COMPAQ

AlphaServer GS60E

Installation Guide

Order Number: EK–GS60E–IN. A01

This guide is intended for use by customer service engineers and self-maintenance customers installing an AlphaServer GS60E system.

Compaq Computer Corporation

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Preface

Intended Audience

This manual is written for customer service engineers and self-maintenance customers who require information to install an AlphaServer GS60E system.

Document Structure

This manual uses a structured documentation design. Topics are organized into small sections for efficient 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 eight chapters as follows:

- **Chapter 1, Installation Overview,** provides a flowchart that summarizes the installation process.
- **Chapter 2, Site Preparation,** shows how to prepare the site for the system.
- **Chapter 3, Installing the System Cabinet,** shows how to unpack and install the system cabinet.
- **Chapter 4, Installing an Expander Cabinet,** explains how to install one or more expander cabinets, if present.
- **Chapter 5, Making Console, SCSI, and Ethernet Connections,** shows how to connect the console, SCSI, and Ethernet devices if present to the system.
- **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. The icons 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.

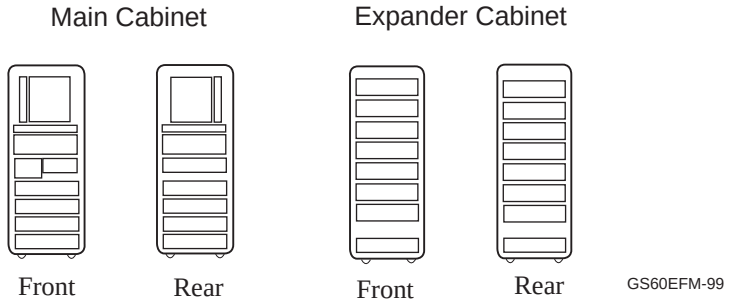


Table 1 AlphaServer GS60E Documentation

Title	Order Number
Hardware User Information and Installation	
AlphaServer GS60E Installation Guide	EK–GS60E–IN
AlphaServer GS60E Operations Manual	EK–GS60E–OP
KFTHA System I/O Module Installation Guide	EK–KFTHA–IN
KFE72 Installation Guide	EK–KFE72–IN
Service Information	
AlphaServer GS60E Service Manual	EK–GS60E–SV
Reference Manual	
AlphaServer GS60E and GS140 Getting Started with Logical Partitions	EK–TUNLP–SF

Table 1 AlphaServer GS60E Documentation (Continued)

Title	Order Number
Upgrade Manuals	
GS60/8200 to GS60E Upgrade Manual	EK–GS60E–UP
H7506 Power Supply Installation	EK–H7506–IN
RRDCD Installation Card	EK–RRDXX–IN

Chapter 1
Installation Overview

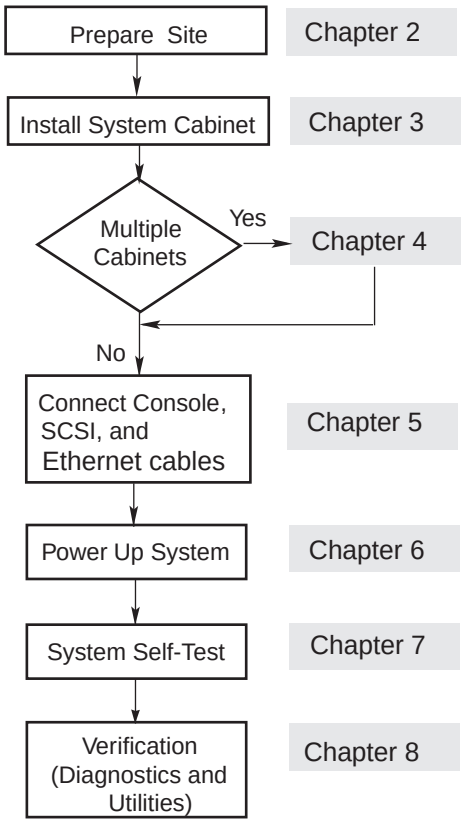
This chapter provides a quick overview of the installation procedure and relates the steps of the procedure with chapters in this manual. It consists of one section:

- 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. Prepare the site for system installation as described in Chapter 2.
2. Install the system cabinet as described in Chapter 3.
3. If the system has one or more expander cabinets, refer to Chapter 4 for installation instructions.
4. Connect the console, and, if appropriate, make the Ethernet, and SCSI connections as described in Chapter 5.
5. Power up the system as described in Chapter 6.
6. Observe and consider the results of the system self-test as described in Chapter 7.
7. Verify system operation by running various diagnostics and utilities as described in Chapter 8.

Chapter 2
Site Preparation

This chapter provides site planning guidelines, cabinet sizes, space and environmental requirements, and system power requirements.

Sections include:

- Pre-Installation Checklist
- Cabinet Sizes
- Floor Space and Environmental Requirements
- Power Requirements
- AC Power Cable and Receptacles

2.1 Pre-Installation Checklist

Check off tasks when completed before system installation. To facilitate the installation process, it is recommended that the customer plan ahead and coordinate the site planning and scheduling with Compaq.

Planning the Site:

- □ Plan the physical layout of the system cabinet, expander cabinets, console terminal, and other system units.
- □ Plan to place all equipment away from heavy traffic centers, leaving enough room for airflow and maintenance.
- □ Do not place systems on carpets.
- □ Obtain cabinet weights and dimensions to check against floor loading restrictions.
- □ Determine the correct power requirements for the system to be installed.
- □ Determine the sizes of the circuit breakers and the number of branch circuits required.
- □ Determine the number, type, and location of required AC power outlets.
- □ Check the compatibility of different power sources. This must be checked when multiple types of power distribution transformers, or power conditioning equipment is used.
- □ Determine system power consumption to calculate the input line power requirement.
- □ Establish a system grounding scheme for the installation.
- □ Determine environmental cooling requirements.
- □ Check the location and requirements of cabling for communication devices such as Ethernet.

Check the Delivery Route:

- ☐ Check the height, width, and location of doors and passageways for adequate clearance.
- ☐ Check floor loading requirements along passageways.
- ☐ Check passageway restrictions such as corners, ramps, or obstructions.
- ☐ Check the size, capacity, and availability of elevators.

Table 2-1 lists the shipping dimensions of the GS60E system and expander cabinets. These dimensions include the width of the shipping pallet, the height of the shipping boxes, and the weight of the packing materials.

Table 2-1 Shipping Dimensions and Weights

Cabinet	Height cm (in)	Width cm (in)	Depth cm (in)	Weight kg (lbs)[1]
GS60E System	194 (76.25)	91.5 (36.0)	121.5 (47.9)	398 (875)
GS60E Expander	194 (76.25)	91.4 (36.0)	121.5 (47.9)	365 (804)

[1] System and expander weights are based on a fully configured cabinet.

2.2 Cabinet Sizes

Include all cabinets and peripherals when laying out the installation site. A sample system could include a main cabinet, a maximum of two expander cabinets, and console devices. Figure 2-1 shows a sample GS60E system.

Figure 2–1 GS60E Sample System

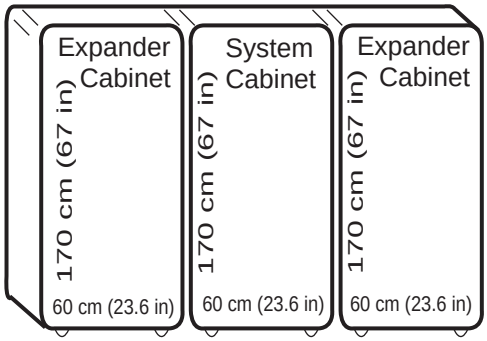

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Table 2-2 Cabinet Dimensions and Weights

Cabinet	Height cm (in)	Width cm (in)	Depth cm (in)	Weight kg (lbs)[1]
GS60E System	170 (67.0)	60 (23.6)	100 (39.4)	352 (775)
GS60E Expander	170 (67.0)	60 (23.6)	100 (39.4)	320 (704)

[1] System and expander weights are based on a fully configured cabinet.

2.3 Floor Space and Environmental Requirements

Table 2-3 lists system environmental requirements. Space for front and rear clearance are the minimum required for airflow and maintenance.

Figure 2–2 Sample GS60E Configuration

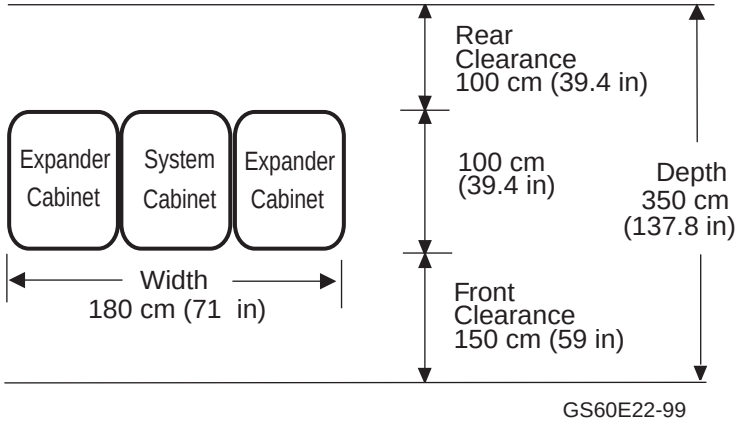


Table 2-3 Environmental Specifications

Environmental	Operating[1]	Storage
Temperature	5°–35° C (41°–95° F)	-40°–66°C (–40°–151° F)
Relative humidity	10–90%	10–95%
Altitude	0–3 km (0–10,000 ft)	0–12.2 km (0–40,000 ft)

[1] Recommended operating temperature is 18°–24° C (65°–75° F) and 40–60% relative humidity.

The minimum amount of clearance space for the system front is 150 cm (59 in) and rear is 100 cm (39.4 in), as shown in Figure 2-2. These clearances are needed for airflow and maintenance.

Air for the system cabinet to cool the card cage is brought in from the top and blown out at the back of the cabinet. Air to cool the options is brought in from the front of the cabinet and blown out the back. Air to cool the expander cabinet is brought in from the front and blown out the back.

NOTE: *Do not place anything on top of the cabinets, since this restricts airflow. Inadequate airflow can cause the system to shut down.*

2.4 Power Requirements

The power system consists of an AC input box, a DC distribution module, redundant hot swap power supplies, a cabinet control logic (CCL) panel, and cables.

Figure 2–3 GS60E Power System Components

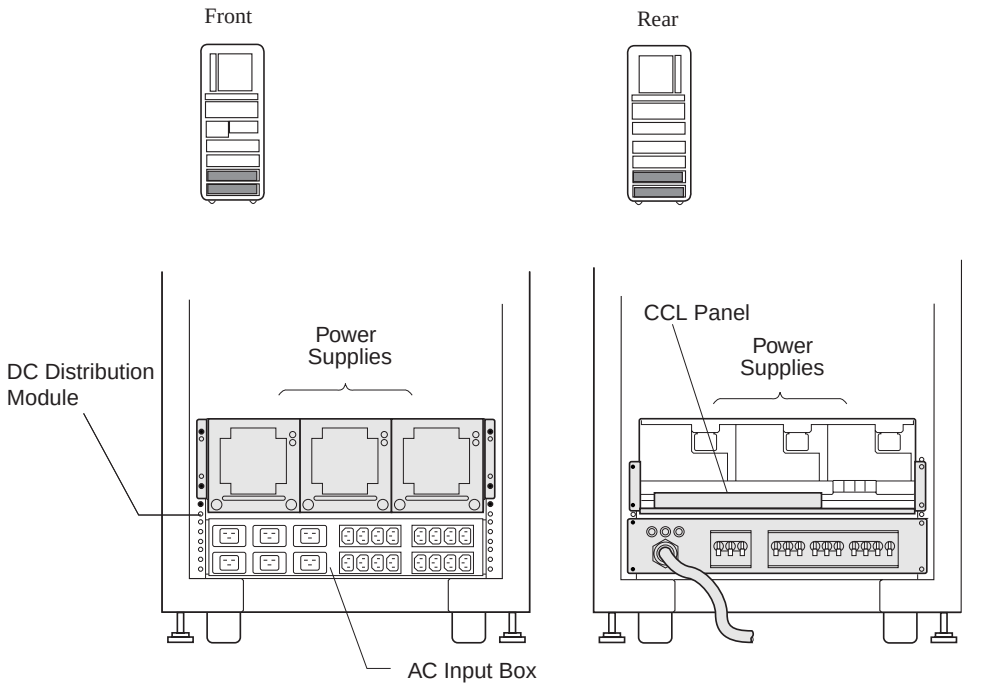


Table 2–4 Three-Phase AC Input Voltages

Country	Input Voltage	Circuit Breaker Rating (amps)	Frequency Range (Hz)
Japan	202 Delta	30	50–60
North America	120/208 Wye	30	50–60
Europe/AP	380–415 Wye	32	50–60
Each system and expander cabinet requires its own AC power connector.			

