



AlphaServer GS80

Upgrade Manual

Order Number: EK-GSR80-UP. C01

This manual is for service providers of *HP AlphaServer* GS80 systems. It discusses system expansion and upgrade of an original system with faster CPUs.

Hewlett-Packard Company

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Contents

Preface	ix
----------------	----

Chapter 1 Overview

1.1	The System.....	1-2
1.2	GS80 Block Diagram.....	1-3
1.3	GS80 Physical Diagram	1-4
1.4	Cabinets	1-5

Chapter 2 System Upgrade

2.1	Installing a Power Subrack.....	2-2
2.2	Installing the Second Drawer	2-4
2.2.1	Installing the Distribution Board Assembly.....	2-6
2.2.2	Global Port, Clock, and Ground Connections.....	2-8
2.2.3	Power, Signal, and CSB Connections.....	2-14

Chapter 3 PCI Box Installation

3.1	Installing a PCI Box.....	3-2
3.1.1	Preparing the PCI Box for Installation.....	3-4
3.1.2	Preparing the Cabinet for PCI Box Installation	3-6
3.1.3	Installing the PCI Box and Making Cable Connections	3-8
3.2	Expander Cabinet Configurations	3-10

Chapter 4 System Power-Up

4.1	Control Panel Keyswitch.....	4-2
4.2	Installing the System Management Console	4-4
4.3	Powering Up the System.....	4-5
4.4	Q-VET Installation Verification.....	4-14
4.4.1	Installing Q-VET.....	4-16
4.4.2	Running Q-VET.....	4-18

4.4.3	Reviewing Results of the Q-VET Run	4-20
4.4.4	De-Installing Q-VET	4-22

Appendix A GS80 Interconnection Diagram

Appendix B Upgrades Using B4166 and B4168 CPUs

B.1	Upgrades Retaining Older CPUs	B-2
B.2	Upgrades Replacing Older CPUs	B-5
B.3	Changing the Clock Module Switch Settings	B-7
B.4	B4168 Compatibility Switch	B-11
B.5	Verification	B-12
B.6	Replacing the System Cosmetics	B-13

Index

Examples

4-1	Power-Up Display	4-5
B-1	Updating the Firmware	B-5

Figures

1-1	A GS80 System	1-2
1-2	GS80 Block Diagram (Two-Drawer System)	1-3
1-3	GS80 Physical Diagram (Two-Drawer System)	1-4
2-1	Installing the Power Subrack	2-2
2-2	Installing Second Drawer	2-4
2-3	Installing the Distribution Board Assembly	2-6
2-4	Cable Connections-1	2-8
2-5	Cable Connections-2	2-11
2-6	Cable Connections-3	2-12
2-7	Cable Connections-4	2-13
2-8	Power, Signal, and CSB Connections	2-14
3-1	PCI Box	3-2
3-2	Preparing the PCI Box for Installation	3-4
3-3	Preparing the Cabinet for Installation	3-6
3-4	Cable Connections of the PCI Box	3-8
3-5	Configurations Based on the Starlight Storage Shelf	3-10

3-6	Configurations Based on the StorageWorks Storage Shelf.....	3-11
3-7	Mounting Locations for the Starlight Storage Shelves.....	3-12
3-8	Mounting Locations for the StorageWorks Storage Shelves.....	3-13
3-9	Mounting Locations for the PCI Box.....	3-14
3-10	Mounting Locations for the Memory Channel.....	3-15
4-1	Operator Control Panel.....	4-2
A-1	GS80 Interconnection Diagram.....	A-2
B-1	Installing a CPU.....	B-2
B-2	System Clock Switch Packs.....	B-7
B-3	Accessing the Clock Module.....	B-8
B-4	Setting the B4168 Compatibility Switch.....	B-11
B-5	GS80 Cabinet.....	B-13

Tables

1		
1-1	Cabinet Models and Power Requirements.....	1-5
3-1	PCI Box Mounting Hardware.....	3-3
4-1	Keyswitch Functions on the Control Panel.....	4-3
B-1	Comparisons of CPUs.....	B-3
B-2	Comparisons of System Drawers.....	B-4

Preface

Intended Audience

This manual is for service providers of *HP AlphaServer* GS80 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 four chapters and two appendixes.

- **Chapter 1, Overview**, provides a conceptual introduction to the system.
- **Chapter 2, System Upgrade**, discusses the requirements for the upgrade of a one-drawer system to a two-drawer system.
- **Chapter 3, PCI Box Installation**, describes how to install a PCI box. A section at the end of the chapter gives the configuration rules for an expander cabinet.
- **Chapter 4, System Power-Up**, describes how to power up the system and when to boot the operating system.
- **Appendix A, GS80 Interconnection Diagram**, shows how the components of the GS80 system are interconnected.
- **Appendix B, 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 GS80 Documentation

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

Information on the Internet

Visit the HP Web site at www.compaq.com/alphaserver for service tools and more information about the *AlphaServer* GS80 system.

Chapter 1

Overview

The *AlphaServer* GS80 systems form the low end of the family of high-performance server platforms GS80/160/320 designed for enterprise-level applications. Like the GS160/320 systems, the GS80 systems are distinguished by their versatility and high degree of expandability.

This chapter gives an overview of the GS80 system with a block diagram and a physical diagram. Section 1-4 lists the system and expander cabinets with their power requirements.

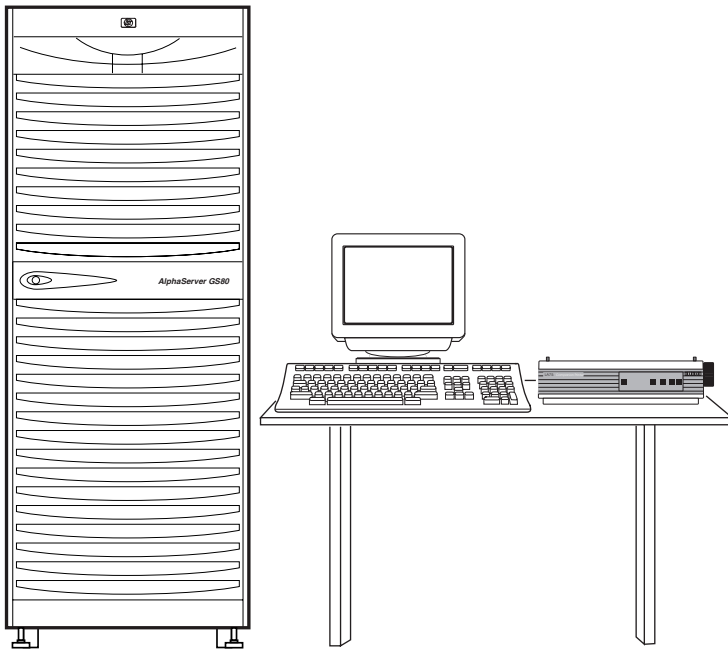
The GS80 system is contained in a single cabinet. It is a drawer-based system consisting of one or two drawers. Each drawer contains one QBB with up to four CPU modules and up to four memory modules. In a two-drawer system a distribution board connects the two QBBs through their global ports.

The system cabinet of the GS80 also contains the power supplies and accommodates one PCI box, a storage shelf (optional), and the OCP (operator control panel). An expander cabinet can house additional PCI boxes and storage shelves.

1.1 The System

The GS80 systems come in two Alpha microprocessor configurations: 4-processor and 8-processor. Each group of four microprocessors, along with memory and I/O modules, is designed into a single quad building block (QBB) that is housed in a drawer. Thus the systems are also designated as one-drawer and two-drawer.

Figure 1-1 A GS80 System



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System Upgrades

A system upgrade is achieved in three ways:

- Adding a second drawer to a single drawer system
- Adding a storage device to the single-drawer system
- Adding an expander cabinet to accommodate any additional I/O devices

This manual details the procedures for the addition of a second drawer to the system cabinet as well as the installation of a PCI box. The addition of an expander cabinet is discussed in the *AlphaServer GS80 Installation Guide* (EK-GSR80-IN).

CPU Upgrades

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.

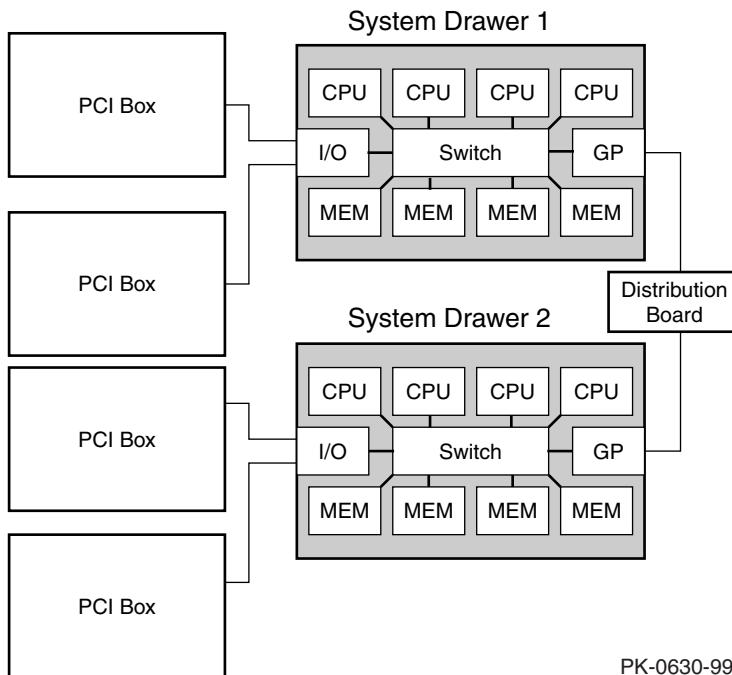
The addition of B4166 or B4168 CPUs to an existing system with B4125 CPUs results in a partial upgrade. In a fully upgraded system, all system drawers would support the size of the CPU's B-cache, and all B4125 CPUs would be replaced with B4166 or B4168 CPUs.

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

1.2 GS80 Block Diagram

Figure 1-2 shows a block diagram of a two-drawer GS80 system. A distribution board makes the interconnect between the two drawers (QBBs) through their global ports.

