AlphaServer GS160/320

Upgrade Manual

Order Number: EK-GS320-UP. D01

This manual is for service providers of *HP AlphaServer* GS160/320 systems. It discusses system expansion and upgrade of an original system with faster CPUs.

Hewlett-Packard Company

August 2002

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Any modifications to this device—unless expressly approved by the manufacturer—can void the user’s authority to operate this equipment under part 15 of the FCC rules.

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Compliance with these directives implies conformity to the following European Norms (in brackets are the equivalent international standards):

EN55022 (CISPR 22) - Electromagnetic Interference

EN50082-1 (IEC801-2, IEC801-3, IEC801-4) - Electromagnetic Immunity

EN60950 (IEC950) - Product Safety

Warning!

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Achtung!

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Attention!

Ceci est un produit de Classe A. Dans un environnement domestique, ce produit risque de créer des interférences radioélectriques, il appartiendra alors à l'utilisateur de prendre les mesures spécifiques appropriées.

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Preface

Intended Audience

This manual is for service providers of *HP AlphaServer* systems. It discusses system upgrades and CPU upgrades for GS160/320 systems.

Document Structure

This manual uses a structured documentation design. Topics are organized into small sections, usually consisting of two facing pages. Most topics begin with an abstract that provides an overview of the section, followed by an illustration or example. The facing page contains descriptions, procedures, and syntax definitions.

This manual has five chapters and an appendix.

- **Chapter 1, Overview,** provides a conceptual introduction to the system.
- **Chapter 2, Upgrade to Two System Boxes,** discusses the requirements and procedures for upgrading an *AlphaServer* GS160 from one system box to two system boxes.
- **Chapter 3, Upgrade to Two System Cabinets,** describes how to upgrade a GS160 system to a GS320 system.
- **Chapter 4, System Power-Up,** describes how to power up the system and when to boot the operating system.
- **Chapter 5, Upgrade Component Installation,** describes the installation procedures of a system box, CPU module, power subrack, PCI box, and power supplies. The chapter ends with a discussion of the configuration rules for the expander cabinet.
- **Appendix A, Upgrades Using B4166 and B4168 CPUs,** discusses how to upgrade an original (blue cabinet) system to a new (black cabinet) system that operates with faster CPUs.

Documentation Titles

Table 1 HP AlphaServer GS160/320 Documentation

Title	Order Number
QA–6GAAA–G8	AlphaServer GS80/160/320 Documentation Kit
EK–GS320–UG	*AlphaServer GS80/160/320 User's Guide*
EK–GS320–RM	*AlphaServer GS80/160/320 Firmware Reference Manual*
EK–GSPAR–RM	*AlphaServer GS80/160/320 Getting Started with Partitions*
EK–GS320–IN	*AlphaServer GS160/320 Installation Guide*
EK–GSR80–IN	*AlphaServer GS80 Installation Guide*
AG–RKSW*–BE	AlphaServer GS80/160/320 User Information CD
QA–6GAAB–G8	AlphaServer GS80/160/320 Service Documentation Kit
EK–GS320–SV	*AlphaServer GS80/160/320 Service Manual*
EK–GS320–RM	*AlphaServer GS80/160/320 Firmware Reference Manual*
AG–RKSZ*–BE	AlphaServer GS80/160/320 Service Information CD
EK–GSCON–IN	*AlphaServer GS80/160/320 System Management Console Installation Guide*
EK–GSCON–UG	*AlphaServer GS80/160/320 System Management Console User Guide*
EK–GS320–UP	*AlphaServer GS160/320 Upgrade Manual*
EK–GSR80–UP	*AlphaServer GS80 Upgrade Manual*
EK–GS320–SP	*AlphaServer GS80/160/320 Site Preparation*
EK–GSHPG–RM	*AlphaServer GS160/320 CPU Online Addition and Removal*

Information on the Internet

Visit the HP Web site at www.compaq.com/alphaserver for service tools and more information about the *AlphaServer* GS160/320 systems.

Chapter 1
Overview

The *AlphaServer* GS160/320 systems are high-performance server platforms designed for enterprise-level applications. They are distinguished by their versatility and high degree of scalability and expandability.

These powerful, switch-based systems use four Alpha microprocessors per quad building block (QBB). Two QBBs paired back-to-back and rotated 180^{0} with reference to each other form a system box. Each QBB backplane contains a switch that acts as an interconnect between the CPU modules, memory modules, I/O riser modules, and the global port module.

1.1 The Systems

The GS160/320 system consists of a power cabinet and one system cabinet (GS160) or two system cabinets (GS320), depending on the configuration. The power cabinet contains the power supplies, the I/O components—the PCI boxes and storage units—and the OCP. The system cabinets house the system boxes that carry interconnect modules as well as CPU and memory modules.

The system cabinet can be configured with one or two system boxes. The first system box is located in the lower cavity of the cabinet and the second system box is inserted in the upper cavity. A fully configured system consists of a power cabinet and two system cabinets—system cabinet 1 and system cabinet 2—each system cabinet containing two system boxes.

In a single system box system a distribution board interfaces the two QBBs directly through their global ports. In configurations with more than one system box a hierarchical switch replaces the distribution board and adds a second level switch to route information between the system boxes.

Additional PCI boxes and storage shelves can be accommodated in expander cabinets that can be attached to either side of the system.

1.2 System Diagrams

1.2.1 Block Diagrams

Figure 1–1 shows the block diagram of a GS160 system with a single system box installed. A distribution board makes the interconnect between the QBBs through their global ports.

Figure 1–1 GS160 Block Diagram

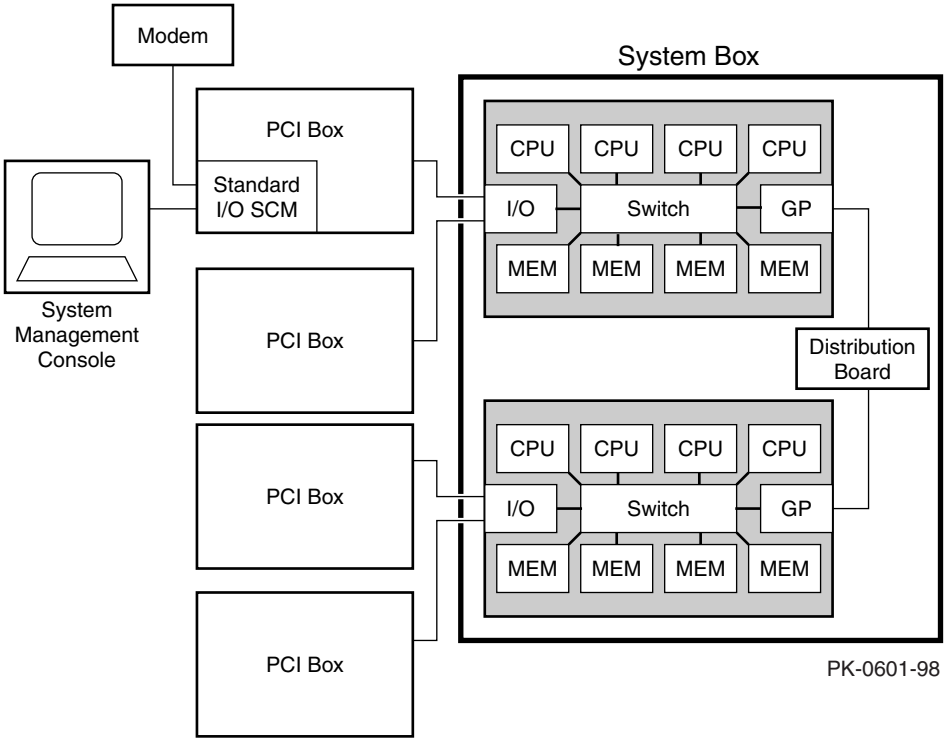


Figure 1–2 shows a block diagram of a GS160 with two system boxes. A hierarchical switch makes the interconnect between the QBBs in the two system boxes through their global ports.

Figure 1–2 GS160 Block Diagram

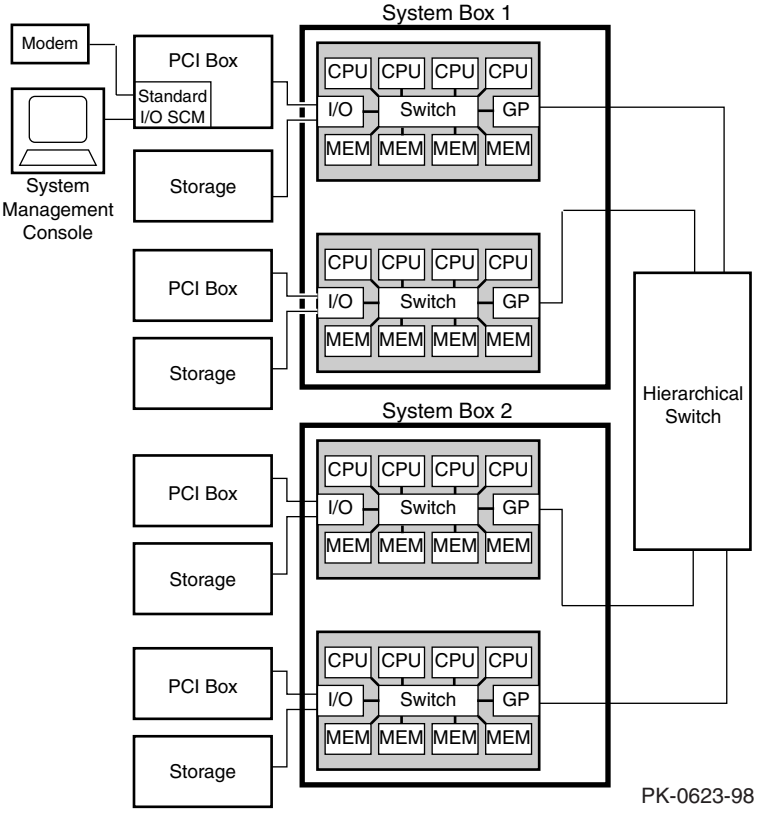
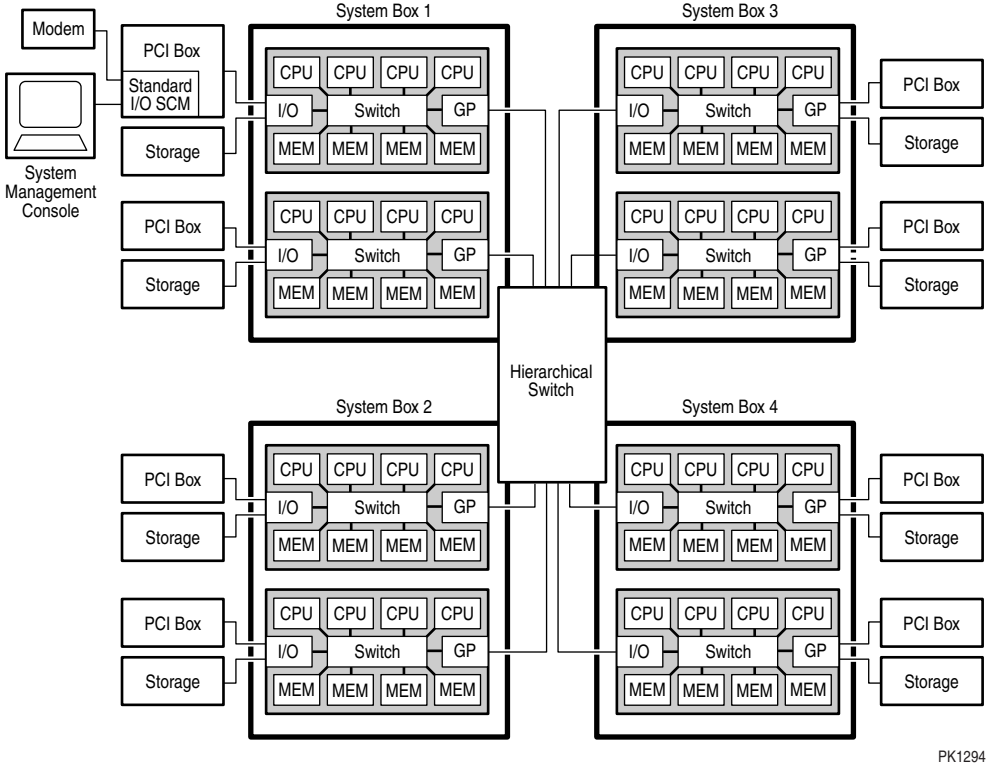


Figure 1–3 shows a block diagram of a GS320 with four system boxes. A hierarchical switch makes the interconnect between the QBBs in the four system boxes through their global ports.

Figure 1-3 GS320 Block Diagram



1.2.2 Physical Diagrams

Figure 1–4 shows a fully configured GS160 system.

Figure 1-4 GS160 Physical Diagram

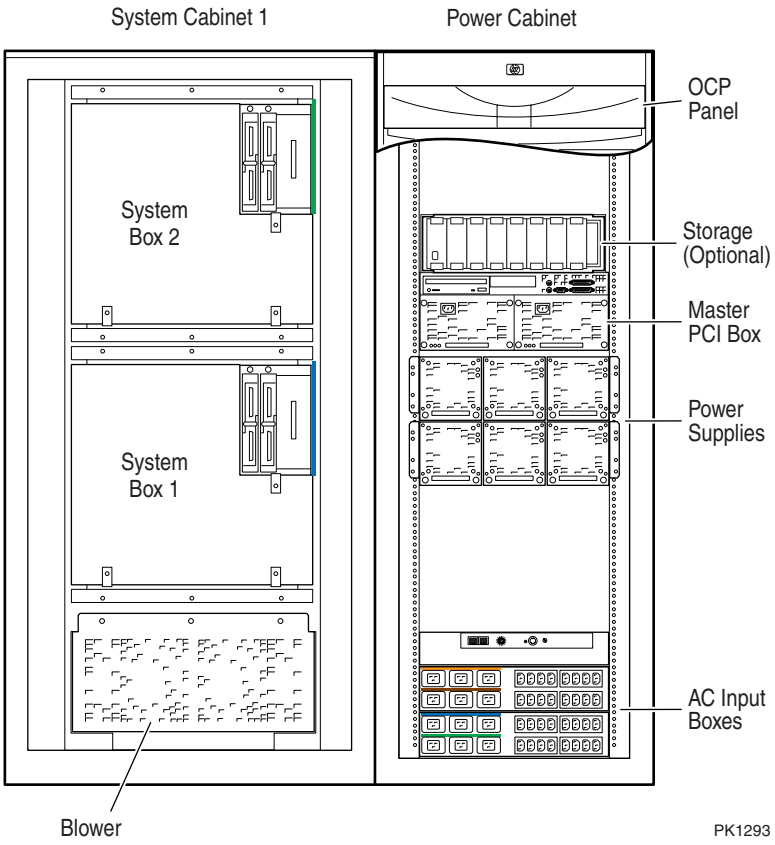
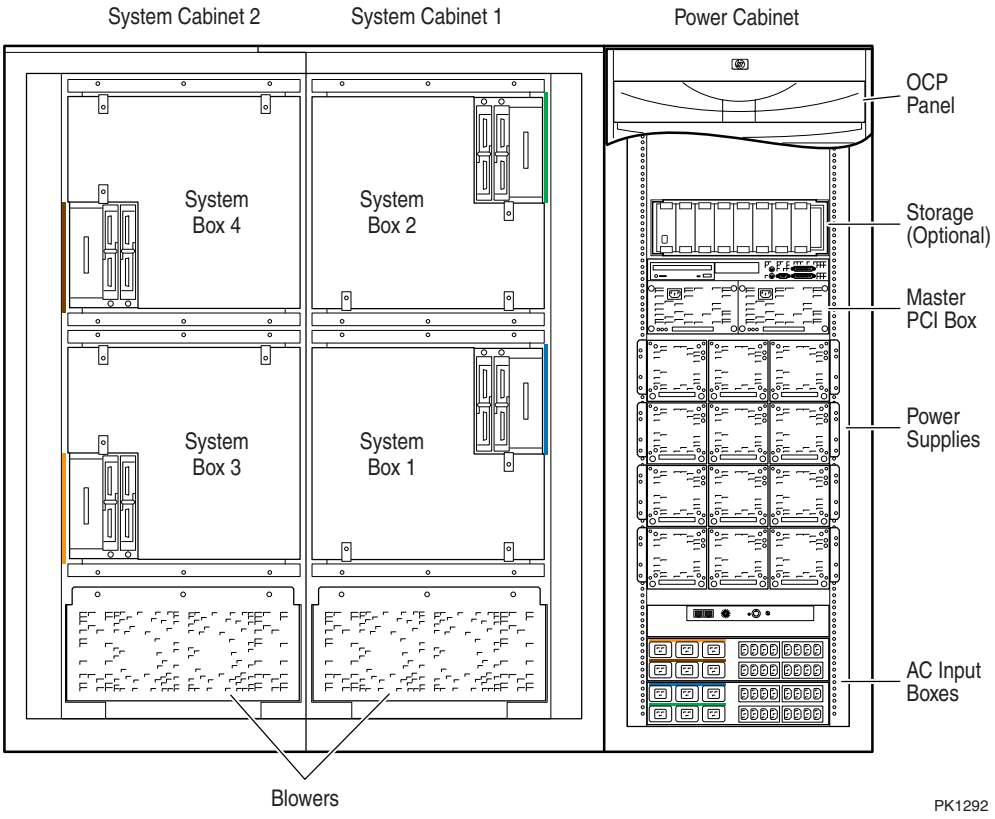


Figure 1–5 shows a fully configured GS320 system.

Figure 1-5 GS320 Physical Diagram



1.3 Cabinets

Table 1–1 shows the model number of cabinets and power requirements for systems operating in various electrical environments.

Table 1–1 Cabinet Models and Power Requirements

Cabinet Model	Power Requirement
System Cabinet 1 H9A21-AA	Not Applicable
System Cabinet 2 H9A21-AB	Not Applicable
Power Cabinet H9A20-BA (North American/Japanese)	120-208V
Power Cabinet H9A20-BB (European)	380-415V
Expander Cabinet H9A20-AA (North American)	120V
Expander Cabinet H9A20-AB (European)	220-240V
Expander Cabinet H9A20-AC (North American/Japanese)	200-240V

1.4 Color Codes

System boxes and the associated power subracks and cables are color-coded for ease of reference and identification. Table 1–2 shows the color codes used for the system components.

Table 1-2 Color Codes of System Components

System Components	Color Code
System box 1,subrack 1, AC breakers, outlets, cables	Blue
System box 2,subrack 2, AC breakers, outlets, cables	Green
System box 3,subrack 3, AC breakers, outlets, cables	Orange
System box 4,subrack 4, AC breakers, outlets, cables	Brown

1.5 Upgrades

Upgrades of the GS160/320 are conducted at two levels: component and system. At the component level, an upgrade consists of the addition of either a PCI box or a storage unit. At the system level, upgrade procedures depend on the existing system, and the configuration to which the system needs to be brought up.

1.5.1 Component Addition

Additional PCI boxes and storage units are installed either in the power cabinet or, if the power cabinet is full, in an expander cabinet attached to either side of the system. Additional expander cabinets can accommodate further component upgrades. The placement order of PCI boxes and storage units in expander cabinets must follow the configuration rules given in Chapter 5.

1.5.2 System Box Addition

A system box is added to the following systems:

- A GS160 with a single system box
- A GS320 with three system boxes
- In an upgrade of a GS160 system to a GS320 system

To add a second system box to a single system box GS160 system, you need to install the (green) system box in system cabinet 1 and replace the distribution board assembly with a hierarchical switch. You must also install the associated power subrack and power supplies in the dedicated area in the power cabinet.

The addition of the fourth system box to a three system box GS320 system is similar to the addition of the second system box except that in this case the system is already equipped with a hierarchical switch. Install the (brown) system box in system cabinet 2. You must also install the associated power subrack and power supplies in the dedicated area in the power cabinet.

The addition of a third (or third and fourth) system box requires an upgrade from GS160 to GS320. In this case you must join system cabinet 2 to system cabinet 1. If system cabinet 2 has the system box(es) already installed, then make the appropriate power subrack installations and cable connections.

1.5.3 Original System Upgrade

In this upgrade, the original 4-Mbyte B-cache B4125 CPUs are replaced with faster B4166 CPUs (8-Mbyte B-cache) or B4168 CPUs (16-Mbyte B-cache); or B4166 or B4168 CPUs are added to the existing system. The original system has the following characteristics:

1. The system cabinet is blue.
2. The system drawer(s) supports 4 Mbytes of CPU B-cache.
3. The system contains 731 MHz B4125 CPUs only.
4. The system runs on a 9.6 ns clock.

The addition of B4166 or B4168 CPUs to an existing system with B4125 CPUs results in a partial upgrade. In a fully upgraded system, all system drawers would support the size of the CPU's B-cache, and all B4125 CPUs would be replaced with B4166 or B4168 CPUs.

The rules and procedures for upgrading an original system are discussed in Appendix A.

Chapter 2
Upgrade to Two System Boxes

This chapter discusses the requirements and procedures for upgrading an *AlphaServer* GS160 from one system box to two system boxes. To upgrade a one system box GS160 system to a two or more system-box system, you must remove the distribution board assembly and replace it with a hierarchical switch.

The upgrade procedure consists of the following operations:

- Removal of the distribution board assembly
- Installation of the hierarchical switch
- Installation of a power subrack (green)
- Installation of the second system box (green)
- Power-up

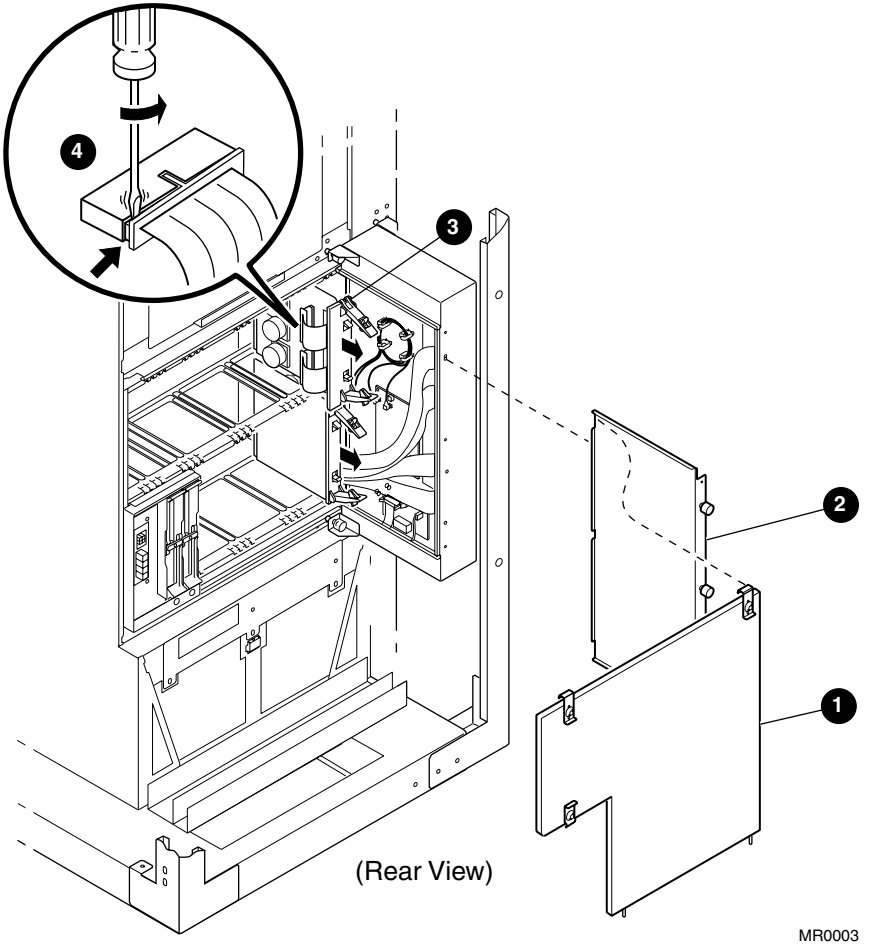
Procedures for the removal of the distribution board assembly, the installation of the hierarchical switch, cable connections, and system preparation for booting are given in the subsequent sections.

The installation procedures for the system box and the corresponding subrack are given in Chapter 5. Power-up is discussed in Chapter 4.

2.1 Removing the Distribution Board Assembly

Remove the distribution board assembly as shown in Figure 2–1 and Figure 2–2.

