I/O Upgrade Manual

HP 3000/9x9KS and HP 9000/K-Class Enterprise Servers

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Printing History

New editions of this manual incorporate all material updated since the previous edition. The manual printing date and part number indicate its current edition. The printing date changes when a new edition is printed. (Minor corrections and updates included at reprint do not cause the date to change.) The manual part number changes when extensive technical changes are incorporated.

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Change Narrative

- Edition 10 changes include minor corrections and updates as required.
- Edition 9 changes include the following:
  a. Added references to the 929KS/020 and 989KS/x00 systems as appropriate.
  b. Incorporated minor corrections and updates to the entire manual.
- Edition 8 changes include the following:
  a. Added references to the new K360 system as appropriate.
  b. Incorporated minor corrections and updates to the entire manual.
- Edition 7 changes include the following:
  a. Divided Chapter One into three chapters.
  b. Added HP-PB I/O Bus Converter information as Chapter Four.
  c. Added OS Requirements and Diagnostic Support information as Appendix A.
  d. Incorporated minor corrections and updates to the entire manual.

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SERIOUS ERRORS, such as technical inaccuracies that may render a program or a hardware device inoperative, should be reported to your HP Response Center or directly to a Support Engineer.

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1 I/O Upgrade Information

This I/O Upgrade manual provides information for expanding the I/O capability of the HP 3000/9x9KS and HP 9000/K2x0, K3x0, K4x0, and K5x0 computer systems.

Introduction

HSC I/O upgrades are achieved by adding an expansion card with two or four slots. Only the HP 9000/K5x0 systems allow the addition of a secondary I/O expansion card. HP-PB I/O upgrades are achieved by replacing a PAL chip on the System Board. The upgrades available are shown in Table 1-1.

Table 1-1 Available Upgrades

Available Upgrades		Computer Systems			
Upgrade Type	Product No.	HP 3000/ 9x9KS		HP 9000/ K4x0	HP 9000/ K3x0/K5x0
		929-979KS	989KS		
Add 4 HP-PB slots	A3185A	Yes[a]	No	Yes	No
Primary HP-HSC 2 slots	A3186A	Yes[b]	No	Yes	No
	A3696A	No	Yes	No	Yes
Primary HP-HSC 4 slots	A2990A	Yes[b]	No	Yes	No
	A3695A	No	Yes	No	Yes[c]
Secondary dual-bus HP-HSC 4 slots	A3694A	No	No	No	Yes[b]
HSC-to-HPPB[d] Converter Card	A3699A	Yes[e]	Yes	Yes[f]	Yes[e]

a. Not applicable to 989KS.
b. Must be used in conjunction with HSC-to-HPPB Converter Card to allow card cages to be connected. Will not support native cards.
c. HP 9000/K5x0 only
d. This I/O card is also known as an HP-PB I/O Bus Converter Card.
e. Requires general release patch MPE JXP5 or release MPIX 5.5 Express 4 (C.55.04) and patches MPEJXP5 and MPE JXR9.
f. Requires HP-UX 10.20 Release 9804.

Backplane Card Slot Color Codes

The following color bars appear above the slots on the system backplane:

Table 1-2 Color Codes

Color	Slot
Yellow	HP-PB0
Green	HP-PB1
Blue	Core/IO
Orange	HP-HSC Expansion I/O (primary)
Split Magenta/Purple[a]	Optional HP-HSC Secondary I/O[b] or additional Processor slots.
Purple	Processor slots.

a. HP 9000/K3x0/K5x0 systems and HP3000 989KS systems.
b. HP 9000/K5x0 systems only.

I/O and processor cards have matching color codes to assist in correctly matching the cards to the right slots.

Electrostatic Discharge

Computer systems contain assemblies and components that are sensitive to electrostatic discharge (ESD). Carefully observe the precautions listed in this section and use the ESD wrist strap, ESD sheet, and ESD foam pad provided in the ESD kit (part number A3024-80004). The following precautions can significantly reduce the risk of system failure or component damage due to ESD.

Always wear a grounded wrist strap when working around a system or handling any assembly, component, or card.

Treat all assemblies, components, cards, and connections as sensitive.

When unpacking cards or components to the system, keep the item in it's conductive bag until it is ready to be installed.

Keep body movement to a minimum, this generates static electricity that causes ESD.

Avoid working in carpeted areas.

Try to select a work area where potential static sources are minimized.