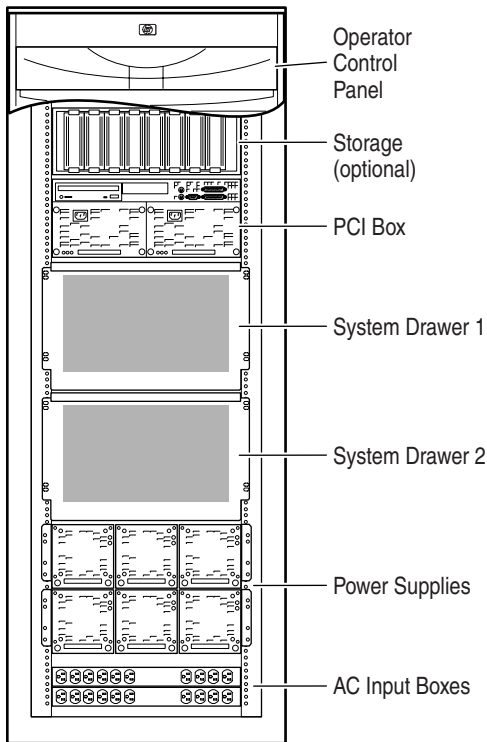
Figure 1-2 GS80 Block Diagram (Two-Drawer System)



1.3 GS80 Physical Diagram

Figure 1-3 shows the physical diagram of a two-drawer GS80 system with a PCI box and an optional storage unit.

Figure 1-3 GS80 Physical Diagram (Two-Drawer System)



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1.4 Cabinets

Table 1-1 shows the model number of cabinets and power requirements for GS80 systems operating in various electrical environments.

Table 1-1 Cabinet Models and Power Requirements

Cabinet Model	Power Requirement
System Cabinet H9A20-CA (U.S./Canada)	115-127V
System Cabinet H9A20-CB (Europe)	200-240V
System Cabinet H9A20-CC (U.S./Canada/Japan)	200-240V
Expander Cabinet H9A20-AA (U.S./Canada)	115-127V
Expander Cabinet H9A20-AB (Europe)	200-240V
Expander Cabinet H9A20-AC (U.S./Canada/Japan)	200-240V

Chapter 2

System Upgrade

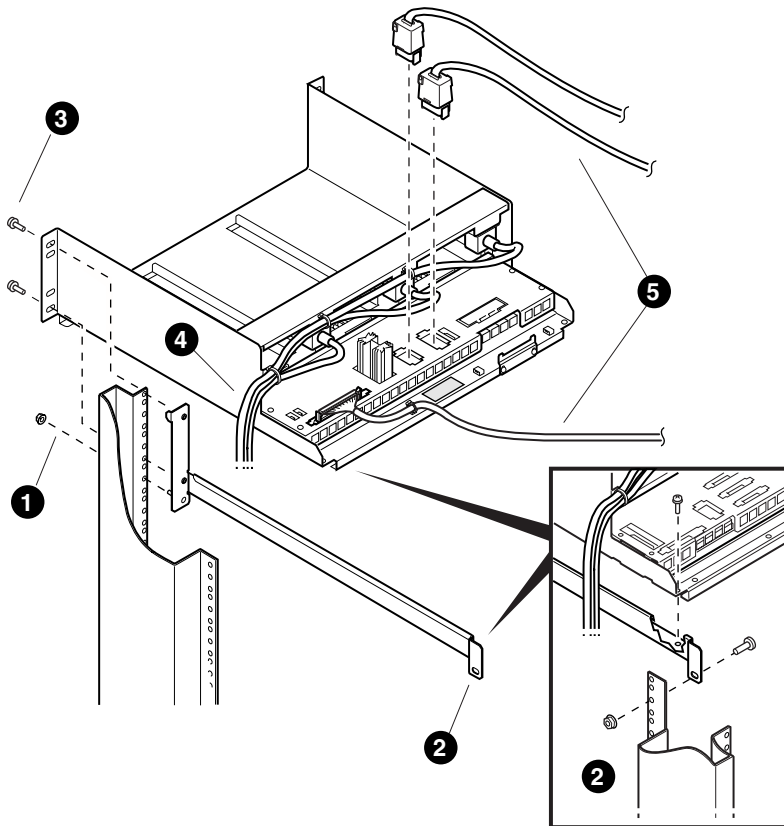
To upgrade a one-drawer system to a two-drawer system, you must:

- Install the power subrack for the second drawer
- Install the second drawer

2.1 Installing a Power Subrack

Install the power subrack first, then install the second drawer. **Figure 2-1** shows how to install the power subrack.

Figure 2-1 Installing the 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

Refer to Figure 2–1 and install the power subrack into the cabinet as follows:

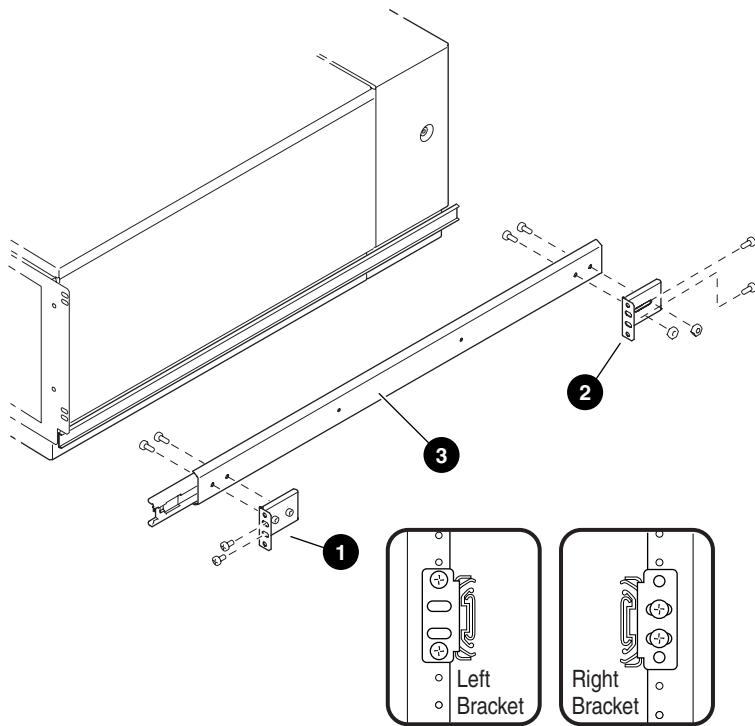
1. Insert an M6 screw **❶** on the left-hand base support bracket (74-52913-01) through the appropriate hole on the left-hand rail of the cabinet front so that the bracket is inside the cabinet and the three securing holes are lined up with the cabinet rail holes. Secure with an M6 nut.
2. Secure the back of the base support bracket to the rear cabinet rail hole 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 push it into the cabinet.
5. Attach the power subrack assembly to the front of the cabinet with two M6 screws and nuts on each side **❸**.
6. Route the power cables **❹** from the subrack over the rail inside the cabinet and then over to the bottom AC input box. Plug the power cables into the AC input box.
7. Connect the power and signal cables **❺** to the connectors on the rear panel of the power subrack. Also, connect the OCP power cable to the subrack.
8. Install the power supplies.

You have now installed the power subrack into the cabinet. Next, you must install the second drawer and make the cable connections.

2.2 Installing the Second Drawer

Figure 2-2 shows a system with two drawers. To install the second drawer you must first prepare the system cabinet. Insert the drawer referring to Figures 2-2 to 2-7.

Figure 2-2 Installing Second Drawer



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Refer to Figure 2–2 and install the second drawer as follows:

1. Install the front mounting brackets ❶ and rear brackets ❷ to the slides. Leave rear brackets slightly loose. Locate hole 28 on the left rail and hole 29 on the right rail. Ensure that the holes have U-nuts and fasten the left and right mounting brackets for the slides.
2. Mount the left side external track to the rails using two M6 screws ❸. Do the front end first, then the rear end. Tighten mounting screws. Repeat for the right side external track, but leave loose for proper alignment with drawer slides.
3. Pull out the slide rails all the way until they lock. Make sure that the ball bearing races on the external slide rails are positioned forward. Lift the drawer (two persons needed) and carefully engage the internal rails on the drawer with the external slide rails on the cabinet. Carefully slide the drawer into the cabinet while making sure that the drawer rails engage with the bearings.
4. Slide the drawer in and ensure that the loose right slide has engaged correctly with the mating track. Tighten the right slide mounting screws.
5. Test that the drawer is installed properly by sliding it in and out of the cabinet. Then, push the drawer all the way into the cabinet.

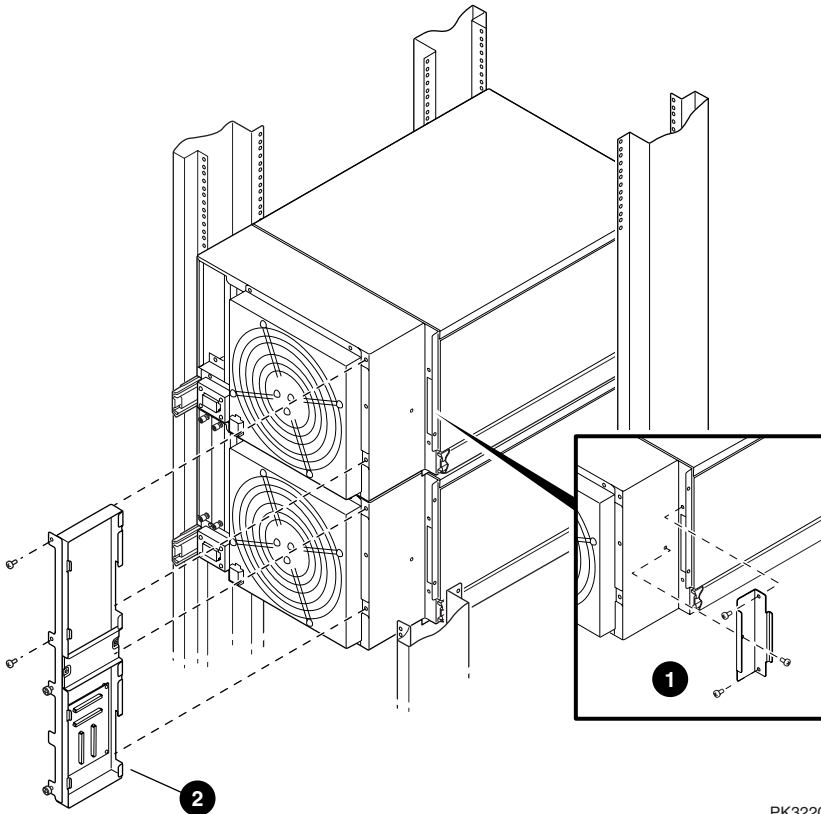
You must now install the distribution board assembly and make the following cable connections:

- Global port cables
- Clock module power and signal harness
- Clock module coaxial cable

2.2.1 Installing the Distribution Board Assembly

Remove the placeholder bracket and insert the distribution board assembly from the rear of the cabinet. Fasten it to the upper and lower drawers. See Figure 2-3.