Figure 2–1 Removing the Distribution Board Assembly (1)

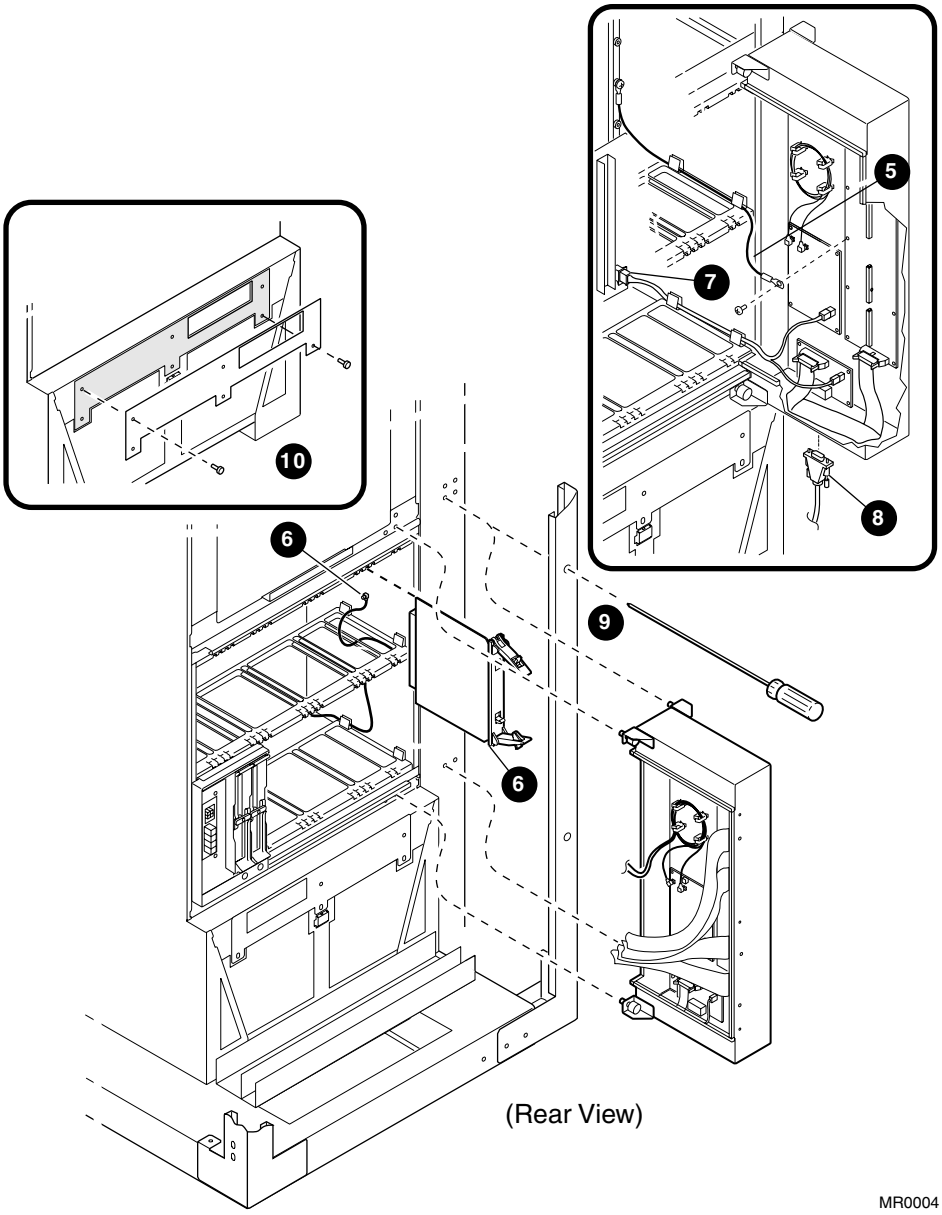


Remove the distribution board assembly as follows:

1. Remove EMI covers from front and rear of the blue system box ❶.
2. Loosen the two captive screws holding the EMI cover to the distribution board assembly and remove the assembly EMI cover ❷.
3. Pull front global port module from system box ❸ and detach global port cables using a flat-blade screwdriver ❹. Repeat for rear global port module.
4. Disconnect ground cable from distribution board assembly ❺ (see Figure 2–2.
5. Pull the clock splitter module half way out from the rear quadrant of the blue system box and disconnect the clock cable ❻. Reinsert the clock splitter module without locking it in place. Repeat the step for the front quadrant by first removing the adjacent filler module.
6. Disconnect the power cable from the backplane ❼.
7. Disconnect the CSB cable ❽.
8. Loosen the four captive screws holding the distribution board assembly to the cabinet ❾. You will need the 12-inch Phillips screwdriver (included in the H-switch installation kit) to reach the two screws through the holes on the cabinet rail.
9. Pull the distribution board assembly out.
10. Remove the screw on the fan mounting bracket and turn the bracket 180° to expose the plenum opening ❿. Turn the rubber gasket to match the opening. Tighten back the screw on the fan mounting bracket.

You have now removed the distribution board assembly and prepared the system cabinet for the installation of the H-switch and the plenum.

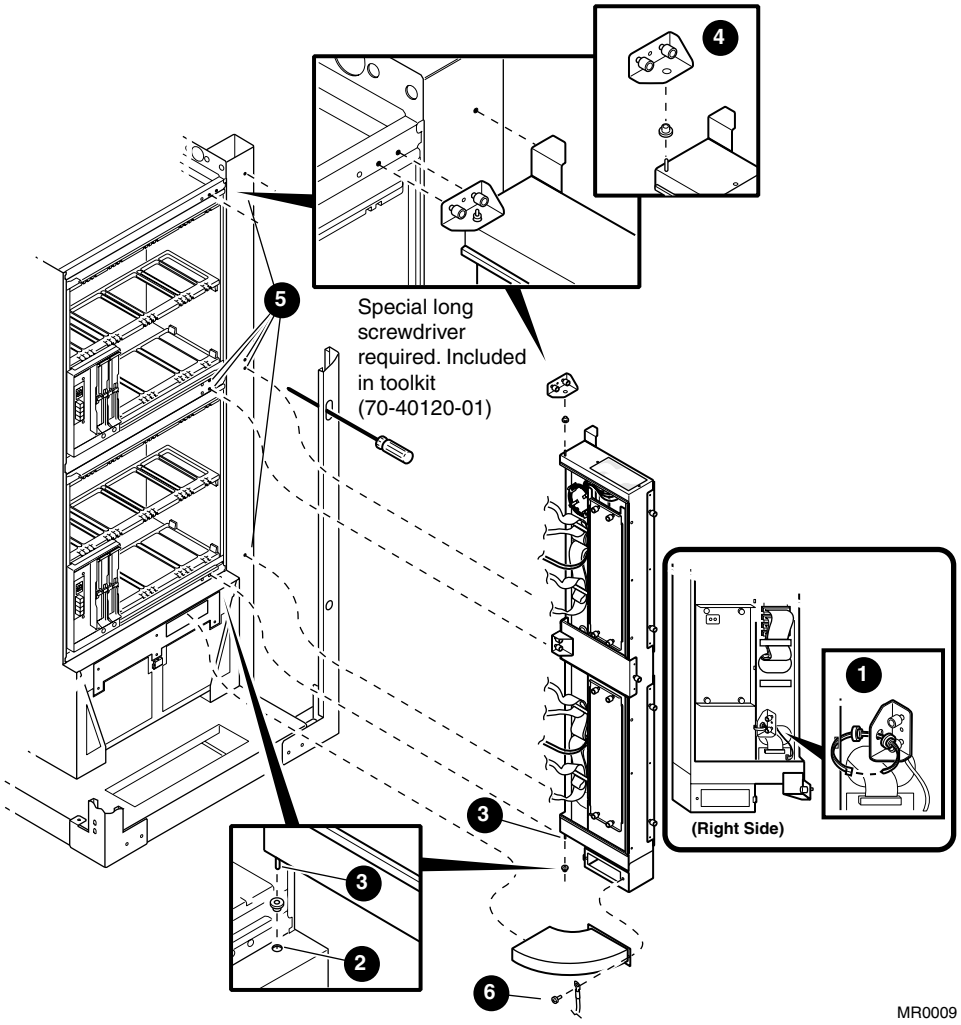
Figure 2–2 Removing the Distribution Board Assembly (2)



2.2 Installing the Hierarchical Switch

Figure 2–3 shows how to install the H-switch.

Figure 2–3 Installing the Hierarchical Switch



Install the H-switch as follows:

1. Remove the shipping covers from the front and rear of the green system box and install the green system box as explained in Chapter 5.
2. Remove EMI covers from the front and rear of the green system box.
3. Unpack the H-switch and the plenum.
4. Remove the pivot bracket and pivot bushing set from the H-switch by cutting the wrap ❶.
5. Install the bushing in the hole in the cabinet frame ❷.
6. Insert the lower pivot pin on the H-switch ❸ through the bushing on the cabinet frame.
7. Seat the pivot bracket and bushing on the upper H-switch pivot and tighten the captive screws on the bracket to the cabinet ❹. At this point the H-switch should be rotating freely on the pivots.
8. Attach the H-switch to the cabinet frame by securing captive screws ❺ (six pieces) on both sides of the H-switch frame.
9. Slide the rear end of the plenum through the plenum hole in the cabinet until it latches in place. Attach the other end of the plenum to the H-switch with a single screw ❻. Also attach the ground cable (17-04991-01).

You have now secured the H-switch and the plenum. Next you must make the cable connections. You must connect five types of cables:

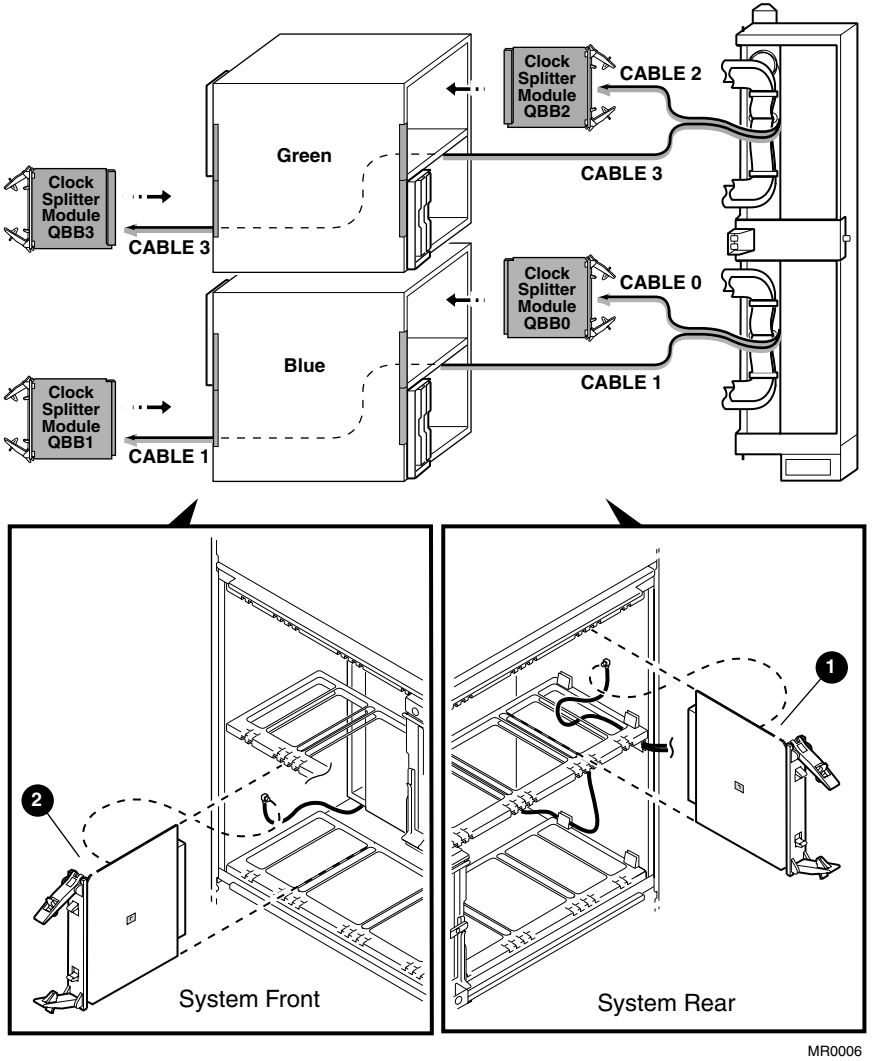
- Clock cables
- Power cables
- Global port cables
- Ground cables
- CSB cable

CAUTION: *Always wear an antistatic wrist strap when working on the system. Wrist wraps are located on the front and rear doors of system cabinet 1 and on the rear door of the power cabinet.*

2.3 Connecting the Clock Cables

Connect the clock cables as shown in Figure 2–4.

Figure 2–4 Connecting the Clock Cables



Connect the clock cables as follows:

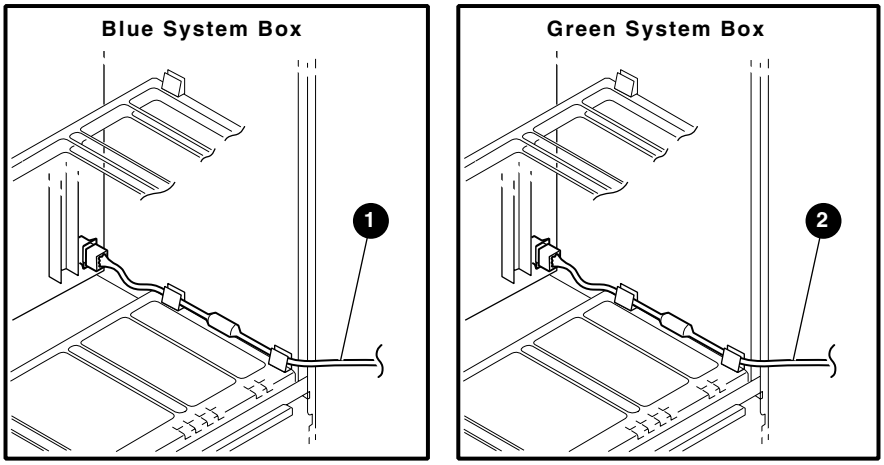
1. Pull the clock splitter module of the blue rear quadrant half way out. Route the "0" clock cable on the H-switch to the clock module and connect it to the clock module connector ❶. Secure the clock cable to the frame by passing the cable through the clamps on the frame. Push the clock module in and lock it in place.
2. Remove filler module adjacent to the clock splitter module in the blue front qudrant (not shown). Pull the clock splitter module of the blue front quadrant half way out. Route the "1" clock cable on the H-switch through the opening under the backplane directing it toward the front quadrant. Secure the clock cable to the system box by passing the cable through the cable clamps as shown on the frame. Connect the cable to the clock module connector ❷. Push the clock module in and lock it in place.
3. Repeat steps 1 and 2 for the green system box, connecting the clock cables "2" and "3" to the clock modules of the rear and the front quadrants, respectively.

You have now made the clock splitter module connections.

2.4 Connecting the Power Cables

Connect the power cables as shown in Figure 2–5.

Figure 2–5 Connecting the Power Cables



Connect the power cables as follows:

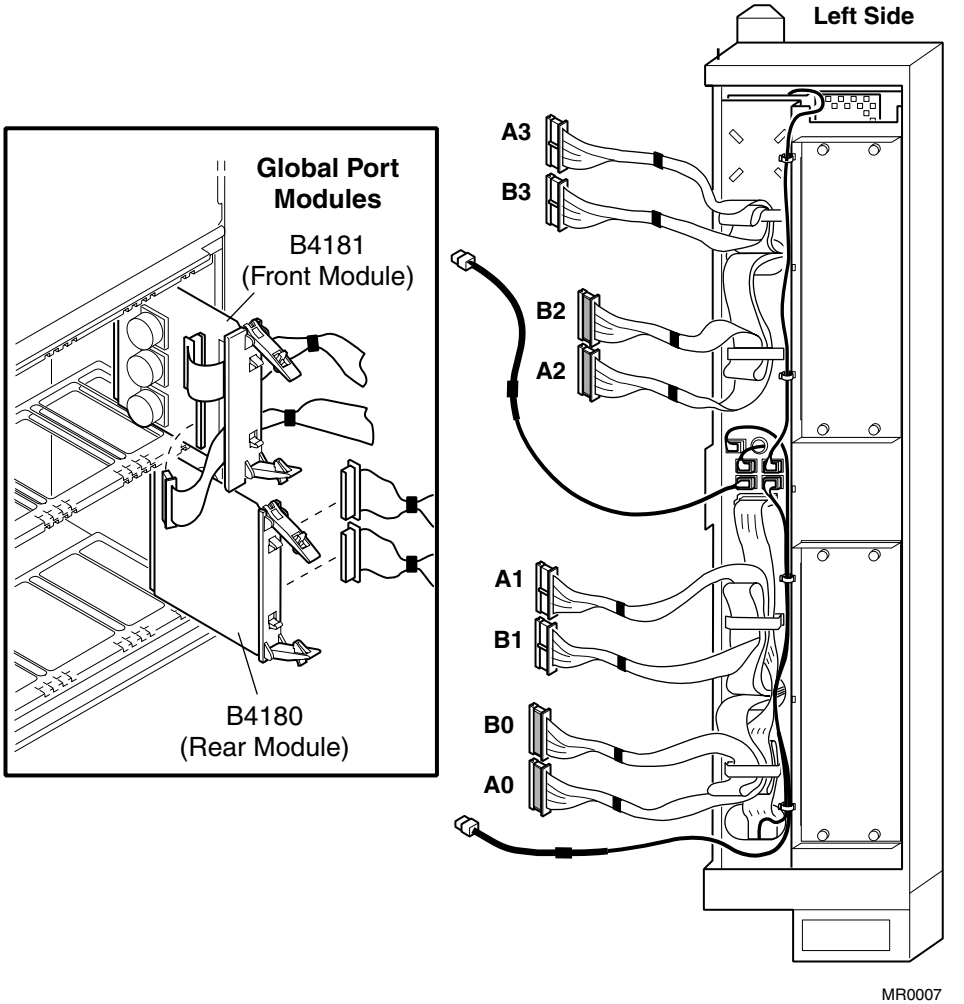
1. Connect the power cable ❶ to the backplane in the rear of the blue system box. Route the power cable through clamps.
2. Repeat step 1 for the green system box ❷.

You have now made power connections to the blue and green system boxes.

2.5 Connecting the Global Port Cables

Each global port module has two connectors. Attach the global port module connectors as shown in Figure 2–6.

Figure 2–6 Connecting the Global Port Cables



There are two global port modules on each system box. Each global port module has two connectors, “A” and “B”. “A” connectors on the “A” cables connect to “A” connectors on the global modules and the “B” connectors on the global port cables connect to the “B” connectors on the global port modules.

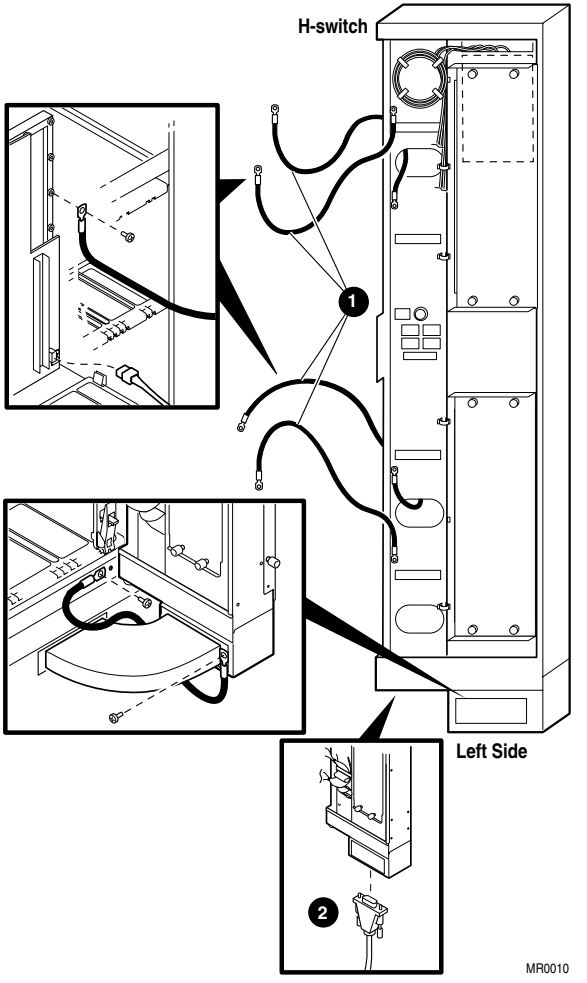
Make the connections to the global port modules of the blue system box as follows:

1. Connect the blue cable “A0” on the H-switch to the “A” connector on the global port 0 module.
2. Connect the blue cable “B0” on the H-switch to the “B” connector on the global port 0 module.
3. Insert the global port module 0 into the lower backplane slot.
4. Pass the blue “A1” cable through the slot on global module 1 and connect it to the “A” connector on the opposite side of the global port 1 module (upper backplane).
5. Pass the blue “B1” cable through the slot on global module 1 and connect it to the “B” connector on the opposite side of the global port 1 module (upper backplane).
6. Flip the global port module 1 and insert it into the upper backplane slot. There should be only one twist in the cable.
7. Repeat steps 1 to 6 to make H-switch global port connections to the green system box. Always make sure that connector “A” on the global port cable is connected to connector “A” on the global port module and connector “B” on the global port cable is connected to connector “B” on the global port module. The connectors are “A2” and “B2” for the lower quadrant and “A3” and “B3” for the upper quadrant of the green system box. Make sure all global port cables are fully seated on both ends.

2.6 Connecting GRD Cables and the CSB Cable

Attach the ground cables and the CSB cable as shown in Figure 2–7.

Figure 2–7 Connecting Ground Cables



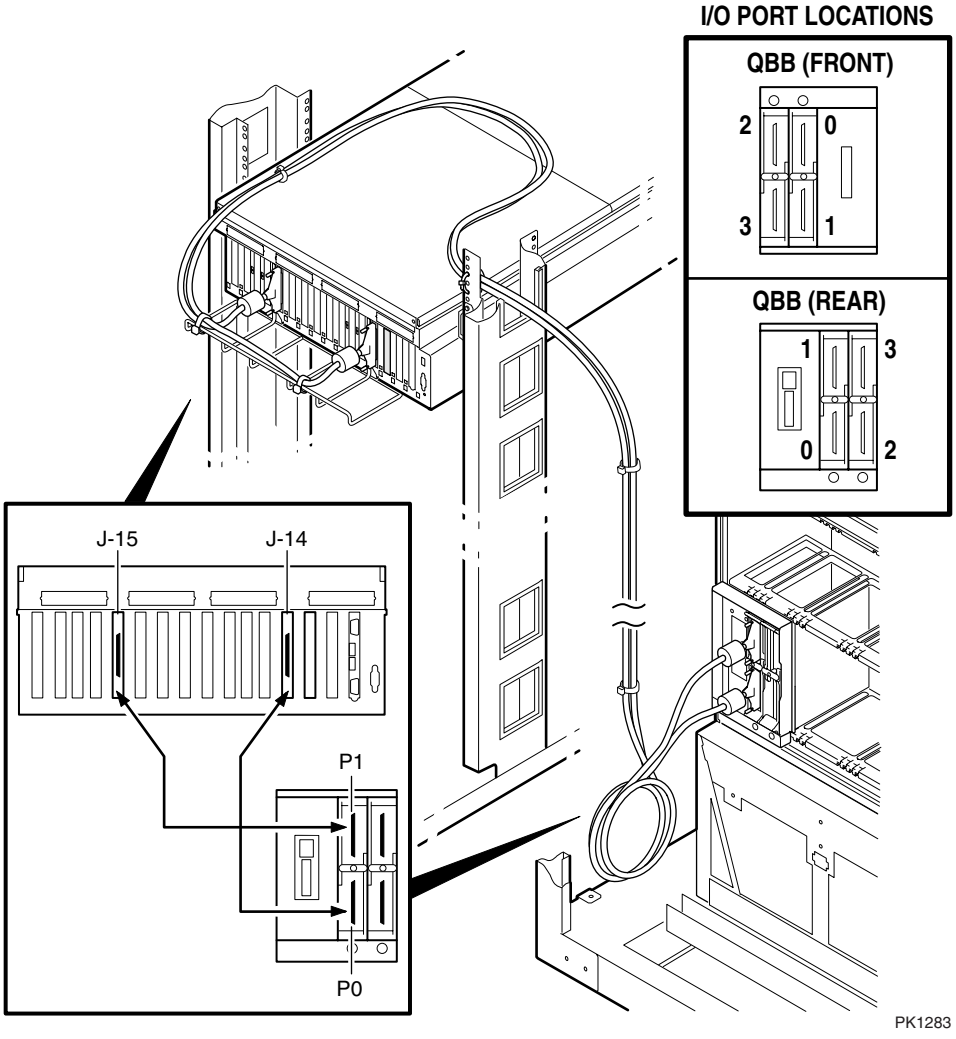
Attach the ground cables and the CSB cable as shown in Figure 2–7:

1. Attach the ground cables ❶ to the system cabinets using existing screws on the H-switch.
2. Connect the CSB cable to the H-switch ❷.