Anti-Static Wrist Strap

The anti-static wrist strap is a bracelet like strip that goes around either wrist. The other end of the strap connects to a convenient metal surface on the computer cabinet.

Anti-Static Mat

The anti-static mat can be either the conductive bag, the ESD sheet, or the ESD foam pad. The anti-static mat does not have to be connected to the cabinet. It should be placed close to the computer while performing the upgrade tasks.

Tools required

To accomplish the upgrade procedures to the computer the following tools are required:

A Torx #10 driver. (This is the preferred tool)

A flat blade screw driver. (this can be used if a Torx driver is not available)

A3204-80004 ESD Kit

Chip extraction tool (HP part number 8710-1982)

Flashlight or alternate light source (recommended but not required)

Verifying the Current PDC Firmware

If you are planning to install an HSC to HP-PB Converter Card, you will need to verify your system's PDC firmware version to see if it supports that type of memory.

If you need to upgrade your PDC, see the section entitled "Obtaining the Correct Firmware Patch."

If on-line diagnostics are not present on your system, use the Boot Console Handler procedure to verify the current version.

On-line Procedures for all HP 3000 Systems and all pre-HP-UX OS 10.20 HP 9000 Systems

1. At the system prompt, enter, **sysdiag**.
2. At the sysdiag prompt, enter, **sysmap**.
3. At the sysmap prompt, enter, **cpumap**.
4. Note the PDC firmware value.
5. At the ENTER MAP prompt, enter, **exit**.
6. At the DUI prompt, enter, **exit**.

The output of cpumap will display the current PDC revision (See Table A-1, Appendix A).

On-line Procedures for HP 9000 Systems Only

For HP 9000 systems with HP-UX OS version 10.20 and later, determine the Support Tools Manager version to establish the correct procedure to follow.

To determine the Support Tools Manager version:

1. Log in as root.
2. At the prompt, enter, **mstm**
3. Note the Support Tools Manager version.

   For Support Tools Manager version A.07.00 or less, proceed to the paragraph titled, HP 9000 System Support Tools Manager A.07.00 or Earlier. For Support Tools Manager version A.08.00 or greater, proceed to the paragraph titled, HP 9000 System Support Tools Manager A.08.00 or Later.

HP 9000 System Support Tools Manager A.07.00 or Earlier

1. Press f2 (ok).
2. Press f4 (device).
3. Press f5 (select class)
4. Move cursor to “processor.”
5. Press “Enter” on the keyboard.
6. Press f2 (ok).
7. Press f8 (previous menu).
8. Press f5 (tools).
9. Press f2 (information).
10. Press f2 (run).
11. Press f3 (info log). After a few seconds, the Information Tool Log for the CPU will be displayed. The “PDC Firmware Revision” is displayed in the first column.
12. Note the PDC firmware value
13. Press f2 (done).
14. Press f8 (previous menu).
15. Press f8 (previous menu).
16. Press f8 (exit).
17. Press f2 (ok).

HP 9000 System Support Tools Manager A.08.00 or Later

1. Press f2 (ok).
2. Move the cursor to “CPU.”
3. Press f3 (select).
4. press f4 (menu bar on).
5. Enter “T” to select Tool Menu.
6. Enter “I” to select Information Mode.
7. Enter “R” to run. After a few seconds, the Information Tool Log for the CPU will be displayed. The “PDC Firmware Revision” is displayed in the first column.
8. Note the PDC firmware value.
9. Press f2 (information).
10. Press f2 (done).
11. Press f8 (exit).
12. Press f2 (ok).

Off-line Procedures for all HP 9000 and HP 3000 Systems Using the Boot Console Handler (BCH)

1. Shut down operating systems as follows:

   - For HP 9000 Systems:

     Log on as root, and enter, **reboot -r**. This command will shut down the operating system and reboot the HP 9000 system.

   - For HP 3000 Systems:

     At the console, type **Ctrl A**. When the "=" prompt is displayed, type **shutdown** and press **Enter**. When the operating system has successfully shut down, type **Ctrl B**. The terminal will then display CM>. At this prompt, type **RS** and press **Enter**. These commands shut down the operating system and reboot the HP 3000 system.

2. If AUTOBOOT is on, you will receive the following message:

```
Process is starting autoboot process.
To discontinue, press any key within 10 seconds.
```

   At this point, press any key on the keyboard within 10 seconds to interrupt the boot process.