Figure 2-3 Installing the Distribution Board Assembly



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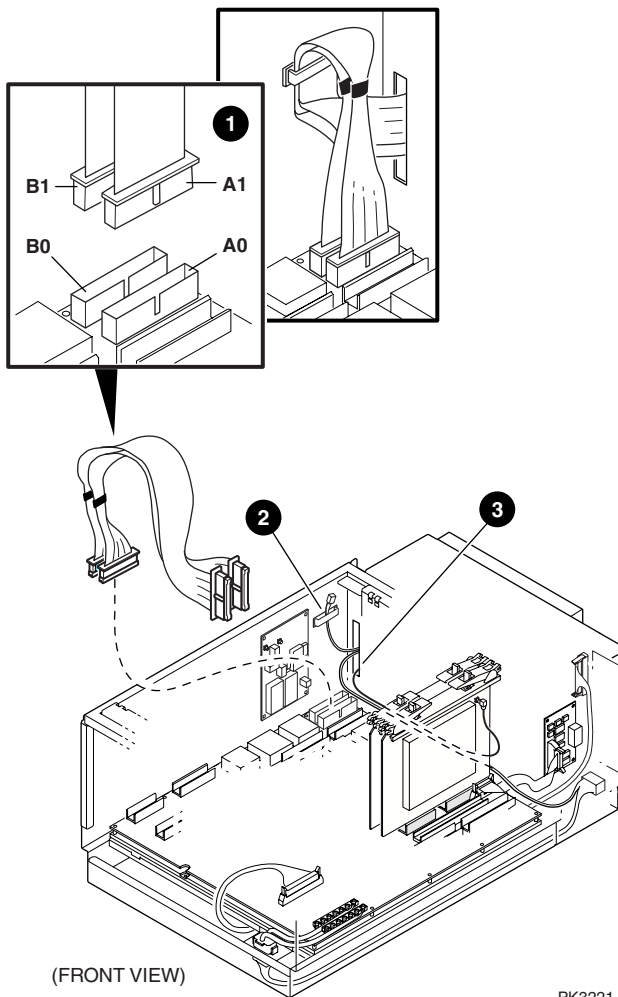
Refer to Figure 2–3 and install the distribution board assembly as follows:

1. Pull the top drawer out of the cabinet and remove the placeholder bracket ❶. Push the drawer back in.
2. Repeat step 1 on the lower drawer. Discard the placeholder brackets.
3. At the rear of the cabinet, push both drawers out about ten inches. Insert the distribution board assembly from the rear of the cabinet and fasten it to the upper and lower drawers ❷. The upper part is fastened with two M4 screws and the lower part with two captive screws. Note the guide pins and mount the assembly to the upper drawer first. Do not tighten screws. Ensure that lower captive screws are aligned and engaged to lower drawer. If alignment of captive fasteners is not possible, loosen the eight M6 slide mounting screws of one drawer and adjust for proper alignment. Once alignment is made, tighten all screws and torque M6 screws to 6.9 Newton-meters and M4 screws to 2 Newton-meters. Do not torque captive fasteners.

2.2.2 Global Port, Clock, and Ground Connections

Refer to Figure 2-4 to Figure 2-7 in making the global port, clock, and ground connections.

Figure 2-4 Cable Connections-1



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Refer to Figures 2-4 to 2-7 and make cable connections from the drawers to the distribution board assembly. Do the lower drawer first.

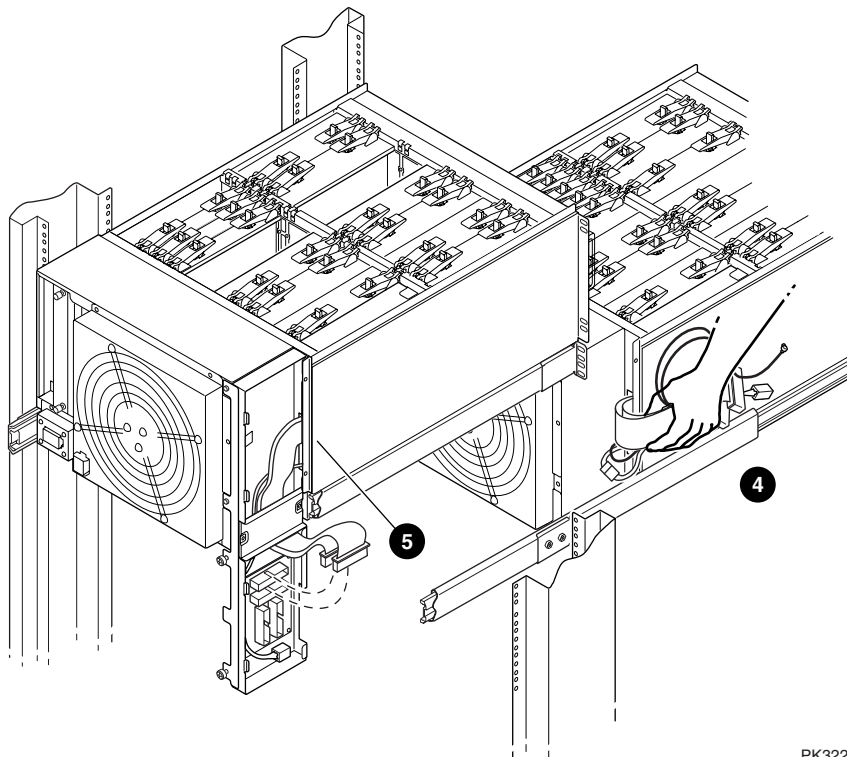
1. Loosen captive fasteners on the distribution board assembly and extend the lower drawer.
2. Remove drawer cover to assemble and route cables.
3. Remove the CPU and memory modules near the back left corner of the drawer. Then, remove the two screws that hold the clock compartment cover and remove the cover. Next, remove the plastic clock compartment shield.
4. Attach global cables marked A1 and B1 to backplane connectors marked A0 and B0, and route through clamp and chassis cutout **1**.
5. Route male end of power harness through rear cutout and secure unused female connector with clamp **2**.
6. Route coax cable and power harness through chassis cutout **3**. Reinstall the clock compartment shield and the clock compartment cover removed earlier. Reinstall the CPU and memory modules and reattach the drawer cover.

7. Carefully pull out the upper drawer while keeping the cables from the lower drawer out of the way to protect them from any damage by the distribution board assembly ④ (see Figure 2–5). Ensure that the distribution board assembly is engaged with the lower drawer. Tighten captive fasteners.
 8. Remove the CPU and memory modules near the back left corner of the drawer. Then, remove the two screws that hold the clock compartment cover and remove the cover. Next, remove the plastic clock compartment shield.
 9. Attach global ports marked A0 and B0 to the connectors on the backplane labeled A0 and B0. Route the power harness loose female connector and global cables from the upper drawer to the connectors in the distribution board assembly ⑤. Fold cables such that they route flat under the bracket and attach without twist to the distribution board.
-

NOTE: Figure 2-4 does not show global cables being routed through the inner chassis cable clamp.

10. Connect the power harness plug from the lower drawer to the power harness receptacle of the upper drawer ⑥ (see Figure 2–6). The bottom drawer receptacle and clock module are not used.
11. Route the coax cable from the lower drawer through the distribution board assembly and the upper drawer rear cutout and connect it to the clock module of the upper drawer. Coil excess cable into no less than a 3-inch diameter loop through the clamp in the distribution board assembly ⑦. Install shield and clock compartment cover with screws.

Figure 2-5 Cable Connections-2



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12. Connect the global port cables of the upper and lower drawers **3** to the distribution board. Attach the plastic shield to cable B0 before plugging in its connector. Then, fold the shield up to protect the global port cables from the metal flanges.
13. Put the two covers on the distribution board assembly. Insert the tabs of the distribution board assembly covers through the chassis slots, close the covers, and fasten them to the chassis **9** with screws. (see Figure 2-7).
14. In the upper drawer, reinstall the CPU and memory modules. Next, reattach the drawer cover and push both drawers into the cabinet. Fasten them with the screws.

15. Install the ground strap to tie the drawers together **10**. Attach one end of the ground strap to the power connector block on each drawer using one of the existing mounting screws.

