

# AlphaServer 4000

## PCI Upgrade Manual

Order Number: EK-4000A-UI. B01

Use this manual as a quick reference to upgrade a DIGITAL AlphaServer 4000 system drawer (BA30B) from 8 to 16 PCI slots using the H7150 upgrade kit.

Digital Equipment Corporation  
Maynard, Massachusetts

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**First Printing, June 1997**

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**FCC Notice:** The equipment described in this manual generates, uses, and may emit radio frequency energy. The equipment has been type tested and found to comply with the limits for a Class A digital device pursuant to Part 15 of FCC Rules, which are designed to provide reasonable protection against such radio frequency interference. Operation of this equipment in a residential area may cause interference, in which case the user at his own expense will be required to take whatever measures are required to correct the interference.

**Shielded Cables:** If shielded cables have been supplied or specified, they must be used on the system in order to maintain international regulatory compliance.

**Warning!** This is a Class A product. In a domestic environment this product may cause radio interference, in which case the user may be required to take adequate measures.

**Achtung!** Dieses ist ein Gerät der Funkstörgrenzwertklasse A. In Wohnbereichen können bei Betrieb dieses Gerätes Rundfunkstörungen auftreten, in welchen Fällen der Benutzer für entsprechende Gegenmaßnahmen verantwortlich ist.

**Avertissement!** Cet appareil est un appareil de Classe A. Dans un environnement résidentiel, cet appareil peut provoquer des brouillages radioélectriques. Dans ce cas, il peut être demandé à l'utilisateur de prendre les mesures appropriées.

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# Preface

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## Intended Audience

This manual is for DIGITAL service engineers.

## Document Structure

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

## Documentation Titles

Table 1 lists the books in the DIGITAL AlphaServer 4000 documentation set.

**Table 1 DIGITAL AlphaServer 4000 Documentation**

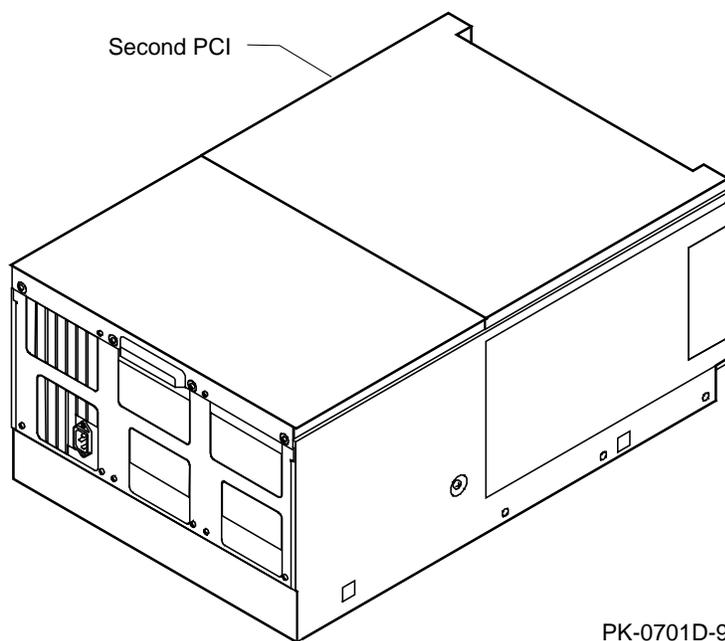
Title	Order Number
<b>User and Configuration Documentation Kit</b>	QZ-00VAB-GZ
<i>System Drawer User's Guide</i>	EK-4000A-UG
<i>Configuration and Installation Guide</i>	EK-4100A-CG
<b>Service Information</b>	
<i>Service Manual</i> (hard copy)	EK-4100A-SV
<i>Service Manual</i> (diskette)	AK-QXBJA-CA
<i>System Drawer Upgrades</i>	EK-4041A-UI
<i>PCI Upgrade Manual</i>	EK-4000A-UI

**Table 1 DIGITAL AlphaServer 4000 Documentation (Continued)**

Title	Order Number
<b>Reference Information</b>	
<i>KN30n CPU Installation Card</i>	EK-KN300-IN
<i>MS3n0 Memory Installation Card</i>	EK-MS300-IN
<i>H7291 Power Supply Installation Card</i>	EK-H7291-IN
<i>ServerWORKS Manager Administrator User's Guide</i>	ER-4QXAA-UA

*NOTE: Upgrading a BA30B system drawer from 8 to 16 PCI slots requires the installation of a PCI motherboard. It is installed in a section of the drawer referred to throughout this procedure as the second PCI. Its location is shown in Figure 1.*

**Figure 1 Second PCI Location**



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# Procedure

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## Overview

The upgrade procedure has eight steps:

1. Expose the system drawer. The procedures are different for pedestal and cabinet systems.
2. Remove covers from the system bus, second PCI, and power system sections.
3. Remove the RFI shield between the system bus and second PCI sections.
4. Install the system bus to PCI bus bridge module.
5. Install the PCI motherboard.
6. Install the power supply.
7. Install PCI option cards.
8. Verify the installation.

## Upgrade Kit Contents

The H7150 upgrade kit contains these items. Check that all are present.

