combination of these. Disks supported on the AlphaServer 8400 are the RZ26, the RZ26L, and the RZ28.
- If the two shelves in the BA655 PIU are SCSI shelves, each can be on its own bus or can be daisy-chained together, provided there are no conflicting SCSI nodes.
- The system cabinet can house a maximum of two BA655 PIUs.
- SCSI configurations are discrete within a cabinet; that is, the bus and all nodes reside within one cabinet, either the system cabinet, the expander cabinet, or a StorageWorks cabinet.

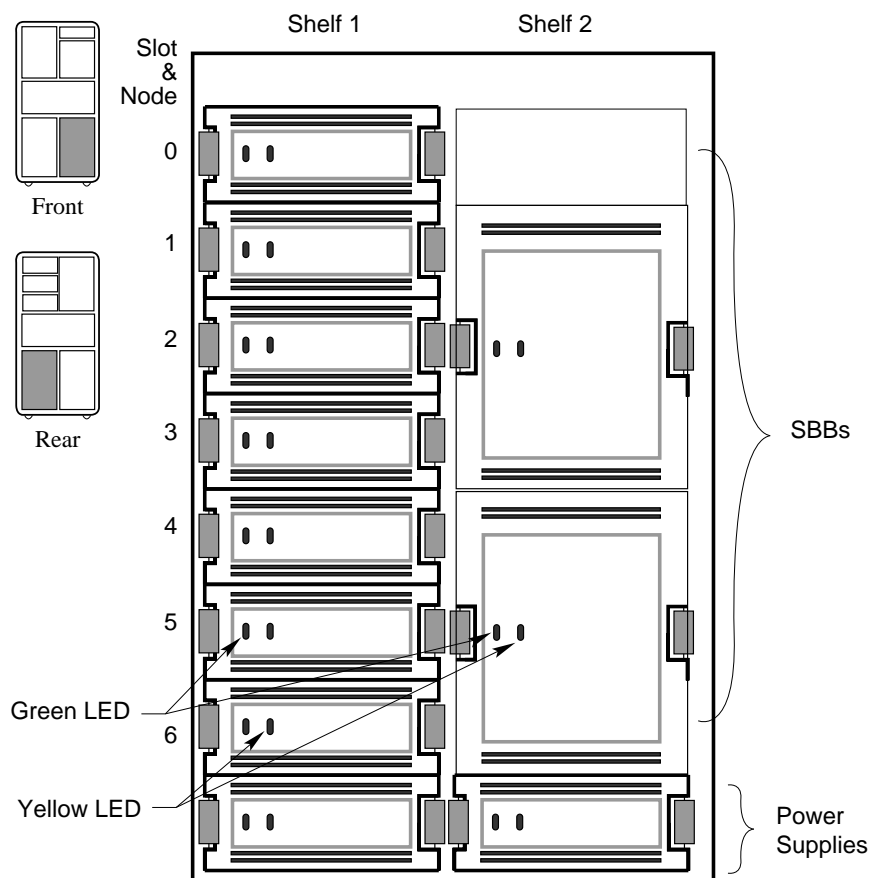
All cabling and node setting has been completed prior to shipping. To check the configuration, check self-test and issue a **show device** console command:

- ❶ The system goes through self-test. Check that the SCSI adapter(s) passed self-test.
- ❷ Issue a **show device** command. In this example, a KZMSA is in slot 13 (slot D) of the XMI that is channel 0. There are two ports off this KZMSA (see ❷). The devices from port 1 are listed first, followed by the devices from port 2.
- ❸ Each port connects to a shelf housing seven RZxx drives on one bus. All devices in this example are reporting to the console and are working. When a DWZZA is used, it occupies a StorageWorks shelf slot, but it is not a node nor is it "seen" by the console.

8.6.2 Check Console Output Against Physical Devices

Next check the output from the show device command against the physical SBBs in the BA655 PIUs.

Figure 8-4 SCSI PIU with SBBs



BXB-0362-92

Check the output from the **show device** command against the physical SBBs in the BA655 PIU. There should be a one-to-one correspondence between SBBs reporting to the console and the physical devices mounted in the PIU. Note that the node number reported by the console corresponds to the physical position of an SBB within a shelf; the slots and nodes are numbered 0 to 6, from top to bottom (see Figure 8-4).