Table 2–5 Three-Phase Power Requirements

Cabinet	Power (watts)	Heat Dissipation (BTU/hr)
System	1,200 minimum[1] 2,450 maximum[2]	4,100 minimum[1] 8,300 maximum[2]
System and two expander cabinets	5,150 maximum[3]	17,550 maximum[3]

[1]These figures are based on a minimum configuration containing three power supplies, a dual CPU module, one memory module, one system I/O module, one CD-ROM, one minimally configured PCI shelf, and one StorageWorks shelf with one disk drive.

[2]Based on a fully configured system containing three power supplies, three CPU modules (6 CPUs), two memory modules, two system I/O modules, one CD-ROM, two PCI shelves, and two StorageWorks shelves with 12 disk drives.

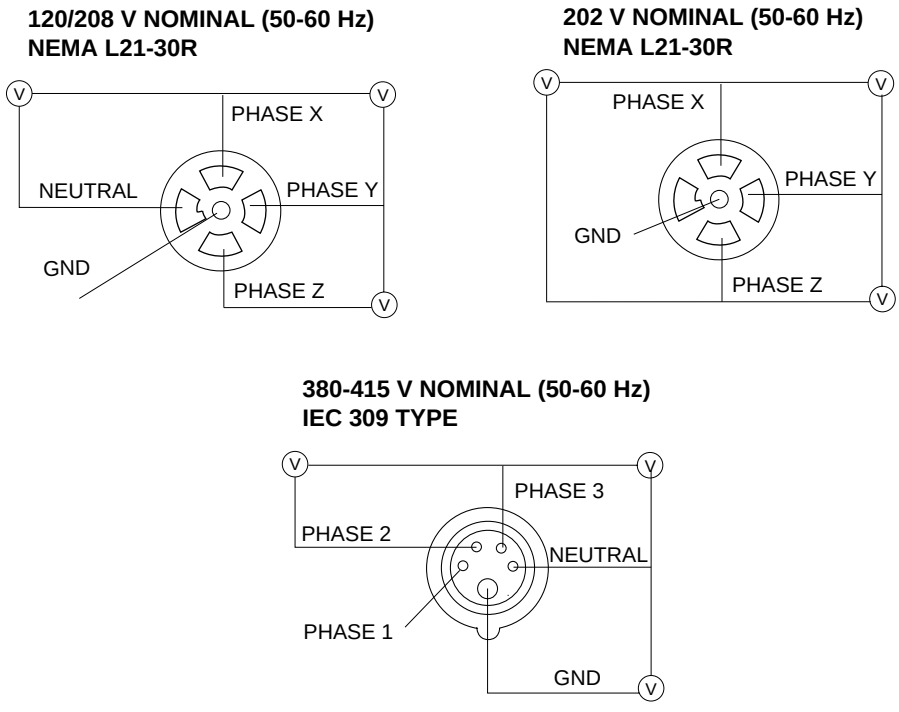
[3]Based on a fully configured system cabinet (see note 2) and two expander cabinets each containing three PCI shelves and four StorageWorks shelves with 24 disk drives.

NOTE: *AC power receptacles are also required for console terminals and printers.*

2.5 AC Power Cable and Receptacles

The AC power cable is 4.5 m (15 ft) in length. It consists of three-phase leads (X, Y, and Z) plus neutral (N) and ground (G). AC power connectors are shown in Figure 2-4.

Figure 2–4 AC Power Receptacles



Chapter 3
Installing the System Cabinet

This chapter describes how to install the AlphaServer GS60E system cabinet. The cabinet contains the CPU, memory, a system I/O module, at least one PCI I/O subsystem, disks, and power.

If your system has an expander cabinet, unpack it and remove it from the pallet as described in the first four sections of this chapter.

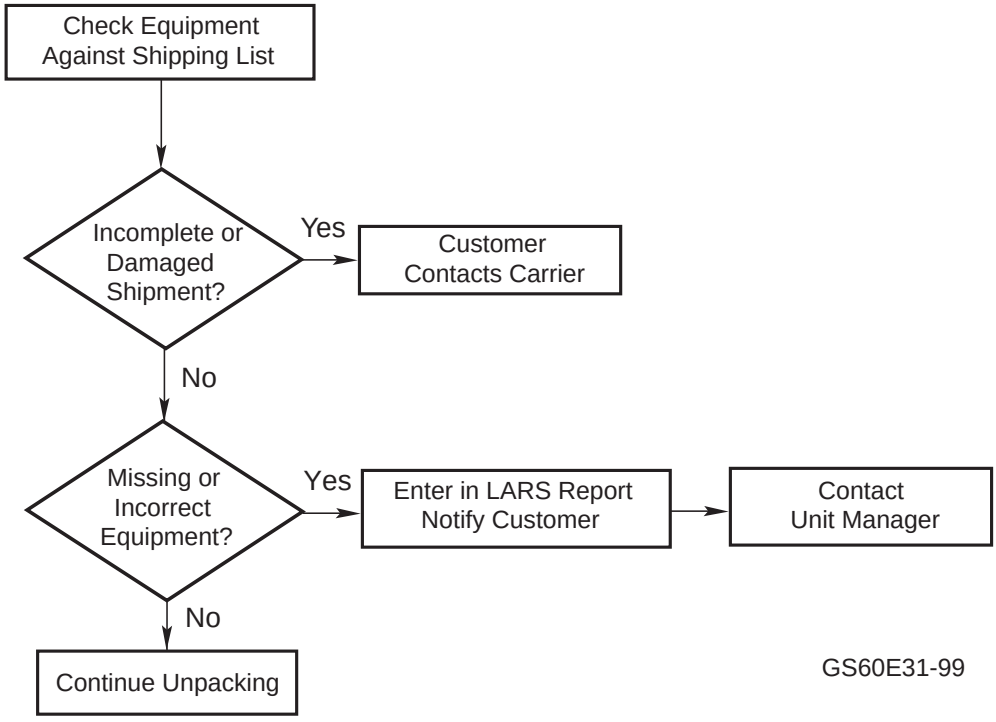
Sections in this chapter include:

- Inspect the Shipment
- Collect Tools and Resources
- Remove Packing Material
- Remove Cabinet from the Pallet
- Level the Cabinet

3.1 Inspect the Shipment

Check that all system equipment is at the installation site.

Figure 3–1 Inspection Flowchart



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 opened.

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

3.2 Collect Tools and Resources

You will need the items listed in Table 3-1 to unpack and install the system cabinet. The removal of the cabinet from the pallet requires at least two people.

Table 3–1 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
Flathead screwdriver	For installation of I/O port module cable(s)

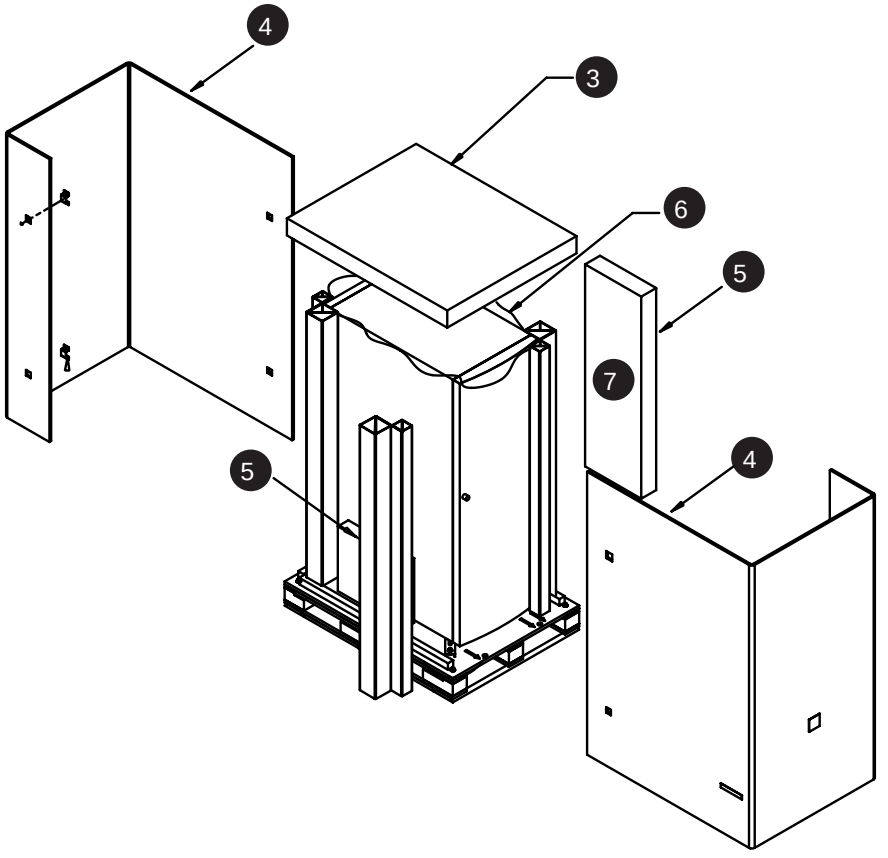
Review requirements such as power, environmental, and space requirements for the system.

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

3.3 Remove Packing Material

Remove all packing material to prepare the system cabinet for removal from the pallet.

Figure 3–2 Packing Material



Use the following procedure to unpack the system cabinet:

❶ Position the carton so that the front door faces an open space with enough clearance to allow the cabinet to be rolled down ramps.

❷ Using a utility knife, cut the shipping straps from the carton.

❸ Remove the outside top cardboard cover.

❹ Remove the outside shipping box, using a 7/16" socket wrench to remove the four bolts that hold the box together.

❺ Remove the four corrugated spacers and the ramp and accessories boxes from around the cabinet.

❻ Remove the inner protective plastic wrapping by slipping it up and over the cabinet.

❼ Locate the box that contains the ramp kit and open it (see Figure 3-2).

❽ Follow the unpacking illustrations located on the outside of the shipping box for removing the cabinet from the pallet (see Section 3.4).

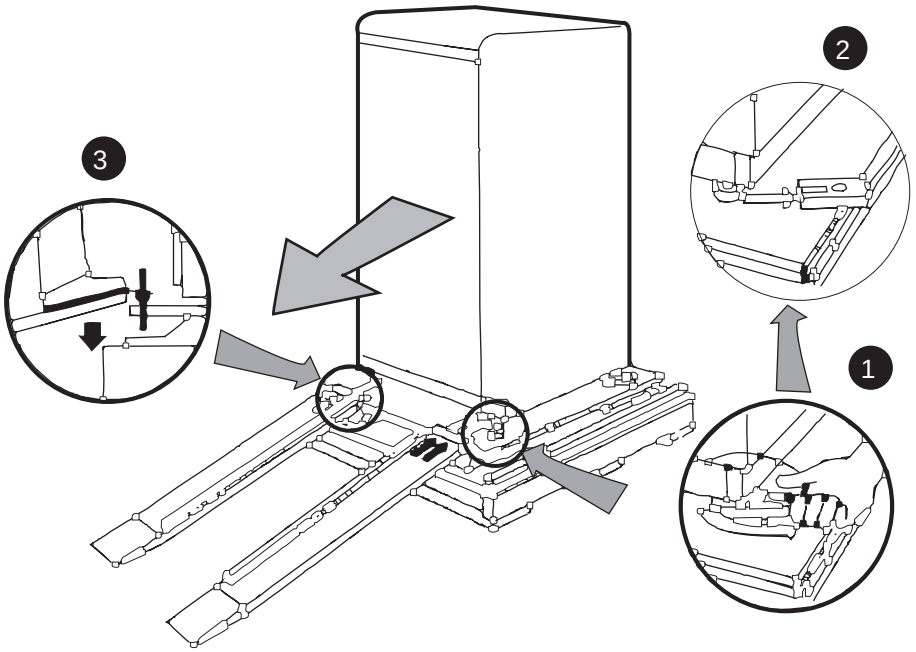
NOTE: *It's a good idea to save all packing materials intact in case the system needs to be shipped in the future.*

3.4 Remove Cabinet 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 3–3 Preparation and Removal from Pallet



WARNING: Serious injury may result if the cabinet is improperly handled or proper safety conditions are not met.

Check the cabinet sides, top, front door, and rear panel for damage. If the cabinet is damaged, do the following:

- Enter the location and extent of the damage on the LARS report.
- Notify the customer and your unit manager.
- Stop unpacking until the customer gives you permission to continue.