3. The Main Menu is displayed. A prompt will appear as:

```
MAIN MENU: Enter command or menu>
```

   Enter the command **in**.

4. A prompt will appear as:

```
Information Menu: Enter Command>
```

   Enter the command **fv**.

The system will respond with the current firmware revision.

Obtaining the Correct Firmware Patch

The firmware patches for all K-Class and HP3000 9x9/KS systems can obtained from the HPESC (HP Electronic Support Center) via the World Wide Web or via FTP.

Downloading the Firmware Patch via the World Wide Web

To access and download the appropriate patch, perform the following steps:

1. Connect to the HPESC World Wide Web service home page at their URL by entering the following:

   http://us-support.external.hp.com

2. Under Support Line, select the Patch Database option.

3. If you are a previously registered user:

   a. Click on "Enter as a Registered User" and select your region.

   b. Login, entering your User ID and password. This will take you to the Patch Database Main screen.

   If you are a first-time user:

   a. Click on your geographic region under "Register Now".

b. Review the “Terms and Conditions” page. At the bottom of the page you may accept the terms and conditions and proceed to the registration page.

c. Complete the registration information requested.

d. Once the registration information has been successfully transmitted, the User ID Assigned screen will appear. Write down the User ID (or print the screen) for later reference.

e. Click on “Begin Using Patch Database Now” to proceed to the Patch Database Main screen.

4. Select the Firmware Patches option.
5. Select the CPU Patches option and click on “Show Patches”.
6. Choose the appropriate patch (for example, (PF_CKHK0022). A patch description will appear. Click on “download” to copy the patch to your system.

NOTE The selected patch must be downloaded from HP SupportLine onto a system that has HP-UX as the operating system.

7. Follow the instructions in the Readme file to create a bootable tape and to update PDC.

Downloading the Firmware Patch using FTP

1. Connect to HPESC via ftp. You must initiate downloading from an open subnet system as:

   > ftp us-support.external.hp.com

   (If you do not have an open subnet system, try using rftp instead of ftp.)

2. Login as “anonymous”.
3. At the Password prompt, enter your e-mail address as the password.
4. Change to the directory containing the firmware patches:

   > cd firmware_patches/hp/cpu

   If desired, review the contents of the directory by using the **ls** command. For each patch, there is an accompanying text file (patchfilename.txt). The text file contains the patch description and the instructions for creating the patch tape.

5. Download the appropriate patch file and text file:

   get <patchfilename>

   get <patchfilename>.txt

2 HP-PB I/O Upgrade

CAUTION The procedures outlined in the HP-PB I/O Upgrade chapter are to be performed by trained and experienced Field Service personnel ONLY. If you have not received Hewlett Packard Service Training, or do not have the equivalent hardware experience, DO NOT attempt these procedures.

HP-PB I/O upgrade procedures contained in this chapter do not pertain to the following servers:

- HP 9000/K360, Kx70, Kx80 systems.

  K360 systems are limited to four slots only. Additional internal HP-PB slots are not an option.

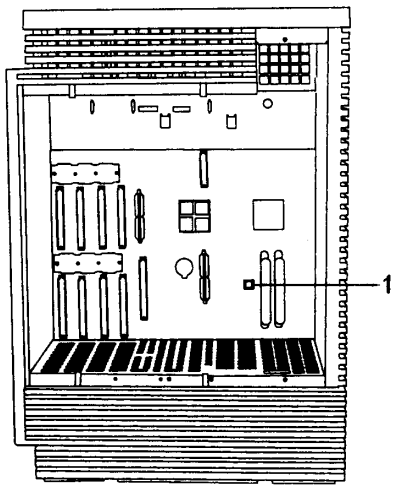
  Kx70/Kx80 servers do not allow expansion of the internal HP-PB I/O.

- HP 3000/989KS systems.

HP-PB Expansion

To expand the HP-PB I/O capability of the computer, the Programmable Array Logic (PAL) chip on the system board has to be changed. The PAL chip is accessed from the back of the computer and is located in the same place for either the HP 3000 or the HP 9000 systems. Figure 2-1, item 1, shows the PAL location with all components removed from the back of the computer.