- B3040–AB system bus to PCI bus bridge module
- B3051–AA PCI motherboard
- H7291–AA power supply
- 99–06557–03 bag of 11 M3x5 screws

## Tools Required

- #1 Phillips screwdriver with an 8-inch shaft
- #2 Phillips screwdriver
- Flathead screwdriver

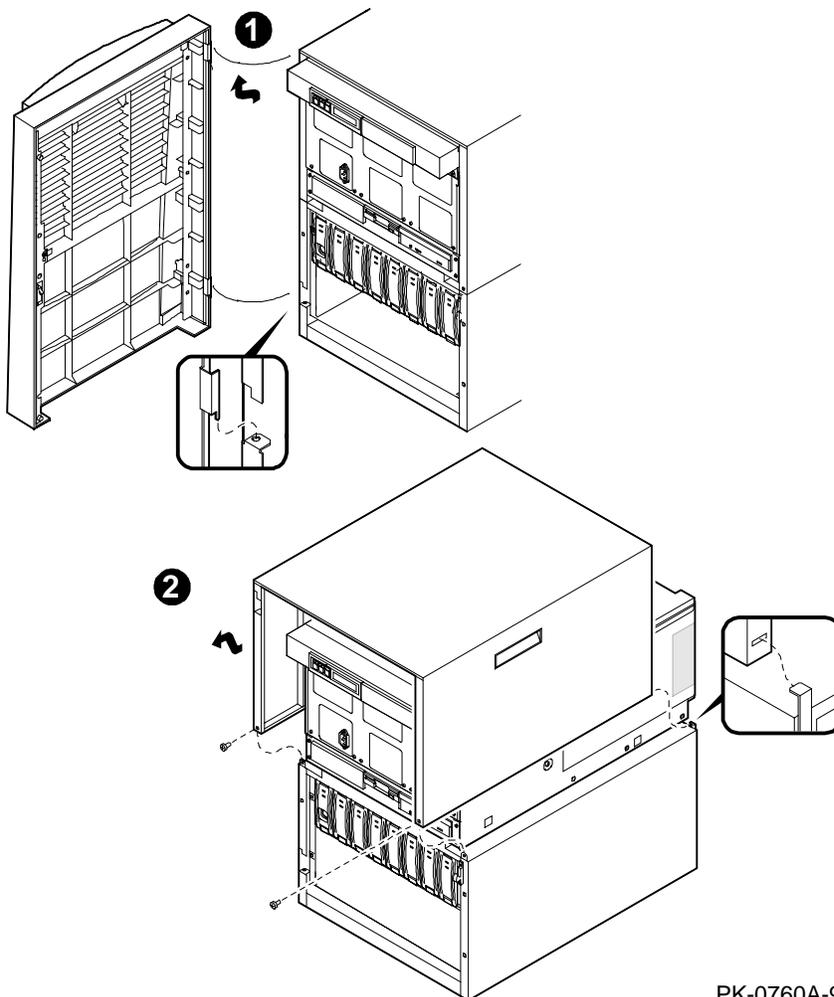
## Expose the System Drawer in the Pedestal

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Open and remove the front door, and remove the top cover and the pedestal tray.

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Figure 2 Pedestal Door and Cover Removal

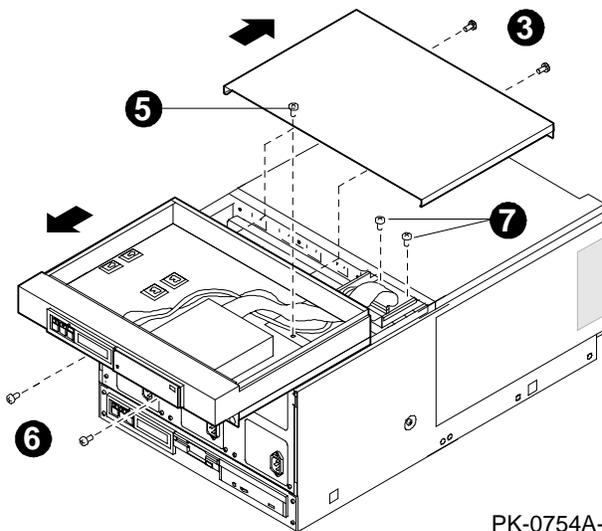


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*CAUTION: Wear an antistatic wrist strap when working on this system.*

1. Open the front door of the pedestal and remove it by lifting and pulling it away from the system (see **1** in Figure 2).
2. Remove the top cover from the pedestal: remove the two screws midway up the side of the pedestal (one on each side), tilt the cover up, and lift it away from the frame (see **2**).
3. Remove the tray cover by removing the two screws at the back of the tray (see **3** in Figure 3).
4. Disconnect the cables that connect the control panel (and any optional SCSI devices) to the bulkhead connector in the rear right corner of the tray.
5. Remove the screw holding the tray to the bulkhead (see **5**).
6. Remove the two screws at the front of the tray and slide the tray off the drawer (see **6**).
7. Remove the two screws holding the bulkhead plate in place and remove the plate (see **7**).