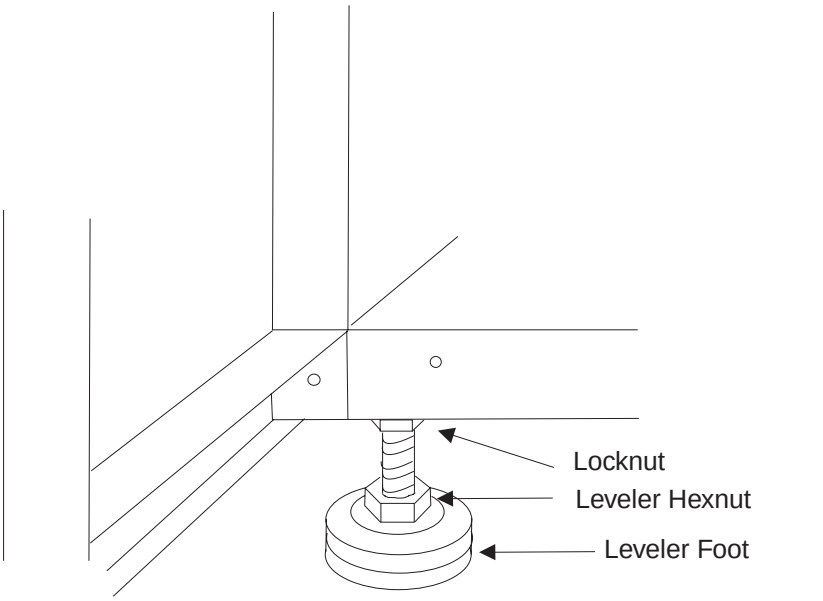
1. Using an adjustable wrench, remove the four bolts and shipping brackets that hold the cabinet leveler feet to the pallet (Figure 3-3).
2. The leveler feet are lowered to the pallet surface for shipping. Using the adjustable wrench, raise the feet to the upmost position before removing the system from the pallet (see Section 3.5).
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 pallets (see Figure 3-3).
4. 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. To avoid static electricity, which can cause system problems, do not place the system on a carpet.

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

3.5 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 3–4 Leveler Foot Adjustment



1. Using an adjustable wrench, lower and adjust the leveler feet at each corner of the system. (A shipping bracket can also be used to lower the leveler feet. The bracket cutout and leveler feet hexnuts are the same size.)
2. Using a bubble level, check to see that the cabinet is properly leveled (side to side and front to back).
3. Once the cabinet is level, lock each of the feet into place by tightening the locknut at the top of each leveler foot.

Chapter 4
Installing an Expander Cabinet

This chapter explains how to install one or more expander cabinets for the system. An expander cabinet provides room for I/O adapters and additional storage for the system. The system can have a maximum of two expander cabinets.

The expander cabinet is designed for PCI I/O shelves and BA36R StorageWorks shelves. At the bottom of the cabinet there is room for three power supplies (one is optional), a CCL panel, and DC distribution. Above this area there are seven shelf slots for PCI I/O shelves and BA36R StorageWorks shelves. The maximum number of PCI I/O shelves in an expander cabinet is four. The maximum number of PCI I/O shelves for an entire system is eleven.

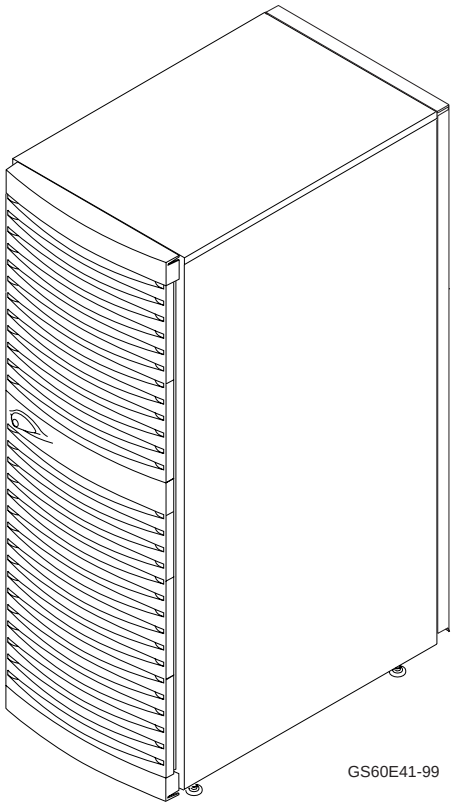
Sections in this chapter include:

- Unpack the Cabinet
- Remove System Cabinet Panel and Position Expander Cabinet
- Level All Cabinets
- Secure Cabinets Together
- Connect the Power Control Cable
- Connect the I/O Cable

4.1 Unpack the Cabinet

Unpack the expander cabinet in the same way you unpacked the system cabinet in Chapter 3. The expander cabinet ships with no side panels.

Figure 4–1 Expander Cabinet

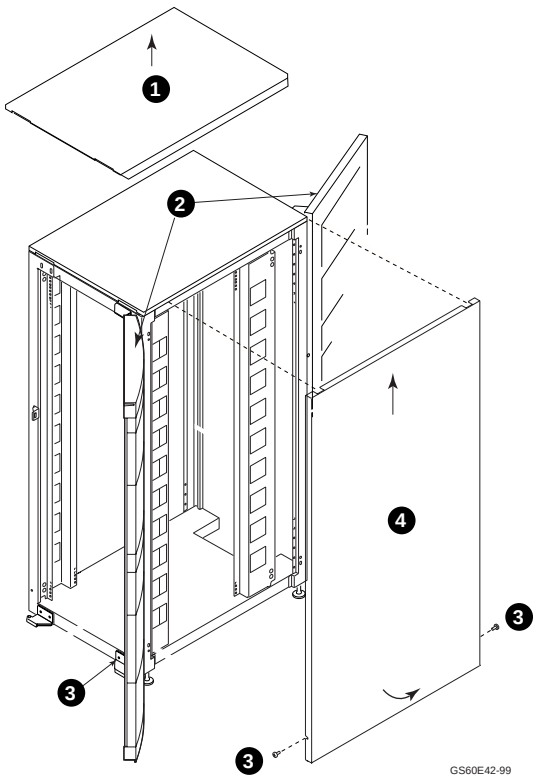


1. Inspect the shipment for the expander cabinet as done for the system cabinet (see Section 3.1).
2. Collect the tools and resources needed to install the expander cabinet (see Section 3.2).
3. Remove the carton and packing material from the expander cabinet (see Section 3.3). Identify and put aside the components of the installation kit.
4. Use two people to remove the expander cabinet from the shipping pallet (see Section 3.4).

4.2 Remove System Cabinet Panel and Position Expander Cabinet

If installing one expander cabinet, remove the right system cabinet panel. Position the expander cabinet to the right of the system cabinet. The second expander cabinet is positioned to the left as viewed from the front.

Figure 4–2 Removing System Cabinet Panel

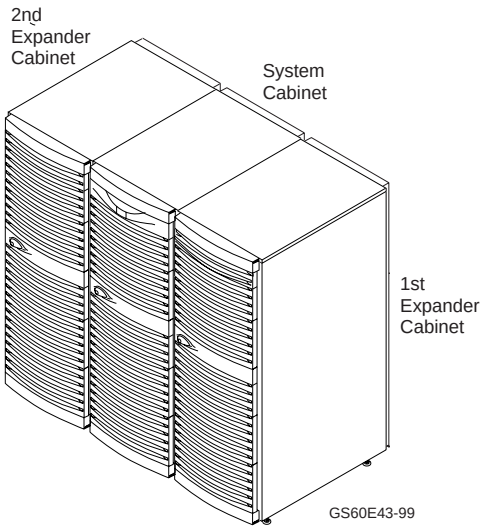


1. Lift off the system cabinet cover and set aside (see ❶, Figure 4-2).
2. Open the system cabinet's front and rear doors ❷.
3. Remove the front and rear screws holding the right panel ❸.
4. Pull the bottom of the panel away from the cabinet, lift up, and remove ❹. Repeat Steps 3 and 4 on the left side if there is a second expander cabinet.
5. Attach the removed panel(s) to the expander cabinet(s) by reversing the above steps. This can be done now or after the cabinets are secured together (see Section 4.4).

As shown in Figure 4-3, place the first expander cabinet to the right of the system cabinet as viewed from the front of the system. Position a second expander cabinet to the left of the system cabinet. A system can have a maximum of two expander cabinets.

Figure 2-2 shows the system layout with clearances for access, and Table 2-2 provides information on cabinet dimensions and weight.

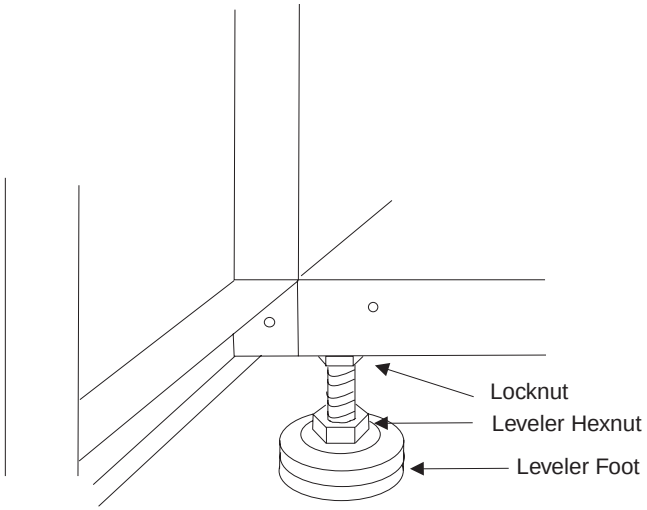
Figure 4–3 Expander Cabinet Positioning



4.3 Level All Cabinets

Level the cabinets by adjusting the rubber feet on all the cabinets and then check the cabinets with a bubble level. Be sure the sides of the cabinet butt each other and the cabinets are the same height.

Figure 4–4 Leveler Foot Adjustment

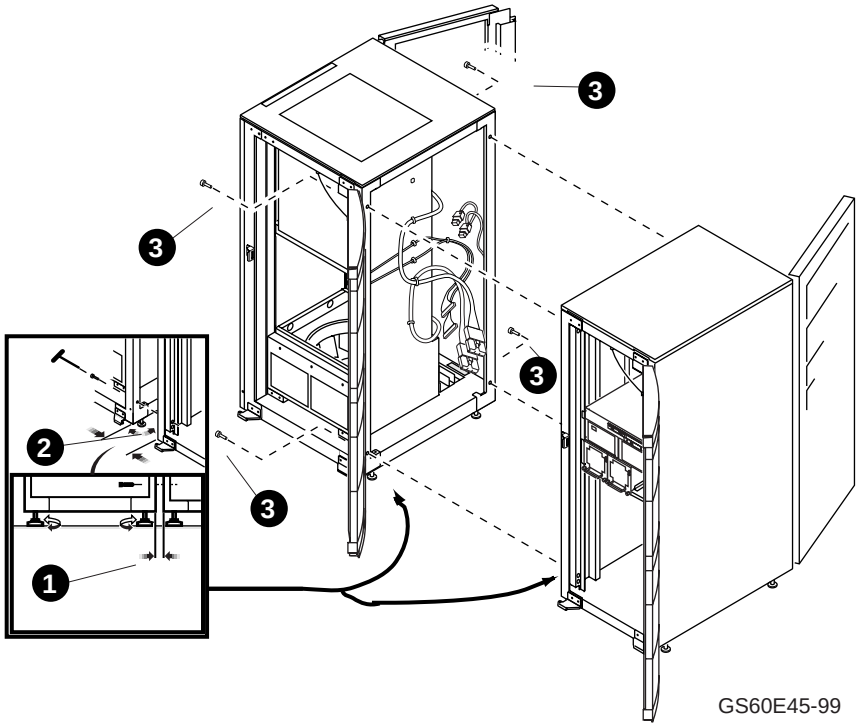


1. Use an adjustable wrench to lower and adjust the leveler feet. A shipping bracket can also be used to adjust the leveler feet, since the bracket cutout and leveler feet hexnuts are the same size.
2. Use a bubble level while adjusting the feet and make sure all cabinets are properly leveled in three dimensions (top to bottom, side to side, and front to back). The operation is complete when the tops are level and the sides of the cabinet are snug, top to bottom, front to back.
3. Once the cabinets are level, lock each of the feet into place by tightening the locknut at the top of each leveler foot.

4.4 Secure Cabinets Together

The expander cabinet is secured to the system cabinet with four screws supplied with the expander cabinet.