2.7 I/O Hose Connections

Connect the hose cables from the local I/O riser ports to the remote risers in the PCI boxes.

Figure 2–8 I/O Hose Connections



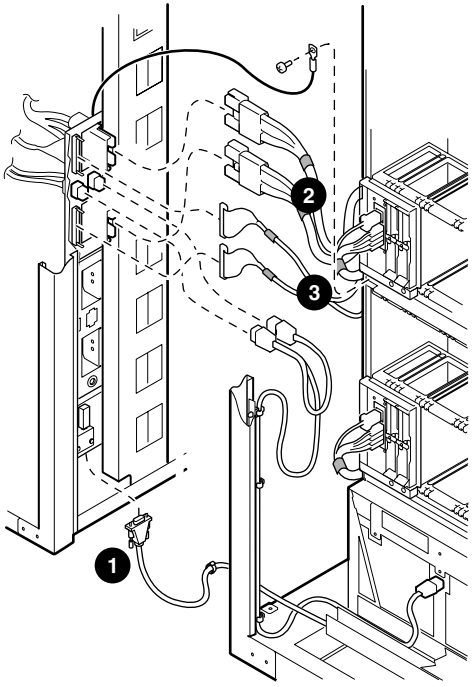
Connect the hose cables from the local I/O riser ports to the remote risers in the PCI boxes. Figure 2–8 shows typical connections of I/O hoses between the local I/O riser ports and the remote risers in the PCI box. Note that Port 0 (or Port 2) is connected to J14 on the PCI box and Port 1 (or Port 3) is connected to J15.

NOTE: *Use label to identify port number and QBB number on both ends of the I/O hose.*

2.8 Preparing System for Booting

Replace the service cover on the H-switch and make DC power and signal cable connections (Figure 2–9). Power up the system and set the serial number at the SRM prompt.

Figure 2–9 DC Power and Signal Connections



To prepare the system for booting you must do the following:

1. Reinstall the EMI covers on the H-switch.
2. Reinstall the EMI covers on the blue and green system boxes.
3. Make the CSB cable connection ❶ between the H-switch and the CSB adapter and terminator on the power cabinet (if not connected).
4. Connect the DC power cables ❷ and the DC signal cables ❸. The power and signal cables are color-coded. Signal cables for the system box are located right next to the connector on the system box.

The system has now been upgraded from one system box to two system boxes and is ready for booting. The procedures for powering up and booting the system are detailed in the *AlphaServer GS80/160/320 User's Guide*, *AlphaServer GS80/160/320 Service Manual,* and the *AlphaServer GS160/320 Installation Guide*.

NOTE: *Following the completion of the system upgrade use the SRM* **`set system serial`** *command to set the system serial number. See the AlphaServer GS80/160/320 Service Manual for details.*

Chapter 3
Upgrade to Two System Cabinets

This chapter describes how to upgrade a GS160 system to a GS320 system. Prior to the upgrade, consult the *AlphaServer GS80/160/320 Site Preparation* manual to ensure that appropriate measures are taken for the desired system expansion. The upgrade consists of the following operations:

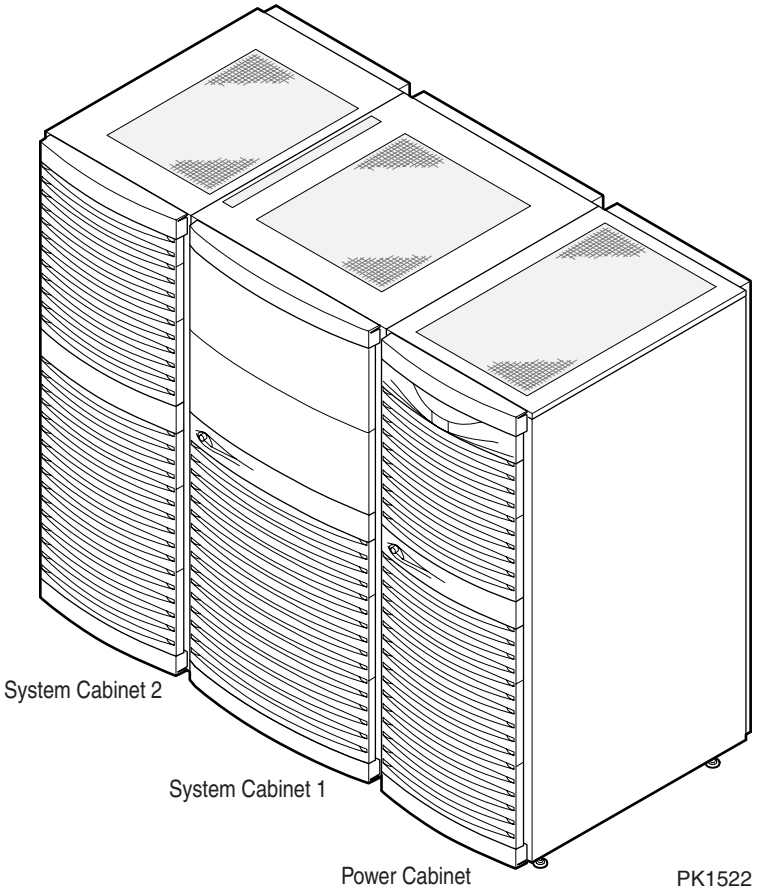
- Joining system cabinet 2 to system cabinet 1
- Installation of power subracks (orange and brown)
- Installation of the third (orange) and fourth system box (brown)
- Power-up

The installation procedures for the system boxes and the corresponding subracks are given in Chapter 5. Power-up is discussed in Chapter 4.

3.1 AlphaServer GS320 System

The basic AlphaServer GS320 system is contained in three cabinets: power cabinet; system cabinet 1; system cabinet 2. Figure 3–1 shows a basic AlphaServer GS320 system.

Figure 3–1 AlphaServer GS320 System



The GS320 system consists of two system cabinets (system cabinet 1 and system cabinet 2) and a power cabinet. The power cabinet contains the operator control panel, up to four power subracks (one power subrack for each system box), up to eight AC input boxes (two per system box) with power supplies, a 14-slot PCI box assembly (BA54A), and a PCI box mounting and accessory kit (CK-BA54A). System cabinet 1 contains two system boxes. System cabinet 2 may contain one or two system boxes. A hierarchical switch is attached to system cabinet 1.

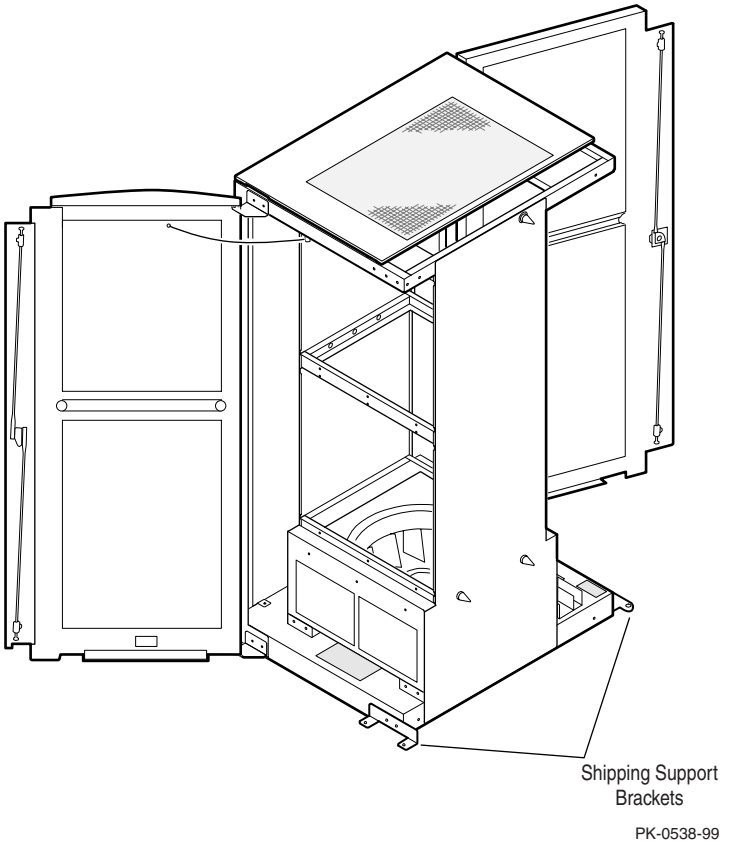
Expander cabinets are used for additional PCI boxes and storage shelves. Optional dual-AC switches can be attached to the power cabinet to ensure uninterrupted power supply to the system.

A system upgrade from GS160 to GS320 requires the addition of system cabinet 2, which is attached to system cabinet 1 of the existing system.

3.2 System Cabinet 2

Figure 3–2 shows system cabinet 2. It is similar to system cabinet 1. It contains a blower and can accommodate two system boxes.

Figure 3–2 System Cabinet 2 Assembly (H9A21-BA)



System cabinet 2 is similar to system cabinet 1. It contains up to two system boxes. It is joined to system cabinet 1 to expand the system configuration from two system boxes to three or four system boxes.

Refer to the Illustrated Parts Breakdown (EK-GS320-IP) for system cabinet parts.

3.3 Upgrading GS160 to GS320

Prepare the site for the expansion of the system. Make sure that you have the tools needed for the installation. Following the installation, wait for any condensation on the metal surfaces to evaporate before powering up the system. Table 3–1 gives the joining kits required for the installation. Only kit 70-40121-01 is needed to join system cabinet 2 to system cabinet 1.

Table 3–1 Joining Kits Required for Installation

Joining Kit	Part Number
Power cabinet to system cabinet 1 (part of power cabinet assembly)	70-40120-01
System cabinet 2 to system cabinet 1	70-40121-01
Expander cabinet to power or system cabinet	70-40120-02

System cabinet 2 is joined to system cabinet 1. Certain preparations need to be made before joining system cabinet 2 to the existing system. Before you start any installation procedure:

1. Ensure that the site is properly prepared for expansion of the system. Refer to the *AlphaServer GS80/160/320 Site Preparation* manual for spatial guidance, system specifications, and power requirements.
2. Roll system cabinet 2 off pallets.
3. Remove all protective packaging.
4. Ensure that you have the appropriate joining kit.

Install system cabinet 2 in four stages:

1. Prepare system cabinet 1 for installation.
2. Prepare system cabinet 2 for installation.
3. Join system cabinet 2 to system cabinet 1.
4. Make cable connections to system cabinet 2.

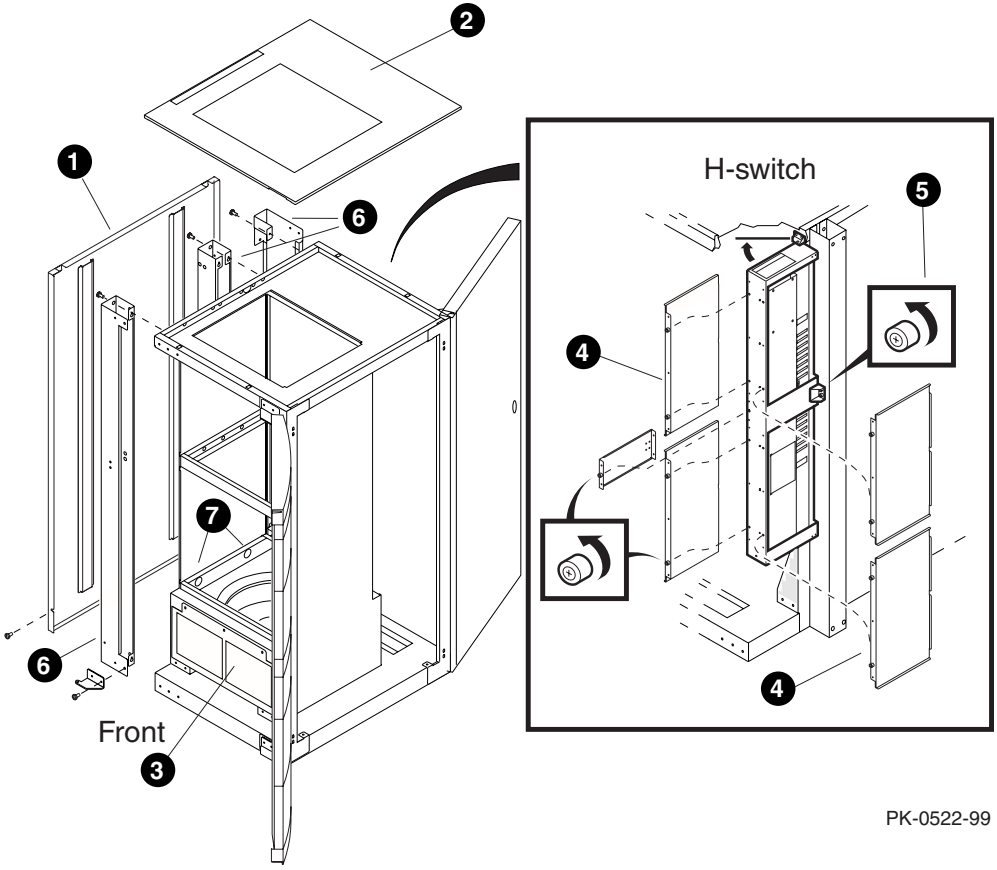
After you have finished installing system cabinet 1, hand the shipping brackets to the customer to keep for later use. Shipping brackets are required for moving the system.

WARNING: Before you power up the system, inspect the modules for any visible sign of water condensation on the heatsinks, DC-to-DC converters, and the CPUs. Due to the large mass of the GS160/320 system, condensation may occur during transfer from a cold to a warm environment. Allow time for the condensation to evaporate completely. DO NOT power the system up if you notice any indication of condensation.

3.3.1 Preparing System Cabinet 1 for Joining

Figure 3-3 shows how to prepare system cabinet 1 for joining.

Figure 3-3 Preparing System Cabinet 1 for Joining



Position system cabinet 1 at the predetermined location. Lower the corner leveling feet on system cabinet 1 until the system cabinet is anchored and the casters are free to rotate. Release the tie wraps on the CSB cable and hose cables that are coiled and attached to the sides of system cabinets for later routing.

Prepare system cabinet 1 for joining.

1. Remove the left side panel ❶, top cover ❷, and blower ❸.
2. Remove system box rear covers (not shown) and hierarchical switch (H-switch) covers ❹.
3. Loosen the H-switch mounting screws and gently rotate the H-switch toward system cabinet 1 ❺.
4. Remove the support pieces on the left side of the system cabinet, as well as the fastening hardware ❻. These pieces will not be reinstalled.
5. Remove the two labels that cover the lower alignment holes ❼.

NOTE: *If you are upgrading a single-system box system with a distribution board assembly attached to system cabinet 1, you must replace the distribution board assembly with a hierarchical switch. Procedures for the removal of the distribution board assembly and the installation of the hierarchical switch are given in Chapter 2.*

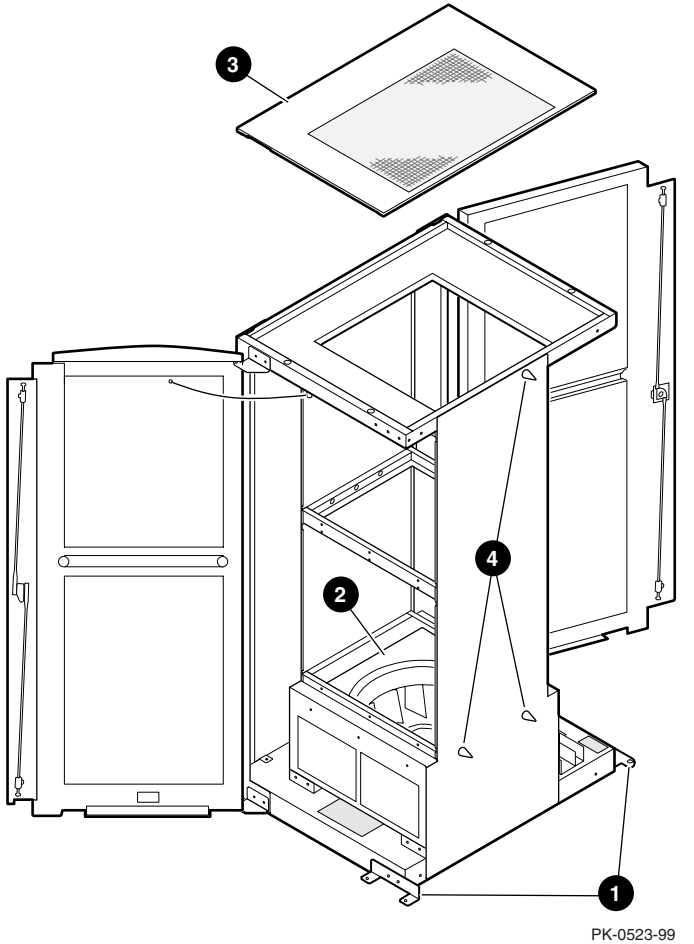
---

6. Raise all system cabinet 1 leveling feet.
7. Loosen joining screws from system cabinet 1 to power cabinet.

3.3.2 Preparing System Cabinet 2 for Joining

Figure 3–4 shows how to prepare system cabinet 2 for joining.

Figure 3–4 Preparing System Cabinet 2 for Joining



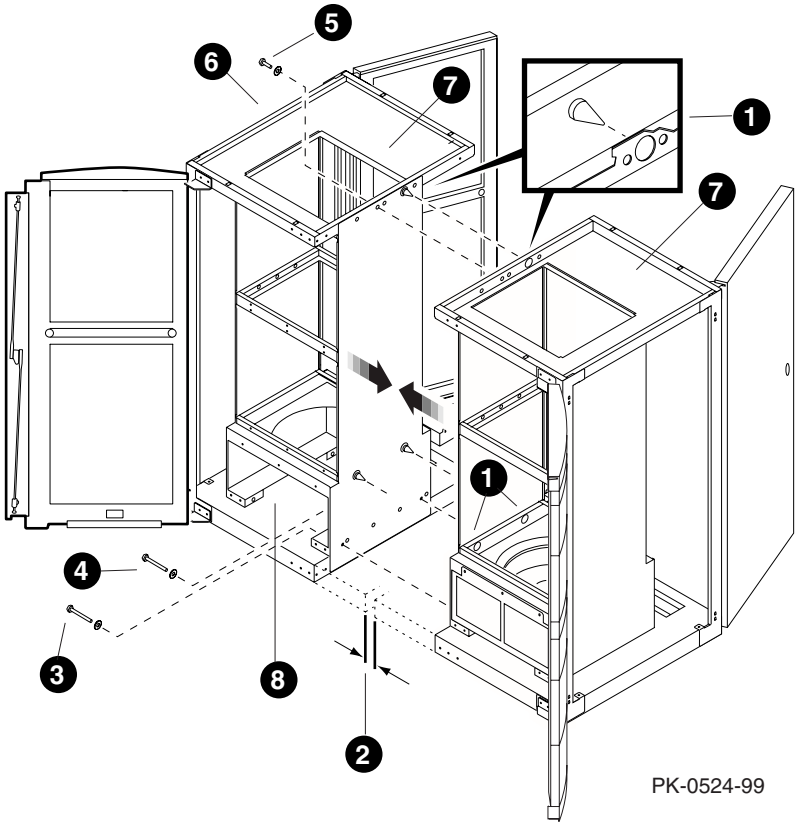
Prepare system cabinet 2 for joining.

1. Remove and discard the shipping brackets (front and rear) ❶.
2. Remove the blower ❷. Remove the fastening screws at the front and rear of the system cabinet and disconnect the power cable harness. Pull the blower out from the front of the cabinet.
3. Remove the top cover ❸. Open front and rear doors of the cabinet and gently lift off the top cover.
4. Remove the protective sleeves on the tapered pins ❹.
5. Make sure all the leveling feet are up so the cabinet can move freely.

3.3.3 Joining System Cabinet 2 to System Cabinet 1

Figure 3–5 shows how to join system cabinet 2 to system cabinet 1.

Figure 3–5 Joining System Cabinet 2 to System Cabinet 1

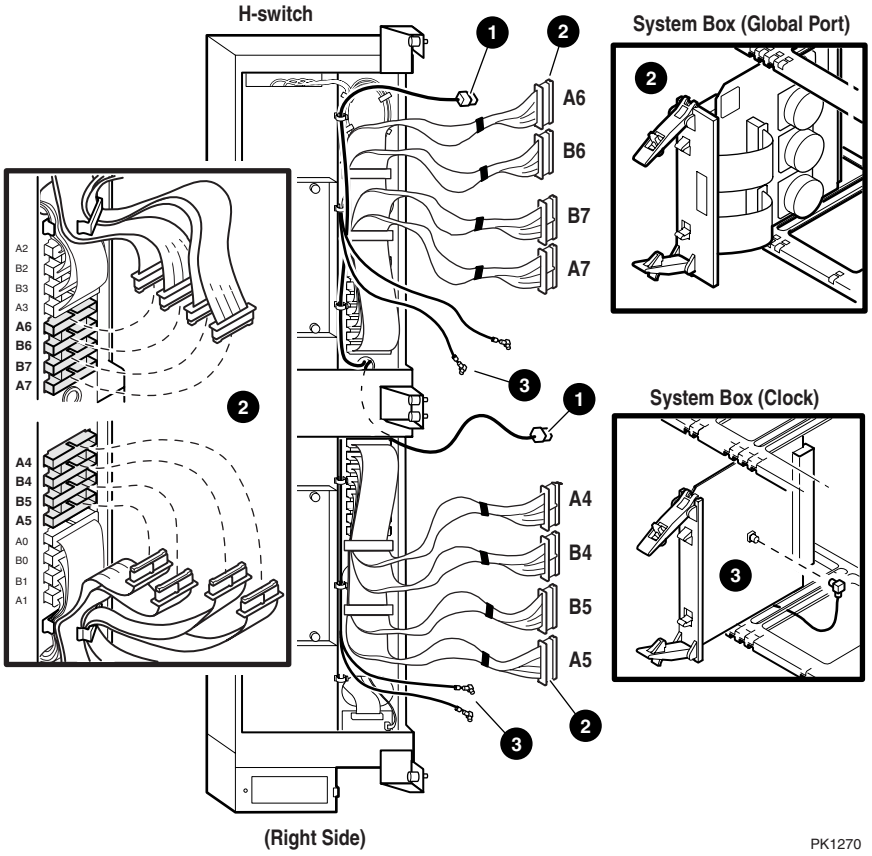


Join system cabinet 2 to system cabinet 1.

1. Position system cabinet 2 to the left of system cabinet 1. Note the taper pins on system cabinet 2 and the corresponding alignment holes on system cabinet 1 ❶.
2. With the front of the system cabinet bases aligned, roll system cabinet 2 toward system cabinet 1 until there is a minimum separation between the frames ❷.
3. From the accessory hardware bag shipped with system cabinet 2, remove and assemble items (bolts with washers) pointed to by ❸, ❹, and ❺ in Figure 3–5 (wrench supplied with kit).
4. Loosely thread item into hole at front of system cabinet 2 base ❸ and another item at rear of system cabinet 2 base ❹.
5. Thread item next to the upper taper pin ❺.
6. Tighten the three bolts in the sequence ❹, ❺, ❸.
7. Reinstall side panel on the left of system cabinet 2 ❻.
8. Reinstall top covers ❼.
9. Reinstall blower in system cabinet 2 ❽.

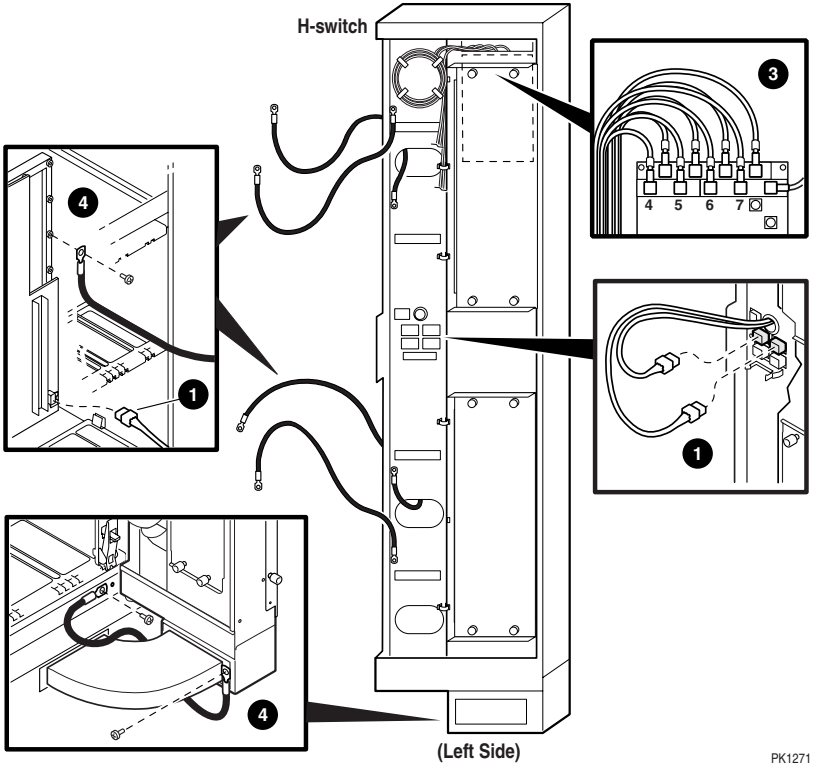
10. Make system box 3 and system box 4 cable connections to the H-switch. The connections include power ❶, the global ports ❷, clock modules ❸ (see Chapter 2 for illustration of clock splitter cable routing), and system ground ❹. Figure 3–6 shows the cable connections to the right side and Figure 3–7 to the left side of the H-switch.