Figure 2-1 PAL Chip Location



HP-PB Upgrade Procedures

Observe all ESD precautions. The suggested time to perform the upgrade is at a non-peak usage for the computer. To accomplish the upgrade, perform the following steps:

1. Log Off all users and stop all active applications that may be running.
2. Perform a system backup of the entire Operating System and data base. If this is not feasible, perform a backup of the data base. (This should be done at a scheduled interval as common practice for protecting any new data or changes to the existing data base.)
3. Perform a system shutdown as follows:
   - For HP 9000 systems: Enter "**/etc/shutdown -h**" at the prompt.
   - For HP 3000 systems (from the system console): Enter "**Control A**" (an equal sign (=) will be displayed), then type "**shutdown**" at the prompt.
4. Turn the computer key switch to the STANDBY position.
5. At the rear of the computer, unplug the power cord.
6. Loosen all captive screws on the power supply (power supply captive screws will be identified by a hollow arrow (=>)), then grasp the extractor levers (if equipped) and pull them out.

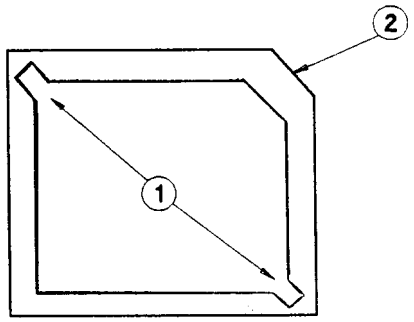
NOTE The power supply has six captive screws, three each on the top and bottom.

7. Grasp the handle on the power supply and pull it out of the computer.

CAUTION The power supply may weigh as much as 26.5 lbs (12 kg). Improper lifting could cause personal injury and/or equipment damage. Be careful when you pick it up and be careful where you put it down.

8. Remove the back CPU cover plate by loosening the two (one top and one bottom) captive mounting screws and pulling the cover plate away.
9. Carefully remove the rear CPU cards (if they are present) and place them on the anti-static sheet.
10. Reach into the computer and insert the tapered end of the extraction tool (8710-1982) into one of the extraction slots (Figure 2-2, item 1) in the PAL socket (U30).

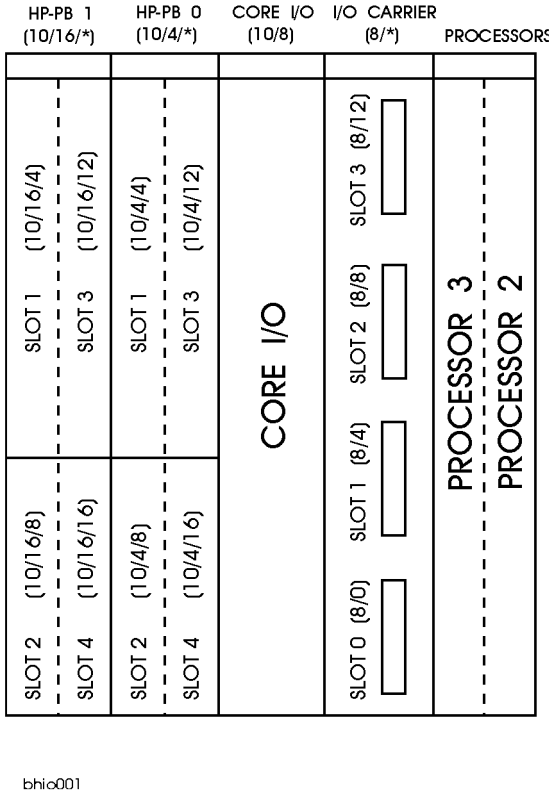
Figure 2-2 PAL Chip Socket



11. Gently pry up on the corner of the resident PAL chip (each side) until you can safely remove it. Be careful not drop the chip inside the computer cabinet, because it could fall into the fan compartment.
12. Match the beveled corner (Figure 2-2, item 2) of the PAL socket to the beveled corner of the replacement PAL chip (A2375-81801).
13. Position the replacement PAL chip into the socket and gently push until it fully seats.
14. Remove the HP-PB1 cover plate.
15. Install the HP-PB card guides (5062-9367) and single high bulkheads (5062-3343)
16. Replace the power supply and CPU card(s) that were removed.
17. Connect the power cord to the rear of the computer.
18. Turn the computer key switch to the ON position.
19. Monitor the Front Panel Display and Console for any error or fault (FLT) messages.

Figure 2-3 shows the added HP-PB I/O slots. The four slots under the HP-PB 1 title are the additional I/O slots. Any supported HP-PB I/O cards can now be installed into the computer.