Figure 4–5 Securing Expander Cabinet

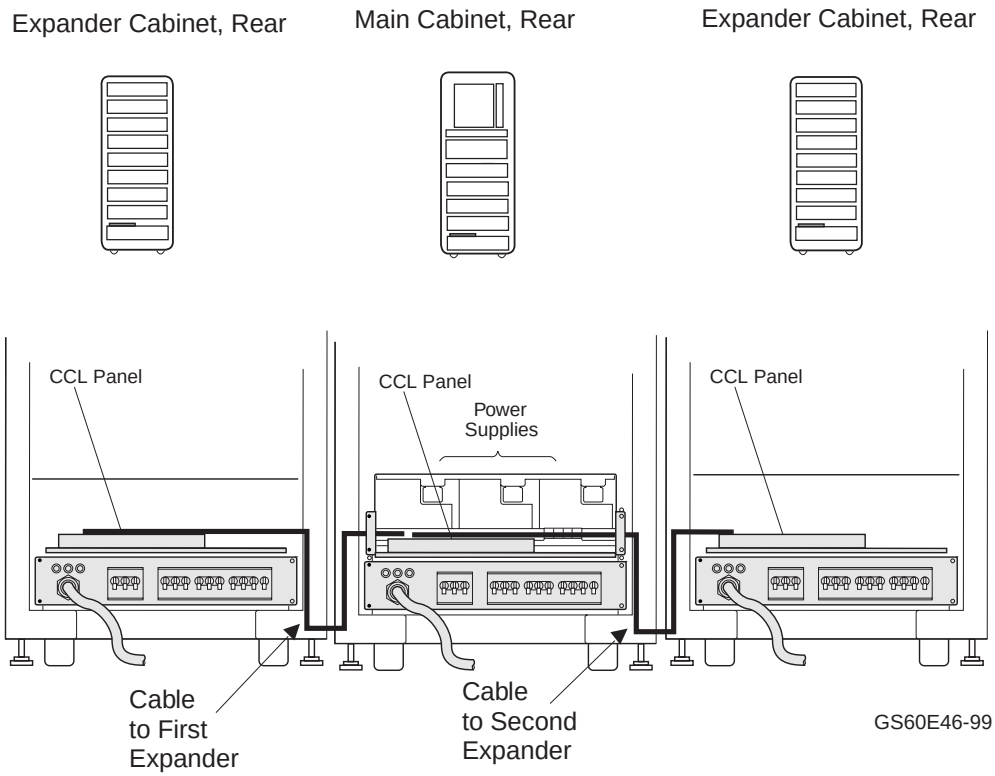


1. Position the cabinets close together so there is less than 10 mm separation between them ❶.
2. Align the cabinet heights by adjusting the leveling feet (see Sections 4.2 and 4.3) ❷.
3. Secure the cabinets together using the four screws inserted through the system cabinet ❸ using an Allen wrench supplied with the cabinet joining kit (P/N 70-40120-01).
4. Repeat Steps 1 through 3 if there is a second expander cabinet.

4.5 Connect the Power Control Cable

Connect the power control cable from the control panel in the system cabinet to the CCL panel in the expander cabinet. If there are two expander cabinets, install the jack splitter into the control panel in the system cabinet and connect both power control cables to the splitter. Route each cable from the control panel in the system cabinet to the CCL panel in each expander cabinet.

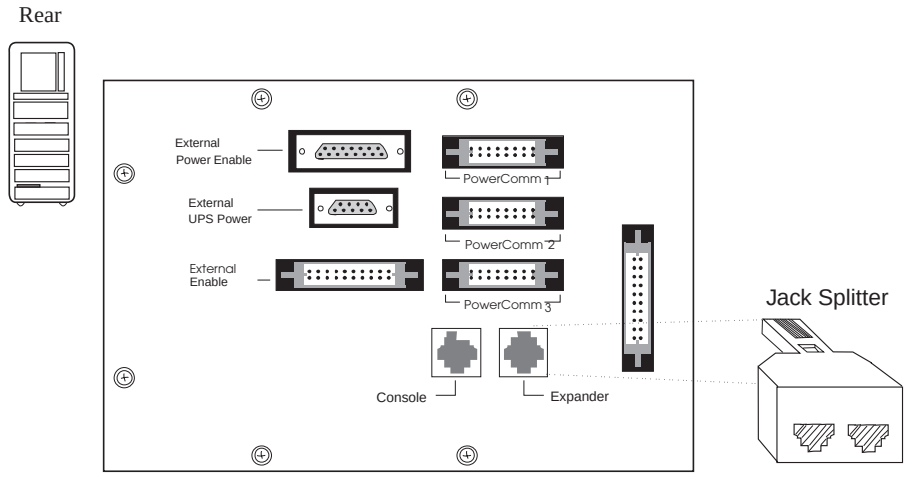
Figure 4–6 Power Control Cable Installation



WARNING: Before beginning this procedure, make sure the system is powered off.

1. If there are two expander cabinets, at the rear of the system cabinet plug the jack splitter (PN 12-44937-01) into the system cabinet control panel jack marked Expander (see Figure 4-7).
2. For the right expander cabinet, plug the power control cable (PN 17-03511-05) into the jack splitter or the jack marked Expander on the system control panel at the rear of the system cabinet.
3. Route the cable according to Figure 4-6 and plug the other end of the cable into the jack marked Expander on the CCL panel at the rear of the right expander cabinet.
4. For the left expander cabinet, plug the second power control cable (PN 17-03511-05) into the jack splitter in the system cabinet.
5. Route the cable according to Figure 4-6 and plug the other end of the cable into the jack marked Expander on the CCL panel at the rear of the left expander cabinet.
6. Tie wrap the cables in place.

Figure 4–7 CCL Panel and Jack Splitter



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4.6 Connect the I/O Cable

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

Figure 4–8 I/O Cable Connections

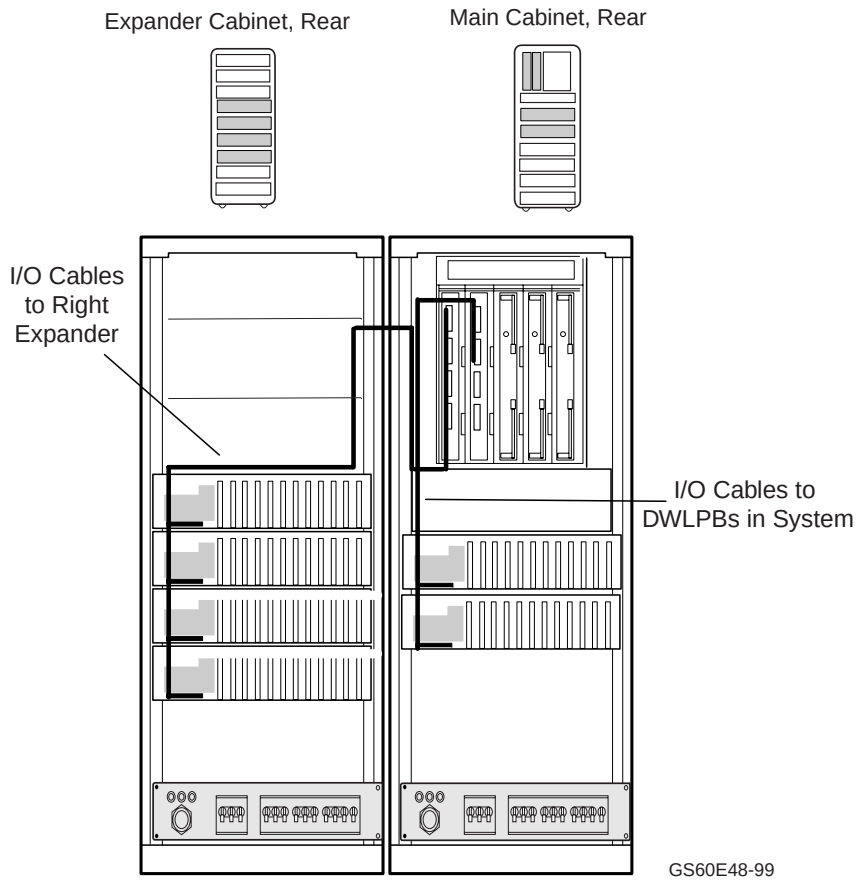


Figure 4-8 shows a system with six PCIs (DWLPBs). In this configuration, two KFTHAs are in TLSB slots 8 and 7. There are six PCIs, two in the system cabinet and four in the expander cabinet.

Cabling Guidelines

1. The PCIs in the system cabinet are connected to the KFTHA in slot 7.
2. The PCIs in expander cabinet are connected to the KFTHA in slot 8.
3. If there are two expander cabinets, the PCIs in the right expander are connected to the KFTHA in slot 8, and the PCIs in the left expander are connected to the KFTHA in slot 6.
4. The cable from the topmost connector on the KFTHA is connected to the PCI in the lowest position in the expander, the cable from the next topmost position is connected to the PCI that is above the lowest one in the expander. The other two cables follow this principle.

To install the cables:

1. Plan your cabling carefully, taking into consideration the above conditions and how the cables are routed and bundled as shown in Figure 4-8.
2. Each PCI must be connected to a KFTHA. Cable 17-03085-04 connects the KFTHA to the PCI in the system cabinet and connects the PCIs in the expander cabinets to KFTHAs in the system cabinet.
3. Using a flathead screwdriver, install the end of the I/O cable labeled IOP (PN 17-03085-04) to the KFTHA connector. Be sure the connector is aligned before tightening the screws.
4. Route the I/O cable(s) as shown in Figure 4-8.
5. Using a flathead screwdriver, install the end of the I/O cable labeled PIU to the appropriate PCI (see Figure 4-8).
6. Once all cables are connected, place tie wraps on them and secure them as best you can in the positions shown in Figure 4-8.

Chapter 5
Making Console, SCSI, and Ethernet Connections

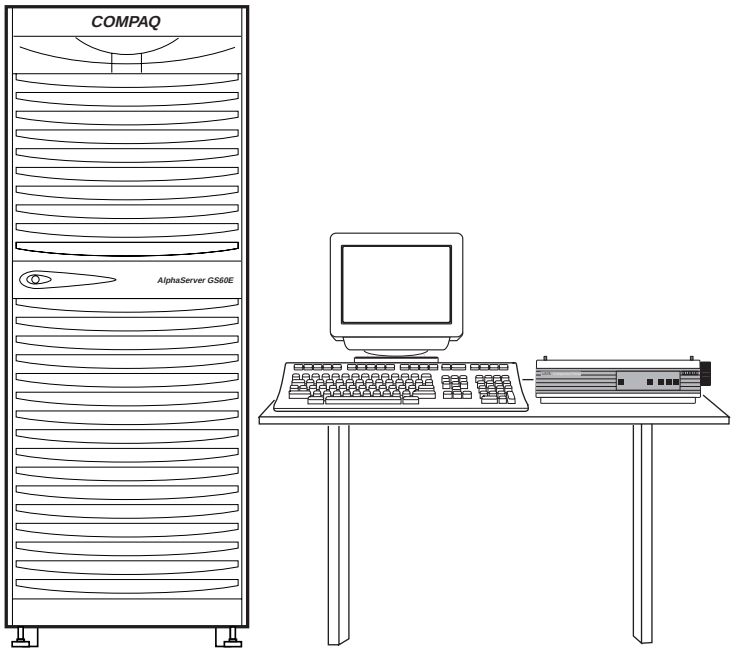
This chapter describes how to connect a console terminal and how to make SCSI, and Ethernet connections. It consists of the following sections:

- Connect the Console Terminal
- Connect the Console Load Device
- Connect SCSI Cables
- Connect Ethernet Cables

5.1 Connect the Console Terminal

Figure 5-1 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 5-2.