Figure 3–6 Cable Connections to the Hierarchical Switch (1)



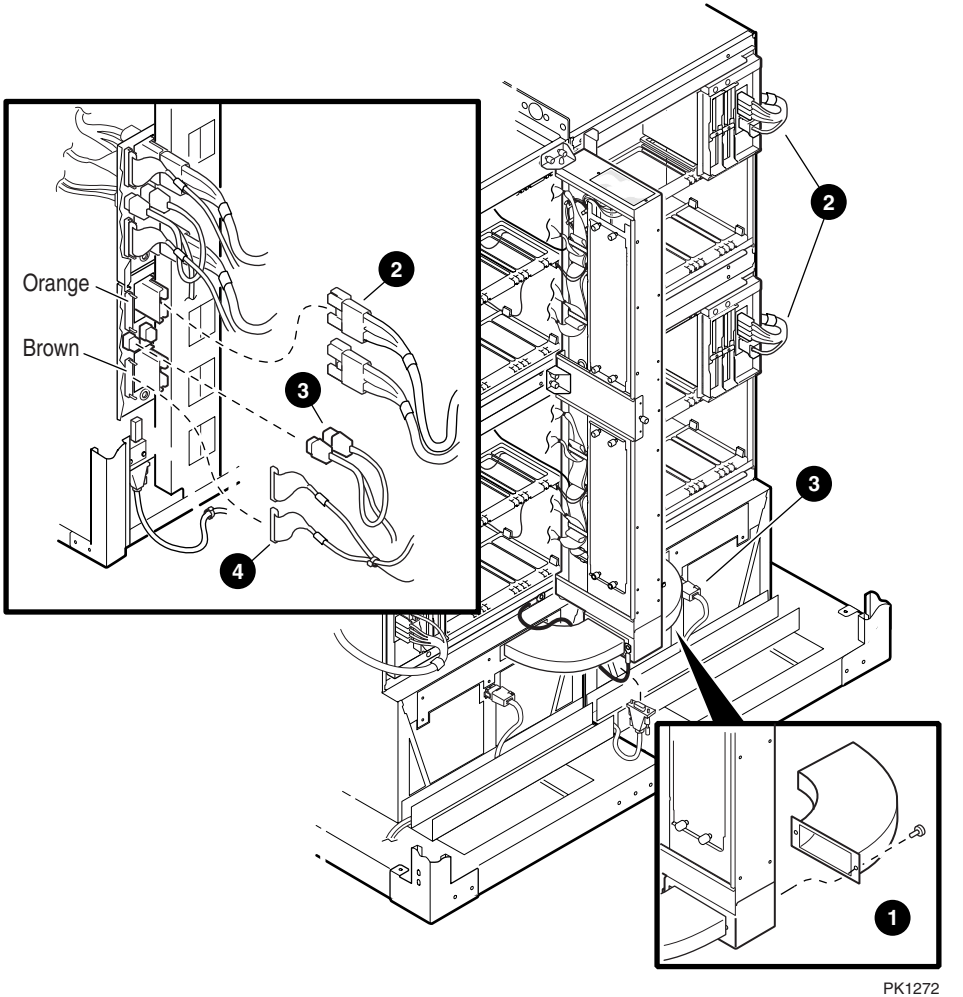
11. Rotate the hierarchical switch toward the system boxes and reattach the H-switch to the system cabinet frame. Install the H-switch covers.

Figure 3–7 Cable Connections to the Hierarchical Switch (2)



12. Remove and discard the filler plate from the right side of the H-switch bottom. Install plenum to the H-switch ❶ (Figure 3–8) using the filler plate mounting screw.
13. Lower an outside corner leveling foot of system cabinet 2 until the associated caster is free to rotate. Repeat for the other three corner casters. Do not lower the center leveling feet.
14. Make all external cable connections to the disconnect panel on the power cabinet (Figure 3–8). These include:
    - Power cables for the system boxes ❷.
    - Power cable for the blower ❸.
    - Signal cables for the system boxes ❹.

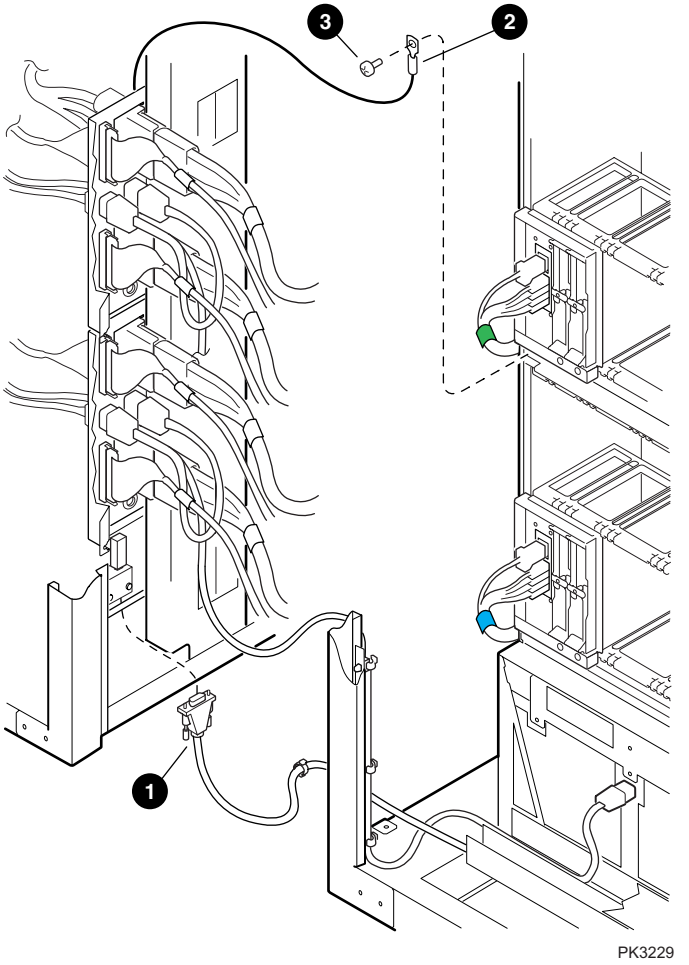
Figure 3–8 External Cable Connections



15. Connect the CSB cable ❶ (Figure 3–9) from the H-switch (if the H-switch has been installed during the current upgrade) to the CSB adapter and terminator on the power cabinet.

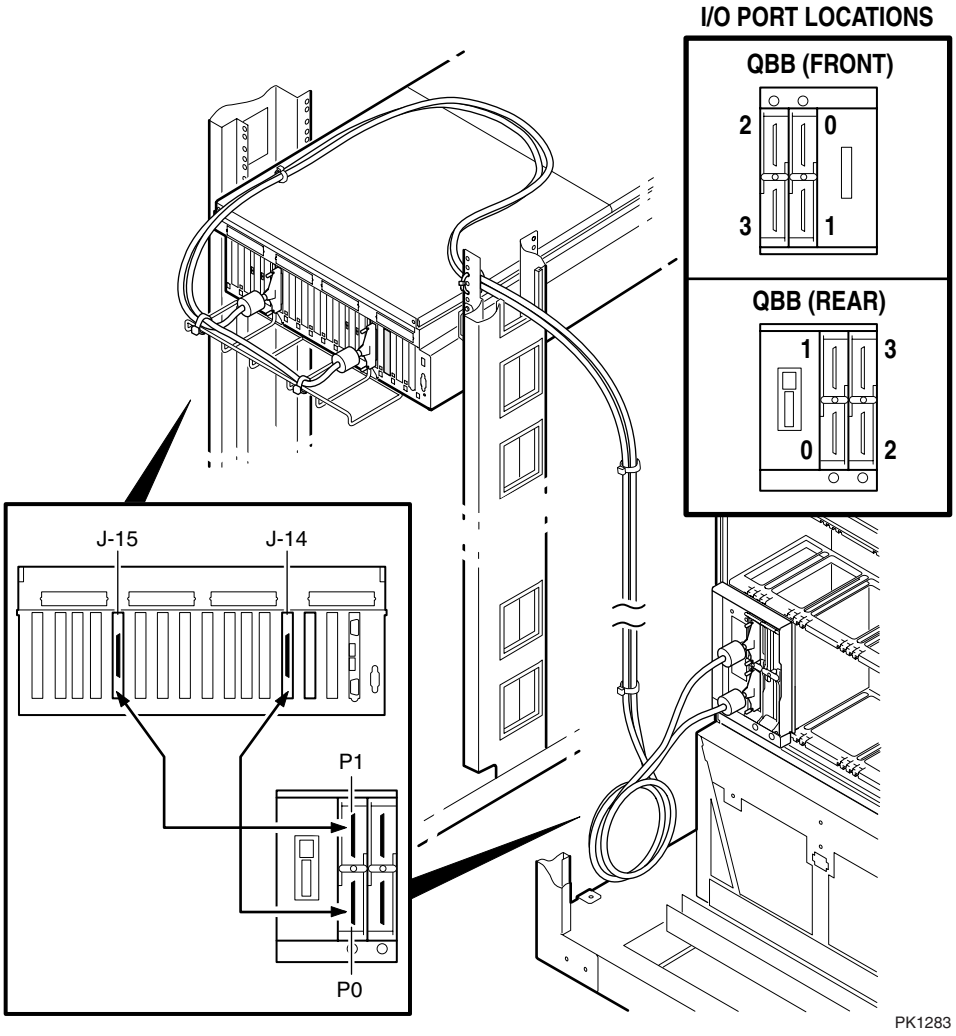
16. Connect the system ground wire ❷ (Figure 3–9) from the power cabinet to the system cabinet as follows: remove the M5 Phillips screw ❸ from the system cabinet, attach the loose end of the ground wire, and secure it to the system cabinet with the screw.

Figure 3–9 CSB and Ground Connections



17. Connect the hose cables from the local I/O riser ports to the remote risers in the PCI boxes. Figure 3–10 shows typical connections of I/O hoses between the local I/O riser ports and the remote risers in the PCI box. Note that Port 0 (or Port 2) is connected to J14 on the PCI box and Port 1 (or Port 3) is connected to J15.

Figure 3–10 I/O Hose Connections



Labels on the I/O hoses indicate the I/O port and the QBB to which they should be connected. Table 3–2 gives the label codes on the I/O hoses for system cabinet 2. Refer to Chapter 2 for I/O hose labels for system cabinet 1.

Table 3–2 I/O Hose Labels for System Cabinet 2

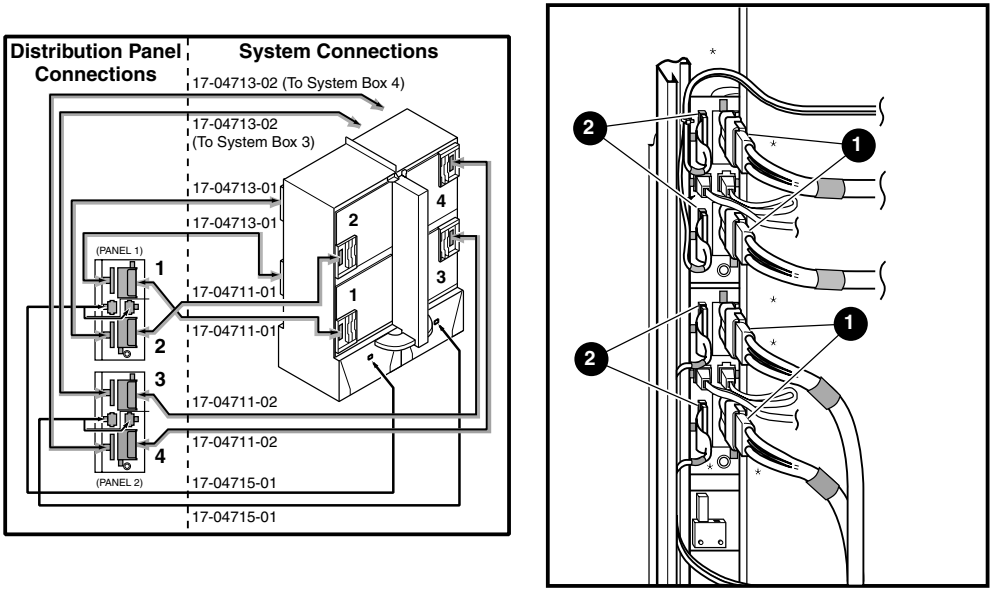
Hose Label	QBB No.	Port No.
04	4	0
14	4	1
24	4	2
34	4	3
05	5	0
15	5	1
25	5	2
35	5	3
06	6	0
16	6	1
26	6	2
36	6	3
07	7	0
17	7	1
27	7	2
37	7	3

You have finished the upgrade of a GS160 to a GS320.

3.4 Preparing System for Booting

Replace the service cover on the H-switch and make DC power and signal cable connections (Figure 3–11). Power up the system and set the serial number at the SRM prompt.

Figure 3–11 DC Power and Signal Connections



MR0011

To prepare the system for booting, you must do the following:

1. Install new covers on the H-switch. Discard the old covers.
2. Connect the DC power cables ❶ and the DC signal cables ❷. The power and signal cables are color-coded. Signal cables for the system box are located right next to the connector on the system box.

The system has now been upgraded from one system box to two system boxes and is ready for booting. The procedures for powering up and booting the system are detailed in the *AlphaServer GS80/160/320 User's Guide*, *AlphaServer GS80/160/320 Service Manual,* and the *AlphaServer GS160/320 Installation Guide*.

NOTE: *Following the completion of the system upgrade, use the SRM* **`set system serial`** *command to set the system serial number. See the AlphaServer GS80/160/320 Service Manual for details.*

Chapter 4
System Power-Up

This chapter tells how to power up the system and what happens upon power-up. Sections include:

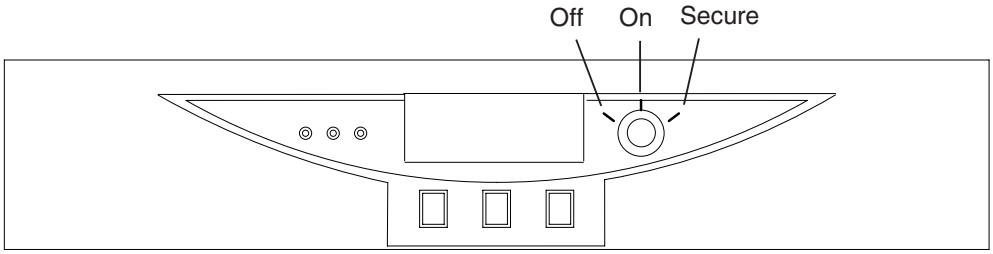
- Control Panel Keyswitch
- Installing the System Management Console
- Powering Up the System
- Q-Vet Verification

Check the power-up display for the new configuration of the system.

4.1 Control Panel Keyswitch

The operator control panel (OCP) keyswitch has three positions: Off, On, and Secure. Figure 4–1 shows the OCP keyswitch.

Figure 4–1 Operator Control Panel



PK-0621A-99

Table 4–1 explains the functions selected by the keyswitch.

Table 4–1 Keyswitch Functions on the Control Panel

Keyswitch Position	Function
Off	System is powered off and cannot be powered on remotely.
On	System is powered on and can be remotely powered on or powered off.
Secure	System is powered on and cannot be remotely powered on or off.

Refer to the *AlphaServer GS80/160/320 User's Guide* or the *AlphaServer GS80/160/320 Service Manual* for functional descriptions of all control panel components.

4.2 Installing the System Management Console

Before you power up the system, you must install the system management console (SMC). Steps to be followed in installing the SMC are listed below. The procedures to install the SMC are fully detailed in the *AlphaServer GS80/160/320 System Management Console Installation Guide.*

Steps to Install the SMC

1. Set up the SMC PC.
2. Install the SMC terminal server in the GS160/320 system.
3. Connect the terminal server to the power source.
4. Turn circuit breakers on but keep the keyswitch on Off.
5. Cable the PC to the terminal server and set up parameters.
6. Verify communication from the console to the system control manager.

You are now ready to power up the system.

WARNING: Before you power up the system, inspect the modules for any visible sign of water condensation on the heatsinks, DC-to-DC converters, and the CPUs. Due to the large mass of the system, condensation may occur during transfer from a cold to a warm environment. Allow time for the condensation to evaporate completely. DO NOT power the system up if you notice any indication of condensation.

4.3 Powering Up the System

To power up the system, first turn the circuit breakers in all cabinets on, then set the keyswitch on the OCP to the On position. Example 4–1 shows a sample console display on power-up. See the *AlphaServer GS80/160/320 Service Manual* or the *AlphaServer GS80/160/320 User's Guide* for explanations of the power-up display.

Example 4–1 Power-Up Display

```
SCM_E0> power on
Powering on PCI Box 0
Powering on PCI Box 1
QBB-0 Powering ON

~I~ Testing OCP Switch- passed
Power ON Phase INIT
QBB-1 Powering ON
QBB-2 Powering ON
QBB-3 Powering ON

~I~ SCM powered via PBM
SCM_E0>
QBB0 now Testing Step-0
QBB1 now Testing Step-0
QBB2 now Testing Step-0
QBB3 now Testing Step-0
~I~ SCMe1 non-csb member while it tests & initializes its
Shared RAM
SCM_E0> .
~I~ QBB0/PSM30 SysEvent: QBB_INIT_CD1                Reg0:7AB3
Reg1:3FFF (test-0)  (fmask/fts:8f)
.
~I~ QBB1/PSM31 SysEvent: QBB_INIT_CD1                Reg0:7AB3
Reg1:3FFF (test-0)  (fmask/fts:8f)

~I~ QBB2/PSM32 SysEvent: QBB_INIT_CD1                Reg0:768F
Reg1:0FFF (test-0)  (fmask/fts:8f)

~I~ QBB3/PSM33 SysEvent: QBB_INIT_CD1                Reg0:768F
Reg1:0FFF (test-0)  (fmask/fts:8f)
```

```
Testing SIO Shared RAM(please wait)

Initializing shared ram
Shared RAM Initialized

Powering ON H-Switch
SCM_E0>
~I~ HSW4/HPM40 SysEvent: HS_INIT_CD1                Reg0:000F
Reg1:D581

Phase 0
~I~ Enable HS Links: 0f

~I~ QbbConf(gp/io/c/m)=0000bbff Assign=0f SQbb0=00 PQbb=00
SoftQbbId=0000ba98
~I~ SysConfig: 00 00  00 00  00 00  00 00  07 1f  07 9f  37 3f
37 9f
SCM_E0>
~I~ HSW4/HPM40 SysEvent: LINK0_ON                   Reg0:000F
Reg1:D581

~I~ HSW4/HPM40 SysEvent: LINK1_ON                   Reg0:010F
Reg1:D581
SCM_E0>
~I~ HSW4/HPM40 SysEvent: LINK2_ON                   Reg0:030F
Reg1:D581
SCM_E0>
~I~ HSW4/HPM40 SysEvent: LINK3_ON                   Reg0:070F
Reg1:D581
SCM_E0> ............
QBB0 now Testing Step-1
QBB1 now Testing Step-1
QBB2 now Testing Step-1
QBB3 now Testing Step-1
QBB0 now Testing Step-3
QBB1 now Testing Step-3
QBB2 now Testing Step-3
QBB3 now Testing Step-3..
QBB0 now Testing Step-5
QBB1 now Testing Step-5
QBB2 now Testing Step-4
QBB3 now Testing Step-4
QBB2 Step(s)-4 5  Tested
QBB3 Step(s)-4 5  Tested
Phase 1
```

```
QBB0 IO_MAP0: 0000A0C001333333
QBB1 IO_MAP1: 0000A1C101333333
QBB2 IO_MAP2: 0000000000000003
QBB3 IO_MAP3: 0000000000000003

~I~ QbbConf(gp/io/c/m)=0000bbff Assign=0f SQbb0=00 PQbb=00
SoftQbbId=0000ba98
~I~ SysConfig: 00 00  00 00  00 00  00 00  07 1f  07 9f  37 3f
37 9f
SCM_E0> .
QBB0 now Testing Step-7
QBB1 Step(s)-5 6  Tested
QBB2 Step(s)-5 6  Tested
QBB3 Step(s)-5 6  Tested
QBB0 now Testing Step-9..
QBB0 now Testing Step-A.
QBB0 now Testing Step-7
QBB0 now Testing Step-9..
QBB0 now Testing Step-A.
QBB0 now Testing Step-8
QBB0 now Testing Step-9..
QBB0 now Testing Step-A.
QBB0 now Testing Step-B.
Phase 2
QBB0 IO_MAP0: 0000A0C001333333
QBB1 IO_MAP1: 0000A1C101333333
QBB2 IO_MAP2: 0000000000000003
QBB3 IO_MAP3: 0000000000000003

~I~ QbbConf(gp/io/c/m)=0000bbff Assign=0f SQbb0=00 PQbb=00
SoftQbbId=0000ba98
~I~ SysConfig: 00 00  00 00  00 00  00 00  07 1f  07 9f  37 3f
37 9f
SCM_E0>
QBB0 now Testing Step-C
QBB1 now Testing Step-C
QBB2 now Testing Step-C
QBB3 now Testing Step-C..
```

```
Phase 3
~I~ QbbConf(gp/io/c/m)=0000bbff Assign=0f SQbb0=00 PQbb=00
SoftQbbId=0000ba98
~I~ SysConfig: 00 00  00 00  00 00  00 00  07 1f  07 9f  37 3f
37 9f
SCM_E0> .
QBB0 now Testing Step-D
QBB1 now Testing Step-D
QBB2 now Testing Step-D
QBB3 now Testing Step-D....
QBB0 IO_MAP0: 0000A0C001333333
QBB1 IO_MAP1: 0000A1C101333333
QBB2 IO_MAP2: 0000000000000003
QBB3 IO_MAP3: 0000000000000003

Phase 4
~I~ QbbConf(gp/io/c/m)=0000bbff Assign=0f SQbb0=00 PQbb=00
SoftQbbId=0000ba98

QBB0 unloading console across port0 from PCI Box-0
Console COM1 from master PCI Box-0
~I~ SysConfig: 00 00  00 00  00 00  00 00  07 1f  07 9f  37 3f
37 9f
Retrieving FRU information for Shared RAM...(please wait)
SCM_E0> .
QBB3 now Testing Step-E
QBB0 now Testing Step-E
QBB1 now Testing Step-E
QBB2 now Testing Step-E..
Power On Complete

Returning to system COM1 port


System Primary QBB0 : 0
System Primary CPU  : 0 on QBB0


Par hrd/csb CPU  Mem   IOR3 IOR2 IOR1 IOR0  GP  QBB  Dir PS
Temp
     QBB#   3210 3210     (pci_box.rio)     Mod BP   Mod 321
(:C)

(-)  0/30   PPPP P--P  --.- --.- P0.1 P0.0   P   P    P  P-P
28.0
```

```
(-)  1/31   PPPP --PP  --.- --.- P1.1 P1.0   P   P    P  P-P
32.0
(-)  2/32   PPPP P--P  --.- --.- --.- --.-   P   P    P  -PP
29.0
(-)  3/33   PPPP ---P  --.- --.- --.- --.-   P   P    P  -PP
30.0


HSwitch  Type    Cables 7 6 5 4 3 2 1 0    Temp(:C)

HPM40    4-port         - - - - P P P P     32.0



PCI Rise1-1  Rise1-0  Rise0-1  Rise0-0   RIO  PS  Temp
Cab 7 6 5 4   3 2 1   7 6 5 4   3 2 1    1 0  21  (:C)

10  - - L -   - - -   - - - -   L - S    * *  PP  35.0
11  - - - -   - - -   - - - -   - - S    * *  PP  34.5


OpenVMS PALcode V1.80-1, Tru64 UNIX PALcode V1.74-1

system = QBB 0 1 2 3         + HS
 QBB 0 = CPU 0 1 2 3 + Mem 0     3 + Dir + IOP + PCA 0 1     +
GP  (Hard QBB 0)
 QBB 1 = CPU 0 1 2 3 + Mem 0 1     + Dir + IOP + PCA 0 1     +
GP  (Hard QBB 1)
 QBB 2 = CPU 0 1 2 3 + Mem 0     3 + Dir + IOP + PCA         +
GP  (Hard QBB 2)
 QBB 3 = CPU 0 1 2 3 + Mem 0       + Dir + IOP + PCA         +
GP  (Hard QBB 3)
micro firmware version is T5.5
shared RAM version is 1.4
hose 0 has a standard I/O module
starting console on CPU 0
initialized idle PCB
initializing semaphores
initializing heap
initial heap 300c0
memory low limit = 1fc000
heap = 300c0, 1ffc0
initializing driver structures
initializing idle process PID
initializing file system
initializing timer data structures
```

```
lowering IPL
CPU 0 speed is 731 MHz
create dead_eater
create poll
create timer
create powerup
access NVRAM
QBB 0 memory, 3 GB
QBB 1 memory, 3 GB
QBB 2 memory, 3 GB
QBB 3 memory, 1 GB
total memory, 10 GB
copying PALcode to 10bffe0000
copying PALcode to 20bffe0000
copying PALcode to 303ffe0000
probe I/O subsystem
probing hose 0, PCI
probing PCI-to-ISA bridge, bus 1
bus 1, slot 0 -- dva -- Floppy
bus 0, slot 1 -- pka -- QLogic ISP10x0
bus 0, slot 3 -- ewa -- DE500-BA Network Controller
bus 0, slot 15 -- dqa -- Acer Labs M1543C IDE
probing hose 1, PCI
probing hose 2, PCI
probing hose 3, PCI
bus 0, slot 5 -- pkb -- QLogic ISP10x0
probing hose 8, PCI
probing PCI-to-ISA bridge, bus 1
bus 1, slot 0 -- dvb -- Floppy
bus 0, slot 1 -- pkc -- QLogic ISP10x0
bus 0, slot 15 -- dqb -- Acer Labs M1543C IDE
probing hose 9, PCI
probing hose 10, PCI
probing hose 11, PCI
starting drivers
entering idle loop
starting console on CPU 1
initialized idle PCB
initializing idle process PID
lowering IPL
CPU 1 speed is 731 MHz
create powerup
starting console on CPU 2
initialized idle PCB
initializing idle process PID
lowering IPL
```

```
CPU 2 speed is 731 MHz
create powerup
starting console on CPU 3
initialized idle PCB
initializing idle process PID
lowering IPL
CPU 3 speed is 731 MHz
create powerup
starting console on CPU 4
initialized idle PCB
initializing idle process PID
lowering IPL
CPU 4 speed is 731 MHz
create powerup
starting console on CPU 5
initialized idle PCB
initializing idle process PID
lowering IPL
CPU 5 speed is 731 MHz
create powerup
entering idle loop
starting console on CPU 6
initialized idle PCB
initializing idle process PID
lowering IPL
CPU 6 speed is 731 MHz
create powerup
starting console on CPU 7
initialized idle PCB
initializing idle process PID
lowering IPL
CPU 7 speed is 731 MHz
create powerup
starting console on CPU 8
initialized idle PCB
initializing idle process PID
lowering IPL
CPU 8 speed is 731 MHz
create powerup
starting console on CPU 9
initialized idle PCB
initializing idle process PID
lowering IPL
CPU 9 speed is 731 MHz
create powerup
starting console on CPU 10
```

```
initialized idle PCB
initializing idle process PID
lowering IPL
CPU 10 speed is 731 MHz
create powerup
starting console on CPU 11
initialized idle PCB
initializing idle process PID
lowering IPL
CPU 11 speed is 731 MHz
create powerup
starting console on CPU 12
initialized idle PCB
initializing idle process PID
lowering IPL
CPU 12 speed is 731 MHz
create powerup
starting console on CPU 13
initialized idle PCB
initializing idle process PID
lowering IPL
CPU 13 speed is 731 MHz
create powerup
starting console on CPU 14
initialized idle PCB
initializing idle process PID
lowering IPL
CPU 14 speed is 731 MHz
create powerup
entering idle loop
starting console on CPU 15
initialized idle PCB
initializing idle process PID
lowering IPL
CPU 15 speed is 731 MHz
create powerup
initializing GCT/FRU at 1fc000
initializing pka pkb pkc ewa dqa dqb
environment variable mopv3_boot created
version V5.8-4667 May  4 2000 02:24:27
AlphaServer Console V5.8-4667, built on May 4 2000 at 02:24:27
P00>>>
```