**Figure 3 Pedestal Tray Removal**

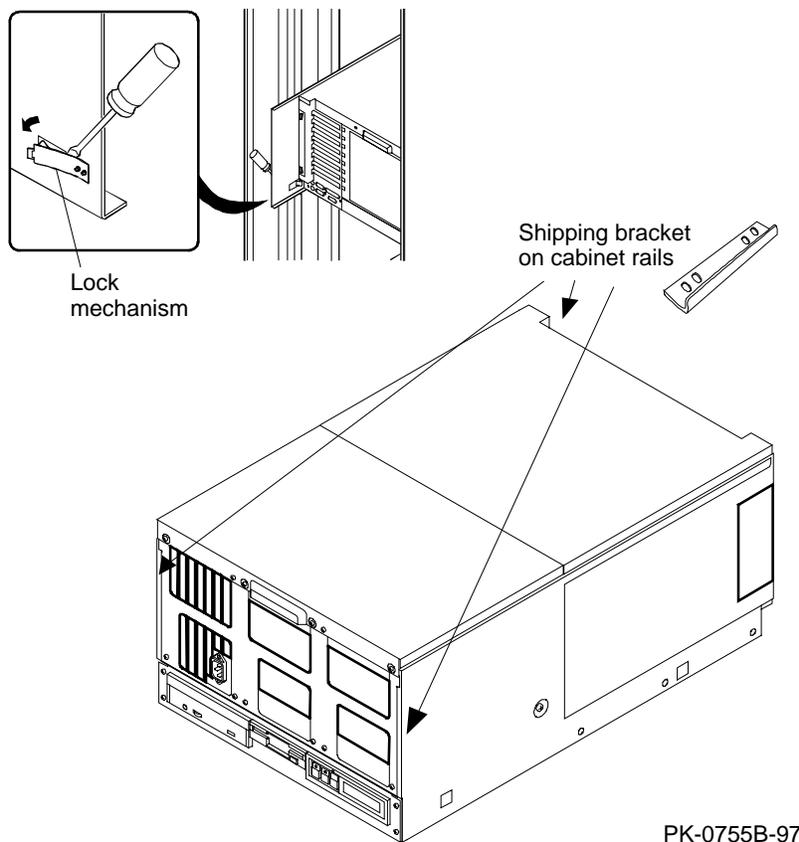


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## Expose the System Drawer in the H9A10-EB/EC Cabinet

Open both doors, disconnect cables that obstruct movement of the drawer, remove the shipping brackets, and slide the drawer out from the cabinet.

Figure 4 Exposing the System Drawer in the H9A10-EB/EC Cabinet



*CAUTION: Wear an antistatic wrist strap when working on this system.*

Slide the drawer out the rear of the cabinet to expose the second PCI and system card cages. Slide it out the front of the cabinet to expose the power system.

**For second PCI and system card cages**

1. Open the front and rear doors of the cabinet.
2. At the front of the cabinet, unplug the power supplies in the drawer.
3. At the rear, remove the two Phillips screws holding the shipping bracket on the mounting rail at the right (see Figure 4).
4. Using a flathead screwdriver, disengage the lock mechanism at the lower left corner of the drawer (see the inset in Figure 4). Slide the drawer out part way and release the lock mechanism by removing the screwdriver.
5. Slide the drawer out until it locks.

**For power system**

1. Open the front and rear doors of the cabinet.
2. At the rear of the cabinet, remove any PCI option cables that might interfere with pulling the drawer forward.
3. At the front, remove the shipping brackets on the right and left rails that hold the drawer (see Figure 4).
4. Slide the drawer out until it locks.

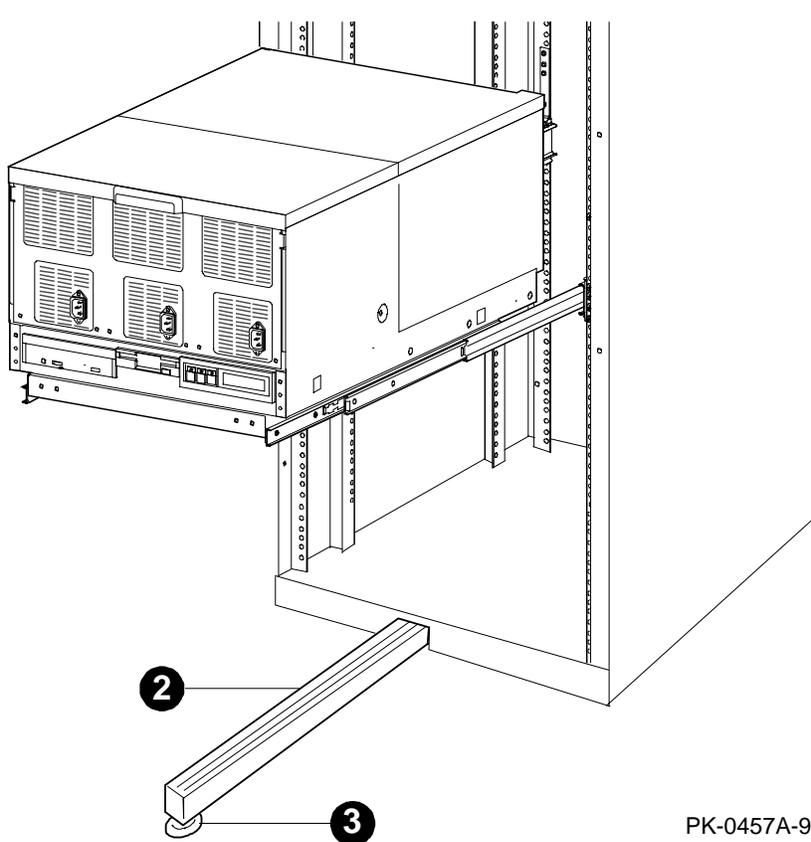
## Expose the System Drawer in the H9A10-EL/EM Cabinet

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The system drawer sits on a tray that slides out the front of the cabinet. A stabilizing bar must be pulled out from the bottom to prevent the cabinet from tipping over.

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Figure 5 Exposing the System Drawer in the H9A10-EL/EM Cabinet



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*WARNING: Only DIGITAL Customer Service representatives or customer maintenance personnel who are familiar with computer hardware should slide system drawers out of the cabinet. Personnel should be experienced and trained in installing computers and related equipment. Before pulling a system drawer out, make sure the stabilizer bar is fully extended; then adjust the foot at the end of the bar so it touches the floor.*

*Wear an antistatic wrist strap when working on this system.*

1. Open the front door of the cabinet.
2. Pull out the stabilizer bar at the bottom of the cabinet until it stops. See ❷ in Figure 5.
3. Extend the leveler foot at the end of the stabilizer bar to the floor. See ❸.
4. Unplug the drawer's power supplies.
5. Pull the drawer out until it locks.