Figure 2-3 HP-PB I/O Slot Locations - HP 9000/K4x0 and HP 3000/9x9KS (except 989KS) Systems



HP-PB locations are the same for both HP 9000/K4x0 and HP 3000/929KS-979KS computers. The Slot path addresses are also the same as shown in Table 2-1.

Table 2-1 HP-PB Address Path

Location	Device Type	Address Path
HP-PB 1, slot 1	HP-PB I/O card	10/16/4 (device addr.)
HP-PB 1, slot 2	HP-PB I/O card	10/16/8(device addr.)
HP-PB 1, slot 3	HP-PB I/O card	10/16/12(device addr.)
HP-PB 1, slot 4	HP-PB I/O card	10/16/16(device addr.)

3 HP-HSC Upgrade

The procedures listed in this section apply to the following systems:

- HP 9000/K3x0, K4x0, and K5x0 computers
- HP 3000 9x9KS computers.

HP 9000/K100/K2x0 computer systems are not supported.

HP-HSC Expansion

HP 9000/K3x0/K4x0 and HP 3000 systems have a single (primary) HP-HSC Expansion I/O slot for upgrades. This slot is immediately to the right of the Core I/O card, as viewed from the rear of the system.

HP 9000/K5x0 systems have an additional space to the right of the primary expansion I/O slot (as viewed from the rear of the system) that can be used either for additional processors OR as a secondary HP-HSC Expansion I/O slot.

HP-HSC Configuration Rules

The following configuration rules apply to the system upgrade:

- If there is a 2-D Graphics Device Adapter (DA) card (A2636-66023 or A3519-60001) in the Optional I/O slot of the core I/O card, move it to the primary HP-HSC expansion card.
- The Fast-Wide SCSI Card (A2969-60001) can be installed in the Optional I/O slot on the core I/O card (if available).

NOTE For HP 9000/K5x0 systems: It is recommended that Dual bus Secondary HP-HSC Expansion I/O cards be installed only where a 2-slot or 4-slot HSC Expansion I/O card is resident in the primary HP-HSC Expansion I/O slot.

NOTE **Configuration Guidelines**

1. Some system configurations can compete for I/O bus usage with the built-in 802.3 LAN interface on the standard multifunction I/O (Core I/O). The result is a slow down in LAN performance due to an increase in CRC errors (LAN retries). An add-in 802.3 LAN card should be used as the primary LAN interface when using four or more Kx70 or Kx80 processors with less than 1.5GB of memory, or when using the VISUALIZE 2-D graphics card in the optional HP-HSC I/O slot on the multifunction I/O.
2. If a 100BT I/O card (HP-PB or HSC) is installed, DO NOT USE THE INTEGRATED LAN or CORE I/O.
3. Do not use the integrated LAN connection under the following circumstances:
   - When using 4, 5, or 6 PA8200 processors and less than 1.5 GB of memory.
   - When using the VISUALIZE-EG 2D graphics card n the HP-HSC I/O slot on the multi-function I/O card.

   Instead of the using the integrated LAN connection, use an add-in LAN card as the primary LAN interface.

To use the integrated LAN port on systems with 4, 5, or 6 PA8200 processors, install at least 1.5GB of memory with a minimum of four 128MB DIMM of the same size.

Primary Expansion I/O Card Upgrade Procedures

Perform the following steps to upgrade a system. Be sure to observe all ESD precautions.

1. Log Off all users and stop all active applications that may be running.
2. Perform a system backup of the entire Operating System and data base. If this is not feasible, perform a backup of the data base. (Backups should be performed at a scheduled interval as common practice for protecting any new data or changes to the existing data base.)
3. Perform a system shutdown as follows:
   - For HP 9000 systems: Enter "**/etc/shutdown -h**" at the prompt.
   - For HP 3000 systems (from the system console): Enter "**Control A**" (an equal sign (=) will be displayed), then type "**shutdown**" at the prompt.
4. Turn the computer key switch to the STANDBY position.
5. At the rear of the computer, unplug the power cord.
6. Remove the cover plate on the primary HP-HSC Expansion I/O slot (next to the Core I/O card) by loosening the two (one top and one bottom) captive mounting screws and pulling the cover plate away.