The SRM console prompt (`P00>>>`) is displayed at the end of power-up.

This completes the power-up initialization/testing sequence. The operating system can be installed from the SRM console prompt.

Follow instructions given in the *AlphaServer GS80/160/320 User's Guide* to:

- Set boot options
- Install *Tru64 UNIX* or *OpenVMS*

After installing the operating system, you can install and run Q-Vet to verify the system operation (Section 4.4).

4.4 Q-Vet Verification

CAUTION: Customers are not authorized to access, download, or use Q-Vet. Q-Vet is for use by service engineers to verify the system installation. Misuse of Q-Vet may result in loss of customer data.

Q-Vet is the Qualification Verifier Exerciser Tool that is used by product engineers to exercise systems under development. We recommend running the latest Q-Vet released version to verify that hardware is installed correctly and is operational. Q-Vet does not verify specific operating system or layered product configurations.

The latest Q-Vet release, information, Release Notes, and documentation are located at http://chump2.mro.cpqcorp.net/qvet/.

If the system has been partitioned, Q-Vet must be installed and run separately on each partition to verify the complete system. We recommend that Compaq Analyze be installed on the operating system prior to running Q-Vet.

CAUTION:

*Do **not** install the Digital System Verification Software (DECVET) on GS80, GS160, or GS320 systems; use Q-Vet instead.*

Non-IVP Q-Vet scripts verify disk operation for some drives with "write enabled" techniques. These are intended for Engineering and Manufacturing Test. Run ONLY IVP scripts on systems that contain customer data or any other items that must not be written over. See the Q-Vet Disk Testing Policy Notice on the Q-Vet Web site for details. All Q-Vet IVP scripts use Read Only and/or File I/O to test hard drives. Floppy and tape drives are always write tested and should have scratch media installed.

*Q-Vet **must** be de-installed upon completion of system verification.*

Swap or Pagefile Space

The system must have adequate swap space (on *Tru64 UNIX*) or pagefile space (on *OpenVMS*) for proper Q-Vet operation. You can set this up either before or after Q-Vet installation.

During initialization, Q-Vet will display a message indicating the minimum amount of swap/pagefile needed, if it determines that the system does not have enough. You can then reconfigure the system.

If you wish to address the swap/pagefile size before running Q-Vet, see the Swap/Pagefile Estimates on the Q-Vet Web site.

4.4.1 Installing Q-Vet

The procedures for installation of Q-Vet differ between operating systems. You must install Q-Vet on each partition in the system.

Install and run Q-Vet from the **SYSTEM** account on VMS and the **root** account on UNIX. Remember to install Q-Vet in each partition.

Tru64 UNIX

1. Make sure that there are no old Q-Vet or DECVET kits on the system by using the following command:
   `setld -i | grep VET`

   Note the names of any listed kits, such as OTKBASExxx etc., and remove the kits using **qvet_uninstall** if possible. Otherwise use the command
   `setld -d kit1_name kit2_name kit3_name`
2. Copy the kit tar file (*QVET_Vxxx.tar*) to your system.
3. Be sure that there is no directory named output. If so move to another directory or remove the output directory.
   `rm -r output`
4. Untar the kit with the command
   `tar xvf QVET_Vxxx.tar`
   Note: The case of the file name may be different depending upon how it was stored on the system. Also, you may need to enclose the file name in quotation marks if a semi-colon is used.
5. Install the kit with the command
   `setld -l output`
6. During the install, if you intend to use the GUI you must select the optional GUI subset (QVETXOSFxxx).
7. The Q-Vet installation will size your system for devices and memory. It also runs qvet_tune. You should answer '**`y`**' to the questions that are asked about setting parameters. If you do not, you may have trouble running Q-Vet. After the installation completes, you should delete the output directory with **`rm -r output.`** You can also delete the kit tar file.
8. You ***must*** reboot the system before starting Q-Vet.

9. On reboot you can start Q-Vet GUI via **`vet&`** or you can run non GUI (command line) via **`vet -nw.`**

OpenVMS

1. Delete any *QVETAXPxxx.A* or *QVETAXPxxx.EXE* file from the current directory.
2. Copy the self-extracting kit image file (*QVETAXPxxx.EXE*) to the current directory.
3. It is highly recommended, but not required, that you purge the system disk before installing Q-Vet. This will free up space that may be needed for pagefile expansion during the AUTOGEN phase.
   $purge sys$sysdevice:[*...]*.*
4. Extract the kit saveset with the command **`$run QVETAXPxxx.EXE`** and verify that the kit saveset was extracted by checking for the "Successful decompression" message.
5. Use **`@sys$update:vmsinstal`** for the Q-Vet installation. The installation will size your system for devices and memory. You should choose all the default answers during the Q-Vet installation. This will verify the Q-Vet installation, tune the system, and reboot. During the install, if you ***do not*** intend to use the GUI, you can answer **`no`** to the question "Do you want to install Q-Vet with the DECwindows Motif interface?"
6. After the installation completes you should delete the *QVETAXP0xx.A* file and the *QVETAXPxxx.EXE* file.
7. On reboot you can start Q-Vet GUI via **$vet** or the command interface via **$vet/int=char.**

4.4.2 Running Q-Vet

You must run Q-Vet on each partition in the system to verify the complete system.

We recommend that you review the Special Notices and the Testing Notes section of the Release Notes located at http://chump2.mro.cpqcorp.net/qvet/ before running Q-Vet.

Follow the instructions listed for your operating system to run Q-Vet in each partition.

Tru64 UNIX

Graphical Interface

1. From the Main Menu, select **IVP**, **Load Script** and select **Long IVP** (the IVP tests will then load into the Q-Vet process window).
2. Click the **Start All** button to begin IVP testing.

Command-Line Interface

```
> vet -nw
Q-Vet_setup> execute .Ivp.scp
Q-Vet_setup> start
```

Note that there is a "**.**" in front of the script name, and that commands are case sensitive.

OpenVMS

Graphical Interface

1. From the Main Menu, select **IVP**, **Load Script** and select **Long IVP** (the IVP tests will then load into the Q-Vet process window).
2. Click the **Start All** button to begin IVP testing.

Command-Line Interface

```
$ vet /int=char
Q-Vet_setup> execute ivp.vms
Q-Vet_setup> start
```

Note that commands are case sensitive.

NOTE: *A short IVP script is provided for a simple verification of device setup. It is selectable from the GUI IVP menu, and the script is called* ***.Ivp_short.scp*** *(****ivp_short.vms****). This script will run for 15 minutes and then terminate with a Summary log. The short script may be run prior to the long IVP script if desired, but not in place of the long IVP script, which is the full IVP test.*

The long IVP will run until the slowest device has completed one pass (typically 2 to 12 hours). This is called a Cycle of Testing.

4.4.3 Reviewing Results of the Q-Vet Run

After running Q-Vet, check the results of the run by reviewing the summary log.

If you follow the above steps, Q-Vet will run all exercisers until the slowest device has completed one full pass. Depending on the size of the system (number of CPUs and disks), this will typically take 2 to 12 hours. Q-Vet will then terminate testing and produce a summary log. The termination message will tell you the name and location of this file.

All exerciser processes can also be manually terminated with the Suspend and Terminate buttons (**stop** and **terminate** commands).

After all exercisers report "Idle," the summary log is produced containing Q-Vet specific results and statuses.

A. If there are no Q-Vet errors, no system event appendages, and testing ran to the specified completion time, the following message will be displayed:

```
"Q-Vet Tests Complete: Passed"
```

B. Otherwise, a message will indicate:

```
"Additional information may be available from Compaq
Analyze"
```

It is recommended that you run Compaq Analyze to review test results. The testing times (for use with Compaq Analyze) are printed to the Q-Vet run window and are available in the summary log.

4.4.4 De-Installing Q-Vet

The procedures for de-installation of Q-Vet differ between operating systems. You must de-install Q-Vet from each partition in the system. Failure to do so may result in the loss of customer data at a later date if Q-Vet is misused.

Follow the instructions listed under your operating system to de-install Q-Vet from a partition. The **qvet_uninstall** programs will remove the Q-Vet supplied tools and restore the original system tuning/configuration settings.

Tru64 UNIX

1. **Stop, Terminate,** and **Exit** from Q-Vet testing.
2. Execute the command **`qvet_uninstall.`** This will also restore the system configuration/tuning file `sysconfigtab`.
3. Note: log files are retained in `/usr/field/tool_logs`
4. Reboot the system. You must reboot in any case, even if Q-Vet is to be reinstalled.

OpenVMS

1. **Stop**, **Terminate,** and **Exit** from any Q-Vet testing.
2. Execute the command **@sys$manager:qvet_uninstall.** This will restore system tuning (modparams.dat) and the original UAF settings.
3. Note: log files are retained in **sys$specific:[sysmgr.tool_logs]**
4. Reboot the system. You must reboot in any case, even if Q-Vet is to be reinstalled.

Chapter 5
Upgrade Component Installation

This chapter gives installation procedures for the following components:

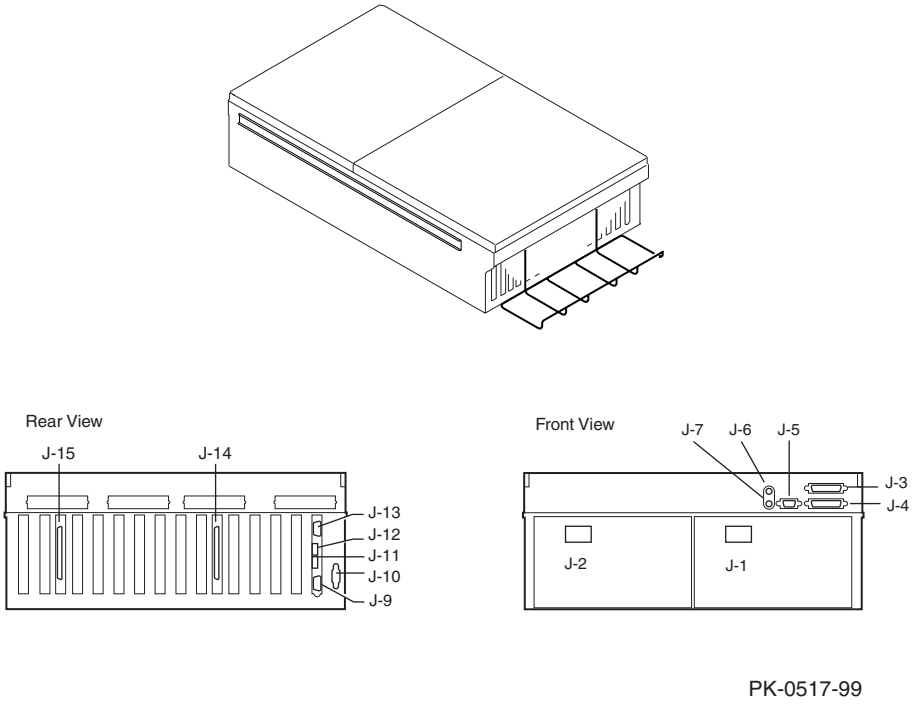
- PCI Box
- System Box
- CPU Module
- Power Subrack
- Power Supply
- AC Input Box

Procedures are applicable for the installation of the component in any location. Configuration rules and component locations for the expander cabinet are given at the end of the chapter.

5.1 Installing a PCI Box

Unpack the shipping box and note its contents. Figure 5–1 shows the PCI box.

Figure 5–1 PCI Box



The shipping box contains the following items:

PCI box (BA54A-AA)
Mounting hardware kit (CK-BA54A-AA)

Table 5–1 lists the items in the PCI box mounting hardware (CK-BA54A-AA).

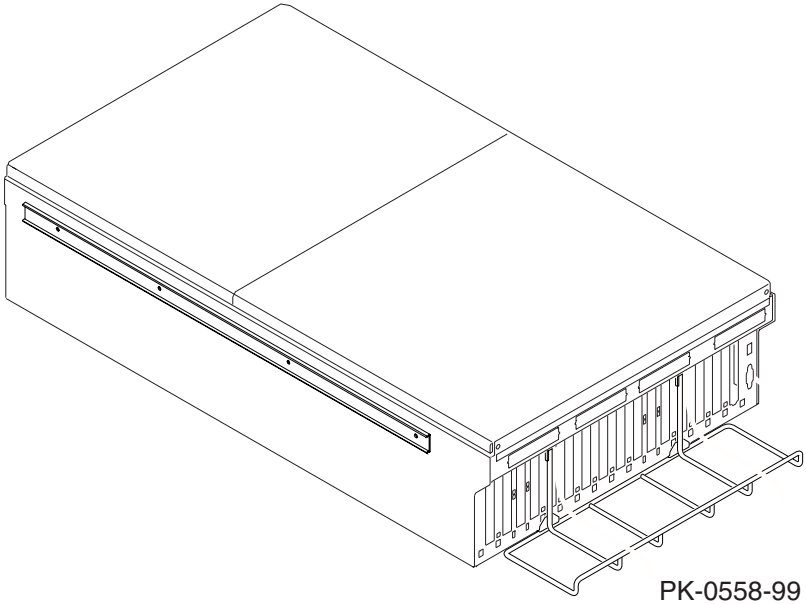
Table 5–1 PCI Box Mounting Hardware

Part Number	Description	CK-BA54A-AA
70-33596-01	Latch assembly	1
74-53016-01	Plate, strike	1
74-52544-01	Through cable	1
74-53597-01	Bracket, shipping	2
74-52428-01	Bracket, slide, front mounting (RH)	4
74-60022-01	Bracket, adapter, mounting	1
12-45925-01	Conn., adapter, molded (2) RJ4	1
12-45926-01	Conn., term., molded, 8 POS., MOD	1
17-04736-01	Wire harness assembly, 2TWP (2), 8 POS. MOD	1
17-04936-01	Cable assembly, mold, shld., 4TWP, (2) 9	1
17-00083-03	Pwr cord term., 3-14 SJT 125V 108I	1
17-00442-18	Pwr cord term., 9' LGG 15A	1
90-09984-19	Screw, SEMs, M4 x 0.7 x 8 mm	6
90-40346-01	Nut, hex metric, M4, CS, ZNC, HXW	6
90-09984-18	Screw, SEMs, M5 x 0.8 x 12 mm	18
90-07786-04	Nut, U-Nut M5	18
90-40347-01	Screw, Mach, M4, TRS, 10 mm, XRCS, CSZ	8

5.1.1 Preparing the PCI Box for Installation

Figure 5–2 shows how to prepare the PCI box for installation.

Figure 5–2 Preparing the PCI Box for Installation



Prepare the PCI box for installation as follows:

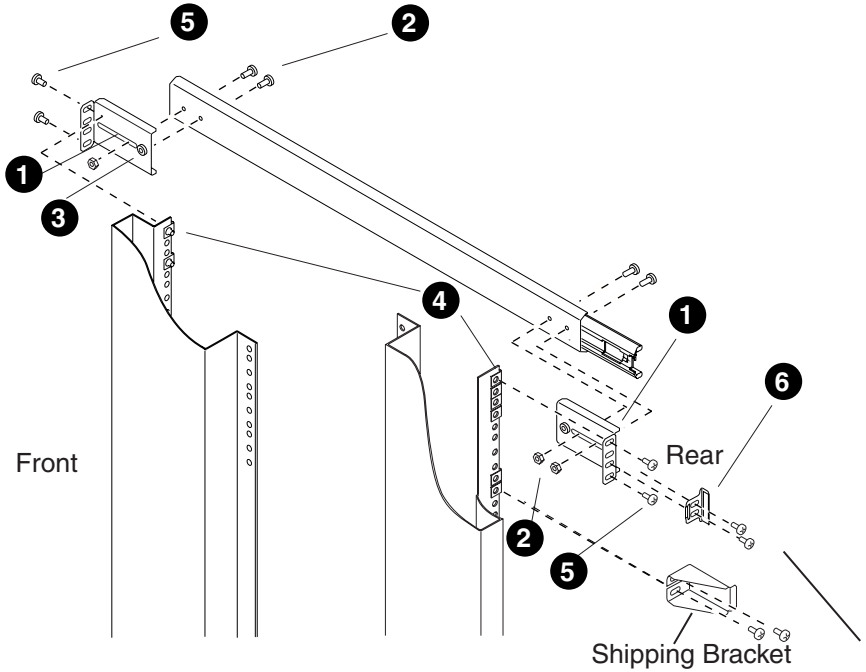
1. Slide the outer track of the mounting rail assembly of the PCI box all the way out. Press on the retaining lever to release the outer track from the assembly.
2. Repeat step 1 on the other side of the PCI box.

The next step is to mount the outer tracks to the cabinet rails.

5.1.2 Preparing the Cabinet for PCI Box Installation

Figure 5-3 shows how to prepare the cabinet for the PCI box installation.

Figure 5-3 Preparing the Cabinet for Installation



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Prepare the cabinet for installation as follows:

1. Select the location in the power cabinet or the expander cabinet where the PCI box is to be installed (see 5.7). Chapter 3 discusses the configuration rules for each system and shows assigned component locations with cabinet rail hole numbers to be used for each location.
2. Attach the two track mounting brackets (P/N 7452428-01) ❶ to the two ends of the outer track bracket with two M4 x 6 truss head screws for each bracket ❷. The front-track mounting bracket has an insert ❸ for alignment. Tighten the screw in the insert but leave the other screws loose for later adjustment and tightening. Do the same on the second outer track bracket.

CAUTION: *It is very important to have the brackets loose until the PCI box is mounted on the rails. Tightening the track mounting bracket at this stage will cause difficulty and may result in jamming when sliding the PCI box into the cabinet later in the procedure.*

---

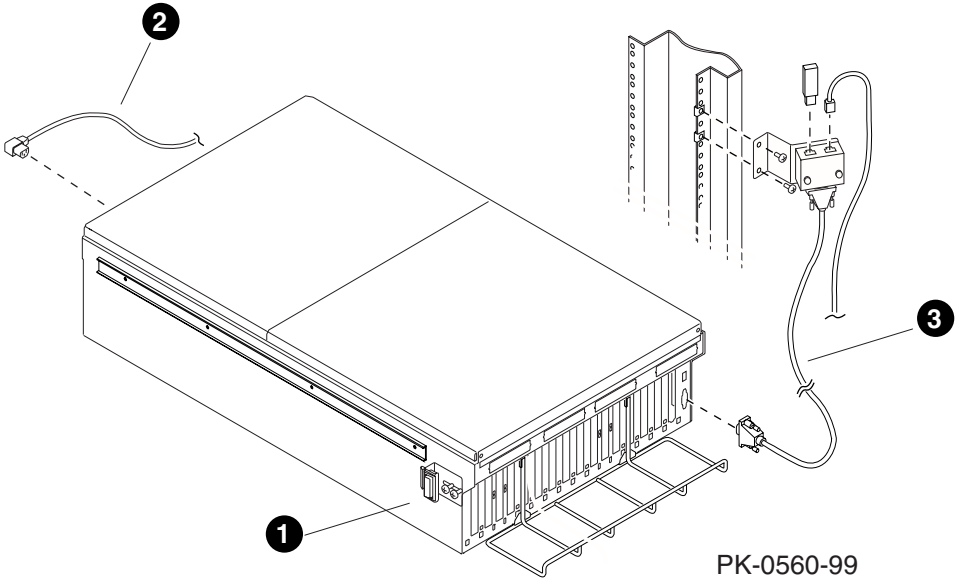
3. Locate the pattern of four holes on the selected area in the cabinet where the PCI box is to be installed.
4. Place U-nuts on each of the four holes in the back cabinet rail and two U-nuts on the two outermost holes in the front cabinet rail ❹.
5. Align the mounting rail brackets with the front and rear of the cabinet rails and attach the mounting rail bracket to the cabinet rails with two M5 screws on the outermost holes of each mounting rail bracket ❺.
6. Mount the second rail on the other side of the cabinet following steps 3 to 5 above.
7. Attach the snap latch retainer bracket ❻ to the rear rail mounting bracket and the cabinet rail at the inner holes of the 4-hole pattern using two M5 screws. Ensure that the snap latch retainer bracket is aligned properly to engage with the plastic latch to be placed on the PCI box after mounting. Repeat this step at the opposite side of the PCI box.