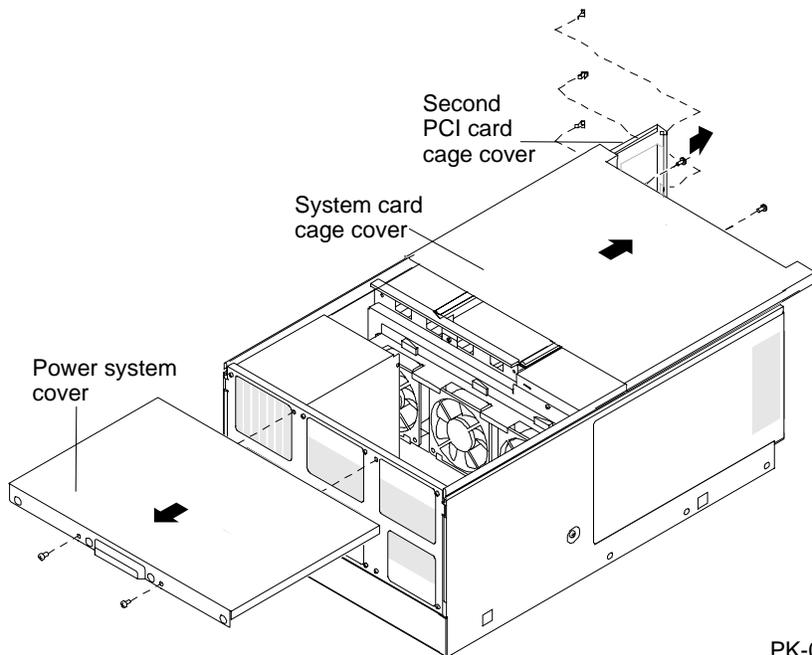
## Remove Covers

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The system drawer has covers on the system bus, PCI, and power sections. Remove a cover by removing the screws and sliding the cover from the system drawer.

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Figure 6 System Drawer Covers



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Each of the covers shown in Figure 6 is attached to the system drawer by M5 screws. The locations of these screws are shown in the illustration. Detach any of the covers by removing the screws and sliding the cover in the direction shown.

*NOTE: Each cover has an interlock switch. Before you power the system back up, check that all covers are in place. The system will power up only when all interlock switches are engaged.*

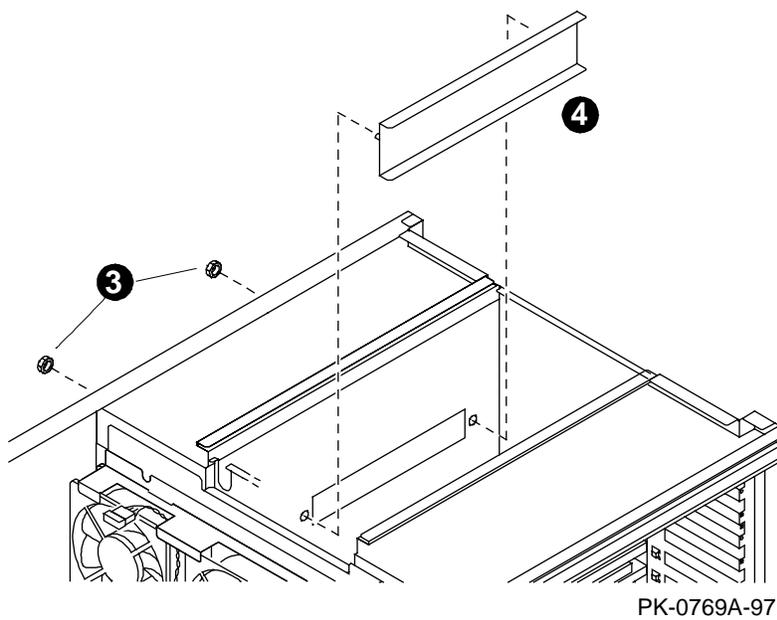
## Remove the RFI Shield

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Remove the covers from the second PCI and system sections. Remove the two screws from the PCI side and remove the RFI shield from the system bus side. You might need to remove some modules on the system bus side to reach the RFI shield.

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Figure 7 RFI Shield Removal



The RFI shield is in the sheet metal partition between the second PCI card cage section and the system card cage section.

1. Remove the covers from the second PCI and system card cage sections of the system drawer (see page 8).
2. You might need to remove some modules from the system card cage section to reach the RFI shield. If necessary, follow these instructions:
  - a. CPU module: Pull up on both module handle levers at the same time and slide the module straight up and out of the card cage. Place the module on an antistatic mat or in an antistatic bag.
  - b. Memory module: Loosen the flathead captive screw attached to the top brace of the module and slide the module straight up and out of the card cage. Place the module on an antistatic mat or in an antistatic bag.

*NOTE: Do not replace these modules until the bridge module is in place.*

3. From the second PCI card cage section, remove the two screws that hold the RFI shield in place (see ③ in Figure 7).
4. From the system card cage section, remove the RFI shield (see ④).