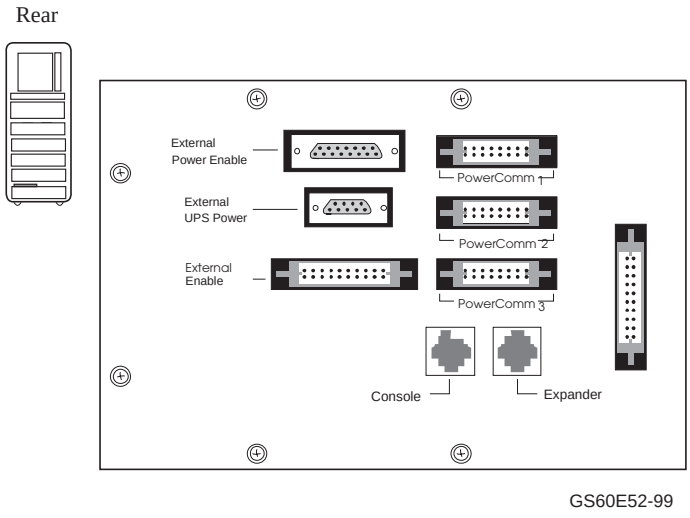
Figure 5–1 System Cabinet, Console Terminal, and Printer



GS60E51-99

1. Unpack the serial console terminal. The console terminal signal cable is shipped in the loose piece box and consists of a 17-01364-02 cable and H8575-A adapter.
2. Open the rear door and connect one end of the 17-01364-02 cable to the console terminal port on the control panel (see Figure 5-2). 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 cable ground wire to the cabinet grounding screw nearby. 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. Otherwise, unpack the printer. Connect the 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

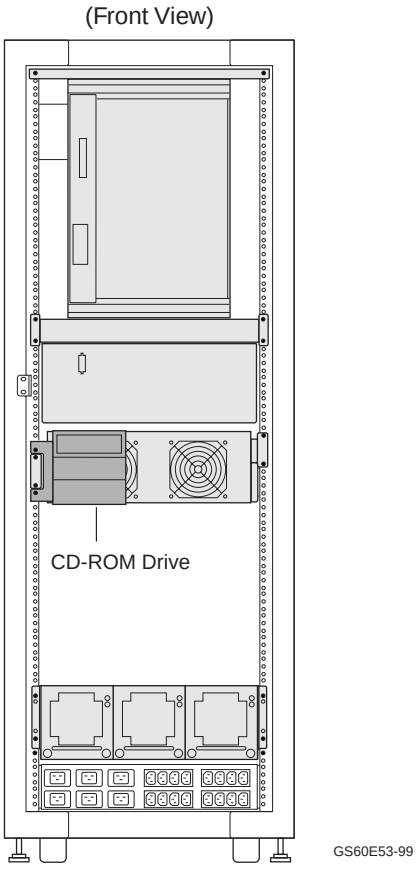
Figure 5-2 CCL Panel and Console Terminal Port



5.2 Connect the Console Load Device

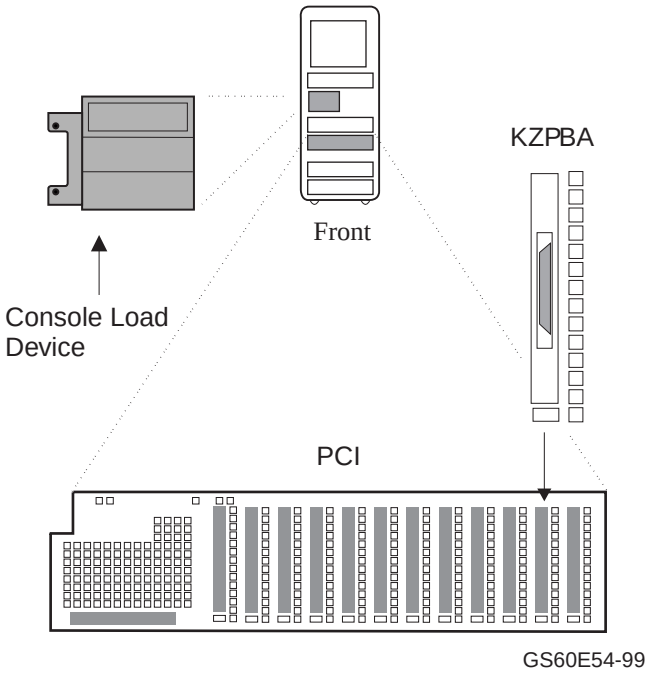
Should the console load device cable be dislodged during shipment, follow these instructions. The CD-ROM drive located at the left center of the system cabinet below the system fan. Two CD-ROMs are required for logical partitioning.

Figure 5–3 Console Load Device



Support for your CD-ROM comes from the KZPBA-CA in the PCI (see Figure 5-4). The BN21N-02 cable is used with a KZPBA-CA.

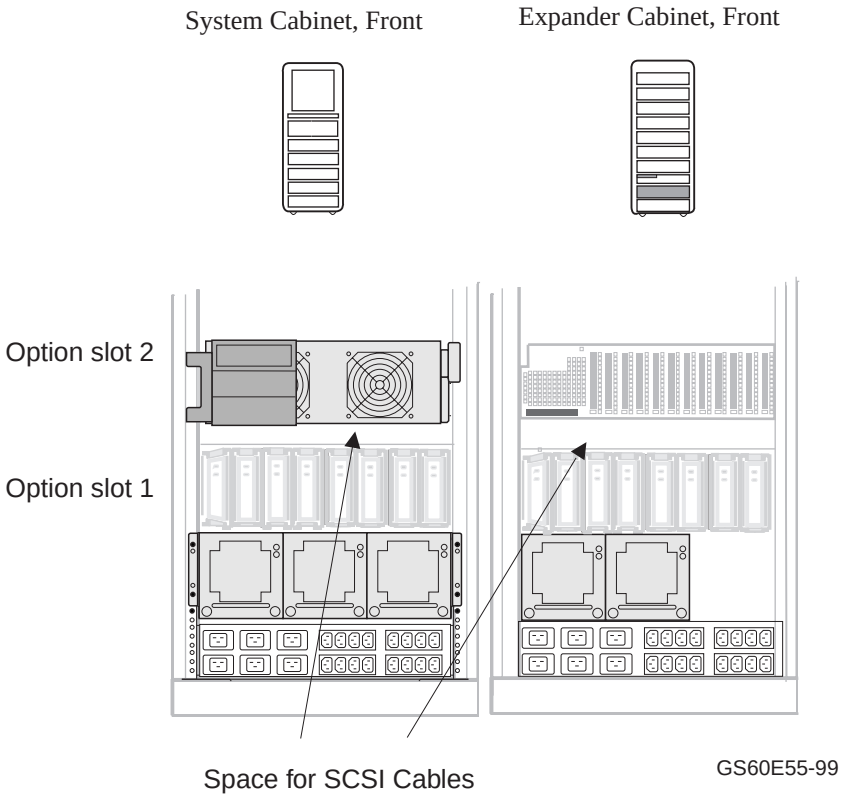
Figure 5-4 KZPBA as the Console Load Device Support



5.3 Connect SCSI Cables

SCSI cable connections depend upon the customer order. Connecting and routing cables are dependent on placement of adapters and devices. Read the information provided and install the cables needed.

Figure 5–5 System and Expander Cabinets



Multiple SCSI configurations are possible both inside system and expander cabinets and outside either cabinet. Manufacturing connects all SCSI devices it can in both system and expander cabinets. There is space in both cabinets to pass cables from front to back (see Figure 5-5). You can assume that loose SCSI cables provided with a system go from device adapters in the system cabinet to devices in another cabinet.

The following rules apply:

1. All SCSI buses must be terminated at both ends. The terminators for the GS60E are the H879 or H8663.
2. All cables exit and enter cabinets at the bottom rear.
3. Signal cables should be routed away from power cables on the right rear frame.

Table 5-1 lists SCSI cables used in GS60E systems to connect devices outside the system cabinet with their adapters.

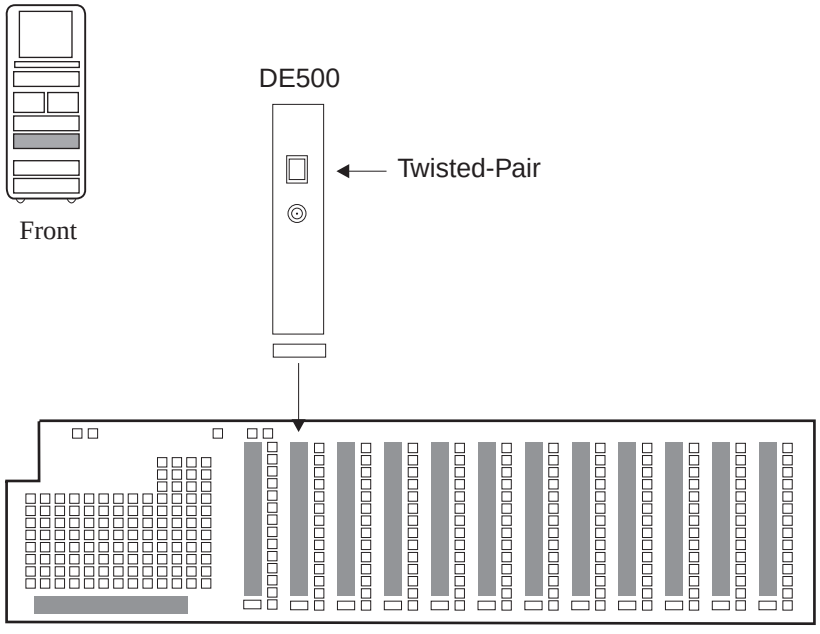
Table 5-1 SCSI Cables to Devices in Other Cabinets

Cable Number	From	To	Length (meters)
BN21N-02	KZPBA-CA	CD-ROM	2
BN38C-01	KZPBA-XX	Rear mounted StorageWorks Shelves	1
BN38C-02		BA36R-RC/RD Front mounted BA36R-RC/RD	2
BN38C-03, -05		Expansion Cabinet BA36R	3, 5

5.4 Connect Ethernet Cables

Ethernet cable connections depend on the customer order. Connecting and routing cables are dependent on placement of adapters and devices. Read the information provided and install the cables needed.

Figure 5–6 Ethernet Connectors on PCI Adapter



The DE500, the PCI Ethernet adapter, implements the twisted-pair Ethernet variant.

1. Connect the transceiver cable (BN25G-xx (unshielded) or BN26M-xx (shielded) to the Ethernet port on the DE500 (see Figure 5-6).
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.

Chapter 6
Powering Up the System

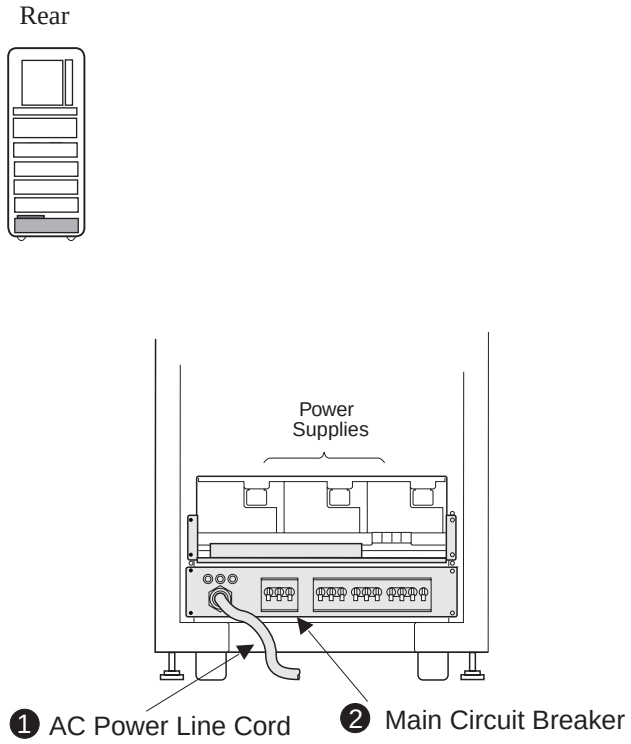
This chapter provides an overview of the power-up procedure for the system. Sections include:

- Prepare to Check the AC Power
- Measure the AC Power
- Turn the Power On and Check Indicators

6.1 Prepare to Check the 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 the AC Power



GS60E61-99

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

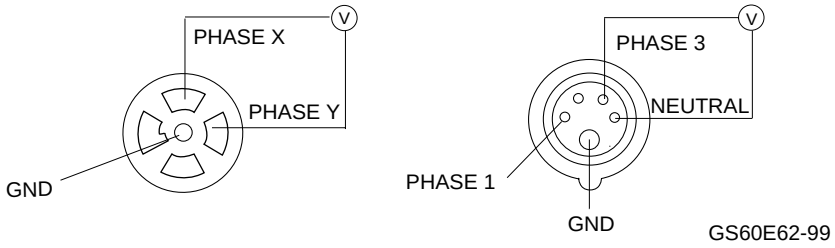
The circuit breaker on the AC input box controls power to the system. For normal operation, the circuit breaker handle must be in the On or up position. To shut the circuit breaker off, push the handle down.

For safety, current overloads during fault conditions cause the circuit breaker to trip to the Off position, removing all power from the system.

6.2 Measure the AC Power

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

Figure 6–2 Measuring System Power



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

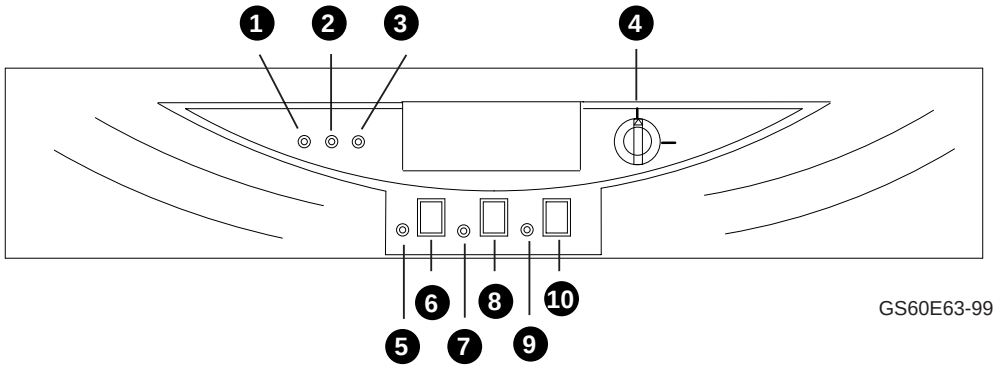
Table 6–1 AC Input Voltage Specifications

Voltage Measurement	202V Nominal junction ground	202V Nominal mid-point ground	208V Nominal	380–415V Nominal
Line to line	202	202	208	380–415
Line to ground	0, 202, 202	101, 101, 175	120	220–240

6.3 Turn the Power On and Check Indicators

Power up the system by pushing up the circuit breaker handle on the AC input box. Turn the keyswitch to the On position and then push the On/Off button under the front cover. Monitor the state of the system as it powers up.