The cabinet is ready for the installation of the PCI box.

5.1.3 Installing the PCI Box and Making Cable Connections

Install the PCI box and make the cable connections. Figure 5–4 shows how to connect the PCI box power cable and module cables.

Figure 5–4 Cable Connections of the PCI Box



CAUTION: *Proper alignment during the insertion of the PCI box in the cabinet is critical. Two people are needed to lift the PCI box and slide it gently into the ball bearing track. Any mishandling or misalignment at this stage could damage the hardware and result in jamming.*

Install the PCI box as follows:

1. Lift the PCI box and gently insert the rear sides of the inner tracks fastened on the sides of the PCI box into the outer ball bearing tracks attached to the cabinet. Visually align the track to the bearings and slide the PCI box all the way in maintaining steady alignment until fully engaged. Slide the PCI box out and in again to ensure free movement on the track. Tighten the screws mounting the brackets to the cabinet rails.
2. Attach the latching bracket to the side of the PCI box ❶ using two M4 screws. Since you may need to adjust these screws later, do not tighten them at this point. Repeat this step at the opposite side of the PCI box.
3. Push the PCI box gently into the cabinet. The plastic latches should engage with the latch retainer brackets on the cabinet. If this happens, you should hear a latching click and the PCI box should sit snug and firm in the cabinet. If the PCI box does not latch into place, pull it out and adjust the position of the latching brackets. You may need to make these adjustments a couple of times before a successful latching occurs.

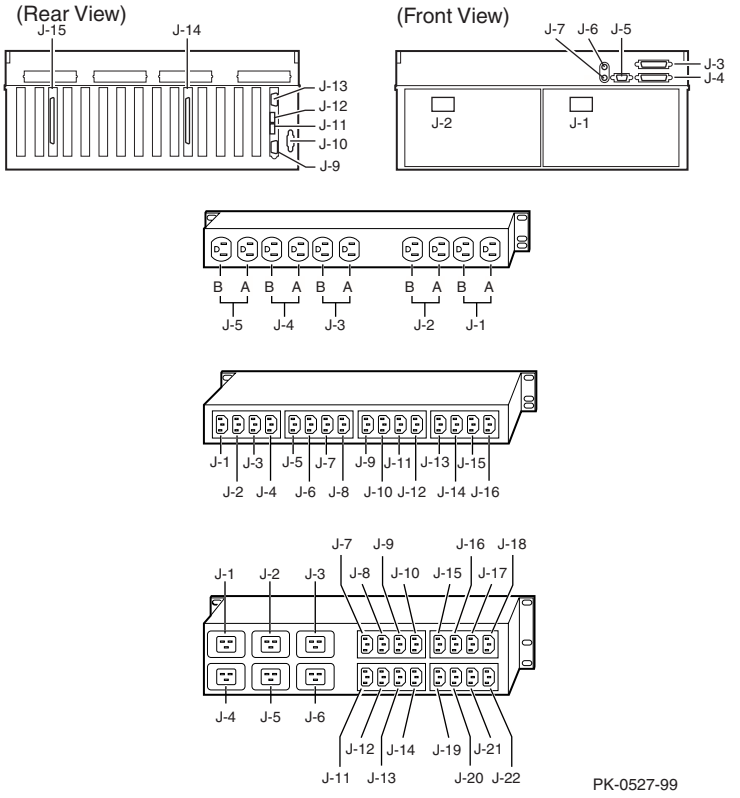
4. If shipping the system, install the shipping brackets on each side of the cabinet (see Figure 5–3) using U-nuts and M5 screws to hold the PCI box securely in place.

CAUTION: *It is absolutely necessary to install the shipping brackets before moving the cabinet. Failure to install the shipping brackets while moving the cabinet could be hazardous as the retainer latch may disengage. Shocks and vibrations may also cause component damage.*

---

5. Attach the power cable ❷ to J1 for a single-box system and to J7 of the first AC input box (Figure 5–5). If there is redundant power, then attach J2 to J8. Attach the console serial bus (CSB) cable ❸ to the J9 connector on the PCI box.

Figure 5–5 Power and CSB Connectors on PCI Box and AC Input Box

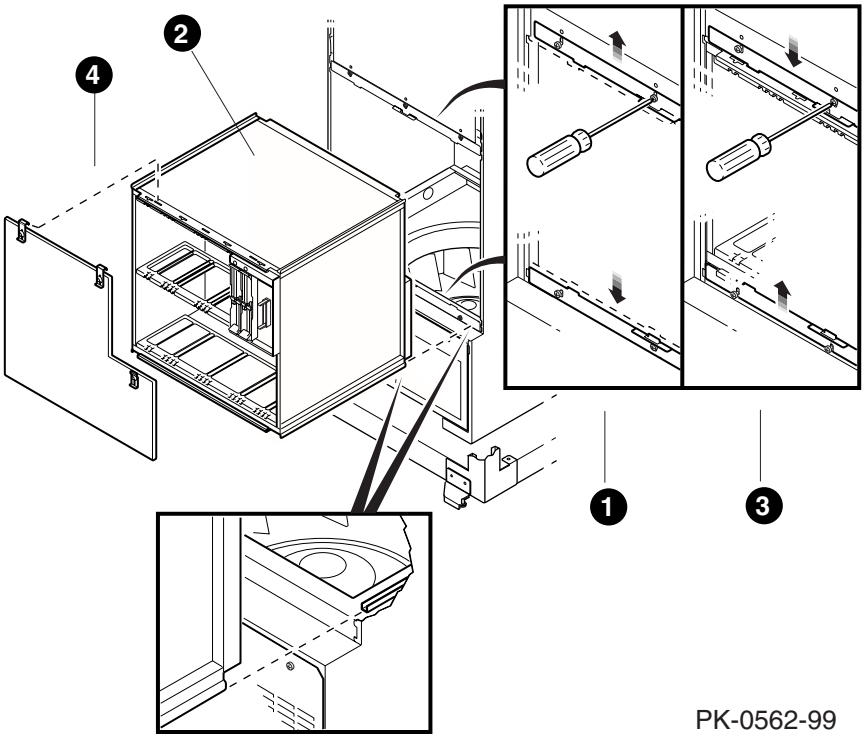


The installation of the PCI box is complete.

5.2 Installing a System Box

The procedure for installing a system box is the same for all upgrades. Figure 5–6 shows the installation of a system box.

Figure 5–6 Installing a System Box



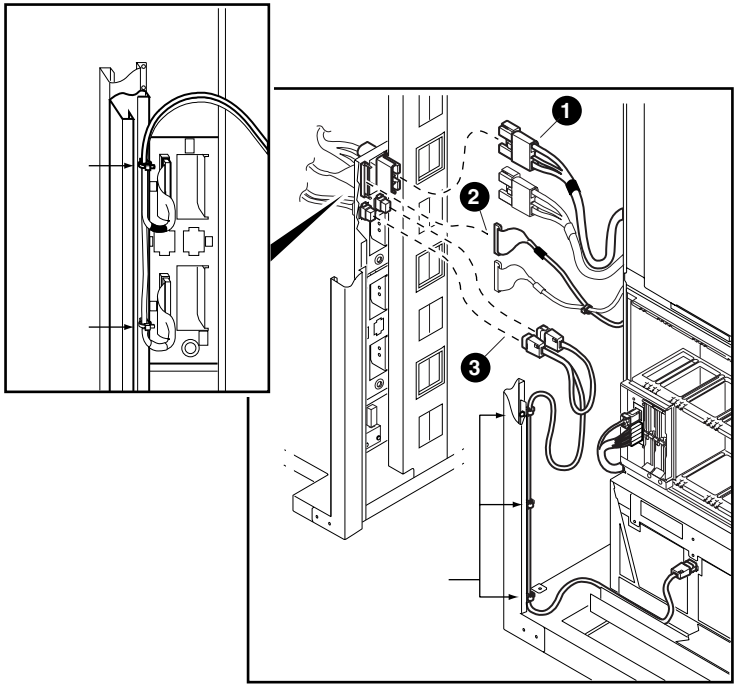
Install the system box as follows:

1. Unscrew and remove the shipping brackets (painted red) from the system cabinet and power cabinet.
2. Unpack the shipping box. The shipping box contains the system box, mounting brackets, and an installation kit.
3. Loosen the three screws on the upper locking bracket of the system box cage and push the bracket up ❶. Tighten the screws. Loosen the three screws on the lower locking bracket and let the bracket down ❷.
4. With assistance from a second person, lift and align the rear of the system box with the front of the cabinet cage ❸. Slide the system box into the cage.
5. Loosen the three screws on the upper bracket and let the bracket down to engage with the slot on the system box faceplate. Tighten screws ❸. Push the lower bracket up to engage with the slot on the system box faceplate. Tighten screws ❸.
6. Loosen the three screws on the lower locking bracket and push the bracket up to engage with the slot on the system box faceplate. Tighten screws ❸.
7. Install any modules.
8. Place the cover on and secure it to the cabinet frame and the system box faceplate with the three fastening brackets ❹.

5.3 Making System Box Cable Connections

After installing the system box, you must make two classes of cable connections: 1) system cabinet to power cabinet connections; 2) console serial bus (CSB) connections. Figure 5–7 and Figure 5–8 show these cable connections.

Figure 5–7 System to Power Cabinet Connections



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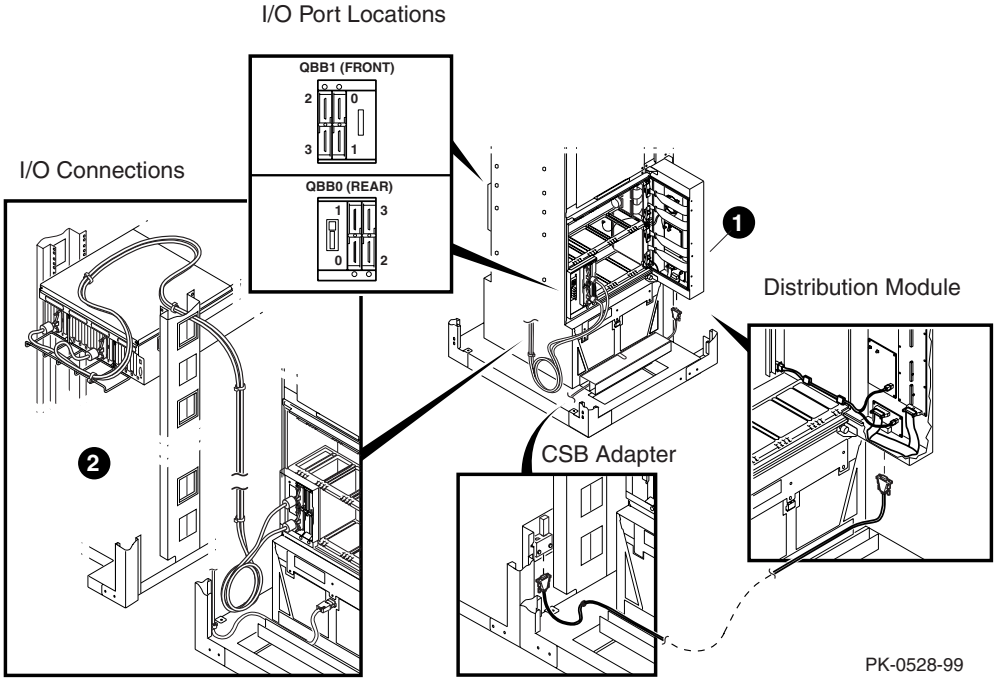
System Cabinet to Power Cabinet Cabling (Figure 5–7)

- Connect system box power cable ❶.
- Connect system box signal cable ❷.
- Connect blower cable ❸. Note that the blower cable splits into two connectors on the power cabinet side.

Console Serial Bus and I/O Cabling (Figure 5–8)

- Connect cable from the H-switch to the CSB adapter and terminator on the power cabinet ❶.
- Connect I/O cables ❷. I/O cabling depends on the configuration of the system box. There are eight I/O slots per system box.

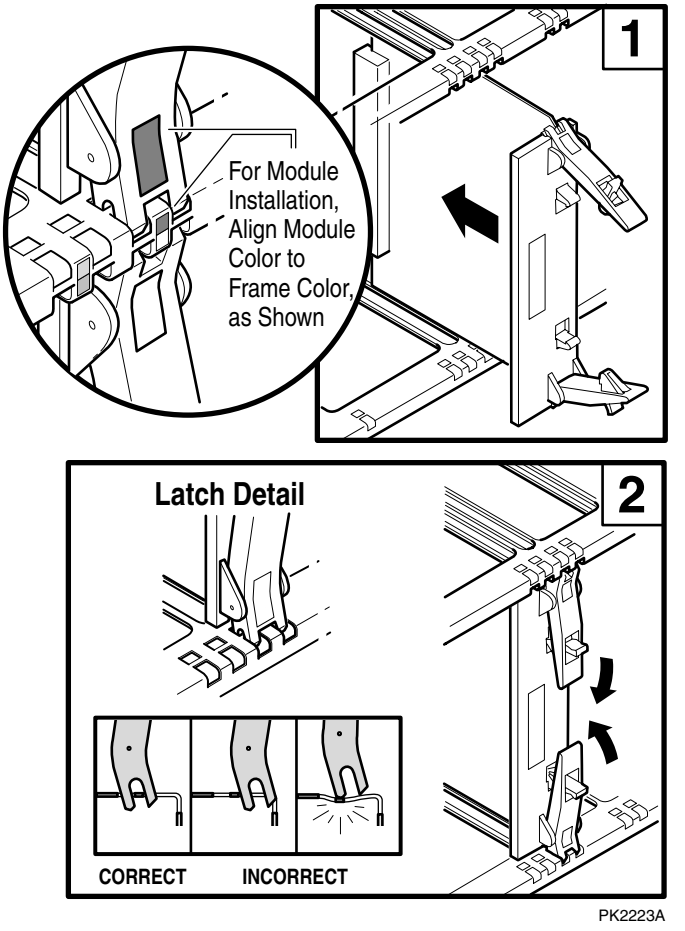
Figure 5–8 Console Serial Bus and I/O Connections



5.4 Installing a CPU Module

Refer to Figure 5–9 and follow the procedure outlined next to install a CPU module.

Figure 5–9 Installing a CPU Module



The unoccupied slot is covered with a filler. First remove the filler from the selected slot, then proceed to install the module as follows:

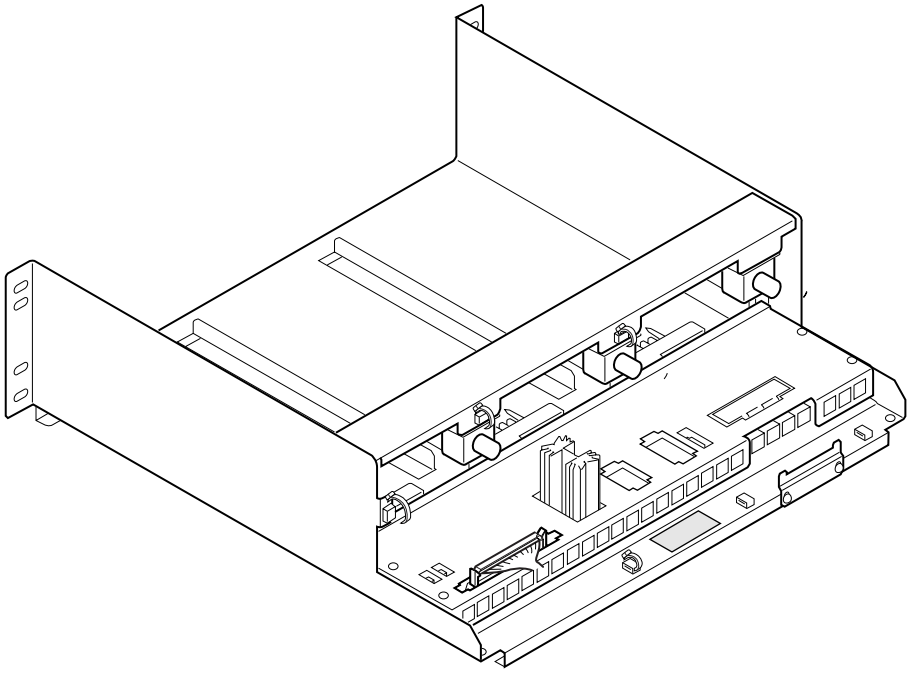
1. Check the firmware revisions and update, if necessary. See Appendix A.
2. Ensure that the color code of the CPU module matches the color code of the slot.
3. Push the retainers on the module latches with your thumbs in the direction of the arrows and release the latch.
4. Slide the module into the slot guide and gently push it in until the latches are activated.
5. Close the latches onto the bulkhead and push them in until you hear two clicks. The module is now firmly seated in the slot.

NOTE: *If you hear only one click, do not use excessive force to push the latches. In some cases a single click indicates that the module is fully engaged.*

5.5 Installing a Power Subrack

The procedure for installing a power subrack is the same for all upgrades. Figure 5–10 shows a power subrack.

Figure 5–10 Power Subrack



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The shipping box of the power subrack assembly contains the following items:

- Subrack power supply assembly
- Two base support brackets, right-hand and left-hand
- Mounting kit hardware consisting of two M6 screws, six M5 screws, and four M6 nuts

The installation areas are color-coded in the same manner as the associated system boxes. Starting from the top, the area is blue for the first power subrack, green for the second, orange for the third, and brown for the forth. The installation order and areas are given in Table 5–2.

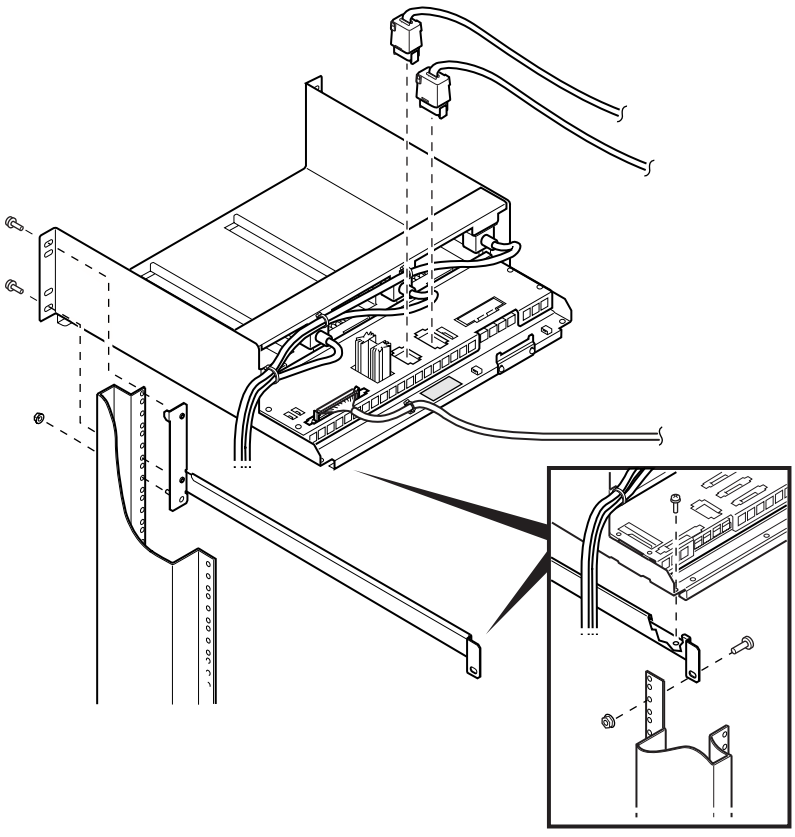
Table 5–2 Locations of the Power Subracks

Power Subrack	Color Code	Front Holes	Rear Hole
0	Blue	51, 53, and 59	51
1	Green	41, 43, and 49	41
2	Orange	30, 32, and 38	30
3	Brown	20, 22, and 28	20

5.5.1 Installing Power Subrack into Cabinet

Figure 5–11 shows how to install a power subrack into the cabinet.

Figure 5–11 Installing a Power Subrack into the Cabinet



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Install the power subrack into the cabinet as follows:

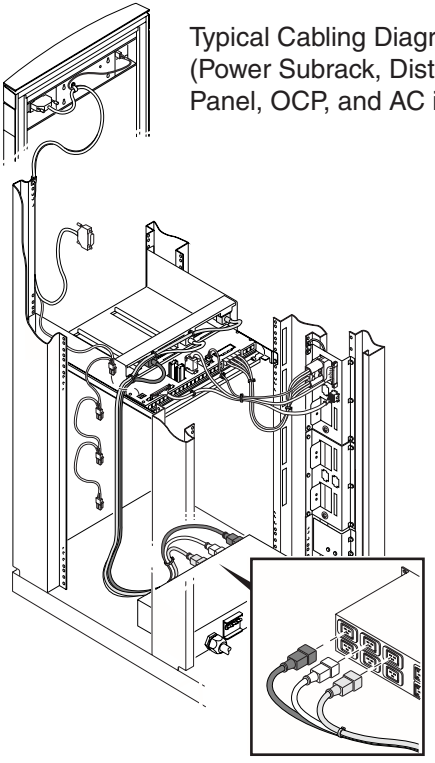
1. Insert the screw on the left-hand base support bracket (74-52913-01) through the appropriate hole on the left-hand rail of the cabinet front (see Table 5–2) so that the bracket is inside the cabinet and the three securing holes are lined up with the cabinet rail holes. Secure with an M6 nut ❶.
2. Secure the back of the base support bracket to the rear cabinet rail hole (see Table 5–2) with an M6 screw and nut ❷.
3. Repeat steps 1 and 2 for the right-hand base support bracket (74-52913-02). Tighten all the nuts with a hex wrench.
4. Slide the power subrack assembly onto the base support brackets and into the power cabinet.
5. Secure the power subrack assembly to the cabinet from the front with two M6 screws, one on each side ❸.

You have now installed the power subrack into the power cabinet. Next you must make the cable connections to the system box and AC input box.

5.5.2 Connecting Cables to the System Box

Figure 5–12 shows the power subrack cabling. The connection to the system box is made through the power distribution panel. First insert the power subrack cable connectors into their respective locations on the power distribution panel. Then connect the system cable connectors to their counterparts from the power subrack on the power distribution panel.