Figure 2-6 Cable Connections-3

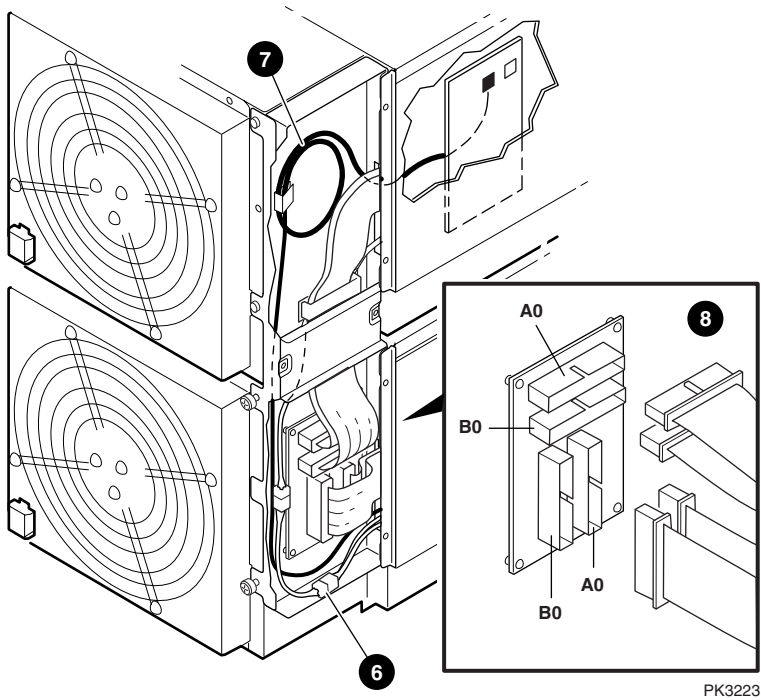
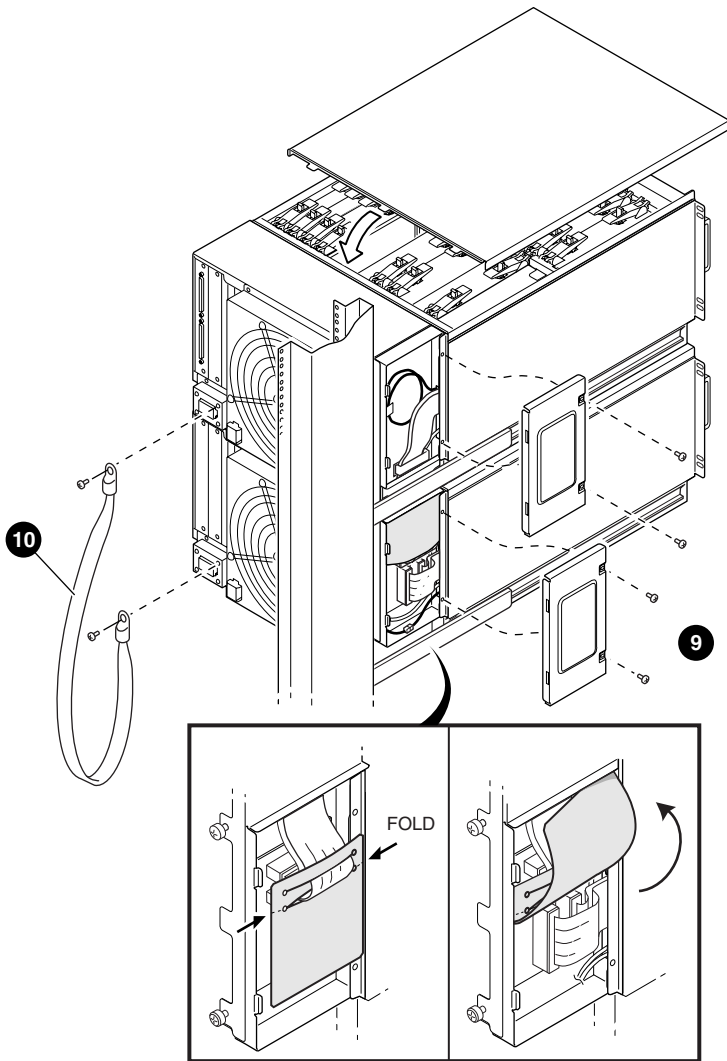


Figure 2-7 Cable Connections-4

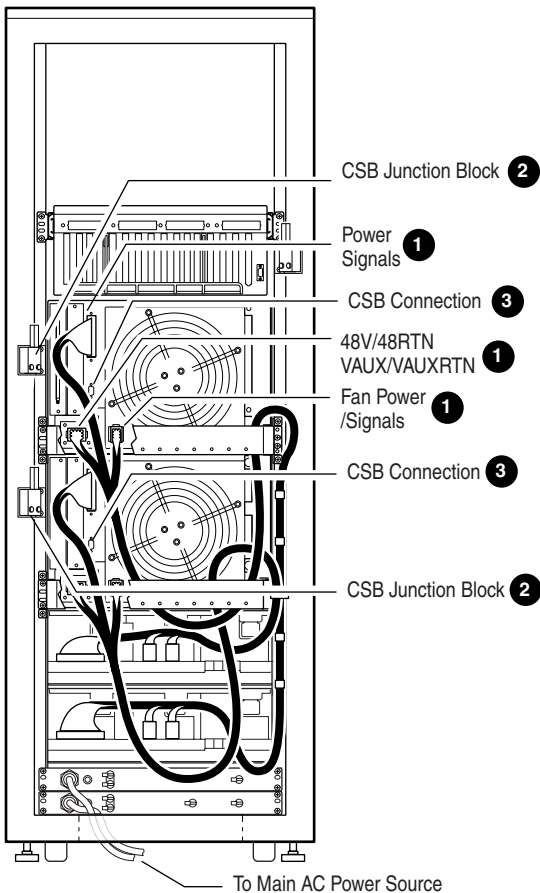


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2.2.3 Power, Signal, and CSB Connections

After you have installed the second drawer, make power/signal connections between the power subrack and the drawer. Connect the drawer to the CSB (console serial bus). See Figure 2-8.

Figure 2-8 Power, Signal, and CSB Connections



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Make the following cable connections to complete the installation of the second drawer:

- Connections from the power subrack to the AC input box (if not made already)
- Power signals to the drawer
- 48V/48RTN; Vaux/VauxRTN connections to the drawer
- Fan power/signals to the drawer
- CSB connections

Refer to Appendix A for a wiring diagram illustrating the above connections. Make sure that the CSB (console serial bus) between the J9 connector of the master PCI box and the J6 connector of the drawer is properly connected and terminated at both ends.

Proceed as follows:

1. Attach the power and signal cables from the power subrack to the new drawer ❶. Route the cables as needed and attach the cables to the frame with cable ties.
2. Attach the cable management bracket to the rear of the cabinet behind the new drawer. Use two M6 screws on each side of the bracket to fasten it to the cabinet frame where the drawer slide rails are attached.
3. Attach the CSB junction block to the side of the cabinet frame near the new drawer ❷ (Figure 3-4 shows details on CSB junction block attachment). Then, attach the CSB cable from this junction block to the drawer ❸. Now, connect the new CSB junction block to the existing junction block with twisted-pair cable. Be sure to terminate any unused connections on the junction blocks.

Make any hose cable connections from the local I/O riser ports on the drawers to the remote risers in the PCI box.

The GS80 upgrade is complete. Turn on the system and verify the operation of the new drawer.

Chapter 3

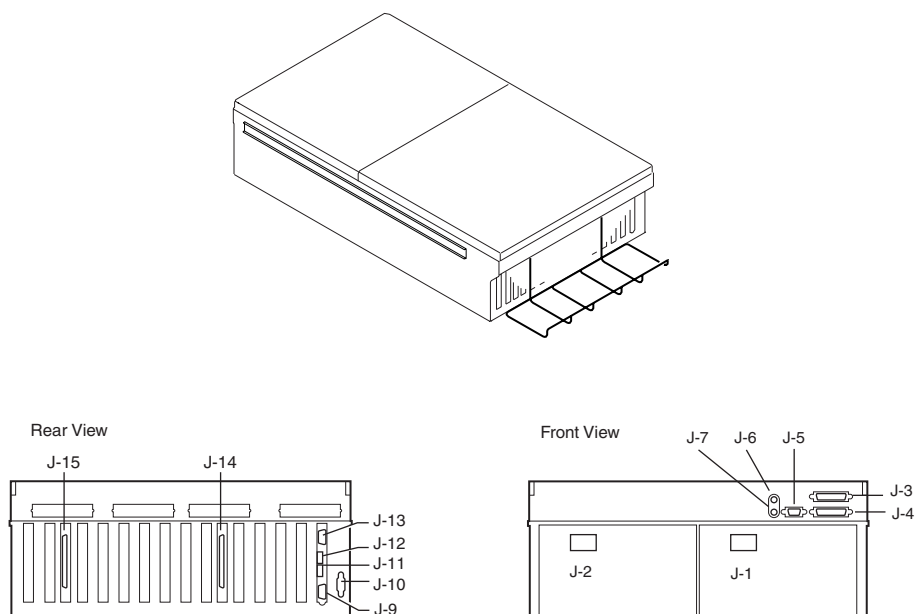
PCI Box Installation

This chapter gives the procedures for the installation of a PCI box. Procedures are applicable for the installation of the component in any location.

3.1 Installing a PCI Box

Unpack the shipping box and note its contents. **Figure 3-1** shows the PCI box.

Figure 3-1 PCI Box



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The shipping box contains the following items:

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

Table 3-1 lists the items in the PCI box mounting hardware (CK-BA54A-AA).

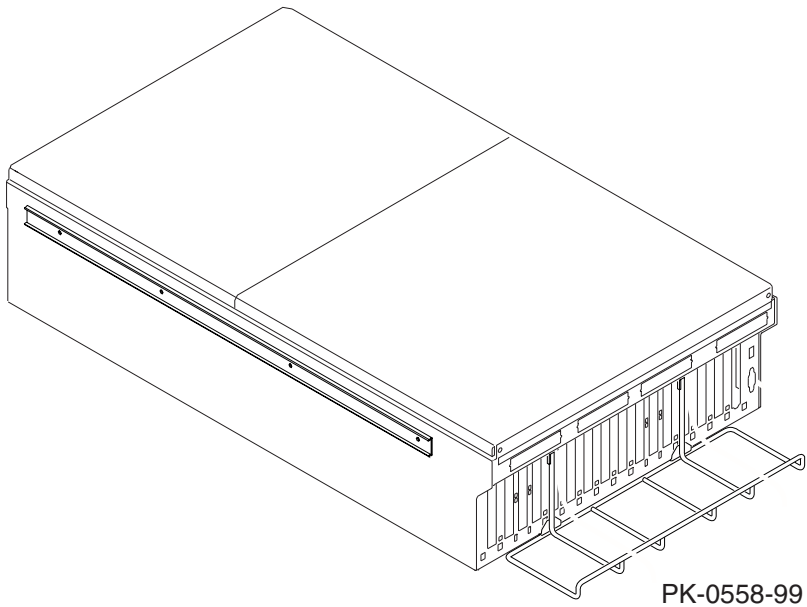
Table 3-1 PCI Box Mounting Hardware

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

3.1.1 Preparing the PCI Box for Installation

Figure 3-2 shows how to prepare the PCI box for installation.