Each SBB has two LEDs. The green LED on the left lights when the SBB is mounted and in use.

Table 8-2 SCSI SBB LED Functions

SBB	LED Condition	Green LED	Yellow LED
Disk or tape	Off	No activity	Normal
	Flashing	Activity	Spinning up or down
	On	Activity	Not used
Power supply	Off	Shelf fault	Power fault
	On	Shelf okay	Power okay

If you encounter any problems, reseal the SBBs and reissue **show device**. If you need further testing, use the **test** command. Refer to BA350 documentation if you need to reconfigure the buses.

For more information:
Service Manual
BA350 Modular Storage Shelf Subsystem Configuration Guide or User's Guide

8.7 If Necessary, Run the RAID Configuration Utility

If a KZPSC is in the system (it shows up in the console display as the DAC960), the customer may want RCU run. When the system was configured in manufacturing, default settings were used when RCU was run. Example 8-5 shows how to run RCU. See the KZ-PSC documentation for detailed information on configuring the devices. The RCU software is on a floppy and requires a KFE70.

Example 8-5 Running RCU

```
P01>>> set arc_enable on ②
```

```
P01>>> initialize ③
```

```
[console display appears]
```

```
P01>>> run rcu -p 1
```

```
④
```

```
⑤
```

The RAID Configuration Utility (RCU) need only be run if a KZPSC controller is in the system. The controller comes with its own documentation describing the utility. The controller operates in several different modes, and the customer should determine how to customize the disk farm. RCU enables those choices. Prior to running the utility, you should read the documentation and discuss what mode the customer wishes to run in. Example 8-5 shows how to run RCU.

- ❶ Place the RCU floppy in the floppy drive.
- ❷ Use the **set** command to turn on the **arc_enable** environment variable.
- ❸ **Initialize** the system to make the **set** command take effect.
- ❹ After self-test completes, enter **run rcu** to identify to the console what program to run. The **run** command defaults to the floppy as the source of the program for execution so no device need be specified.
- ❺ **-p 1** specifies that PCI1 is to be configured. See Example 8-2 for the PCI number containing the KZPSC (shown by the console as the DAC960). (In this case it is connected to a KFTIA hose.)

8.8 If Necessary, Run the EISA Configuration Utility

If the system has a KFE70, a PCI to EISA bridge, it may be necessary to run ECU, the EISA bus configuration tool. The console will tell you if this is necessary. ECU comes on a floppy.

Example 8-6 Running ECU

Power on the system ②

[console display appears]

AlphaServer 8400 Console V1.0, SR0M V1.0, Apr 1 1995 00:00:00

EISA Configuration Error - run the EISA Configuration Utility. ③

P01>>> set arc_enable on ④

P01>>> initialize ⑤

[console display appears]

P01>>> runecu ⑥

The EISA Configuration Utility (ECU) need only be run if there is a PCI to EISA bridge and EISA devices on the system. Manufacturing will have run ECU prior to shipping the system, so running it again may not be necessary. The EISA Configuration Utility comes on a floppy, has online help, and configures the EISA bus. The **arc_enable** environment variable must be on and in effect for ECU to run. There are two versions of the utility, one that runs on a graphics terminal, and another that runs on character cell terminals. Both versions are on the floppy and the console determines what kind of terminal is on the system and chooses the correct ECU version to run. Example 8-6 shows how to run ECU.

- ❶ Place the EISA Configuration Utility floppy in the floppy drive.
- ❷ Power on the system or initialize.
- ❸ After self-test, if the EISA bus is not configured, the console displays the message shown here.
- ❹ Enter the **set** command to turn on the **arc_enable** environment variable.
- ❺ **Initialize** the system to make the **set** command take effect.
- ❻ After self-test enter **runecu**, the console command to invoke ECU. The console loads ECU from the floppy drive and passes control to it.