Figure 5–12 Power Subrack Cabling



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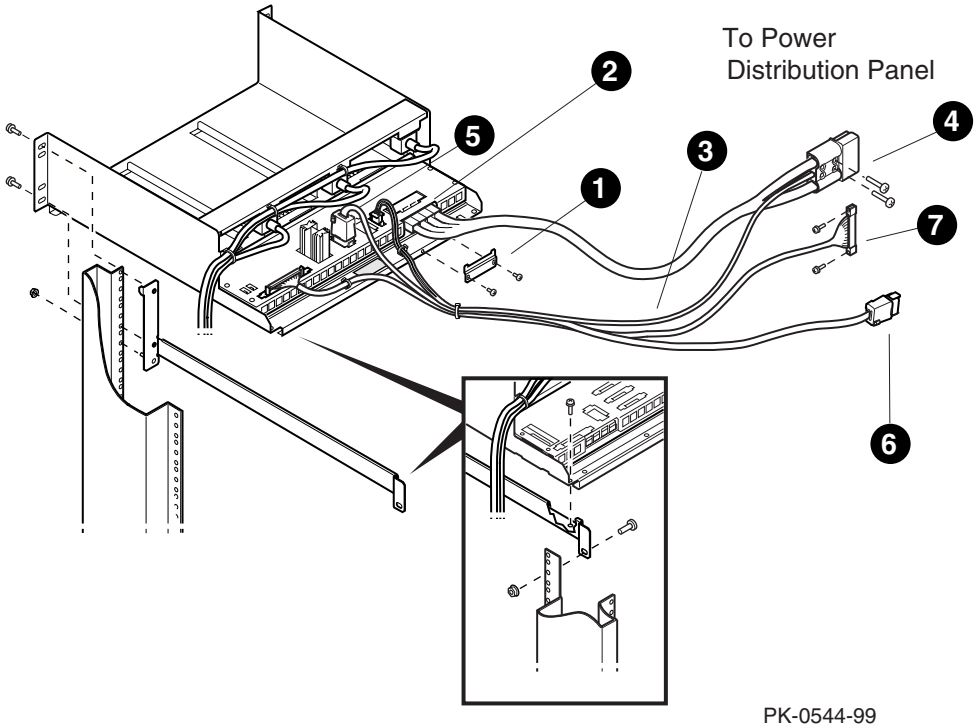
5.5.3 Connecting Power Subrack to Power Distribution Panel

Figure 5–13 Cable Connections to the Power Distribution Panel



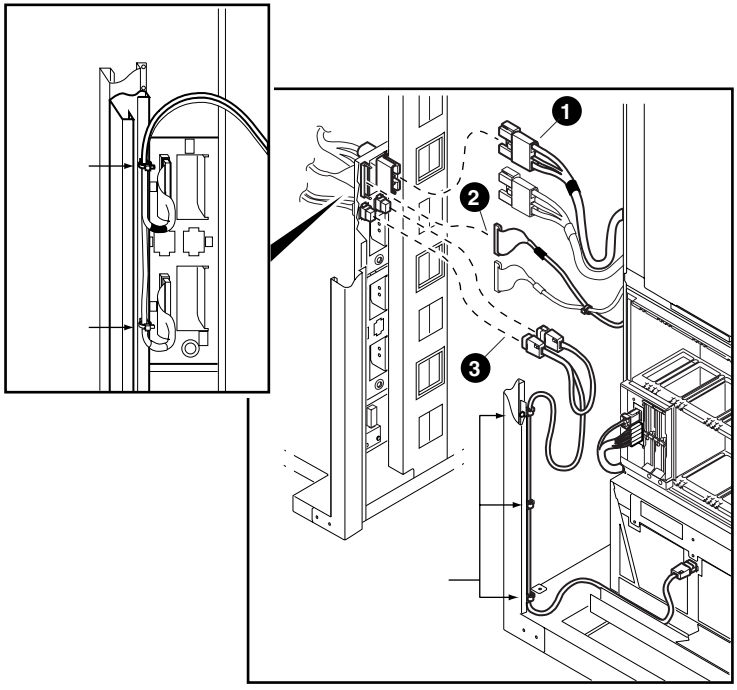
Locate the color-coded area on the power distribution panel and insert the power subrack cables into their respective positions on the panel as follows. Refer to Figure 5–13:

NOTE: *The cable connections of the orange and brown system boxes are made through the second power distribution panel located right underneath the first one on the power cabinet. You need to attach this panel if it is not already installed by manufacturing.*

---

1. Unscrew and remove the 6 AWG harness assembly retainer bracket ❶ on the power subrack to access the connector.
2. Connect the 6 AWG harness assembly (17-04709) to the power subrack connector on one side ❷❸. Connect the other side to the corresponding slot power distribution panel and secure the connection with two screws ❹.
3. Connect the 12-position connector of the cable harness assembly to the power subrack on one side ❺ and insert the receptacle connector on the other side ❻ into the corresponding slot on the power distribution panel.
4. Insert the 50-conductor flat signal cable assembly connector (17-04712) through the slot on the power distribution panel making sure that the key on the connector faces inward to the cabinet. Fasten the connector with two screws ❼. Make sure the orientation of the cable is correct.

Figure 5–14 Cable Connections from System Box



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Refer to Figure 5–14 and proceed as follows:

1. Connect the 6 AWG harness assembly ❶ from the system box to the 6 AWG harness assembly connector on the power distribution panel. Push the cable connector in until it locks firmly.
2. Connect the 50-conductor DC signal harness assembly connector ❷ to the DC connector on the power distribution panel. Open the wings on the connector, align the keys on the connectors, and carefully push the harness assembly connector in until it snaps in and the wings on the panel connector are latched.
3. Connect the 12-position harness assembly receptacle connector from the blower ❸ to the 12-position connector on the power distribution panel (two locations). Note that the holes on the power distribution panel connector are keyed. Push the connector in until it snaps on both sides.

NOTE: *To disconnect, press on the upper and the lower levers of the receptacle connector and pull the connector out. For ribbon MNC connectors, squeeze tab to disconnect.*

---

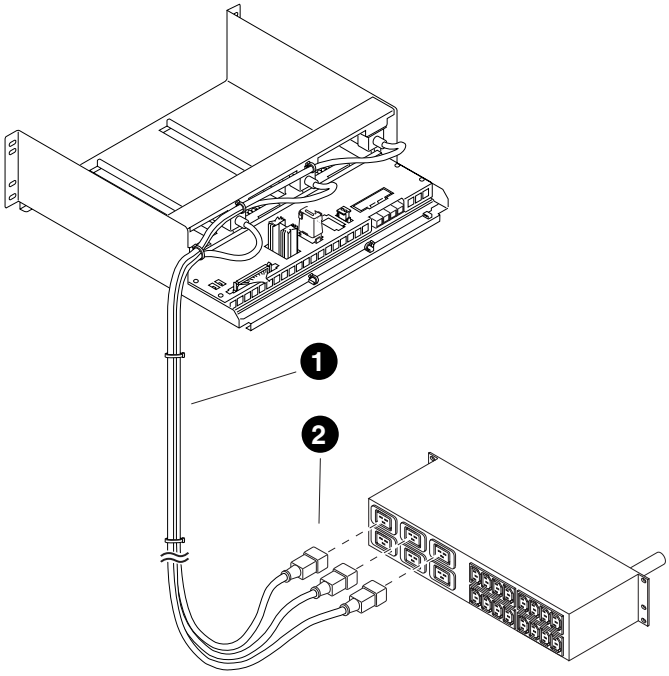
4. Connect the OCP signal cable already hanging (see Figure 5–15) to the power subrack. There is one OCP connector on the cable for each power subrack.

You have now completed the cable connections to the system box.

5.5.4 Connecting Cables to the AC Input Box

Figure 5–15 shows how to make connections to the AC input box.

Figure 5–15 Cable Connections to the AC Input Box



Connect the power cords to the AC input box as follows:

1. Let the three power cords hang down on the side of the power cabinet and pull the connectors in toward the front of the AC input box ❶.

NOTE: *Connectors on the AC input box are color-coded, so that the lowest row of connectors is blue, the next row above is green. If there is another AC input box on top of the first one, then the next row of connectors is orange, and the top row of connectors is brown. Make sure that the AC input box connectors and the power subrack are of the same color code.*

---

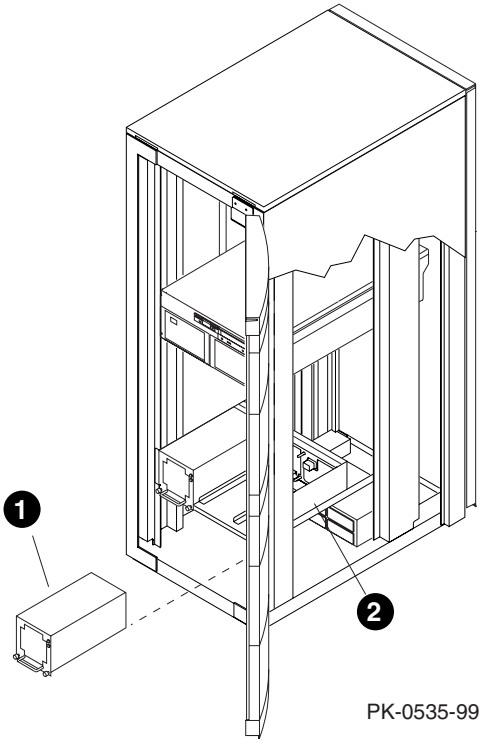
2. The power cords are of different lengths. Connect the longest cord to the left connector, the mid-length cord to the middle connector, and the shortest cord to the right connector ❷.

You have now completed the cable connections to the AC input box.

5.5.5 Installing a Power Supply

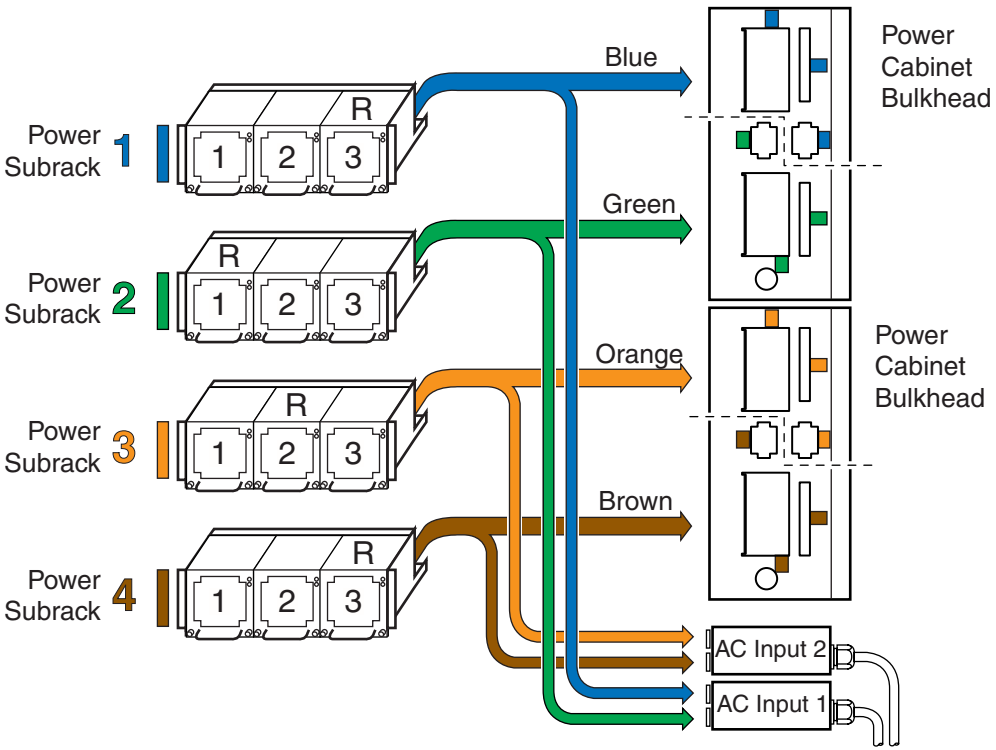
Figure 5–16 shows how to install a power supply.

Figure 5–16 Power Supply Installation



Each power subrack requires a minimum of two power supplies. A redundant third power supply is recommended. Figure 5–17 shows the power supply slot assignments and the placement of the three power supplies for each of the four power subracks.

Figure 5–17 Power Supply Placements



R indicates redundant power supply slot.

PK-0624-99

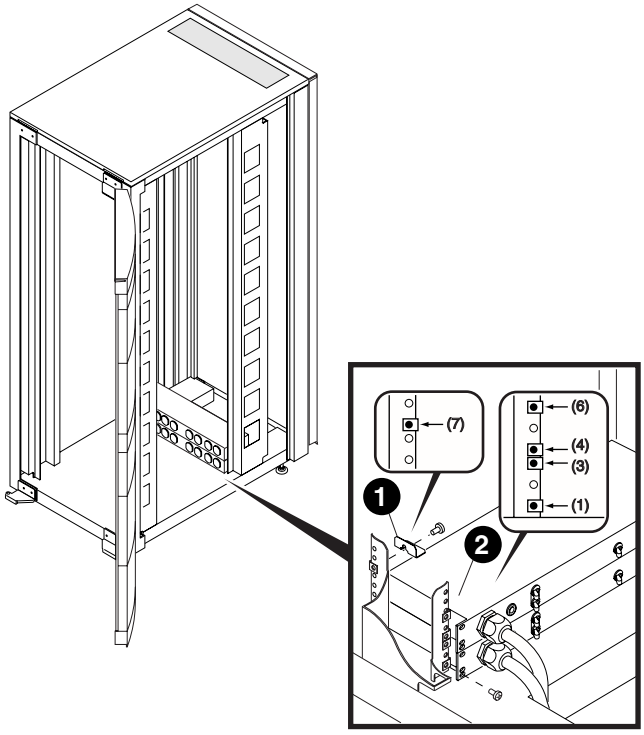
1. Place the power supply onto the power subrack and push it in until firmly engaged ❶.
2. Tighten the two front screws on the power supply to connect it firmly to the power subrack ❷.

You have now completed the installation of a power subrack.

5.6 Installing an AC Input Box

Figure 5–18 shows how to install an AC input box.

Figure 5–18 AC Input Box Installation



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A system with one system box requires one AC input box. A system with more than one system box requires two AC input boxes. Systems with four system boxes may require a third AC input box, depending on the configuration.

Install an AC input box as follows:

1. Unscrew and remove from the two side rails the displacement stopper brackets ❶ that are installed to prevent the AC input boxes from moving during shipment.
2. Insert the additional AC input box into the back of the power cabinet, seat it on top of the existing AC input box (es), and push it in. AC input box side bracket holes are aligned with holes 7 and 12 for the second AC box and holes 13 and 18 for the third box.
3. Secure the AC input box to the cabinet with two screws on each side ❷.
4. Reinstall the displacement stopper brackets on top of the AC input box just installed. Ensure that the clips are on and the brackets press tightly onto the AC input box.
5. Place an orange tape on top of the lower connector row in the back of the AC input box and a brown tape on the upper row of connectors. Do likewise for the breakers.

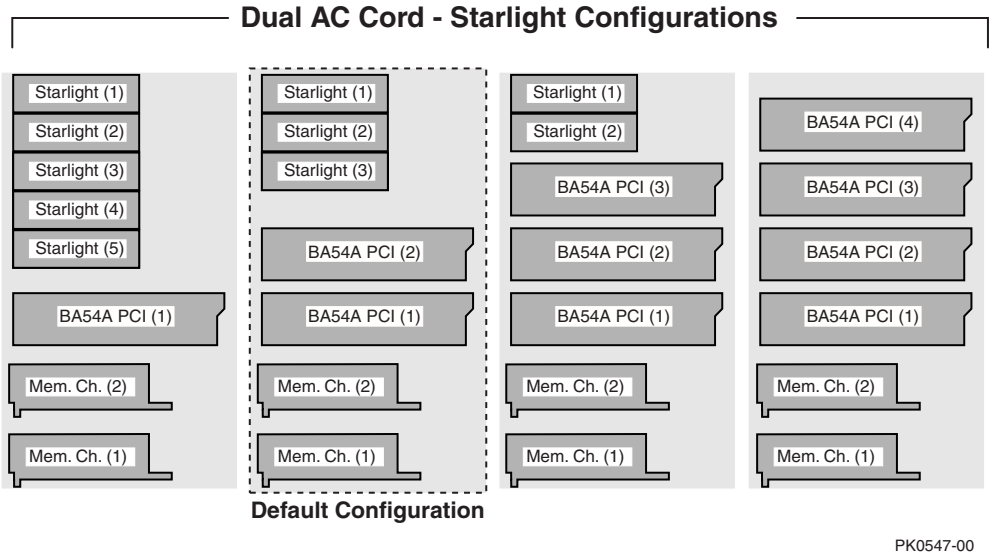
NOTE: *If installing a third AC input box, place black color labels on the AC input box.*

You have now installed an additional AC input box.

5.7 Expander Cabinet Configurations

The expander cabinet provides space for additional I/O components and the memory channel adapter. Figure 5–19, Figure 5–20, and Figure 5–21 show various configurations for the expander cabinet. Figure 5–21, Figure 5–22, Figure 5–23, and Figure 5–24 show the locations in the expander cabinet where the I/O devices are mounted.

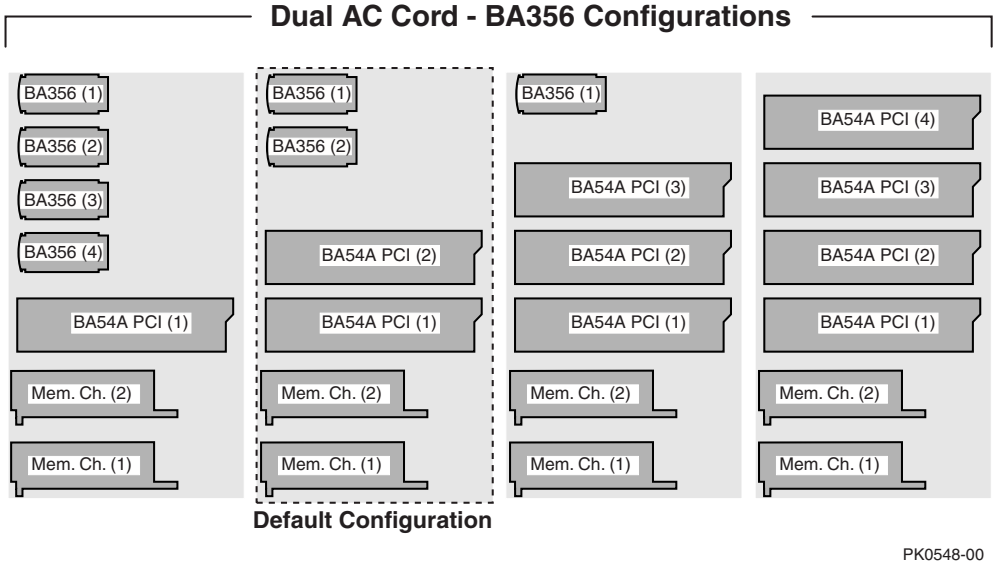
Figure 5–19 Configurations Based on the Starlight Storage Device



PK0547-00

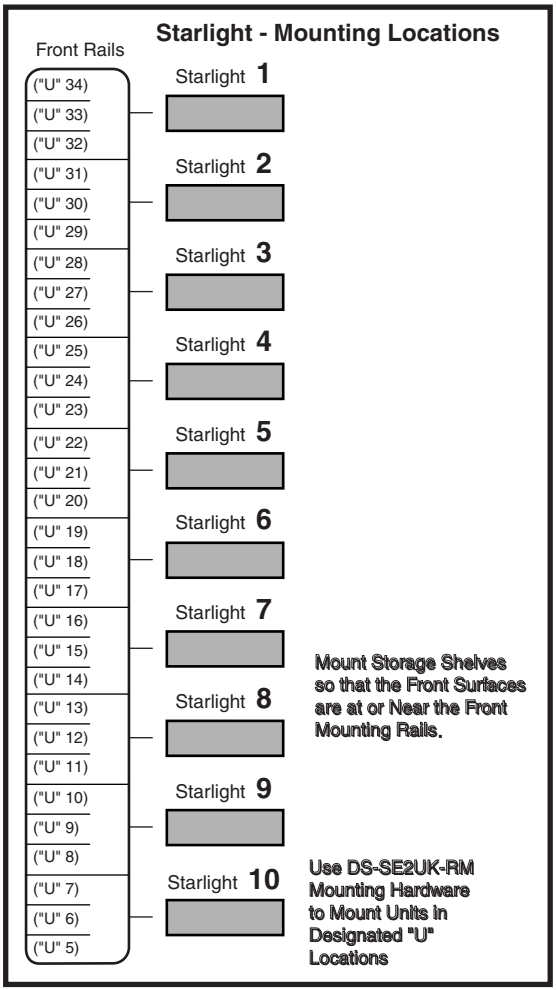
The expander cabinet is used for additional PCI boxes and storage devices. In addition, the expander cabinet holds two memory channel adapters for the PCI boxes. The expander cabinet is shipped with a default configuration but can be built to order as shown by other configurations. Figure 5–19, Figure 5–20, and Figure 5–21 show the various configurations available for the expander cabinet and the placement order of the I/O devices. Figure 5–21, Figure 5–22, Figure 5–23, and Figure 5–24 show the locations in the expander cabinet where the I/O devices are mounted.

Figure 5–20 Configurations Based on the StorageWorks Device



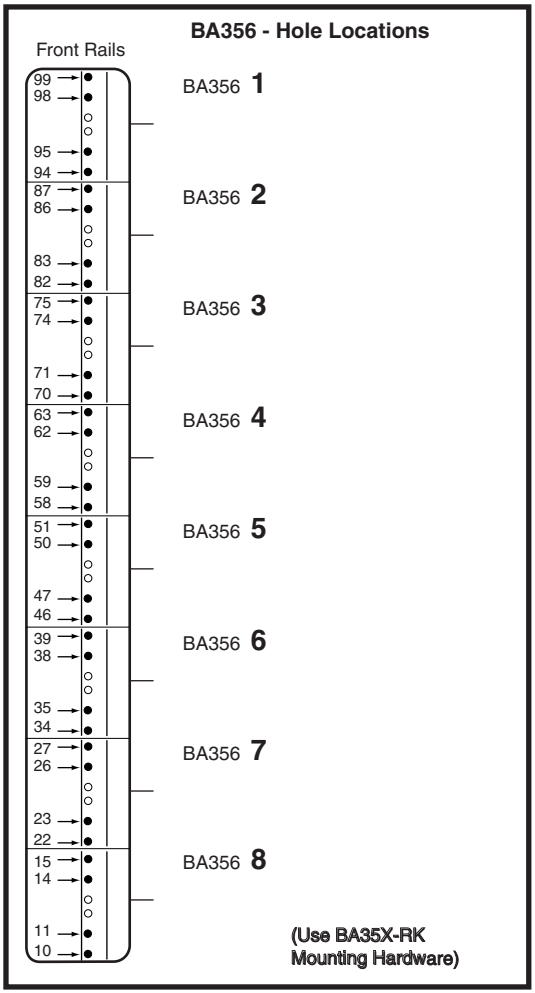
PK0548-00

Figure 5–21 Mounting Locations for the Starlight Storage Device



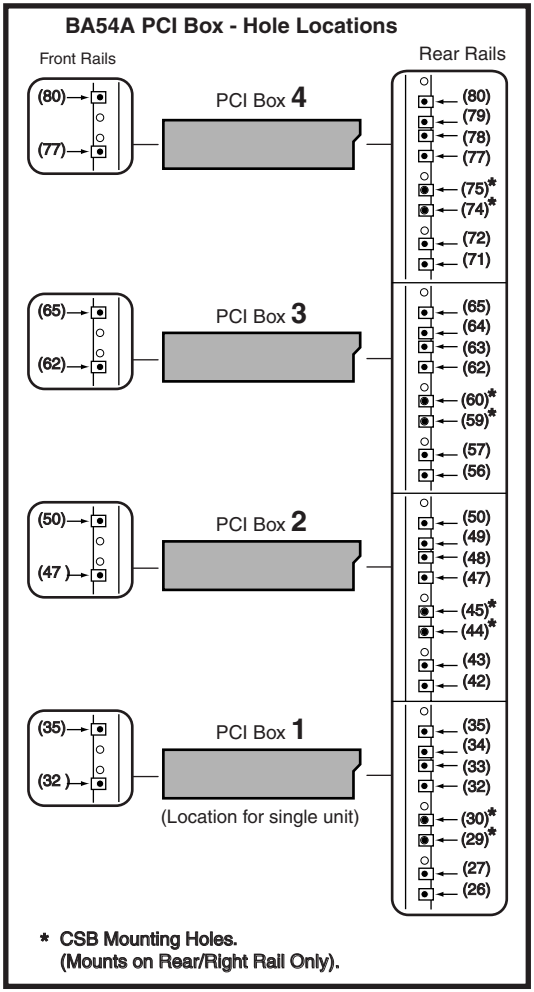
PK0549-00

Figure 5–22 Mounting Locations for the StorageWorks Storage Device



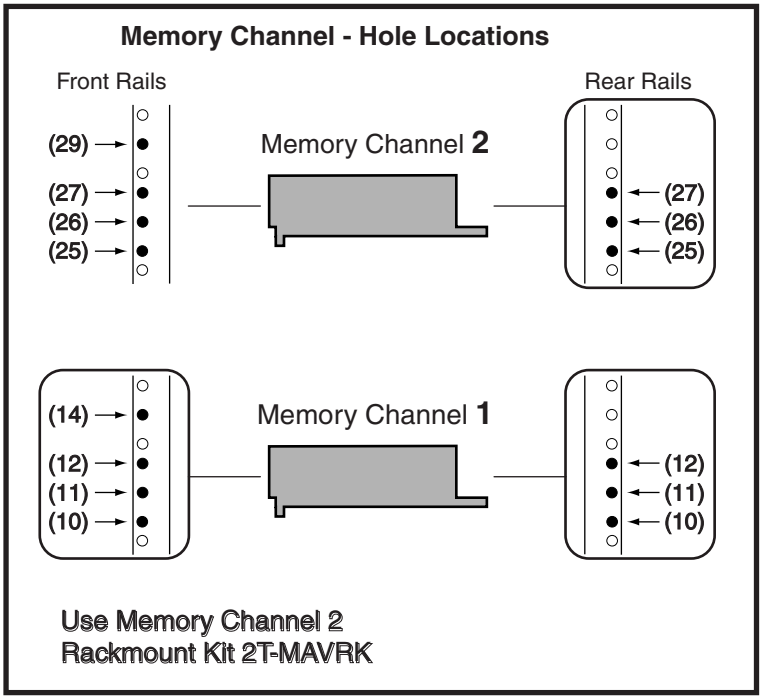
PK0550-00

Figure 5–23 Mounting Locations for the PCI Box



PK0552-00

Figure 5–24 Mounting Locations for the Memory Channel



PK0551-00

Appendix A
Upgrades Using B4166 and B4168 CPUs

Upgrading original systems depends upon whether the customer decides to retain the older, slightly slower CPUs or not. There are three types of upgrades:

- Adding CPUs to a (black) system that always had B4166 CPUs. See Section 5.4.
- Replacing B4125 CPUs in a (blue) system with B4166 or B4168 CPUs.
- Adding B4166 or B4168 CPUs to a (blue) system containing B4125 CPUs.