7. The following steps pertain to installation preparation:

   - For K400/K410/K420 and 929KS-969KS systems:

     a. Remove the adjoining processor 2 and 3 cover plate by loosening the two (one top and one bottom) captive mounting screws and pulling the cover plate away (This is necessary to gain access to the system board.). Remove processors 2 and 3, if present.

     b. Reach into the computer cabinet and remove the plastic dust cover from the HP-HSC expansion connector on the system board.

   - For K450/K460/K360 and 979KS Systems:

     a. Loosen the four captive screws on the power supply, then grasp the extractor levers (if equipped) and pull them out.

     b. Remove the power supply.

CAUTION The power supply may weigh as much as 26.5 lbs (12 kg). Be careful lifting it and be careful where you put it down.

     c. Remove the processor 2 and 3 cover plate by loosening the two (one top and one bottom) captive mounting screws and pulling the cover plate away (This is necessary to gain access to the system board.). Remove processors 2 and 3, if present.

     d. Reach into the computer cabinet and remove the plastic dust cover from the HP-HSC expansion connector on the system board.

   - For Kx70/Kx80 and 989KS Systems:

     a. Remove adjoining processor 4 and 5 slot cover by loosening the two (one top and one bottom) captive mounting screws and pulling the cover plate away. Remove processors 4 and 5, if present.

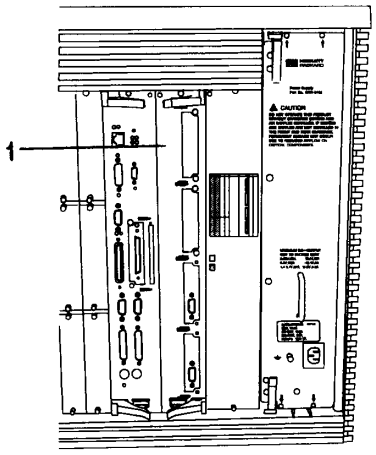
     b. Reach into the computer cabinet and remove the plastic dust cover from the HP-HSC expansion connector on the system board.

8. Remove the plastic dust cover from the connector on the HP-HSC expansion card.

NOTE At this point you must determine which HP-HSC cards are going to be added to the computer. If a graphics card is in the Core I/O card, it needs to be moved to the HP-HSC expansion card. “Moving HP-HSC Cards” for those procedures.

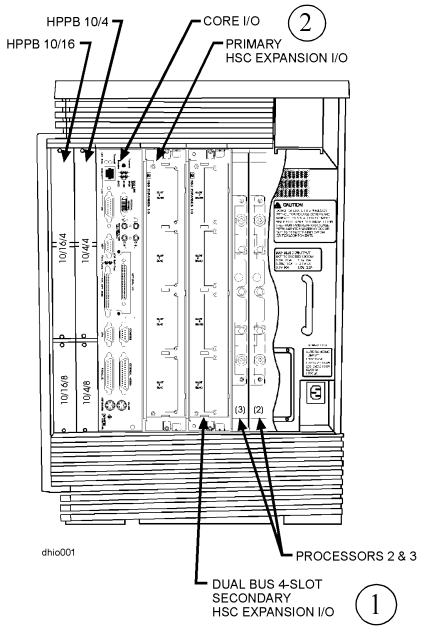
9. Align the HP-HSC expansion card (HP-HSC cards and components to the left side and the extractor levers out) into the card slot (1) and slide it into the computer. See Figure 3-1 and Figure 3-2.

Figure 3-1 HP-HSC Expansion Card Locations (Except Kx70, Kx80, and 989KS)



NOTE The rear view of the system shown in Figure 3-1 is representative of HP 3000/9x9KS (except 979KS/989KS) and HP 9000/K400/410/420 systems. On HP 9000/K3x0/K450/K460 and HP 3000/979KS/989KS systems, the power supply bulkhead extends across the rear processor slots shown in Figure 3-2. However, the Core I/O and Expansion I/O card locations are the same.

Figure 3-2 HSC Expansion Slots - Kx70/Kx80 and 989KS



1 = Not Applicable for 989KS.
2 = HP9000 Core I/O shown.