If ECU is not run and OpenVMS is on the system and booted, OpenVMS prints the following message:

```
%SYSTEM-I-NOCONFIGDATA, IRQ Configuration data for EISA  
slot xxx was not found, please run the ECU and reboot.
```

OpenVMS continues to boot after this message and will run without EISA as a system resource.

If ECU is not run and UNIX is on the system and booted, no information messages are printed. The operating system boots but does not use any EISA resources.

8.9 Booting Factory Installed Software

The factory installs the operating system ordered by the customer. After determining that all devices are seen by the console, you will want to know where the operating system is installed and then boot it.

Example 8-7 Booting the Operating System

```
P01>>> show bootdef_dev      ❶
    bootdef_dev      dk200.2.0.2.0
P01>>> show boot_osflags    ❷
    boot_osflags      0 [for OpenVMS]
    or
    boot_osflags      a [for UNIX]
P01>>> boot                 ❸
Building FRU table.....
(boot dka200.2.0.0.0 -flags 0,0)
SRM boot identifier: scsi 0 0 0 2 200 ef00 10201077
boot adapter: isp0 rev 0 in bus slot 0 off of kftia0 in TLSB slot 8
block 0 of dka200.2.0.0.0 is a valid boot block
reading 1018 blocks from dka200.2.0.0.0
bootstrap code read in
base = 200000, image _start = 0, image_bytes = 7f400
initializing HWRPB at 2000
initializing page table at 1f2000
initializing machine state
setting affinity to the primary CPU
jumping to bootstrap code

OpenVMS Alpha Operating System, Version V6.2  ❹
```

Example 8-7 shows the OpenVMS Alpha operating system as the factory installed software. Had the Digital UNIX operating system been installed, slight variations in the output shown would occur. The callouts in the following list refer to Example 8-7.

- ❶ Enter the **show bootdef_dev** command to see what disk holds the operating system software.
- ❷ Enter the **show boot_osflags** command to see what flags have been set. If the flag set is a 0, and the operating system is OpenVMS, the operating system will come up assuming flags of 0,0. If the flag is an **a** and the operating system is Digital UNIX, the operating system will come up in multiuser mode. See the *AlphaServer 8200/8400 Operations Manual* for a complete discussion of booting.
- ❸ Enter the **boot** command.
- ❹ After booting information messages are given, the operating system banner appears.

8.10 Booting OpenVMS from a CD-ROM

This section shows a sample boot of OpenVMS from the CD drive. The first step is issuing the show device command to determine the mnemonic of the CD drive. This method of booting OpenVMS replaces standalone backup.

Example 8-8 CD-ROM OpenVMS Boot

```
P01>>> show device ❶
polling for units on kzmsa0, slot 2, xmi0...
dka100.1.0.2.0      dka100          RRD44
P01>>> boot -flags 0,0 dka100.1.0.2.0 ❷

Booting... ❸
Connecting to boot device dka100
initializing HWRPB at 2000
initializing page table at 1ee000
initializing machine state
jumping to bootstrap at 1fa000

OpenVMS Alpha Operating System, Version V6.2 ❹
Copyright (c) 1995 Digital Equipment Corporation. All Rights Reserved.
Installing required known files...
Configuring devices...
*****
You can install or upgrade the OpenVMS Alpha operating
system or you can install or upgrade layered products that
are included on the OpenVMS Alpha operating system CD-ROM.
You can also execute DCL commands and procedures to
perform "standalone" tasks, such as backing up the system
disk.

Please choose one of the following:
  1) Install or upgrade OpenVMS Alpha Version V6.2
  2) List layered product kits that this procedure can
install
  3) Install or upgrade layered product(s)
  4) Execute DCL commands and procedures
  5) Shut down this system
Enter CHOICE or ? to repeat menu:
```


- ❶ **Show device** displays information about each I/O device. Polling checks the I/O buses for device configurations. The next line contains three columns. The first column contains the device type and unit number, node number, device channel number, node number, and I/O channel number, separated by periods. The second column displays the name of the device given by the device controller. The third column shows the device type. In this case, see Example 8-8, the CD drive is the RRD44 and its mnemonic is DKA100.
- ❷ In the **boot** command, **-flags** indicates that additional command parameters follow, **0** is the system root of the boot device, **0** is the bootstrap option, **dk** is the device code of the boot device, **a** is the boot device controller designation, and **100** specifies the hexadecimal unit number of the boot device. The **1** is the node number, **0** is the channel number, **2** is the XMI node number, and **0** is the I/O channel number.
- ❸ The system boots OpenVMS from the CD-ROM.
- ❹ The operating system banner appears.