Figure 6–3 Control Panel



Turn the power on by pushing the circuit breaker handle up (see Figure 6-1).

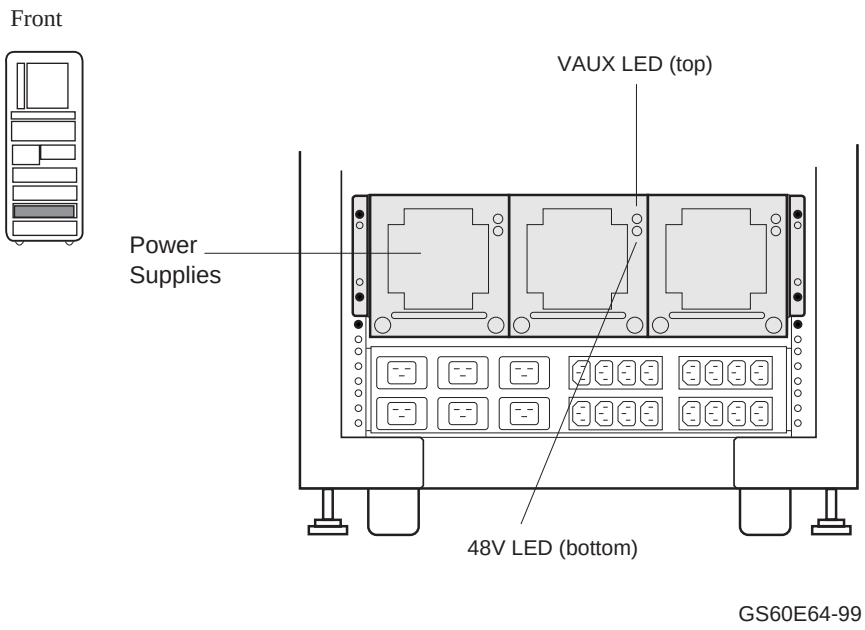
1. Go to the front of the cabinet and check that the power supply VAUX LEDs are on (see Figure 6-4).
2. Turn the control panel keyswitch to the On position.
3. Open the control panel front cover and press the On/Off pushbutton.
4. Monitor the state of the system (see LEDs in Figure 6-3) as it powers up.

***NOTE**: With the keyswitch in the On position, if all six LEDs are blinking, one or more of the power supplies has failed or a power supply is missing. With the keyswitch in the Off position, the LEDs will also blink but do not provide power supply status.*

❶	Run LED (green)	When lit, indicates system has exited console and the operating system is running.
❷	Power LED (green)	When lit, indicates system is powered on.
❸	Fault LED (yellow)	When lit, indicates that TLSB BAD is asserted.
❹	On/Off switch	With the keyswitch in the On position, system will power up when the On pushbutton is pressed. With the keyswitch in the Off position, the On/Off pushbutton is disabled.
❺	On LED (green)	Indicates power is supplied to the entire system.
❻	On/Off pushbutton	With the keyswitch in the On position, this button will power the system on or off. With the keyswitch in the Off position, this button is disabled.
❼	Secure LED (green)	Indicates input from the console device is prevented.
❽	Secure pushbutton	Pressing this button disables the primary console.
❾	Reset LED (yellow)	Indicates a system reset has occurred, clearing captured error information.
❿	Reset pushbutton	Pressing this button causes the system to reset.

The power supplies have two LEDs that indicate normal conditions and faults. When the system (keyswitch) is off, plugged in, and the circuit breakers are on, power is present only within the AC box and power supplies. The green VAUX LEDs on the power supplies should be illuminated. When the system is on, the VAUX and 48V LEDs should light (see Figure 6-4).

Figure 6–4 Power Supplies



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.

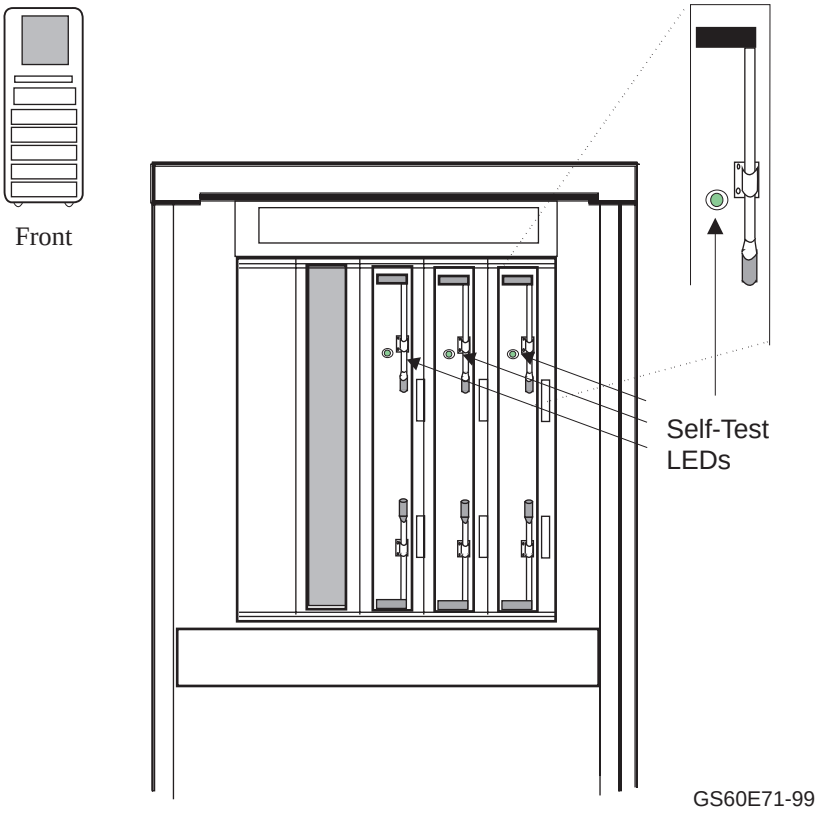
Sections in this chapter include:

- 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 of the cabinet. PCI I/O modules are not visible but some connectors have LEDs on them. Table 6-1 lists TLSB and DWLPB, the PCI motherboard, modules showing LED conditions after self-test. For conditions of LEDs on PCI adapters, see the related documentation.

Table 7–1 LEDs After Self-Test

Module	Self-Test Passed	Self-Test Failed
KN7CG[1]	Green ON	Green OFF
MS7CC	Green ON	Green OFF or ON[2]
KFTHA	Green ON	Green OFF
DWLPB[3]	Green ON	

[1] The green LED on the processor module indicates that 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.

[2] The green LED on the memory module indicates that self-test completed, not passed.

[3] The DWLPB (the PCI motherboard) has four LEDs. The self-test passed LED is the second from the hose connection.

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   M   M   .   .   P   P   P   TYP    ❷
                            o   +   +   +   .   .   ++  ++  ++  ST1    ❸
                            .   .   .   .   .   .   EE  EE  EB  BPD    ❹
                            o   +   +   +   .   .   ++  ++  ++  ST2    ❸
                            .   .   .   .   .   .   EE  EE  EB  BPD
                            o   +   +   +   .   .   ++  ++  ++  ST3    ❸
                            .   .   .   .   .   .   EE  EE  EB  BPD

                    +   +   +   +   +   +   +   .   .   .   .   +    C0 PCI +❺
                            .   .   .   .   .   .   .   .              EISA +❶
.   .   .   .   .   .   .   .   .   .   .   .   .   .   .   .   .    C1
.   .   .   .   .   .   .   .   .   .   .   .   .   .   .   .   .    C2
.   .   .   .   .   .   .   .   .   .   .   .   .   .   .   .   .    C3

                                B0  A1   A0   .   .   .   .   .   ILV
                            .  4GB  4GB  4GB  .   .   .   .   .    12GB
Compaq AlphaServer GS60E 6-6/525/4, Console V5.5 4-MAY-1999 12:06:SROM V2.1,
OpenVMS PALcode V1.57-2, Tru64 UNIX PALcode V1.50-1
P00>>>
```

❶ The NODE # line lists the (hexadecimal) node numbers on the TLSB and I/O buses. Node numbers and slot numbers are identical. For the PCI I/O subsystem, nodes 0 – B are counted from right to left.

❷ The TYP line indicates the type of module at each TLSB node:
- An adapter: the I/O port module (A) is 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 bit in the TLCNR register of each module contains this information. For the KN7CG dual processor, one CPU may pass, another fail. Entries are:
+ (pass) A ++ indicates both processors passed.
– (fail) A –+ indicates one CPU failed and one passed.
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 the 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 Line C0 indicates the self-test results for the DWLPB and all PCI adapters connected through the KFTHA's hose. In this example, self-test passed on PCI slots 0, 5, 6, 7, 8, 9, 10, and 11.

Chapter 8
Diagnostics and Utilities

After the system passes self-test, you must verify proper system operation. First verify the presence of UltraSCSI 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.

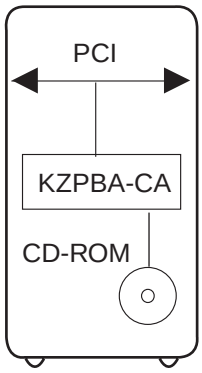
Sections in this chapter include:

- Console Load Device
- Verification Overview
- Diagnostics Overview
- Run System Self-Test
- Show Commands for Installation
- Verify SCSI Devices
- If Necessary, Run the RAID Configuration Utility
- Booting Factory Installed Software
- Booting OpenVMS from a CD-ROM
- Booting Tru64 UNIX from a CD-ROM
- Set Commands for Booting
- Booting LFU from a CD-ROM
- Running the System Exerciser VET

8.1 Console Load Device

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 Accessing the Console Load Device



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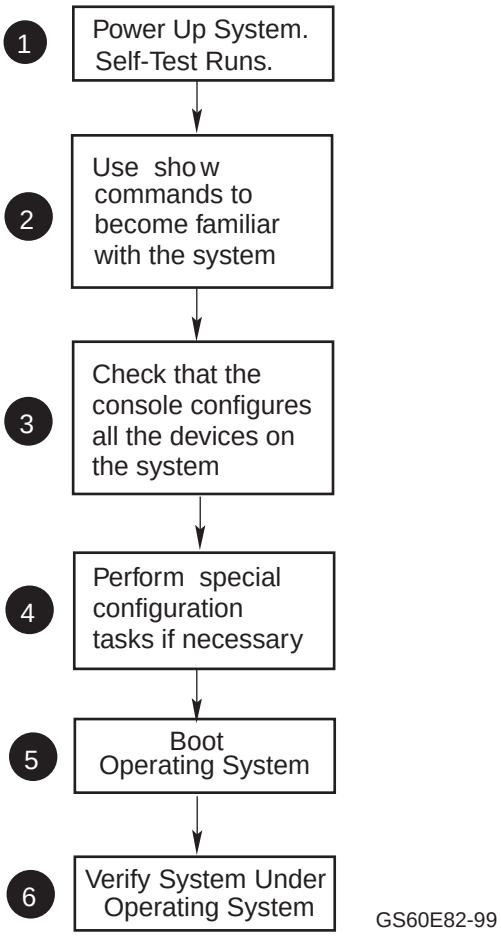
The console load device is used for:

- 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 these systems. It is installed in the system cabinet and used to access software and online documentation. The CD-ROM is installed through the KZPBA-CA in a PCI I/O subsystem. A second CD-ROM must be installed when logical partitioning is used.

8.2 Verification Overview

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

Figure 8–2 Verification Procedure



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. Troubleshoot and repair, if necessary.

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 (VET) is run under the operating system.

Figure 8–3 Diagnostic Overview

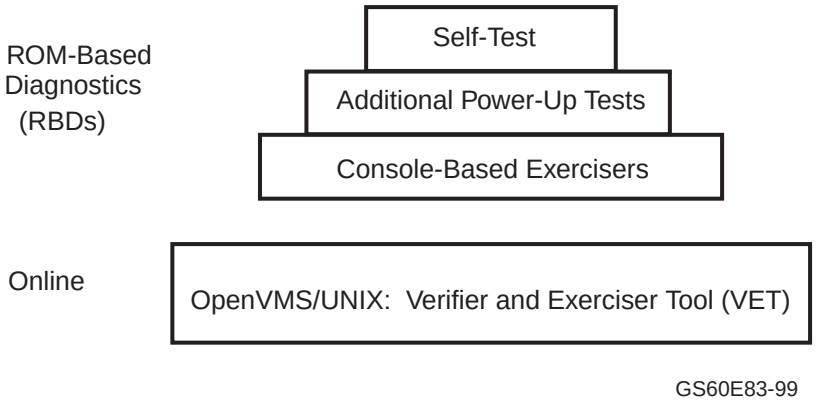


Table 8-1 lists diagnostics provided. Tests in the first two groups run at power-up. The console-based exercisers can be run from the console.

Table 8–1 Diagnostics

Test Group	Test
Self-test	CPU self-test Memory array self-test PCI adapter self-test[1] Device peripheral self-test Power subassembly self-test
Additional power-up tests	CPU/Memory interactive tests Multiprocessor tests KFTHA tests PCI tests
Console-based exerciser	Cache/Memory exerciser Disk exerciser[2] Floating-point exerciser Network exerciser[2]

[1]Self-test on 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   M   M   M   .   .   P   P   P   TYP
                        o   +   +   +   .   .   ++  ++  ++  ST1     ❶
                        .   .   .   .   .   .   EE  EE  EB  BPD
                        o   +   +   +   .   .   ++  ++  ++  ST2     ❷
                        .   .   .   .   .   .   EE  EE  EB  BPD
                        o   +   +   +   .   .   ++  ++  ++  ST3     ❷
                        .   .   .   .   .   .   EE  EE  EB  BPD

                    +   +   +   +   +   +   +   .   .   .   .   +   C0 PCI +❸
                        .   .   .   .   .   .   .   .               EISA +
.   .   .   .   .   .   .   .   .   .   .   .   .   .   .   .   C1
.   .   .   .   .   .   .   .   .   .   .   .   .   .   .   .   C2
.   .   .   .   .   .   .   .   .   .   .   .   .   .   .   .   C3

                                B0  A1   A0   .   .   .   .   .  ILV
                            .  4GB  4GB  4GB  .   .   .   .   .   12GB
Compaq AlphaServer GS60E 6-6/525/4, Console V5.5 4-MAY-1999 12:06:SROM V2.1,
OpenVMS PALcode V1.57-2, Tru64 UNIX PALcode V1.50-1
P00>>>
```