10. When the card makes contact with the system board connector, press the edge of the card to fully seat the card into the computer. Tighten the two captive screws to secure the expansion I/O card.
11. The following steps pertain to equipment replacement:
    - For K400/K410/K420 and 929KS-969KS systems:
        a. Replace processors 2 and 3, if removed.
        b. Replace the adjoining processor 2 and 3 cover plate by tightening the two (one top and one bottom) captive mounting screws.
    - For K450/K460/K360 and 979KS Systems:
        a. Replace processors 2 and 3, if removed.
        b. Replace the processor 2 and 3 cover plate by tightening the two (one top and one bottom) captive mounting screws.
        c. Replace the power supply then tighten the four captive screws.
    - For Kx70/Kx80 and 989KS Systems:
        a. Insert processors 4 and 5, if removed.
        b. Replace the adjoining processor 4 and 5 slot cover by tightening the two (one top and one bottom) captive mounting screws.

If this completes the upgrade, proceed to Upgrade Verification. If HP-HSC cards need to be moved or added, refer to, “Moving HP-HSC Cards”.

Secondary Expansion I/O Upgrade (Dual Bus) Procedures (K5x0 Only)

Perform steps 1 through 5 described in the “Primary Expansion I/O Card Upgrade Procedures”, then:

1. Remove the cover plate on the optional Processor/Dual Bus HP-HSC Expansion I/O slot next to the primary HP-HSC Expansion I/O slot (see Figure 3-2) by loosening the two (one top and one bottom) captive mounting screws and pulling the cover plate away.
2. Remove the cover plate of the adjoining processor slot by loosening the two (one top and one bottom) captive mounting screws and pulling the cover plate away. (This is necessary to gain access to the system board.)
3. Reach into the computer cabinet and remove the plastic dust cover from the HP-HSC expansion connector on the system board.
4. Remove the plastic dust cover from the Dual bus Secondary HP-HSC Expansion I/O Card connector.
5. Align the Dual bus Secondary HP-HSC Expansion I/O Card into the card slot (See Figure 3-2) and slide it into the computer.
6. When the card makes contact with the system board connector, press the edge of the card to fully seat the card into the computer. Tighten the two captive screws to secure the expansion I/O card.
7. Replace the primary HSC extender cover plate and tighten the two captive mounting screws.
8. Reattach any cabling on the primary HSC extender.

If this completes the upgrade, proceed to Upgrade Verification. If additional HP-HSC cards need to be moved or added, refer to, “Moving HP-HSC Cards.”

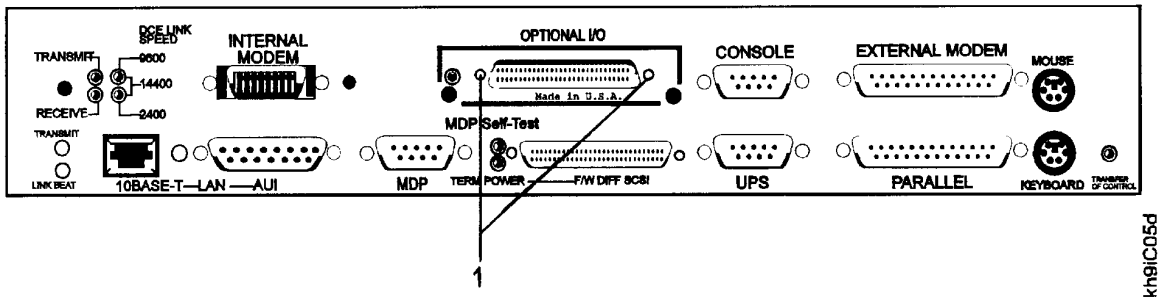
Moving HP-HSC Cards

The following steps describe the procedure for switching HP-HSC cards between the Core I/O card Optional I/O slot and HP-HSC expansion card slots.

Perform steps 1 through 5 described in “Primary Expansion I/O Card Upgrade Procedures”, then:

1. Disconnect the interface cable from the bulkhead connectors.
2. Remove the Core I/O assembly (located next to the HP-PB card slots) by loosening the two captive screws at the top and bottom, and pulling the assembly straight out.
3. Loosen the two captive mounting screws (one on each side, Figure 3-3, item 1) next to the card connector (on the bulkhead).

Figure 3-3 Mounting Screw Location



4. Grasp the back of the HP-HSC card and pull it up, disconnecting it from the core (or HP-HSC expansion) I/O card. See (Figure 3-4, item 1 (for core I/O) or Figure 3-5, item 1 (for expansion I/O).