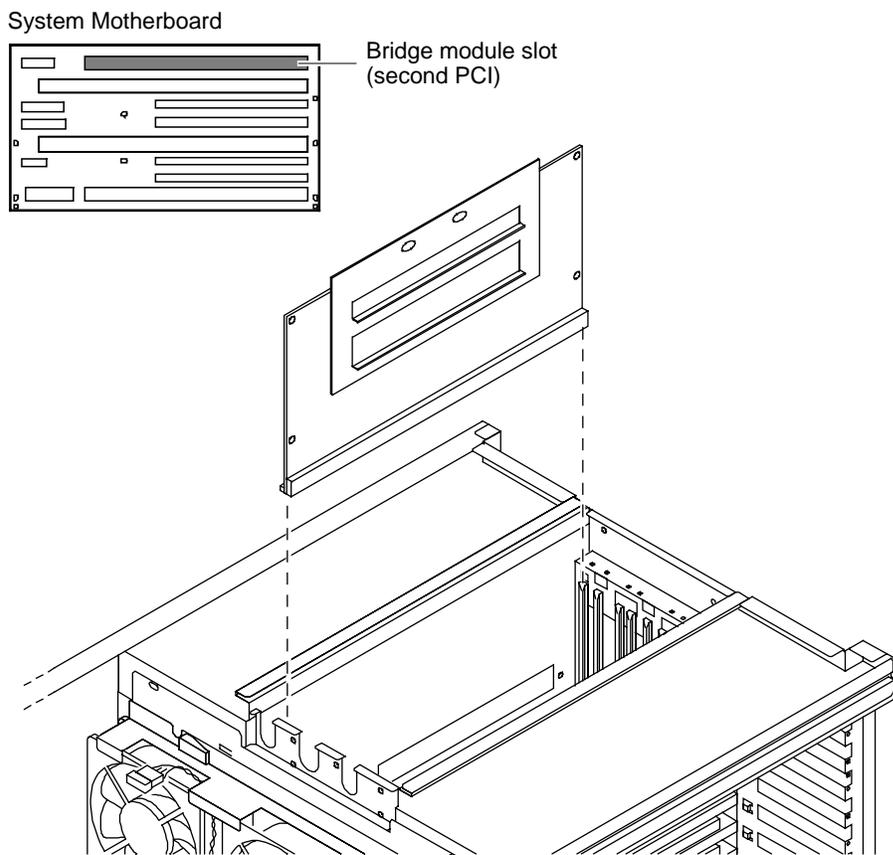
## Insert the Bridge Module

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Insert the bridge module into the connector on the system motherboard, and attach it to the partition. Replace any CPU and memory modules you might have removed.

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Figure 8 Bridge Module Installation



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1. Slide the bridge module into the connector on the system motherboard (see Figure 8). Attach the bridge module to the sheet metal partition with two M3x5 screws.
2. If you removed any modules to reach the RFI shield, replace them:
  - a. CPU module: Slide the module into the connector and push down on both module handle levers at the same time.
  - b. Memory module: Slide the module into the connector and secure the captive flathead screw.

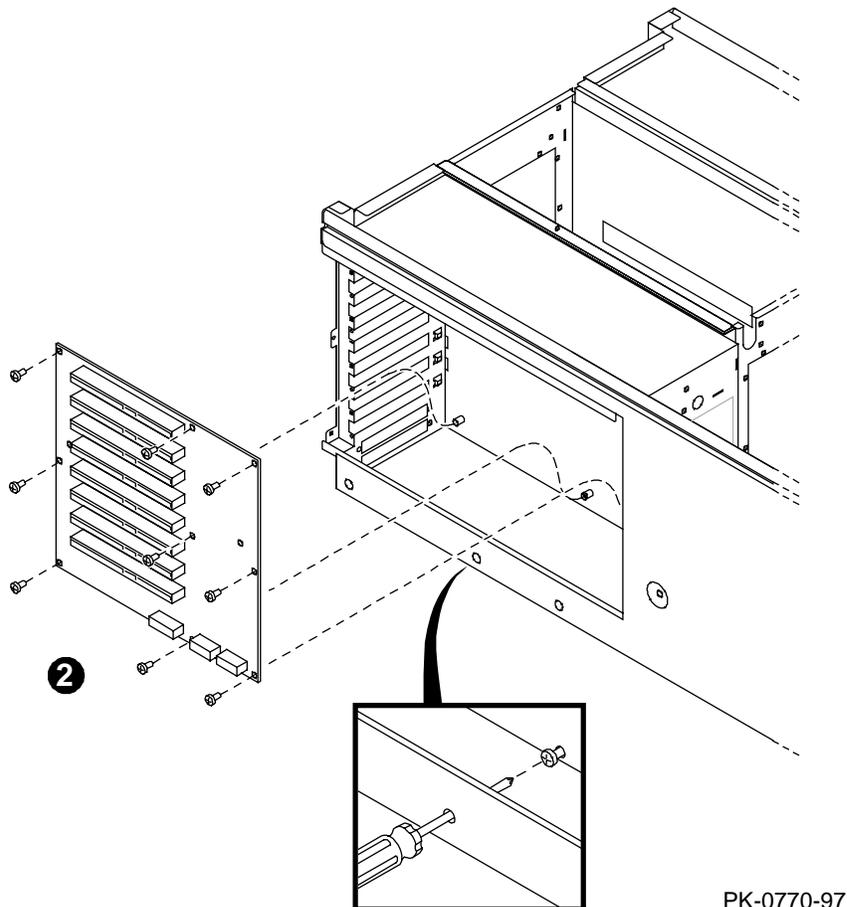
## Install the PCI Motherboard

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Attach the connector on the PCI motherboard to the connector on the bridge module. Secure the PCI motherboard to the partition with nine screws. Attach the power connectors.