Example 8-8 shows that several choices can be made when booting OpenVMS in this fashion. Make the appropriate choice and continue. (Note that by choosing option 4 (Execute DCL commands and procedures) you can back up your system disk. Standalone backup is replaced by this method of booting OpenVMS.)

8.11 Booting Digital UNIX from a CD-ROM

This section shows a sample boot of Digital UNIX from the CD-ROM drive. The first step is issuing the show device command to determine the mnemonic of the CD drive.

Example 8-9 CD-ROM UNIX Boot

```
P01>>> show device ①
polling for units on kzmsa0, slot 2, xmi0...
dka100.1.0.2.0      dka100      RRD44
P01>>> boot dka100.1.0.2.0 -fl a ②
(boot dka100.1.0.2.0 -flags a) ③
SRM boot identifier: scsi 0 2 0 1 100 ef00 10201077
boot adapter: isp3 rev 0 in bus slot 5 off of kftia0 in TLSB slot 8
block 0 of dkd400.4.0.5.0 is a valid boot block
reading 16 blocks from dkd100.1.0.2.0
bootstrap code read in
base = 200000, image _start = 0, image_bytes = 2000
initializing HWRPB at 2000
initializing page table at 1f2000
initializing machine state
setting affinity to the primary CPU
jumping to bootstrap code

OSF Boot - Thu Feb 2 18:13:26 EST 1995
Loading vmunix...
[I/O subsystem reset information, memory information
displayed, I/O bus adapters displayed, configured devices
displayed, network configuration information displayed]
The system is ready.

DEC OSF/1 Version 3.2B (oregon.eng.pk0.dec.com) console
login: ④
```

- ❶ **Show device** displays information about each I/O device. Polling checks the I/O buses for device configurations. The next line contains three columns. The first column contains the console device name. The second column displays the name of the device given by the device controller. The third column shows the device type. In this case, see Example 8-8, the CD drive is the RRD44 and its mnemonic is DKA100.
- ❷ In the **boot** command, **dk** is the device code of the boot device, **a** is the boot device controller designation, and **100** specifies the hexadecimal unit number of the boot device. The **1** is the node number, **0** is the channel number, **2** is the XMI node number, and **0** is the I/O channel number. The **-fl a** causes UNIX to come up in multiuser mode.
- ❸ The system boots from the CD-ROM.
- ❹ After the system is configured, the operating system banner appears, and the user is given the **login:** prompt.

For more information:

DEC OSF/1 Guide to System Administration

8.12 Set Commands for Booting

Use the set command to define a default boot device as shown in Example 8-10.

Example 8-10 Set Boot Commands

```
P00>>> set boot_reset on ❶  
P00>>> set bootdef_dev dua2.4.0.2.0 ❷  
P00>>> set boot_osflags "0,6" ❸  
P00>>> boot ❹
```

[the system now initializes and boots]

- ❶ Enter **set boot_reset on** to initialize the system before booting.
- ❷ If you boot from the same boot device each time, you can store the disk name by defining the default boot device. This is done by using the **set bootdef_dev** command. The default boot device is used for booting during power-up and auto restarts.
- ❸ Use **set boot_osflags** to define the boot command flag parameters of 0, 6. Note the flags shown here are for OpenVMS; UNIX uses different flags.
- ❹ Booting can now be done from that device by typing **boot** or just **b**.

*NOTE: Refer to the Operations Manual for more information on **set** commands and environment variables.*

8.13 Booting LFU with a CD-ROM

The Loadable Firmware Update (LFU) utility is on the Alpha CD-ROM (PN AG-PTMW*-BE). Make sure this CD-ROM is mounted in the CD drive, and then boot LFU.