Figure 3-2 Preparing the PCI Box for Installation



Prepare the PCI box for installation as follows:

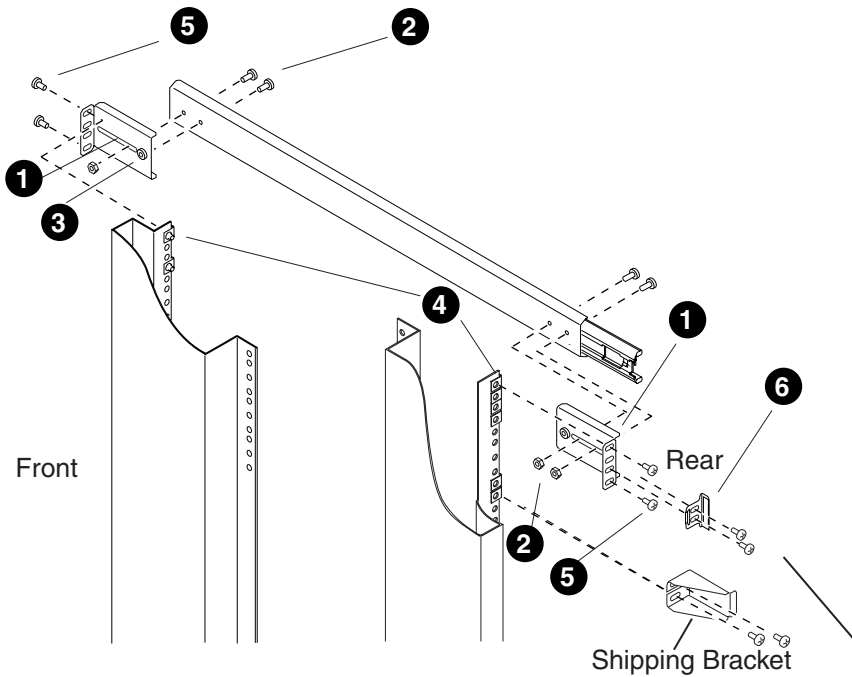
1. Slide the outer track of the mounting rail assembly of the PCI box all the way out. Press on the retaining lever to release the outer track from the assembly.
2. Repeat step 1 on the other side of the PCI box.

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

3.1.2 Preparing the Cabinet for PCI Box Installation

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

Figure 3-3 Preparing the Cabinet for Installation



PK-0559-99

Prepare the cabinet for installation as follows:

1. Select the location in the system cabinet or expander cabinet where the PCI box is to be installed. Refer to the configuration rules given in Section 3.2.
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 two screws in the front bracket but leave the other screws loose for later adjustment and tightening on the rear bracket. Do not use insert to mount the rear bracket. 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.*

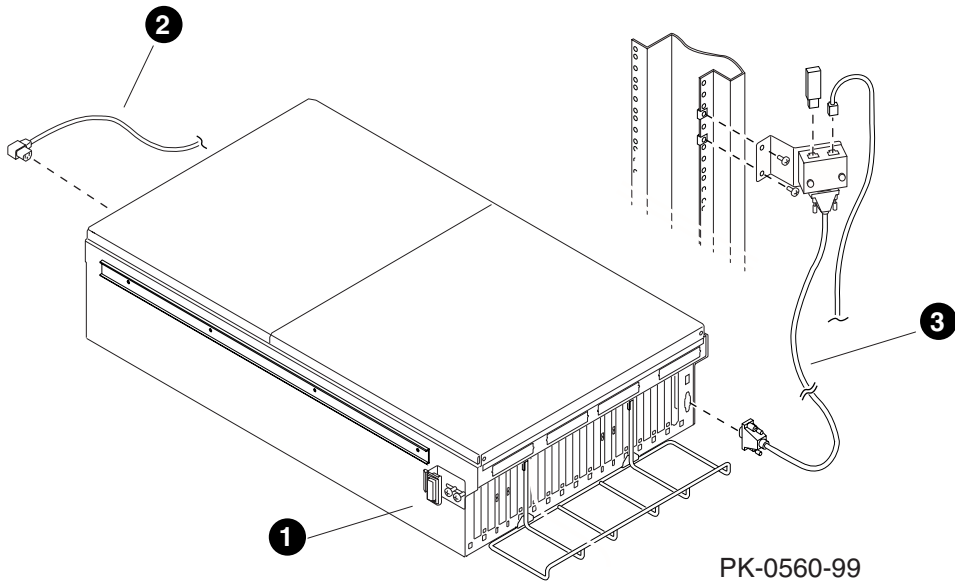
3. Locate the pattern of four holes on the selected area in the cabinet where the PCI box is to be installed.
4. Place U-nuts on each of the four holes in the back cabinet rail and two U-nuts on the two outermost holes in the front cabinet rail ❹.
5. Align the mounting rail brackets with the front and 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.

3.1.3 Installing the PCI Box and Making Cable Connections

Install the PCI box and make the cable connections. Figure 3-4 shows how to connect the PCI box power cable and module cables.

Figure 3-4 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 onto 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:

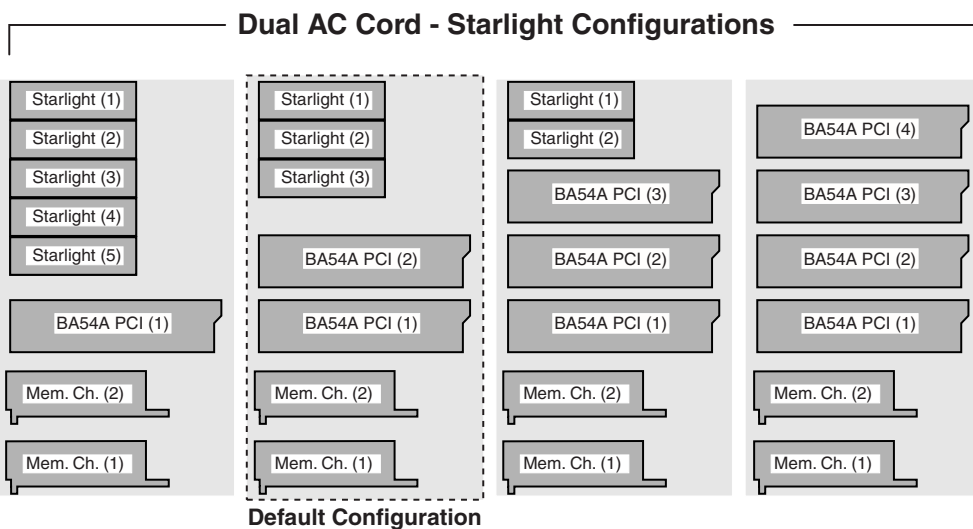
1. Lift the PCI box and gently insert the rear sides of the inner tracks fastened on the sides of the PCI box into the outer ball bearing tracks attached to the cabinet. Visually align the track to the bearings and slide the PCI box all the way in maintaining steady alignment until fully engaged. Slide 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 (see Figure 3–4). 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. When 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. Attach the power cable ❷ to J1 for an 8-processor system and to J7 of the first AC input box. 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.

The installation of the PCI box is complete.

3.2 Expander Cabinet Configurations

The expander cabinet provides space for additional I/O components and the memory channel adapter. Figure 3-5, Figure 3-6, and Figure 3-7 show various configurations for the expander cabinet. Figure 3-7, Figure 3-8, Figure 3-9, and Figure 3-10 show the locations in the expander cabinet where the I/O devices are mounted.

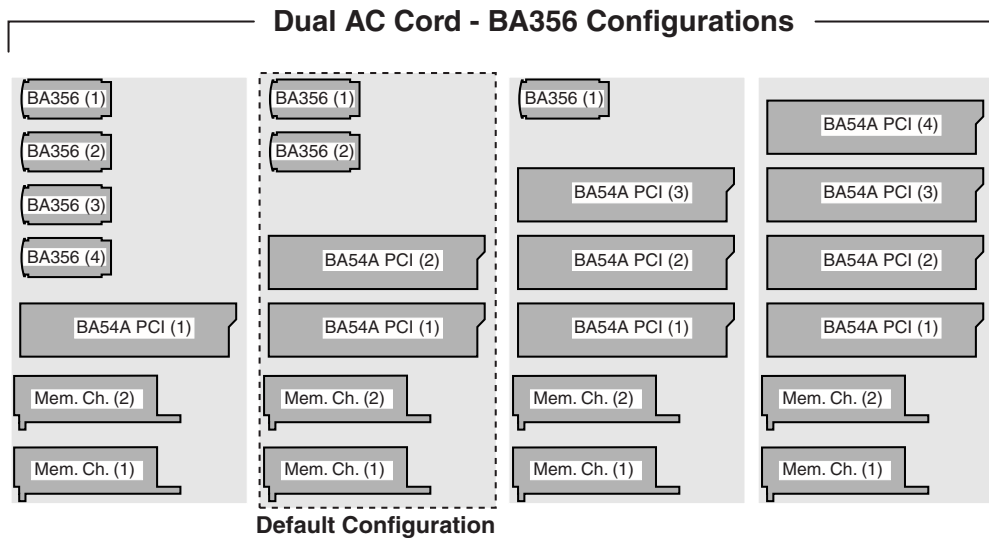
Figure 3-5 Configurations Based on the Starlight Storage Shelf



PK0547-00

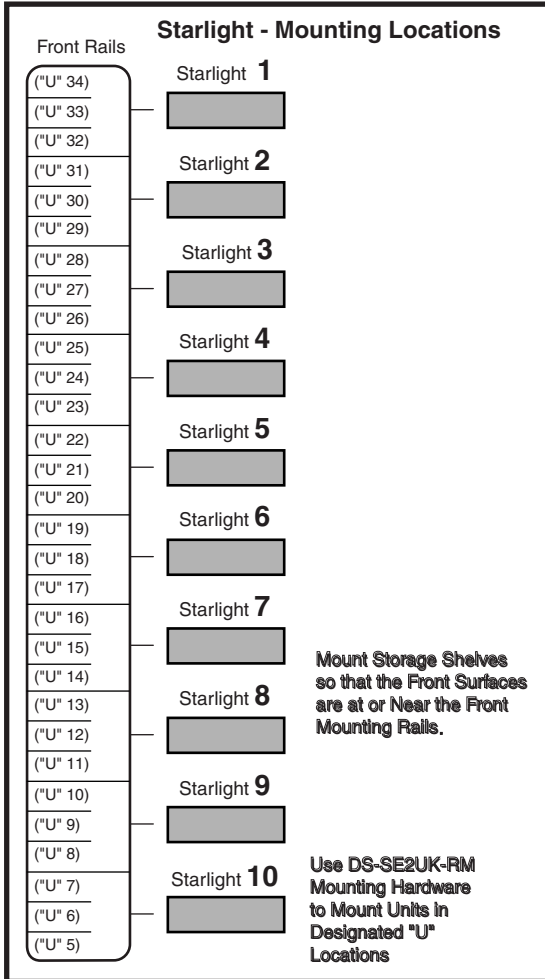
The expander cabinet is used for additional PCI boxes and storage devices. In addition, the expander cabinet holds two memory channel adapters for the PCI boxes. The expander cabinet is shipped with a default configuration but can be built to order as shown by other configurations. Figure 3–5, Figure 3–6, and Figure 3–7 show the various configurations available for the expander cabinet and the placement order of the I/O devices. Figure 3–7, Figure 3–8, Figure 3–9, and Figure 3–10 show the locations in the expander cabinet where the I/O devices are mounted.