❶ Check the ST1 line in the self-test results to see that all CPU and memory modules passed self-test. Note that failing processors are disabled and appear in the ST1 line. If both processors fail, nothing appears 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 line to see that all three types of modules on the TLSB passed their tests.

❸ Check the C0 through C10 lines to determine which modules on the PCI I/O subsystem passed self-test. The example shows one PCI connected to the KFTHA through a hose. (The maximum number of PCI I/O subsystems is eleven.)

***NOTE**: If any module is badly broken on any bus, 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 the show configuration, show device, and show network commands to make sure all devices and system resources are present and "seen" by the console.

Example 8–2 Show Configuration and Show Network

```
P00>>> sho conf  ❶

      Name                 Type   Rev  Mnemonic
   TLSB
0++   KN7CG-AB             8025  0000  kn7cg-ab0
1++   KN7CG-AB             8025  0000  kn7cg-ab1
5+    MS7CC                5000  0000  ms7cc0
6+    MS7CC                5000  0000  ms7cc1
7+    MS7CC                5000  0000  ms7cc2
8+    KFTHA                2000  0000  kftha0

C0 PCI connected to kftha0             pci0
0+    SIO           4828086  0004  sio0
5+    QLogic ISP1040B   10201077  0005  isp0
6+    QLogic ISP1040B   10201077  0005  isp1
7+    QLogic ISP1040B   10201077  0005  isp2
8+    KZPAA             11011  0002  kzpaa0
9+    QLogic ISP1040B   10201077  0005  isp3
A+    QLogic ISP1040B   10201077  0005  isp4
B+    DE500-BA           191011  0030  tulip1

     Controllers on SIO                   sio0
0+    DECchip 21040-AA     21011  0023  tulip0
1+    FLOPPY                   2  0000  floppy0
2+    KBD                      3  0000  kbd0
3+    MOUSE                    4  0000  mouse0
6+    TOY                      7  0000  toy0

     EISA connected to pci0 through sio0   eisa0

P000>>> sho net ❷
polling for units on tulip0, slot 12, bus 0, hose0…
ewa0.0.0.12.0   00-00-F8-25-90-A6  Twisted-Pair
polling for units on tulip1, slot 11, bus 0, hose0…
ewa0.0.0.11.0   08-00-2B-C3-9E-9B  Twisted-Pair
```

Example 8–3 Show Device

```
P00>>> sho dev  ❸
polling for units on floppy0, slot 0, bus 1, hose4...
dva0.0.0.1100.4    DVA0                    RX26/RX23
polling for units on kzpaa0, slot 5, bus 0, hose4...
pka.7.0.5.4        pka                  Bus ID 7
dka400.4.0.5.4     DKA400                  RRD47  1206
polling for units on isp0, slot 6, bus 0, hose4...
pkb.7.0.6.4        pkb       term on    Bus ID 7  5.57
dkb0.0.0.6.4       DKB0                    RZ1CB-CS  0844
dkb100.1.0.6.4     DKB100                  RZ1CB-CS  0844
dkb200.2.0.6.4     DKB200                  RZ1CB-CS  0844
dkb300.3.0.6.4     DKB300                  RZ1CB-CS  0844
dkb400.4.0.6.4     DKB400                  RZ1CB-CS  0844
dkb500.5.0.6.4     DKB500                  RZ1CB-CS  0844
dkb600.6.0.6.4     DKB600                  RZ1CB-CS  0844
polling for units on isp1, slot 7, bus 0, hose4...
pkc.7.0.7.4        pkc       term on    Bus ID 7  5.57
polling for units on isp2, slot 8, bus 0, hose4...
pkd.7.0.8.4        pkd       term on    Bus ID 7  5.57
polling for units on isp3, slot 9, bus 0, hose4...
pke.7.0.9.4        pke       term on    Bus ID 7  5.57
polling for units on isp4, slot 10, bus 0, hose4...
pkf.7.0.10.4       pkf       term on    Bus ID 7  5.57
P00>>>
```

❶ Use the **show configuration** command to see a listing of the modules in the system. This command shows the module TLSB and PCI slot number, module name, module type, revision, mnemonic, and if self-test passed.

❷ The **show network** command displays information about network connections.

❸ 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.

Check the results of the two console commands against the manufacturing system manifest. If something is missing, it is likely broken, needs reseating, or is back ordered.

8.6 Verify SCSI Devices

8.6.1 Check SCSI Devices Using Console Commands

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

Example 8–4 Checking SCSI Devices

```
Initializing. . .                          ❶
                                  :
                                  :
                     +   +   +   +   +   +   +  .   .   .   .  +   C0 PCI +
                                  .   .   .   .   .   .   .   .          EISA +
.   .   .   .   .   .   .   .   .   .   .   .   .   .   .   .   .   C1
.   .   .   .   .   .   .   .   .   .   .   .   .   .   .   .   .   C2
.   .   .   .   .   .   .   .   .   .   .   .   .   .   .   .   .   C3

                                     B0  A1   A0   .   .   .  .  .  ILV
                                  .  4GB  4GB  4GB  .   .   .  .  .   12GB
Compaq AlphaServer GS60E 6-6/525/4, Console V5.5 4-MAY-1999 12:06:SROM V2.1,
OpenVMS PALcode V1.57-2, Tru64 UNIX PALcode V1.50-
P00>>> sho dev  ❷
polling for units on floppy0, slot 0, bus 1, hose0
dva0.0.0.1100.0    DVA0                    RX26/RX23
polling for units on isp0, slot 5, bus 0, hose0...
pka.7.0.5.0        pka       term on     Bus ID 7  5.57
dka0.0.0.5.0       DKA0                     RZ1BB-CS  0656
dka200.2.0.5.0     DKA200                   RZ1CB-CS  0844
dka300.3.0.5.0     DKA300                   RZ1CB-CA  LYJ0
dka400.4.0.5.0     DKA400                   RZ1CB-CS  0844
dka500.5.0.5.0     DKA500                   RZ1CB-CS  0844
polling for units on isp1, slot 6, bus 0, hose0...
pkb.7.0.6.0        pkb       term on     Bus ID 7  5.57
dkb0.0.0.6.0       DKB0                     RZ1CB-CS  0844
dkb100.1.0.6.0     DKB100                   RZ1CB-CS  0844
dkb200.2.0.6.0     DKB200                   RZ1CB-CS  0844
dkb300.3.0.6.0     DKB300                   RZ1CB-CS  0844
dkb400.4.0.6.0     DKB400                   RZ1CB-CS  0844
dkb500.5.0.6.0     DKB500                   RZ1CB-CS  0844
dkb600.6.0.6.0     DKB600                   RZ1CB-CS  0844
polling for units on isp2, slot 7, bus 0, hose0...
pkc.7.0.7.0        pkc       term on     Bus ID 7  5.57
dkc0.0.0.7.0       DKC0                     RZ1CB-CS  0844
dkc100.1.0.7.0     DKC100                   RZ1CB-CS  0844
dkc200.2.0.7.0     DKC200                   RZ1CB-CS  0844
               :
               :
P00>>>
```

Basics:

- There are four ways to attach to SCSI devices:
  – KZPSA, a PCI adapter with a FWD SCSI port
  – KZPSC, the RAID adapter with one to three FWD SCSI ports
  – KZPBA-CA, a PCI to UltraSCSI single-ended controller
  – KZPBA-CB, a PCI to UltraSCSI FWD controller
- Each port has a maximum of eight nodes per bus, including the initiator or host.
- Each modular storage shelf (BA36R) has a power supply and can hold up to seven 3.5" SBBs (such as RZIBB), two 5.25" SBBs (such as the RZ69 or RRD47 drives), or a combination of these.
- SCSI configurations vary depending upon the particular adapter being used. Read the manuals associated with each adapter to learn the configuration rules.

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:

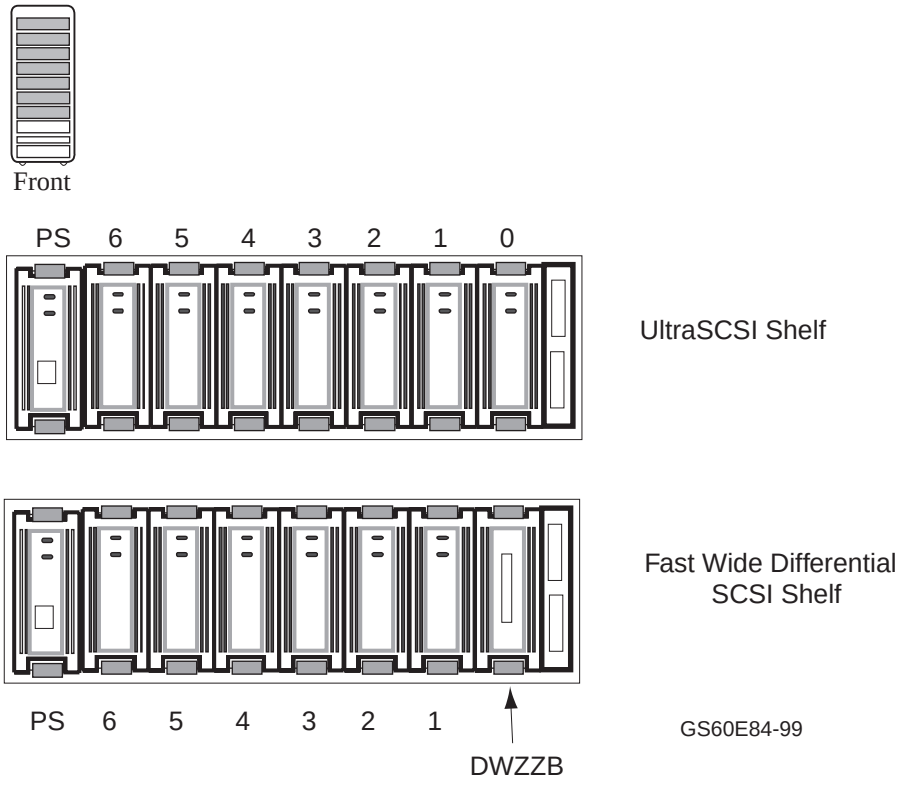
❶ The system goes through self-test. Check that the KFTHA, the KZPBA, the DWLPB, KZPSA, and/or the KZPSC adapters passed self-test.