Example 8-11 LFU Booting

```
P00>>> show device ❶
polling for units on isp0, slot 0, bus 0, hose0...
dka400.4.0.0.0      DKA400              RZ26L  440C
polling for units on isp1, slot 1, bus 0, hose0...
polling for units on isp2, slot 4, bus 0, hose0...
polling for units on isp3, slot 5, bus 0, hose0...
dkd400.4.0.5.0     DKD400              RRD44  0000
dkd500.5.0.5.0     DKD500              RZ26L  440C
P00>>> boot dkd400 -fl 0,a0 ❷
Building FRU table.....
(base boot dkd400.4.0.5.0 -flags 0,a0)
SRM boot identifier: scsi 4 0 5 0 400 ef00 81011
boot adapter: isp3 rev 0 in bus slot 5 off of kftia0 in TLSB slot 8
block 0 of dkd400.4.0.5.0 is a valid boot block
reading 1018 blocks from dkd400.4.0.5.0
bootstrap code read in
base = 200000, image_start = 0, image_bytes = 7f400
initializing HWRPB at 2000
initializing page table at 1f2000
initializing machine state
setting affinity to the primary CPU
jumping to bootstrap code
Bootfile:[alpha8400]as8000_v01.exe ❸

***** Loadable Firmware Update Utility *****
-----
Function      Description
-----
Display      Displays the system's configuration table.
Exit         Return to loadable offline operating environment.
List         Lists the device types and firmware revisions
            supported by this revision of LFU.
Modify       Modifies port parameters and device attributes.
Show         Displays device mnemonic, hardware and firmware
            revisions.
```

Update	Replaces current firmware with loadable data image.
Verify	Compares loadable and device images.
? or Help	Scrolls the function table.

UPD>

④

- ① Use the **show device** command to find the mnemonic of the CD-ROM drive.
- ② Enter the **boot** command to boot from the RRD44. The RRD44 has a device name of dkd400.
- ③ Supply the bootfile directory and name: [alpha8400]as8000_v01.exe. When this system is introduced, May 1995, this bootfile listed here is the correct name. Over time, the version of this file is likely to change. To obtain the correct file name, follow the instructions found in *Alpha Systems Firmware Update Version x.x Release Notes Overview* that comes with the system CD-ROM (AG-PTMW*-BE).
- ④ LFU starts, displays a summary of its commands, and issues its prompt UPD>. (The Modify command appears only if there are devices on the system that have modifiable attributes.)

8.14 Running the System Exerciser VET

Run the DEC Verifier and Exerciser Tool (VET). VET is a tool with generic exercisers designed to ensure proper installation and verification of hardware and operating system software. It is run under the operating system. Install VET from the system CD-ROM (AG-PTMW*-BE) before running it. Example 8-12 shows a sample DEC VET user session. See the *DEC Verifier and Exerciser Tool User's Guide* (AA-PX73A-TE (OpenVMS) or AA-PTTMA-TE (UNIX)) for more information.

Example 8-12 Sample DEC VET User Session

```
$ vet ❶
  Running system sizer on node cpu2 ... please wait.

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VET_setup> load ❷
  Enter number of processes for CPU device (decimal [1]): 2 ❸
  Enter number of processes for MEMORY device (decimal [1]): 2
  Enter number of processes for NETWORK device (decimal [1]): 0
  Enter number of processes for FILE device (decimal [1]): 2
  Enter number of processes for each VIDEO device (decimal [1]): 0
...opening script file $19$dka500:[sys0.][sysmgr]vet_load.script.
Process 1, group exer for device CPU
Process 2, group exer for device CPU
Process 3, group exer for device MEMORY
Process 4, group exer for device MEMORY
Process 5, group exer for device FILE
Process 6, group exer for device FILE
...closing script file $19$dka500:[sys0.][sysmgr]vet_load.script.
VET_setup> start ❹
...starting [Process 1, Pass 1] group exer for device CPU.
...starting [Process 2, Pass 1] group exer for device CPU.
...starting [Process 3, Pass 1] group exer for device MEMORY.
...starting [Process 4, Pass 1] group exer for device MEMORY.
...starting [Process 5, Pass 1] group exer for device FILE.
...starting [Process 6, Pass 1] group exer for device FILE.
...completed [process 1] group exer for device CPU.
...completed [process 2] group exer for device CPU.
...completed [process 5] group exer for device FILE.
...completed [process 6] group exer for device FILE.
```

Table 8-3 lists the DEC VET exercisers and descriptions.