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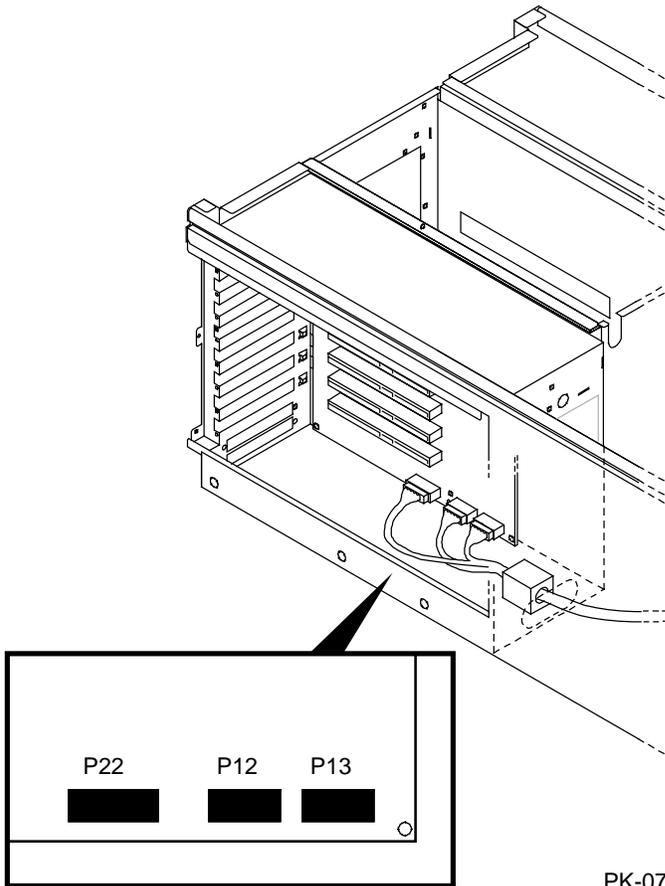
Figure 9 PCI Motherboard Installation



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1. Attach the connector on the back of the PCI motherboard to the connector on the bridge module through the opening in the sheet metal partition.
2. Attach the nine M3x5 screws that hold the PCI motherboard to the partition (see ② in Figure 9). To reach the screws at the bottom of the board, thread your screwdriver through the holes in the sheet metal (see the inset in Figure 9).
3. Attach the 3.3V (P22) and 5V (P12 and P13) connectors. See Figure 10 for the location of these receptacles on the PCI motherboard.

Figure 10 PCI Motherboard Power Connectors



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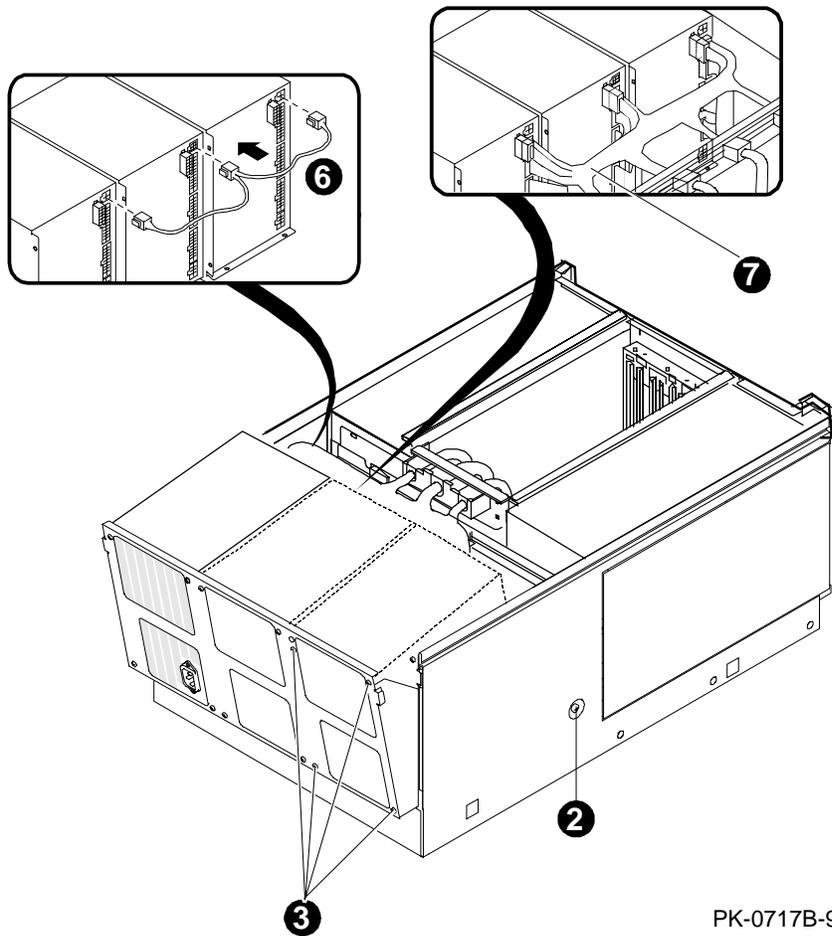
## Install the Power Supply

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Remove the power supply cover and the power supply RFI shield. Insert the power supply, and attach cables.

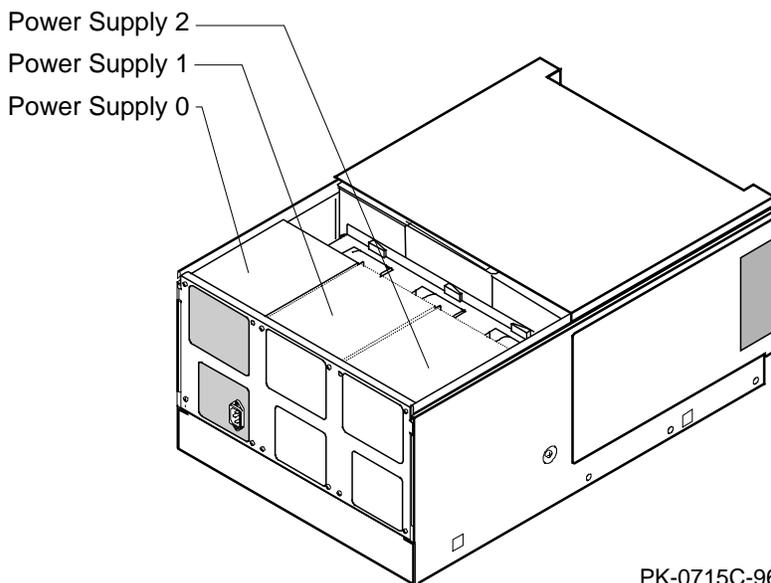
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Figure 11 Power System Cabling