Figure 3–6 Configurations Based on the StorageWorks Storage Shelf



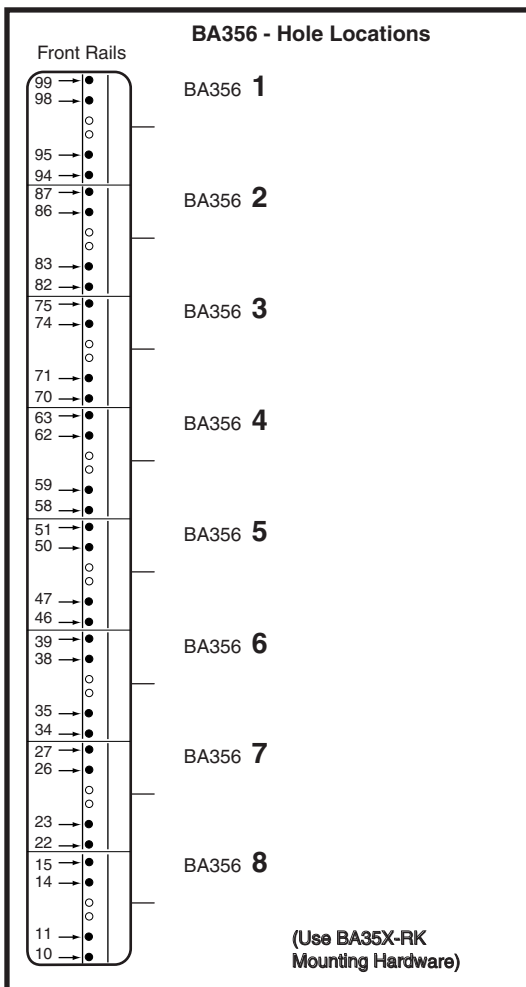
PK0548-00

Figure 3-7 Mounting Locations for the Starlight Storage Shelves



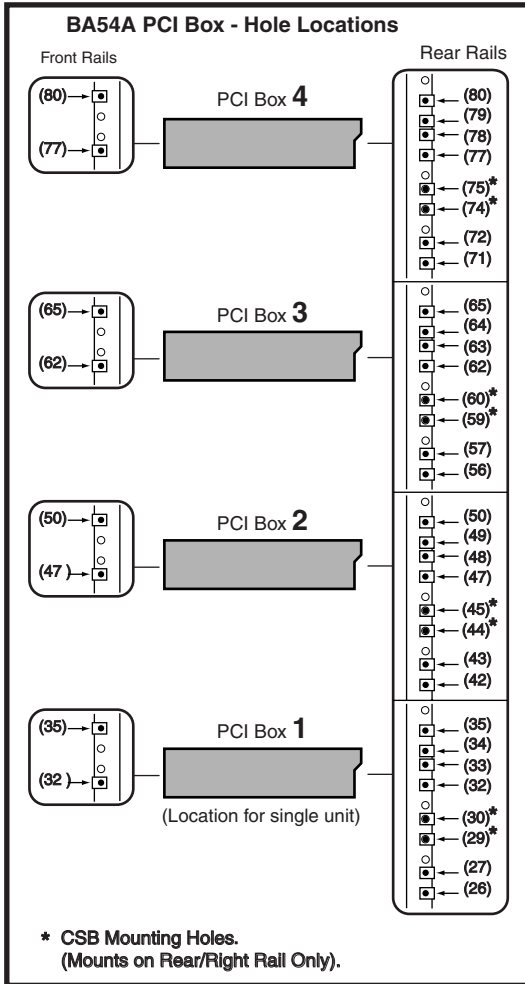
PK0549-00

Figure 3-8 Mounting Locations for the StorageWorks Storage Shelves



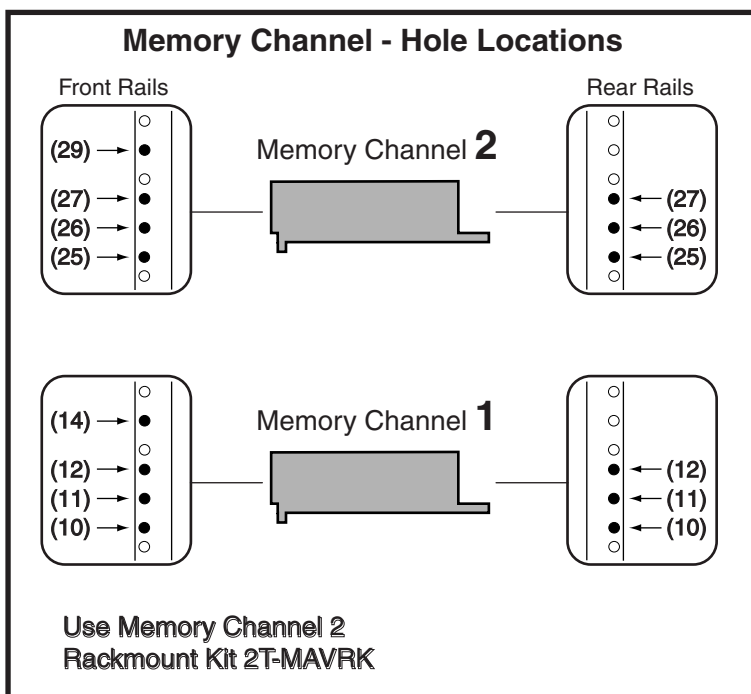
PK0550-00

Figure 3-9 Mounting Locations for the PCI Box



PK0552-00

Figure 3-10 Mounting Locations for the Memory Channel



PK0551-00

Chapter 4

System Power-Up

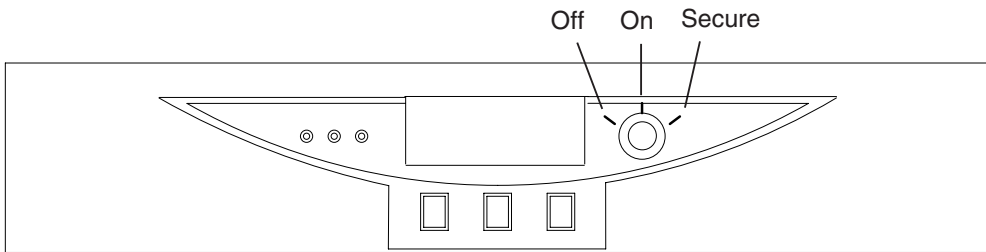
This chapter tells how to power up the system and what happens upon power-up. Sections include:

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

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 GS80 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 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 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 booted and installed from the SRM console prompt.

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

- Set boot options
- Boot and install *Tru64 UNIX*
- Boot and install *OpenVMS*

You can now run Q-VET to verify the system installation (Section 4.4).

4.4 Q-VET Installation Verification

Run the latest Q-VET released version to verify the system installation.

Compaq recommends running the latest Q-VET released version to verify that hardware on *Tru64 UNIX* and *OpenVMS* systems is installed correctly and is operational. Q-VET is the Qualification Verifier Exerciser Tool that is used by product engineers to exercise systems under development. Q-VET does not verify the operating system configuration.

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

You must always obtain the latest revision of Q-VET from the Q-VET Web site—the latest Q-VET release, information, Release Notes and documentation are located at <http://chump2.mro.cpqcorp.net/qvet/>. Q-VET is not FISed on new systems or included on the quarterly firmware CD. (It is distributed on the Tools Unplugged CD at http://phxmcs.phx.dec.com/mcstools_request.htm, but that version may not be the latest.)

CAUTION:

Do ***not*** install the Digital System Verification Software (DECVEL) on GS80, GS160, or GS320 systems.

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. Tape drives are always write tested and should have scratch media installed.

Q-VET should be used to verify a new system installation prior to configuring the system into a cluster or connecting any shared storage devices containing customer data.

Q-VET is to be used by Q-VET knowledgeable HP Service Personnel only.

*Q-VET **must** be de-installed upon completion of system installation verification. Do not leave this software at a customer site; misuse **may** result in loss of customer data.*

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 doesn't 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 Compaq Analyze and Q-VET on each partition in the system.

TCP/IP (on Tru64 UNIX) or DecNet_Phase IV (on OpenVMS) should be configured before installing Q-VET.

Compaq Analyze must be installed on each partition. Q-VET will not start if Compaq Analyze is not installed.

Install and run Q-VET from the **SYSTEM** account on VMS and the **root** account on UNIX. Follow the instructions listed under your operating system to install Q-VET. Remember to install Q-VET in each partition.

Tru64 UNIX

1. Copy the kit tar file (*QVET_Vxxx.tar*) to your system.
2. If this is not a new install check for old Q-VET kits (or DECVET kits) via the following command.

```
setld -i | grep VET
```

Note the names of any listed kits such as OTKBASExxx etc.

Remove the kits with the command

```
setld -d kit1_name kit2_name kit3_name
```

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
```
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 `qvset_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 run the IVP, 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 installation.

Compaq recommends that you review the Testing Notes section of the Release Notes before running Q-VET.

Follow the instructions listed under your operating system to run Q-VET in each partition. Choose the Long IVP script rather than the Short one.

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 quick 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 4 to 10 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 run Q-VET as instructed, Q-VET will terminate testing after the slowest test has completed one pass and produce a Summary file. The termination message will tell you the name and location of this file. All exerciser processes are terminated automatically when the RunTime expires or manually via the Terminate command. After all exercisers report "Idle", the Summary Log is produced containing Q-VET-specific results and statuses as well as system log entries derived from Compaq Analyze.

1. A message will be displayed showing the number of system events appended to the Summary Log:

```
"xx entries have been appended to the summary file"
```

2. If there are more than 0 appendages, the following additional message is displayed.