Table 8-3 DEC VET Exercisers

Exerciser	Description
CPU	Tests processor functions including binary operations, integer computations, floating-point computations, and data conversion.
Memory	Tests dynamic allocation and deallocation of virtual memory and verifies test patterns written.
Disk	Tests logical and physical disk I/O by performing read and write operations and verifies test patterns written.
File	Tests reading and writing to disk files and verifies test patterns written.
Tape	Tests reading and writing to tape device files and verifies test patterns written.
Network	Tests underlying protocol (including caches, buffers, and queues), physical network adapters, local and remote networks, destination adapters, and network services.
Printer	Tests printers by sending ASCII, PostScript, or a user specified file to a selected print queue. A PostScript file is provided with the exerciser.
Video	Tests text, graphic, and palette capabilities of video monitors.

- ❶ In Example 8-12 the user enters the command **vet** at the system prompt. The system sizer message is displayed. The system sizer process finds the devices that are connected to the system and obtains device information needed by the VET programs.
- ❷ At the VET_setup prompt, the user issues the command **load**. The **load** command creates processes for most devices on the system. Note that the File test exercises disks.
- ❸ The VET program displays a series of questions. The user can select the number of processes to run for each device type. In the example, two processes are selected for the CPU device, memory device, and file device.
- ❹ Enter the **start** command to begin testing.

Example 2-2 Sample DEC VET User Session (Continued)

```
^C 5
...stopping [Process 4] group exer for device MEMORY.
...stopping [Process 3] group exer for device MEMORY.
VET_suspend> show runtime 6
Process 1 Runtime:
  Requested runtime:    0 hours   0 minutes   0 seconds
  Elapsed runtime:     0 hours   0 minutes  22 seconds
  Remaining runtime:   0 hours   0 minutes   0 seconds

Process 2 Runtime:
  Requested runtime:    0 hours   0 minutes   0 seconds
  Elapsed runtime:     0 hours   0 minutes  22 seconds
  Remaining runtime:   0 hours   0 minutes   0 seconds

Process 3 Runtime:
  Requested runtime:    0 hours   0 minutes   0 seconds
  Elapsed runtime:     0 hours   3 minutes  39 seconds
  Remaining runtime:   0 hours   0 minutes   0 seconds

Process 4 Runtime:
  Requested runtime:    0 hours   0 minutes   0 seconds
  Elapsed runtime:     0 hours   3 minutes  39 seconds
  Remaining runtime:   0 hours   0 minutes   0 seconds

Process 5 Runtime:
  Requested runtime:    0 hours   0 minutes   0 seconds
  Elapsed runtime:     0 hours   2 minutes  30 seconds
  Remaining runtime:   0 hours   0 minutes   0 seconds

Process 6 Runtime:
  Requested runtime:    0 hours   0 minutes   0 seconds
  Elapsed runtime:     0 hours   3 minutes  20 seconds
  Remaining runtime:   0 hours   0 minutes   0 seconds

VET_suspend> continue 7
...continuing [process 3] group exer for device MEMORY.
...continuing [process 4] group exer for device MEMORY.
...completed [process 3] group exer for device MEMORY.
...completed [process 4] group exer for device MEMORY.

...testing completed. Total errors reported by all processes = 0. 8
VET_setup> exit 9
$
```

- ⑤ The user enters a Ctrl/C to suspend executing processes. DEC VET enters the suspend execution state.
- ⑥ Enter **show runtime** to list the requested, elapsed, and remaining run times of each process.
- ⑦ The **continue** command resumes execution of all suspended processes. After testing is completed, a message is displayed to inform the user of the number of errors reported. No errors were reported in this example (see ③).
- ⑧ Enter **exit** to exit the DEC VET program. The system prompt is displayed.

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