1. Remove the cover from the power system section of the system drawer (see page 8).
2. Remove the two power tray attachment screws. There is one screw on each side of the system drawer (see ② in Figure 11). Tilt the power tray forward.
3. Determine the space in which the power supply will be installed. Power supply 0 is installed first, power supply 2 second, and power supply 1 third (see Figure 12). Remove the RFI cover from that space by removing the four screws at the front of the power tray (see ③ in Figure 11).
4. Insert the power supply in the appropriate space.
5. Insert the screws at the front of the tray to hold the power supply in place:
  - a. If you are installing power supply 2, insert three screws (do not place a screw in the upper left corner).
  - b. If you are installing power supply 1, insert four screws.
6. Attach the current sharing cable at the rear of the power supply (see ⑥ in the inset in Figure 11).
7. Attach the other connectors (see ⑦).

**Figure 12 Power Supply Locations**



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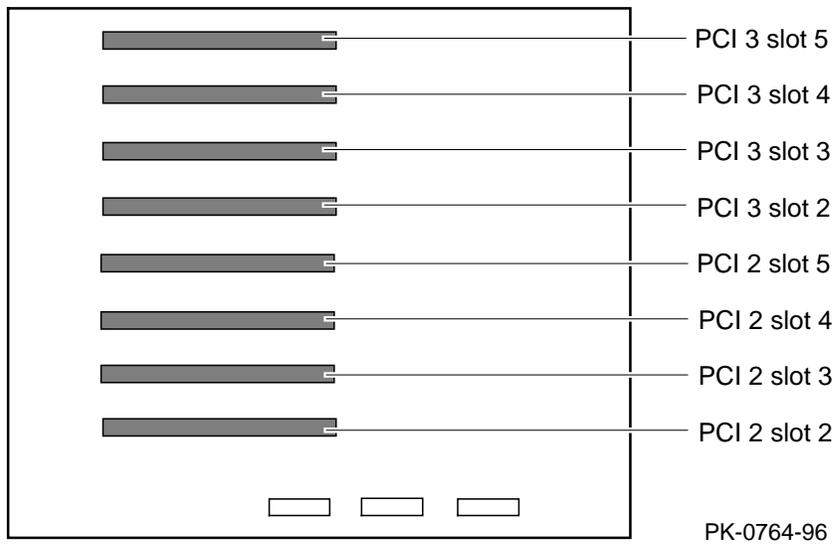
## Install PCI Cards

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**Remove the bulkhead filler plate and reserve the screw. Insert the PCI card face down, and secure it with the reserved screw.**

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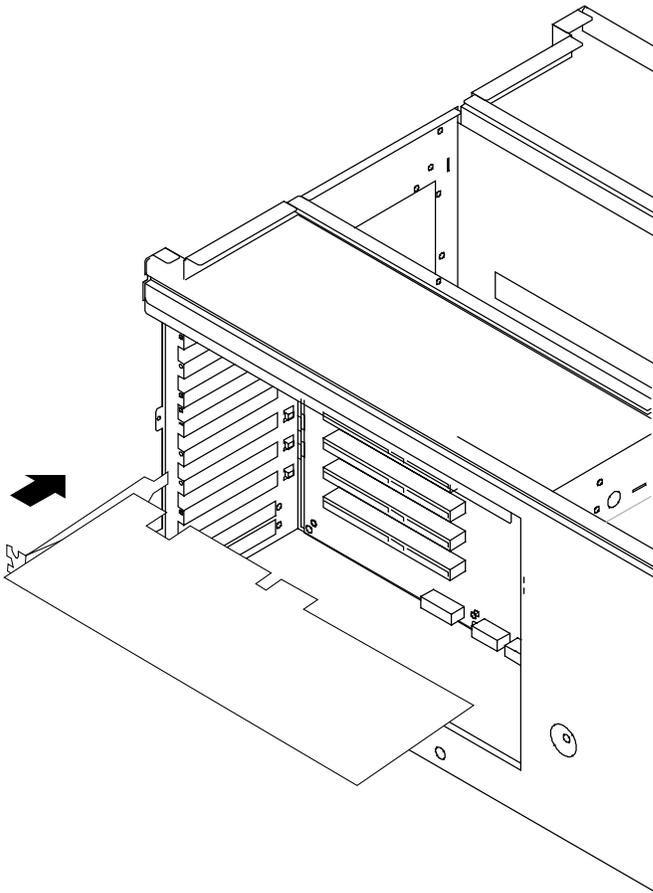
Figure 13 PCI Motherboard Showing Slots



**WARNING:** To prevent fire, use only modules with current limited outputs. Refer to National Electrical Code NFPA 70 or Safety of Information Technology Equipment, Including Electrical Business Equipment EN 60 950.

1. Determine the slot for the PCI card. See Figure 13 for the location of PCI slots on the second PCI motherboard.
2. Remove and discard the bulkhead filler plate from the PCI slot. Reserve the M3x5 screw.
3. Insert the card face down into the connector as shown in Figure 14.
4. Connect any cables and secure the module to the card cage with the reserved M3x5 screw.