If the customer decides to retain the older CPUs, the upgrade consists of adding new CPUs, system box(es), and updating system firmware. See Section A.1.

If the customer decides to replace old CPUs with new ones, the upgrade consists of replacing/adding new CPUs, replacing/adding system box(es), replacing or changing the speed of the system clock, changing the system cosmetics, and updating system firmware. See Section A.2.

NOTE: *Whatever the type of upgrade, the SRM and microprocessor firmware must be brought to a minimum revision prior to performing hardware changes.*

For B4166 CPUs –V6.0-514
For B4168 CPUs –V6.3

A.1 Upgrades Retaining Older CPUs

These upgrades consist of adding new CPUs and new system boxes.

Follow the procedures in Chapter 5 for adding new CPUs and adding a new system box. Table A–1 describes the different CPUs. The CPU derives its operating clock speed from the system clock. The B4125 CPU is not supported when the system clock is run at 9.0 ns.

Be sure to update the firmware. See Section A.2.1.

Table A–1 Comparison of CPUs

CPU Part Number	B-cache Size	Speed in MHz	Comments
B4125	4 Mbytes	731	The B4125 must operate at this speed and requires the system clock to run at 9.6 ns.
B4166	4 or 8 Mbytes	1001	The B4166 runs at this speed and uses all its available B-cache when all CPUs in the system are B4166 or it is in a system with B4168 CPUs, the clock runs at 9.0 ns, and the CPUs are in a system box with duplicate tag support of the 8-MB cache. If the system box duplicate tag supports only 4-MB cache, then only 4 of the 8 Mbytes of B-cache on the CPU are used.
	4 or 8 Mbytes	940	The B4166 runs at this speed and uses all its available B-cache when all CPUs in the QBB are B4166 or it is mixed with B4168 CPUs, but the system clock runs at 9.6 ns. If the system box duplicate tag supports only 4-MB cache, then only 4 of the 8 Mbytes of B-cache on the CPU are used.
	Uses 4 of its 8 Mbyte B-cache	731	The B4166 runs at this speed and uses 4 Mbytes of its B-cache when it is in a QBB with a B4125 CPU and the clock runs at 9.6 ns.
B4168	8 or 16 Mbytes	1224	The B4168 runs at this speed and uses all its available B-cache when all CPUs in the system are B4168 or B4166, the clock runs at 9.0 ns, and the CPUs are in a system box with duplicate tag support of the 16-MB cache. If the system box duplicate tag supports an 8-MB cache, then 8 of the 16 Mbytes of B-cache on the CPU are used.

Table A–1 Comparison of CPUs (Continued)

CPU Part Number	B-cache Size	Speed in MHz	Comments
B4168	Uses 4 of its 16 MB B-cache	1148	The B4168 runs at this speed when placed in a QBB that supports only 4 Mbytes of B-cache, when all CPUs in the system are B4168 or B4166, and the clock runs at 9.0 ns.
	Uses 8 of its 16 MB B-cache	1001	The B4168 runs at this speed and uses 8 Mbytes of its B-cache when the B4168 is placed in the same QBB as the B4166 and the clock is at 9.0 ns.
	4 or 8 Mbytes	940	The B4168 runs at this speed when all CPUs in the QBB are B4168 or B4166, and the system clock runs at 9.6 ns. If the system box duplicate tag supports only 4-MB or 8-MB cache, then only 4 or 8 of the 16 Mbytes of B-cache on the CPU are used.
	Uses 4 of its 16 MB B-cache	731	The B4168 runs at this speed and uses 4 Mbytes of its B-cache when the B4168 is placed in the same QBB as the B4125 and the clock is at 9.6 ns.

Table A–2 Comparison of System Boxes

System Box Part Number	Cache Size Supported by the Box	Comments
BA51A-AA (54-25043-01/02)	4 Mbytes	Though the B4166 and B4168 CPUs have larger B-caches, only 4 Mbytes are used when placed in this backplane.
BA51A-BA (54-25045-01/02)	4 or 8 Mbytes	When CPUs in this backplane are B4166 or B4168, they use 8 Mbytes of B-cache. If a B4125 is mixed with other speed CPUs on the same backplane, all are configured for the 4-Mbyte B-cache size.
BA51A-DA (54-30606-01/02)	4, 8, or 16 Mbytes	When all CPUs in this backplane are B4168, they use 16 Mbytes of B-cache. If CPUs are mixed, B4125, B4166, or B4168 on the same backplane, all are configured for the B-cache size of the processor that supports the smallest size (4 or 8 Mbytes).

From outside the box, there is no easy way to visually distinguish between the two system boxes; to see the components that differ requires looking inside the box. The best way to determine which box is in the system is to use the **show fru** command. The 54-class part number is listed on the QBBx line when the **show fru** command is issued from either the SCM monitor or the SRM console.

Configuration Rules

The original (blue) system upgrade is governed by the following rules:

1. The BA51A-AA, BA, and DA system boxes can all coexist in a system.
2. The B4125 CPUs run at 731 MHz and require a 9.6 ns system clock. B4125 CPUs are not supported with the 9.0 ns system clock.
3. B4125 CPUs have 4 Mbytes of B-cache. When in a QBB in a BA51A-BA or DA system box, firmware configures these CPUs to be consistent with the amount of B-cache available.
4. The B4166 and B4168 CPUs can operate at different speeds and use different amounts of B-cache depending upon the system box they are in, the system clock speed, and whether they are configured with the B4125 CPU. See Table A–1.
5. The B4166 CPU requires that the SRM console and microprocessor firmware be at V6.0-514 or higher.
6. The B4168 CPU requires that the SRM console and microprocessor firmware be at V6.3 or higher.

A.2 Upgrades Replacing Older CPUs

These upgrades consist of updating the firmware, replacing old CPUs, old system box(es), and changing the speed of the system clock.

A.2.1 Firmware Requirements

Before replacing anything, upgrade the system firmware to V6.0-514 or a later revision if you are installing B4166 CPUs, or to V6.3 or a later revision if installing B4168 CPUs.

Example A–1 Updating the Firmware

```
P00>>> show config                    ❶
                        Compaq Computer Corporation
                       Compaq AlphaServer GS320 6/731

SRM Console    V5.8-1, built on May 26 2000 at 12:15:01                ❷
PALcode        OpenVMS PALcode V1.81-1, Tru64 UNIX PALcode V1.75-1
Micro Firmware V5.7                   ❸

QBB 0          Hard QBB 0
 Quad Switch                                  QSA rev 4, QSD revs 0/0/0/0
 Duplicate Tag              Up To 4 MB Caches  DTag revs 1/1/1/1
.
.
.
P00>>> <esc><esc> scm                 ❹
SCM_E0> set hp_count 0                ❺
SCM_E0> reset                         ❻
.
.
.
P00>>> boot dqb0                      ❼
.
.
.
UPD> update srm*                      ❽
.
.
.
UPD> update micro                     ❾
```

```
P00>>> power off          ❿
Powering off Hard_partition_0 consisting of:
       QBB0
       QBB1
QBB-0 Powering OFF
QBB-1 Powering OFF
```

❶ Issue the SRM **show config** command.

❷ Note the version of the SRM console. The B4166 requires V6.0-514 or higher, and the B4168 requires V6.3 or higher.

❸ Note the firmware revision of the microprocessors. The B4166 requires V6.0-514 or higher, and the B4168 requires V6.3 or higher

❹ Issue the **<esc><esc>SCM** command to get to the SCM monitor. Only necessary if the system is partitioned.

❺ Issue the **set hp_count 0** command if the system is partitioned.

❻ Issue the **reset** command to get back to the SRM console to run LFU.

❼ Boot LFU. In this case, LFU is booted off the CD-ROM in a master PCI box.

❽ Issue the LFU **update srm*** command.

❾ Issue the LFU **update micro** command. The system power-cycles automatically after the micros are updated. The environment variables determine the prompt that the system returns to.

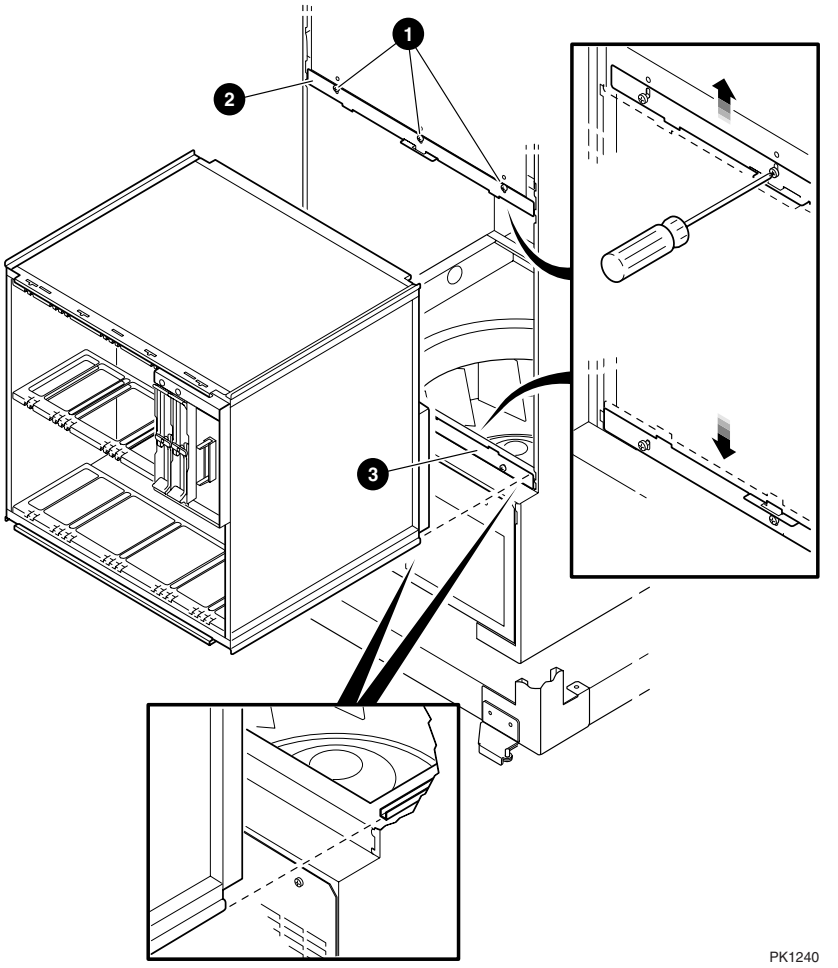
❿ Issue the SRM **power off** command.

Once the micros and the SRM console are updated and the system is powered off, place the main AC circuit breaker(s) in the Off position.

A.2.2 System Box Removal and Replacement

If a QBB backplane requires replacement, the system box is replaced. This procedure requires two people.

Figure A–1 System Box Removal



Removal (Requires two people)

1. Once the system is powered off and the AC circuit breakers are in the Off position, access the system boxes to be removed.
2. Place an ESD mat, two of which are included with the system box spare, on two horizontal surfaces, one in front of the machine and one in back.
3. Remove all modules from the front and rear QBBs. Place them on the ESD mats.
4. Move the cables (global port and clock) out of the system box. Pay close attention to clock cable routing since you will want to put the cables back the same way.
5. Disconnect the power cable from the backplane in the system box. Move the cable out of the box to the rear of the system.
6. Disconnect the ground cable connected to the backplane stiffener and move it out of the way.
7. Disconnect the power cable from the rear of the system box.
8. Disconnect the signal cables from the front of the system box.
9. At the front of the system, loosen the three Phillips head screws holding the upper system box locking bracket ❶. Slide the bracket ❷ up and tighten the middle screw to hold it up.
10. Loosen the three Phillips head screws holding the lower system box locking bracket ❸ and the system box to the frame and slide it down.
11. Slide the system box from the front of the system cabinet.

Replacement

Reverse the steps outlined in the removal procedure. Do not put the modules into the new system box and then try to put the full box back into the system cabinet. Once the new system box is in place, transfer all the modules from the ESD mats to the new system box **except** the CPUs and global port modules (these modules are being replaced).

A.2.3 CPU Replacement

As part of the system box replacement, replace the old B4125 CPUs with the new B4166 or B4168 CPUs.

CAUTION: *The B4180-BD and B4181-BD global ports are required for the BA51A-BA system box and 8-Mbyte B-cache support. The B4180-BE and B4181-BE global ports are required for the BA51A-DA system box and 16-Mbyte B-cache support.*

*Do not swap in the B4180-BC or B4181-BC modules when configuring the system. The B4180-BE and B4181-BE global port modules are also backward compatible with earlier version BA51A-*A system boxes.*

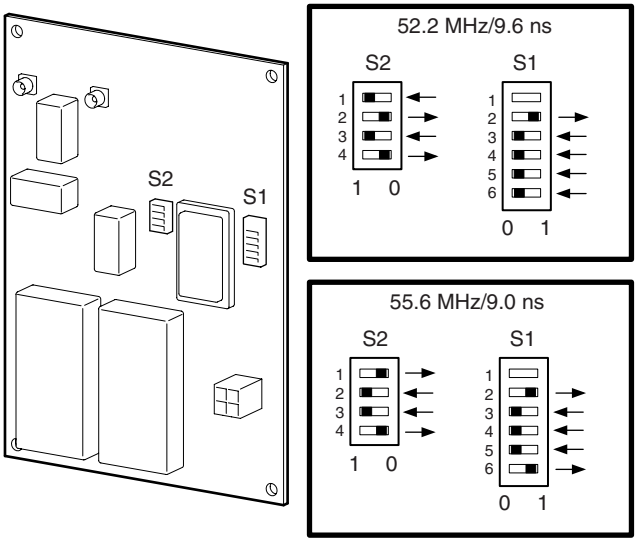
A.3 Dealing with the System Clock

There are two variants of the system clock: one can be set to different frequencies, the other is fixed. If the upgrade kit does not have a new clock module, change the clock frequency (Section A.3.1). If the upgrade includes a new clock module (30-56061-03), replace the clock (Section A.3.2).

A.3.1 Changing Clock Module Switch Settings

Two switch packs on the clock module control the clock frequency. If no B4125 CPUs are in the system, the clock can run at the faster speed (9.0 ns).

Figure A–2 System Clock Switch Packs



The switch packs on the master clock control the speed of the system. When B4125 CPUs are in the system, the clock runs at 9.6 ns. To set the system speed to 9.0 ns, access the clock module and change the switches.

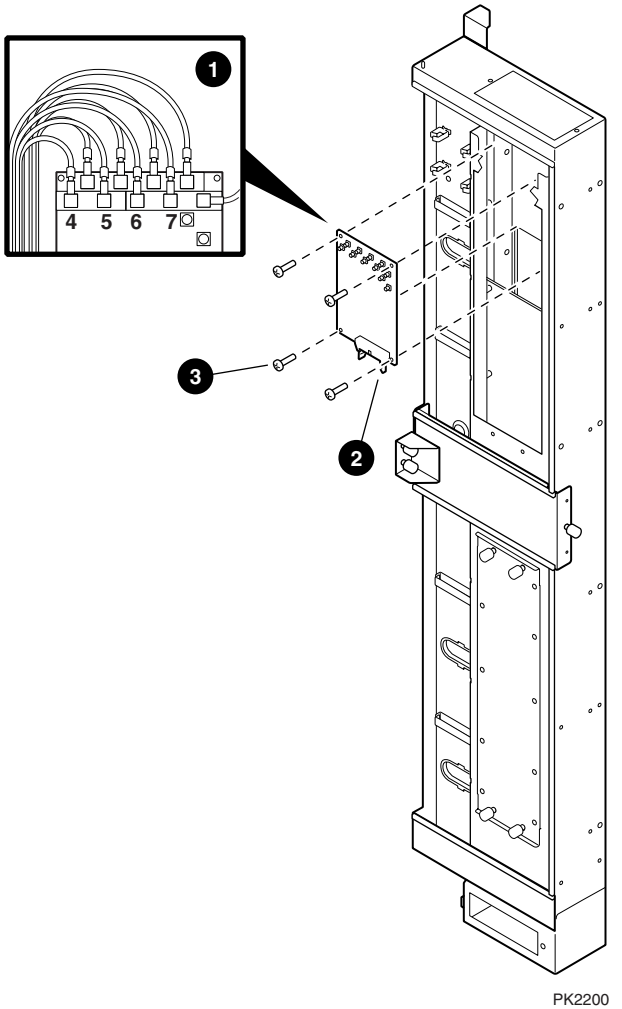
Clock Module Access

1. At the rear of the system remove the EMI covers from the left side of the H-switch.
2. Remove the upper H-switch power supply. The clock module is now exposed.
3. Check the bit settings on the two switches. See Figure A–2 for switch orientation and bit settings.

A.3.2 H-switch Clock Module

AC power must be off when removing the clock. The module is located above the H-switch in the upper left side of the H-switch housing.

Figure A–3 H-switch Clock Module Removal



Removal

1. Remove the EMI covers from the left side of the H-switch.
2. Remove the upper H-switch power supply. The clock module is now exposed.
3. Unplug all coax cables connected to the module making sure that the QBB ID labels are secure. (You may want to use needle-nosed pliers for this.) ❶
4. Unplug the ribbon cable that goes to the H-switch module. ❷
5. Unscrew the four Phillips head screws that hold the module in place and remove it from the H-switch housing. ❸

Replacement

Reverse the steps outlined in the removal procedure. Be sure that the QBB coax cables get plugged into the correct clock connector – they are color coded and labeled.

A.3.3 B4168 Compatibility Switch

The B4168 CPU module has a switch that must be set if the module is to be used with B4125 modules in the same QBB.

Figure A–4 Setting the B4168 Switch

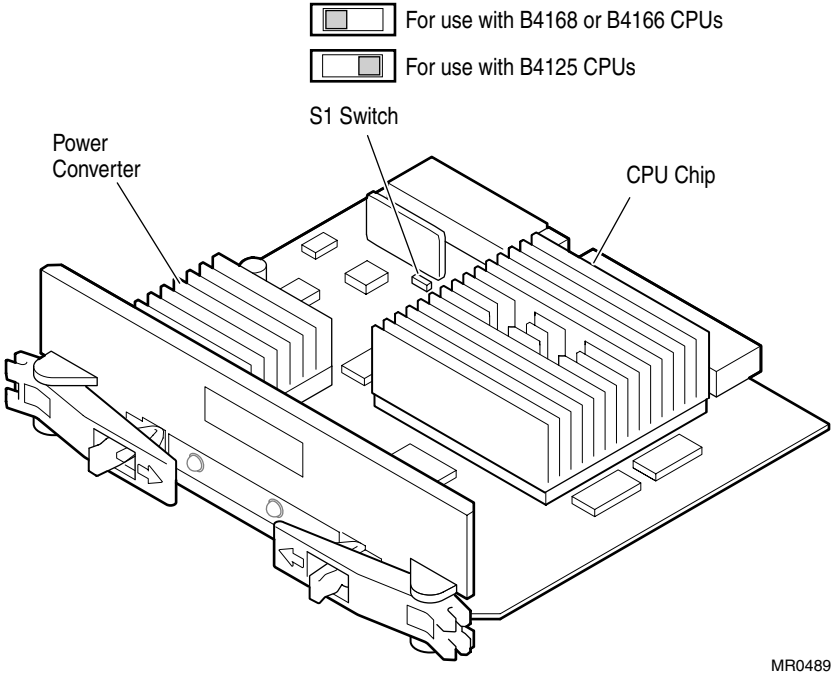


Figure A–4 shows the location of the S1 switch that must be changed if the module is to be in a QBB with a B4125 module.

As viewed here, the switch would be set to the left for 1224/1001 MHz speeds; this is the default position. When set to the right, the switch allows the module to operate with a B4125 module running at 731 MHz.

A.4 Verification

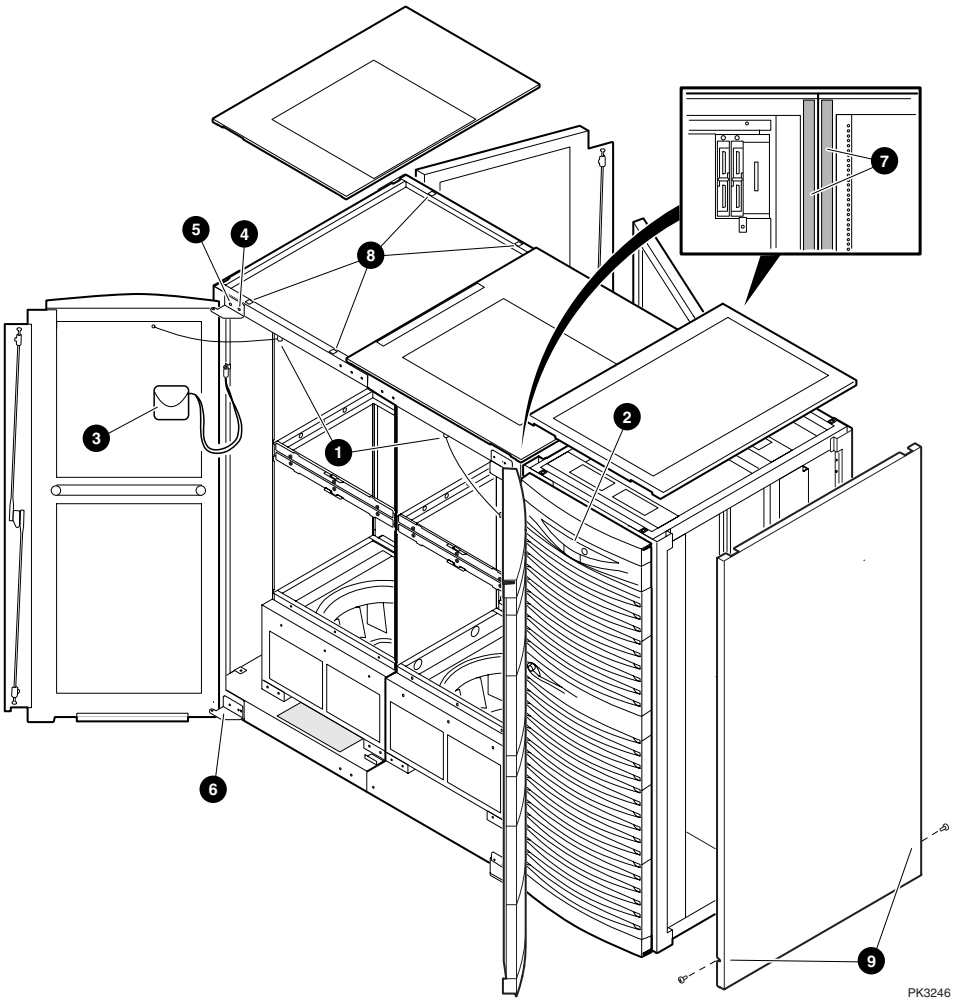
When you power up the system, check that the SCM correctly maps the QBBs in the system. Execute the SRM **set sys_serial_num** command.

Run Q-Vet/IVP (see Section 4.4).

A.5 Replacing the System Cosmetics

When systems are completely upgraded (when B4125 CPUs are replaced), they may also receive new black doors and panels.

Figure A–5 GS320 Cabinets



Door Removal

1. Open the door.
2. On front doors remove the screw at the cabinet end of the ground strap. ❶
3. If the door contains the OCP, disconnect all cables to it. ❷
4. If the door has a service pouch on it, remove it and place it inside the cabinet. ❸
5. Remove the outer screw of the upper bracket holding the door to the frame. ❹
6. Loosen the inner screw of the upper bracket and slide the door and bracket to let the screw pass through the bracket. ❺
7. Tilt the door away from the cabinet and lift it off the bottom bracket.
8. Remove the bottom bracket. ❻

Door Replacement

1. Replace the doors after you have replaced the side panels and covers.
2. Before replacing a door on a power cabinet or system cabinet 1, place black decorative strips along each frame between the two cabinets (front and back). ❼
3. Reverse the removal procedure.

Top Cover Removal

1. The top cover is held in place by plastic tabs at the front and back of the cover. Push the cover up to release the tabs and lift it off the cabinet. ❽

Top Cover Replacement

1. Replace the cover after you have replaced the side panels. Covers are different for each cabinet. Place the correct cover on the correct cabinet and snap in place.

Side Panel Removal

1. The side panels are held in place by two screws toward the bottom of the panel at the front and at the rear of the cabinet. Loosen both screws. ❾
2. Pull the bottom of the panel free from the side members of the frame and lift it off the top frame member.

Side Panel Replacement

1. Reverse the removal procedure.

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