```
"You MUST review these for Errors."
```

If the number is greater than 0, they must be reviewed for errors.

3. 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"
```

4. For automatic test run completions, there are two more possible outcomes:

- If there were no exerciser errors, but there were other errors or significant events in the Summary Log that must be reviewed, the following message appears:

"Q-VET Tests Complete: Warning"

- If one or more exercisers had errors, this message appears:

"Q-VET Tests Complete: Fail"

## 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.**

---

*You must de-install Q-VET from each partition. 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 **qv<sub>et</sub>\_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. Delete ( **rm** ) any Q-VET kit file (QVET\_Vxxx.tar).
3. Note: log files are retained in /usr/field/tool\_logs
4. Execute the program **qv<sub>et</sub>\_uninstall**
5. Reboot the system. You **MUST** reboot in any case, even if Q-VET is to be reinstalled.

### OpenVMS

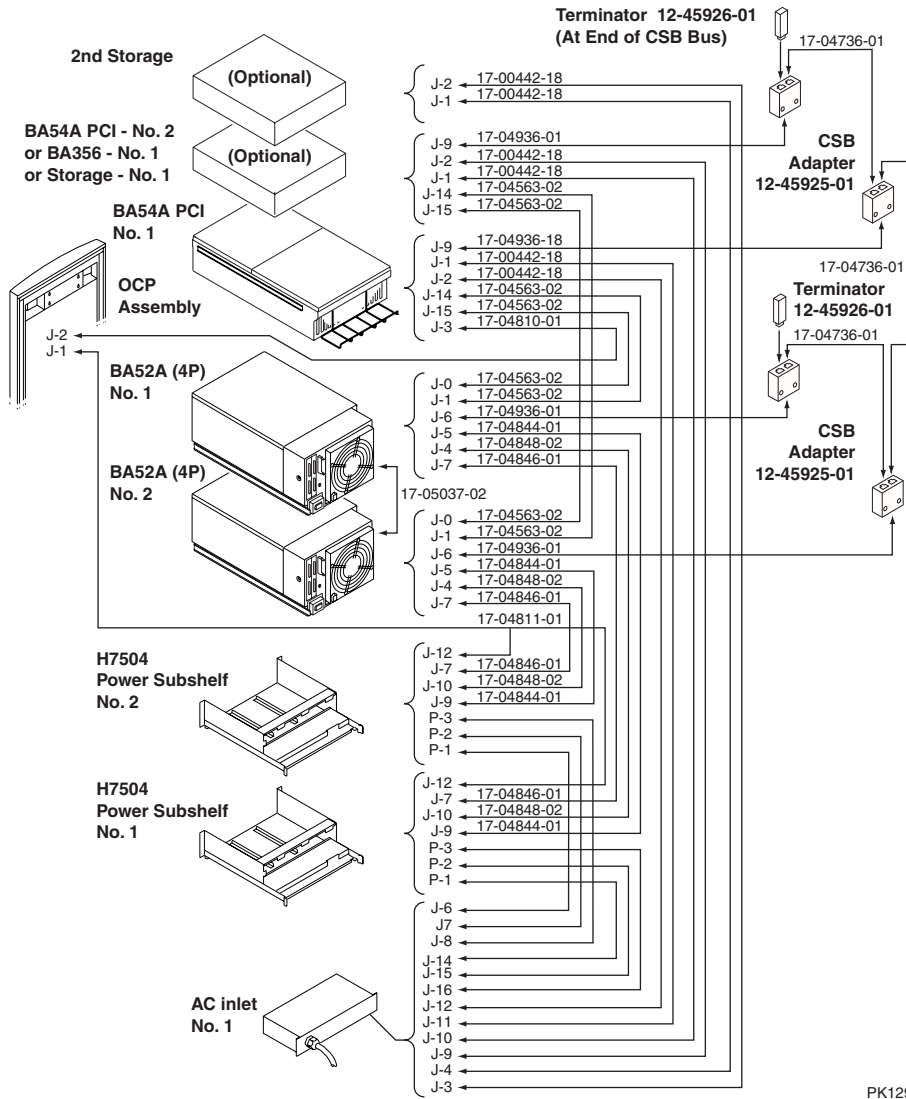
1. **Stop, Terminate, and Exit** from any Q-VET testing.
2. Delete QVETAXP0xx.A and QVETAXPxxx.EXE if they are still on the system.
3. Execute the program **@sys\$manager:qv<sub>et</sub>\_uninstall.com**
4. Note: log files are retained in **sys\$specific:[sysmgr.tool\_logs]**
5. Reboot the system. You **MUST** reboot in any case, even if Q-VET is to be reinstalled.

# Appendix A

## GS80 Interconnection Diagram

Figure A-1 shows the interconnection diagram of the GS80 system. Use this diagram as a guide for cabling when doing system upgrades.

**Figure A-1 GS80 Interconnection Diagram**



PK1298



# Appendix B

## 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.
- 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, a new system drawer, and updating system firmware. See Section B.1.

If the customer decides to replace old CPUs with new ones, the upgrade consists of replacing/adding new CPUs, possibly adding a system drawer, changing the speed of the system clock, and updating system firmware. See Section B.2.

The customer may also decide to replace the old cabinet sides, doors, and top with new black cabinet cosmetics. See Section B.5.

---

**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*

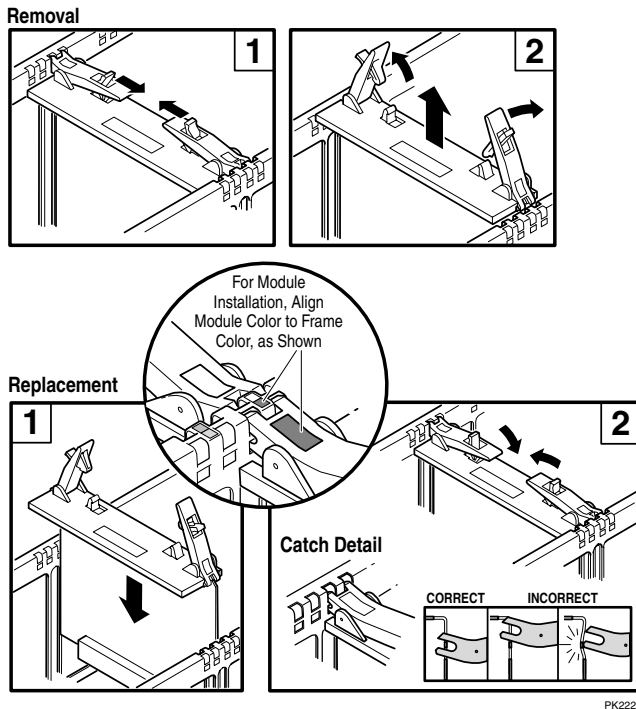
---

## B.1 Upgrades Retaining Older CPUs

These upgrades consist of adding new CPUs, and possibly, a new system drawer. See Chapter 2 for procedures on how to add a new system drawer. Figure B-1 shows how to install a CPU. Table B-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.

**NOTE:** Be sure to update the firmware. See Section B.2.

Figure B-1 Installing a CPU



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.
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 one or two clicks. The module is now firmly seated in the slot.

**Table B-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 B-1 Comparison of CPUs (Continued)**

| <b>CPU Part Number</b> | <b>B-cache Size</b>         | <b>Speed in MHz</b> | <b>Comments</b>                                                                                                                                                                                                                                    |
|------------------------|-----------------------------|---------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 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 B-2 Comparison of System Drawers**

| <b>System Drawer Part Number</b> | <b>Cache Size Supported by Drawer</b> | <b>Comments</b>                                                                                                                                                                                                                                      |
|----------------------------------|---------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| BA52A-AA<br>(54-30354-03)        | 4 Mbytes                              | Though the B4166 and B4168 CPUs have larger B-caches, only 4 Mbytes are used when placed in this backplane.                                                                                                                                          |
| BA52A-CA<br>(54-30354-02)        | 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.                                                      |
| BA52A-DA<br>(54-30360-02)        | 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 drawer, there is no easy way to visually distinguish between the two system drawers; to see the components that differ requires looking inside the drawer. The best way to determine which drawer 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. Any combination of BA52A-AA, CA, and DA system drawers can be 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 BA52A-CA or DA system drawer, 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 drawer they are in, the system clock speed, and whether they are configured with the B4125 CPU. See Table B-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.

## B.2 Upgrades Replacing Older CPUs

---

**First, update the system firmware and then replace the old CPU(s). See Figure B-1. Finally, change the speed of the system clock.**

---

### Example B-1 Updating the Firmware

```
P00>>> show config 1
 Compaq Computer Corporation
 Compaq AlphaServer GS80 6/731

SRM Console V5.8-1, built on May 26 2000 at 12:15:01 2
PALcode OpenVMS PALcode V1.81-1, Tru64 UNIX PALcode V1.75-1
Micro Firmware V5.7 3

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 4
SCM_E0> set hp_count 0 5
SCM_E0> reset 6
.
.
.
P00>>> boot dqbb0 7
.
.
.
UPD> update srm* 8
.
.
.
UPD> update micro 9

P00>>> power off 10
Powering off Hard_partition_0 consisting of:
 QBB0
 QBB1
QBB-0 Powering OFF
QBB-1 Powering OFF
```

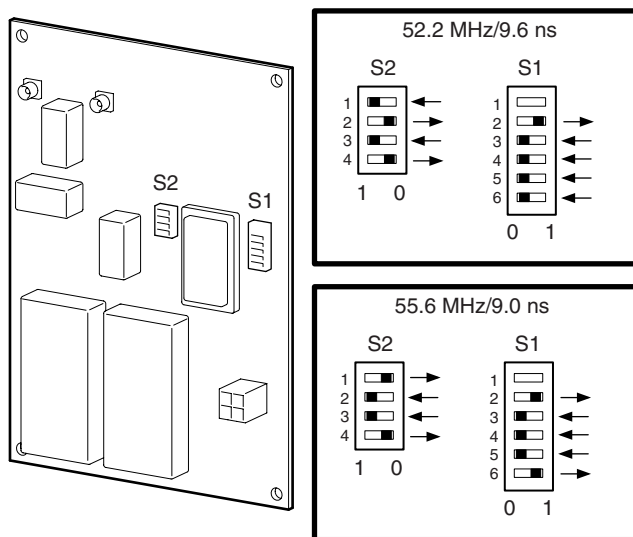
- ❶ Issue the SRM **show config** command.
- ❷ Note the version of the SRM console. The B4166 requires V6.0-514 or higher, and the B4168 requires V6.3 or higher.
- ❸ Note the firmware revision of the microprocessors. The B4166 requires V6.0-514 or higher, and the B4168 requires V6.3 or higher.
- ❹ Issue 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 system firmware is updated and the system is powered off, place the main circuit breaker in the Off position and replace the old CPUs.