**Figure 14 PCI Card Installation**



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## Verify the Installation — DIGITAL UNIX and OpenVMS Systems

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**From the SRM console issue the show configuration or show device command.**

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### Example 1 Verification — DIGITAL UNIX and OpenVMS Systems

P00>>> show config

Digital Equipment Corporation  
AlphaServer 4000

Console V4.8-4 OpenVMS PALcode V1.19-5, DIGITAL UNIX PALcode V1.21-18

Module	Type	Rev	Name
System Motherboard	0	0000	mthrbrd0
Memory 128 MB SYNC	0	0000	mem0
CPU (2MB Cache)	2	0004	cpu0
CPU is disabled	0	0000	cpu1
Bridge (IOD0/IOD1)	600	0021	iod0/iod1
PCI Motherboard	8	0002	saddle0
Bridge (IOD2/IOD3)	600	0021	iod2/iod3
PCI Motherboard	0	0000	saddle1

Bus 0 iod0 (PCI0)

Slot	Option Name	Type	Rev	Name
1	PCEB	4828086	0005	pceb0
2	S3 Trio64/Trio32	88115333	0000	vga0
3	DECchip 21040-AA	21011	0023	tulip0
5	NCR 53C810	11000	0002	ncr1

Bus 1 pceb0 (EISA Bridge connected to iod0, slot 1)

Slot	Option Name	Type	Rev	Name
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Bus 0 iod1 (PCI1)

Slot	Option Name	Type	Rev	Name
1	NCR 53C810	11000	0002	ncr0

Bus 0 iod2 (PCI2)

Slot	Option Name	Type	Rev	Name
2	PCI-PCI Bridge	11011	0002	pcb0

## Example 1 Verification — DIGITAL UNIX and OpenVMS Systems (Continued)

```
Bus 2 pcb0 (PCI-PCI Bridge connected to iod2, slot 2)
Slot Option Name          Type      Rev      Name
0     ISP1020              10201077 0002     isp0

Bus 0 iod3 (PCI3)
Slot Option Name          Type      Rev      Name
P00>>> show device
polling ncr0 (NCR 53C810) slot 1, bus 0 PCI, hose 1  SCSI Bus ID 7
dka500.5.0.1.1      DKa500              RRD45    1645
polling floppy0 (FLOPPY) PCEB - XBUS hose 0
dva0.0.0.1000.0    DVA0                RX23
polling ncr1 (NCR 53C810) slot 5, bus 0 PCI, hose 0  SCSI Bus ID 7
dkb0.0.0.5.0       DKb0                RZ29B    0014
dkb400.4.0.5.0     DKb400              RZ29B    0014
polling isp0 (ISP1020) slot 0, bus 2 PCI, hose 2  SCSI Bus ID 7
dkc0.0.0.2000.2    DKc0                RZ29B    0007
dkc100.1.0.2000.2  DKc100              RZ29B    0007
dkc200.2.0.2000.2  DKc200              RZ29B    0007
dkc300.3.0.2000.2  DKc300              RZ29B    0007
polling tulip0 (DECchip 21040-AA) slot 3, bus 0 PCI, hose 0
ewa0.0.0.3.0       08-00-2B-E5-C3-21  BNC
P00>>>
```

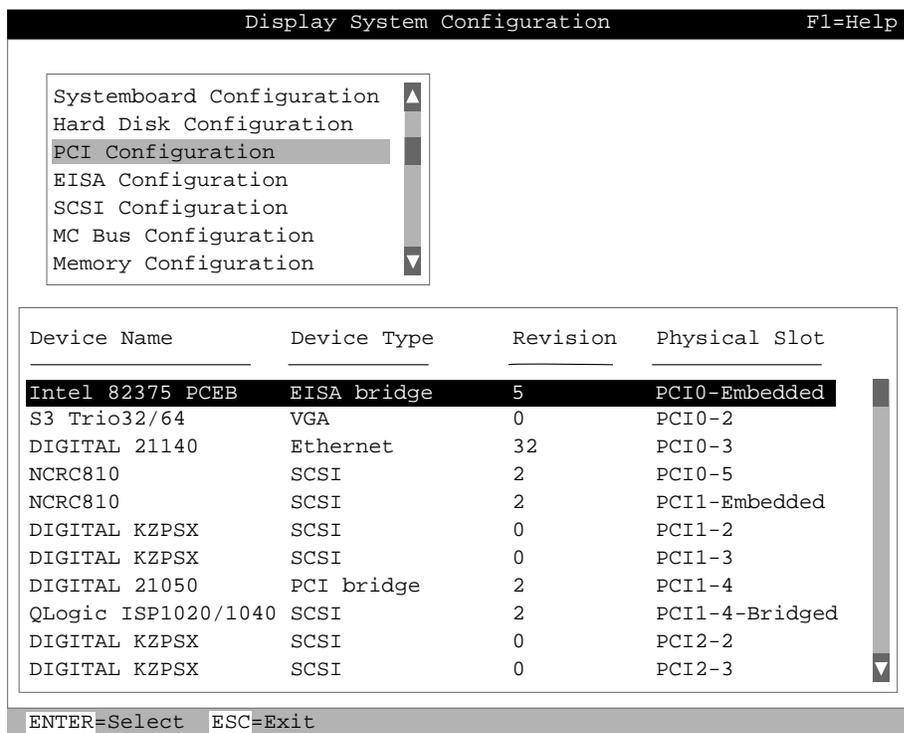
### Verification — DIGITAL UNIX and OpenVMS Systems

- Issue the SRM **show configuration** or **show device** command to verify that the new PCI buses (iod2 and iod3) and options are seen (see Example 1).

## Verify the Installation — Windows NT Systems

From the AlphaBIOS console select **Display System Configuration** and **PCI Configuration**.

Figure 15 Verification — Windows NT Systems



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### Verification — Windows NT Systems

1. Start **AlphaBIOS Setup**, select **Display System Configuration**, and press Enter.
2. Using the arrow keys, select **PCI Configuration** to verify that the new PCI buses and options are seen (see Figure 15).

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