❷ Issue a **show device** command. This example shows three KZPBAs; isp0, isp1, and isp2. Isp0 is in PCI slot 5 on hose0, isp1 is in PCI slot 6 on hose 0, and isp2 is in PCI slot 7 on hose 0.

8.6.2 Check Console Output Against Physical Device

Next check the output from the show device command against the physical SBBs in the cabinet(s).

Figure 8–4 SCSI Disks in StorageWorks Shelves



Check the output from the **show device** command against the physical SBBs. There should be a one-to-one correspondence between SBBs reporting to the console and the physical devices mounted. 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 right to left (see Figure 8-4).

Each SBB has two LEDs. The green LED on the tops lights when the SBB is mounted and is being accessed. For a complete discussion of StorageWorks LED status, see the *StorageWorks Solutions Configuration Guide* (EK-BA350-CG).

If you have problems seeing devices, reseat the SBBs and reissue **show device**. If you need further testing, use the **test** command. Refer to BA36R documenta–tion if you need to reconfigure the buses.

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 the RCU. See the KZPSC documentation for detailed information on configuring the devices. The RCU software is on a floppy and requires a KFE72.

Example 8–5 Running RCU

```
P00>>>  set arc_enable on   ❶
P00>>>  initialize   ❷

            [Console display appears]

P00>>>  run rcu  -p  1
          ❸      ❹
```

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 can operate in several different modes, and the customer should determine how to customize the disk farm. RCU enables the choices. Prior to running the utility, you should read the documentation and discuss which mode the customer wishes. Example 8-5 show how to run RCU.

Place the RAID Configuration Utility floppy in the floppy drive.

❶ Use the **set** command to turn on the **arc_enable** environment variable.

❷ Use the **initialize** command to initialize the system and to make the **set** command take effect.

❸ After self-test completes, enter **run rcu** to identify what programs to run. The **run** command defaults to the floppy as the source of the program for execution so no device need be specified.

❹ **-p 1** specifies that PCI**1** is to be configured.

8.8 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 8–6 Booting the Operating System

```
P00>>> show bootdef_dev ❶
       bootdef_dev             dk200.2.0.2.0
P00>>> show boot_osflags       ❷
       boot_osflags            0     [for OpenVMS]
             or
       boot_osflags     a      [for UNIX]
P00>>>  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 V7.1-2  ❹
```

Example 8-6 shows the OpenVMS Alpha operating system as the factory installed software. Had the Tru64 UNIX operating system been installed, slight variations in the output show would have occurred.

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 Tru64 UNIX, the operating system will come up in multiuser mode. See the *AlphaServer GS60E 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.

8.9 Booting OpenVMS from a CD-ROM

This section shows how to boot OpenVMS from the CD-ROM drive. The first step is to issue the show device command to determine the mnemonic of the CD drive. This method of booting OpenVMS replaces standalone backup.

Example 8–7 CD-ROM OpenVMS Boot

```
P00>>> sho dev                                  ❶
polling for units on floppy0, slot 0, bus 1, hose0...
dva0.0.0.1100.0    DVA0                         RX26/RX23
polling for units on isp0, slot 4, bus 0, hose0...
pka.7.0.4.0        pka       term on     Bus ID 7  5.57
dka0.0.0.4.0       DKA0                     RZ1CB-CS  0844
dka100.1.0.4.0     DKA100                   RZ1CB-CS  0844
dka200.2.0.4.0     DKA200                   RZ1CB-CS  0844
dka300.3.0.4.0     DKA300                   RZ1CB-CS  0844
dka400.4.0.4.0     DKA400                   RZ1CB-CS  0844
polling for units on kzpaa0, slot 5, bus 0, hose0...
pkb.7.0.5.0        pkb                      Bus ID 7
dkb500.5.0.5.0     DKB500                   RRD47  1206
polling for units on isp1, slot 6, bus 0, hose0...
pkc.7.0.6.0        pkc       term on     Bus ID 7  5.57
polling for units on isp2, slot 7, bus 0, hose0...
pkd.7.0.7.0        pkd       term on     Bus ID 7  5.57
polling for units on isp3, slot 8, bus 0, hose0...
pke.7.0.8.0        pke       term on     Bus ID 7  5.57
polling for units on cipca0, slot 10, bus 0, hose0...
pua.4.0.10.0       pua                      Bus ID 4  A315
pua.0.0.10.0       node 0  HSJ000  HSJ  V52J HSJ5
              :
dua65.2.0.10.0     $7$DUA65  (HSJ02)        HSX0
P00>>>
P00>>> boot dkb500          ❷
(boot dkb500.5.0.5.0 -flags 0)
SRM boot identifier: scsi 0 5 0 5 500 ef00 11000 ❸
boot adapter:kzpaa0  rev 2 in bus slot 5 off of kftha0 in TLSB slot8
block 0 of dkb500.5.0.5.0 is a valid boot block
              :
jumping to bootstrap code
       OpenVMS (TM) Alpha Operating System, Version V7.1-2  ❹
%SMP-I-SECMSG, CPU #01 message:   P01>>>START
              :
%SMP-I-CPUTRN, CPU #01 has joined the active set.
              :
$! Copyright(c) 1998 Digital Equipment Corporation. All rights reserved
       Installing required known files...
```

```
      Configuring devices...
%EWA0, Twisted-Pair(10baseT) mode set by console
            :
************************************************************
   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)  Upgrade, install or reconfigure OpenVMS Alpha Version V7.2
    2)  Display products and patches that this procedure can install
    3)  Install or upgrade layered products and patches
    4)  Show installed products
    5)  Reconfigure installed products
    6)  Remove installed products
    7)  Execute DCL commands and procedures
    8)  Shut down this system

Enter CHOICE or ? for help: (1/2/3/4/5/6/7/8/?)
```

❶ **Show device** displays information about each I/O device. Polling checks the DWLPB for device configurations. The next line contains four columns. The first column contains the device type and unit number, node number, device channel number, the internal PCI 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, and the fourth column shows the revision of the device. The CD drive in this case is the RRD47 and its mnemonic is DKD500.

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, **b** is the boot device controller designation, and **500** specifies the hexadecimal unit number of the boot device. The **5** is the node number, **0** is the channel number, **5** is the PCI 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 8-7 shows that several choices can be made when booting OpenVMS in this manner. Make the appropriate choice and continue. (Note that by choosing option 7, Execute DCL commands and procedures, you can back up your system disk. Standalone backup is replaced by this method of booting OpenVMS.)

8.10 Booting Tru64 UNIX from a CD-ROM

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

Example 8–8 CD-ROM UNIX Boot

```
P00>>> sho dev                                    ❶
polling for units on floppy0, slot 0, bus 1, hose4...
dva0.0.0.1100.0    DVA0                    RX26/RX23
polling for units on kzpaa0, slot 5, bus 0, hose4...
pka.7.0.5.4        pka                   Bus ID 7
dka400.4.0.5.4     DKA400                   RRD47  1206
polling for units on isp0, slot 6, bus 0, hose4...
pkb.7.0.6.4        pkb       term on     Bus ID 7  5.57
dkb0.0.0.6.4       DKB0                     RZ1CB-CS  0844
dkb100.1.0.6.4     DKB100                   RZ1CB-CS  0844
dkb200.2.0.6.4     DKB200                   RZ1CB-CS  0844
dkb300.3.0.6.4     DKB300                   RZ1CB-CS  0844
dkb400.4.0.6.4     DKB400                   RZ1CB-CS  0844
dkb500.5.0.6.4     DKB500                   RZ1CB-CS  0844
dkb600.6.0.6.4     DKB600                   RZ1CB-CS  0844
polling for units on isp1, slot 7, bus 0, hose4...
pkc.7.0.7.4        pkc       term on     Bus ID 7  5.57
polling for units on isp2, slot 8, bus 0, hose4...
pkd.7.0.8.4        pkd       term on     Bus ID 7  5.57
polling for units on isp3, slot 9, bus 0, hose4...
pke.7.0.9.4        pke       term on     Bus ID 7  5.57
polling for units on isp4, slot 10, bus 0, hose4...
pkf.7.0.10.4       pkf       term on     Bus ID 7  5.57
P00>>>

P02>>>boot dka400                  ❷
(boot dka400.4.0.5.4 -flags a)              ❸
SRM boot identifier: scsi 4 5 0 4 400 ef00 11000
boot adapter:kzpaa0 rev 2 in bus slot 5 off of kftha1 in TLSB slot 7
block 0 of dka400.4.0.5.4 is a valid boot block
reading 16 blocks from dka400.4.0.5.4
bootstrap code read in
base = 200000, image_start = 0, image_bytes = 2000
initializing HWRPB at 2000
GCT base = 20012e000
              :
              :
setting affinity to the primary CPU
              :
```

```
jumping to bootstrap code

Digital UNIX boot - Mon Apr 12 12:39:50 EDT 1999
Loading vmunix ...
[I/O subsystem reset information, memory information displayed, I/O
         bus adapters displayed, configured devices displayed,
network
         configuration information, partitioning information
displayed]
The system is ready.

The Installation Guide contains more information about installing
DIGITAL UNIX.

1) Default Installation
2) Custom Installation
3) UNIX Shell

Enter your choice:          ❹
```

❶ **Show device** displays information about each I/O device. Polling checks the DWLPB for device configurations. The next line contains four columns. The first column contains the device type and unit number, node number, device channel number, the internal PCI 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, and the fourth column shows the revision of the device. The CD drive in this case is the RRD47 and its mnemonic is DKD400.

❷ In the **boot** command, **dk** is the device code of the boot device, **a** is the boot device controller designation, and **400** specifies the hexadecimal unit number of the boot device. The **4** is the node number, **0** is the channel number, **5** is the PCI node number, and **4** 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 Select the type of installation desired and follow the instructions after which the operating system banner appears and the user is given the **login:** prompt.

8.11 Set Commands for Booting

Use the set command to define a default boot device as shown in Example 8-9.

Example 8–9 Set Boot Commands

```
P00>>> set boot_reset on      ❶
P00>>> set bootdef_dev dka200.2.0.0.0     ❷
P00>>> set boot_osflags “0,6”             ❸
P00>>> boot                   ❹

      [the system 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.*

8.12 Booting LFU from a CD-ROM

The Loadable Firmware Update (LFU) Utility is on the Alpha CD-ROM (PN AG-RCFB*-BS). Make sure this CD-ROM is mounted in the CD drive and then boot LFU.

Example 8–10 AlphaServer GS60E 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                          RZD47  440C
dkd500.5.0.5.0      DKD500                          RZ26L  440C
P00>>>  boot dkd400  -fl 0,a0                       ❷
Building FRU table. . . . . . . . .
(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
initialing machine state
setting affinity to the primary CPU
jumping to bootstrap code
Bootfile:[gs140]gs140_V55_10.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>         ❹
```

❶ Use the **show device** command to find the mnemonic of the CD-ROM drive.

❷ Enter the **boot** command to boot from the RRD47. The RRD47 has a device name of dkd400.

❸ Supply the bootfile directory and name: [gs140]gs140_vXX_XX.exe, where the XXs are subject 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-RCFB*-BS).

❹ 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.

8.13 Running the System Exerciser VET

Run the System 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-RCFB*-BS) before running it. Example 8-11 shows a sample VET user session. Refer to the System Verification Software documentation for details on invoking the Verification Software exercisers.

Example 8–11 Sample VET User Session for Command Mode

```
$ 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 exec for device CPU.
…starting [Process 2, Pass 1] group exec for device CPU.
…starting [Process 3, Pass 1] group exec for device MEMORY.
…starting [Process 4, Pass 1] group exec for device MEMORY.
…starting [Process 5, Pass 1] group exec for device FILE.
…starting [Process 6, Pass 1] group exec for device FILE.
…completed [process 1] group exec for device CPU.
…completed [process 2] group exec for device CPU.
…completed [process 5] group exec for device FILE.
…completed [process 6] group exec for device FILE.
```

Table 8-2 lists the VET exercisers and descriptions.

Table 8-2 Verification Software 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 8-11 the user enters the **vet** command 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 issued the **load** command. **Load** 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 this example, two processes are selected for the CPU device, memory device, and file device.

❹ Enter the **start** command to begin testing.

Example 8-11 Sample VET User Session (Continued)

```
^C    ❺
…stopping [Process 4] group exer for device MEMORY.
…stopping [Process 3] group exer for device MEMORY.
VET_suspend> show runtime ❻
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 ❼
…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=0.❽
VET_setup> exit ❾
$
```

❺ The user enters a Ctrl/C to suspend executing processes. VET enters the suspend execution state.

❻ Enter show runtime to list the requested, elapsed, and remaining run times of each process.

❼ 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 ❽).

❽ Enter exit to exit the VET program. The system prompt is displayed.

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