## B.3 Changing the 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 B-2 System Clock Switch Packs

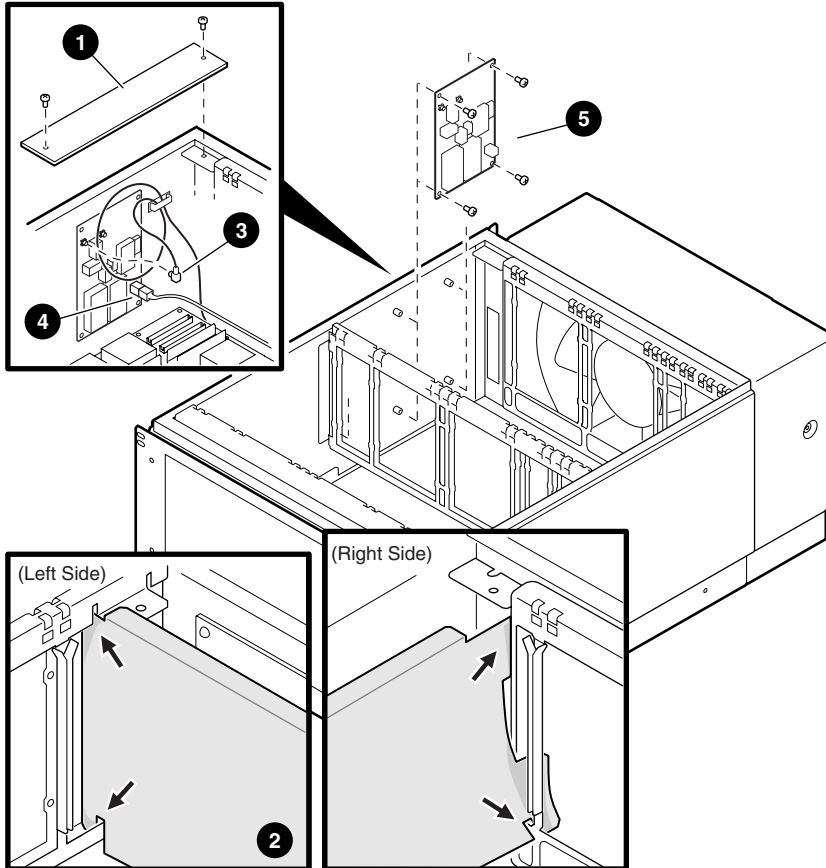


PK3247



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.

**Figure B-3 Accessing the Clock Module**



PK1249

1. Access the top system drawer and remove CPU3 and memory 2 to allow space to access the clock module.
2. Remove the clock module cover plate in the rear left corner of the drawer compartment by removing the two Phillips head screws holding it in place and lift it out of the drawer. ❶
3. Remove the clock compartment shield. Note how the shield is installed. ❷
4. Unplug the coax clock cable(s) from the clock module. ❸
5. Unplug the power cable. ❹
6. Unscrew the four Phillips head screws holding the module to the side of the drawer and remove the module. ❺
7. Check the bit settings on the two switches. See Figure B-2 for switch orientation and bit settings.

## B.4 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 B-4** Setting the B4168 Switch

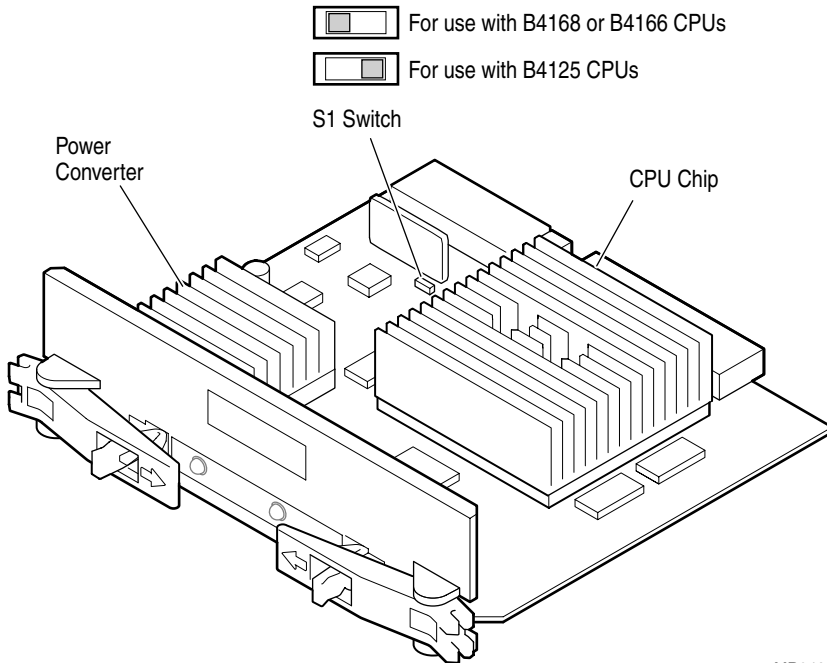


Figure B-4 shows the location of the S1 switch that must be changed if the module is to be in a QBB with a B4125 module.

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.

## B.5 Verification

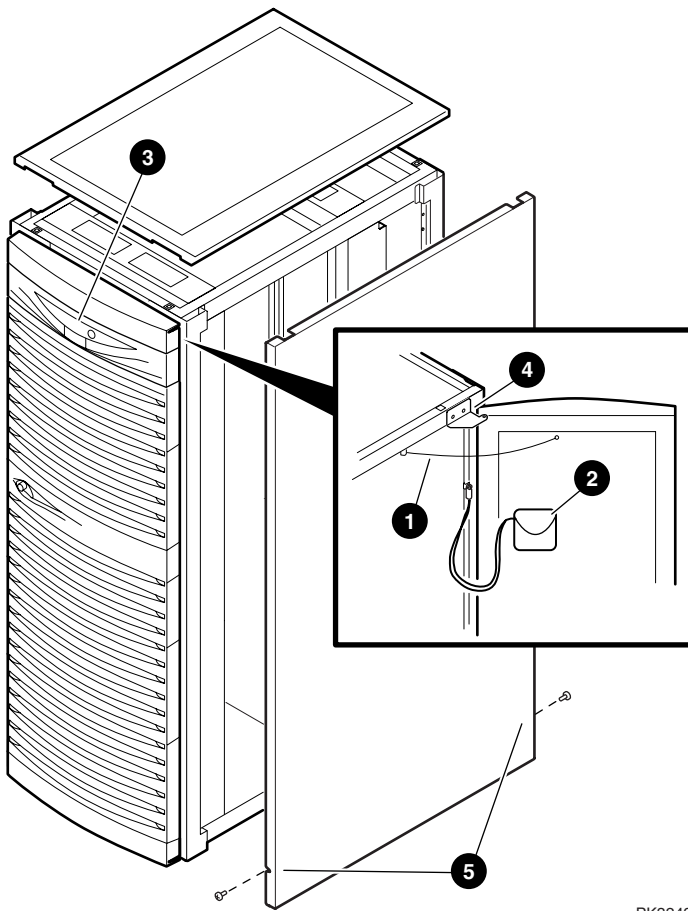
When you power up the system, check that the SCM correctly maps the QBBs in the system. Execute the SRM **set sys\_serial\_num** command.

Run Q-Vet (see Section 4.4.2).

## B.6 Replacing the System Cosmetics

After a system is completely upgraded, new cabinet doors, sides, and top may be installed.

Figure B-5 GS80 Cabinet



PK3249

## Door Removal

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

## 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.

## 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. ❺
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.

## Door Replacement

1. Replace the doors after you have replaced the side panels and covers.
2. Reverse the removal procedure.

# Index

## B

Block diagram, 1-3

## C

Cabinet preparation, 3-6

Cabinets, 1-5

Clock connections, 2-8

Configurations, expander cabinet, 3-10

Connections

clock, 2-8

CSB, 2-14

global port, 2-8

ground, 2-8

PCI box, 3-8

power, 2-14

signal, 2-14

Control panel keyswitch, 4-1, 4-2

CPU switch, 1-11

CPU upgrades, 1-3

CSB connections, 2-14

## D

De-installing Q-VET, 4-22

Distribution board assembly, 2-6

## E

Expander cabinet configurations, 3-10

## G

Global port connections, 2-8

Ground connections, 2-8

GS80 block diagram, 1-3

GS80 physical diagram, 1-4

GS80 system, 1-2

## I

Installation

distribution board assembly, 2-6

PCI box, 3-2

power subrack, 2-2

second drawer, 2-4

Installing Q-VET, 4-16

## K

Keyswitch, 4-1, 4-2

Keyswitch functions, 4-3

## M

Mounting hardware, PCI box, 3-3

Mounting locations

Memory Channel, 3-15

PCI box, 3-14

Starlight, 3-12

StorageWorks, 3-13

## P

PCI box

cable connections, 3-8

installation, 3-2

mounting hardware, 3-3

preparation, 3-4

Physical diagram, 1-4

Power connections, 2-14

Power requirements, 1-5

Power subrack installation, 2-2

Power-up, 4-5

Power-up display, 4-5

## **Q**

QBB, 1-2

Q-VET installation verification, 4-14

Q-VET results review, 4-20

## **R**

Running Q-VET, 4-18

## **S**

Second drawer installation, 2-4

Signal connections, 2-14

SMC, 4-4

System management console, 4-4

System upgrades, 1-3

## **U**

Upgrades

CPU, 1-3, B-1

system, 1-3