Figure 3-4 HP-HSC Card Removal (core I/O)

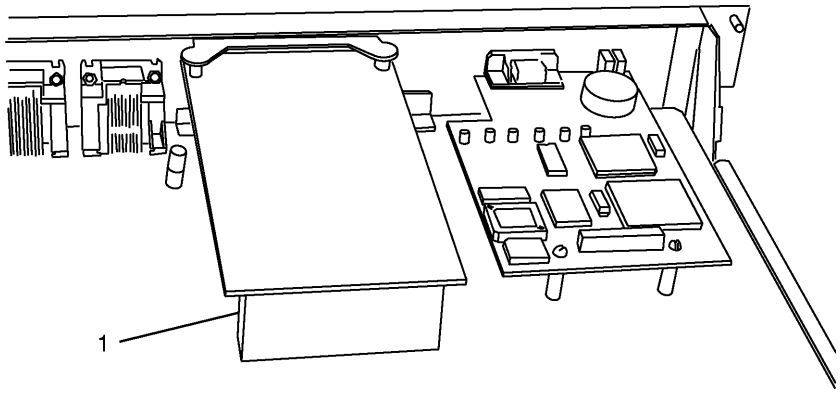
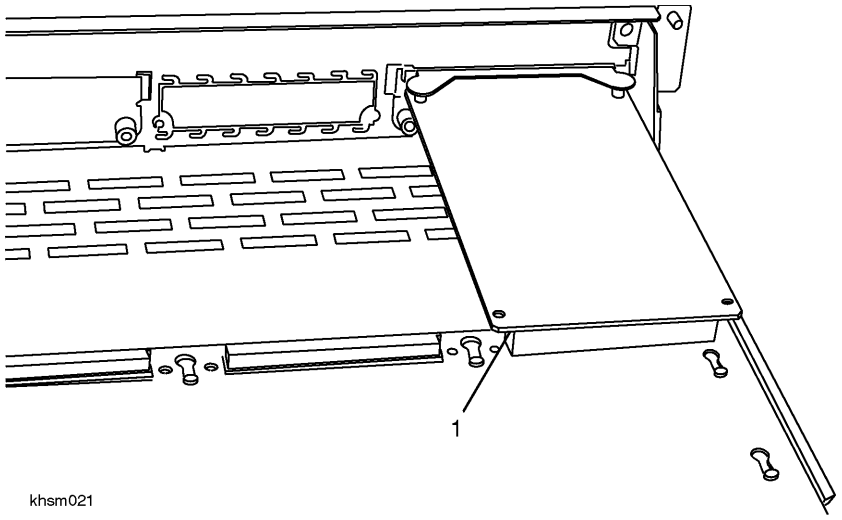


Figure 3-5 HP-HSC Card Removal (expansion I/O)



5. Continue to lift the back of the HP-HSC card until it is angled enough to disengage the hooked tabs from the mounting slots in the bulkhead.
6. If there is a cover plate in the slot position where an HP-HSC card is to be installed, loosen the two captive mounting screws and remove the cover plate.

NOTE Do not discard the cover plate. If a core I/O or expansion I/O HP-HSC slot is open, use the cover plate to close it.

7. Angle the HP-HSC card so that the hooked tabs of the card slide through the desired bulkhead tab slots.
8. Carefully align the extended pins to the HP-HSC card connector on the back of the card and gently press down to fully seat the card on the connector.
9. Tighten the two (one on each side) captive mounting screws to secure the HP-HSC card to the bulkhead.
10. Insert the core I/O and expansion I/O cards back into their appropriate slots.
11. Connect the interface cable to the bulkhead connectors.

Upgrade Verification

Before performing the procedures in this section, verify that all removed cover plates are reinstalled and secure.

1. Reconnect the power cord to the rear of the computer.
2. Turn the computer key to the ON position.
3. Observe the Front panel Display and console for any error or fault (FLT) messages.

When all procedures are complete with no errors or faults, reconfigure the system to add the new HP-HSC path addresses. Refer to the Owner's Guide for configuration instructions. HP-HSC Slot path addresses are shown in Table 3-1.

Table 3-1 HP-HSC Slot Addresses

Location	Device Type	Address Path
Core I/O card, Optional I/O connector	HP-HSC I/O card	10/8 (device addr.)
Primary Four Slot HP-HSC Expansion I/O		
HP-HSC I/O Expansion card, slot 0	HP-HSC I/O card	8/0 (device addr.)
HP-HSC I/O Expansion card, slot 1	HP-HSC I/O card	8/4 (device addr.)
HP-HSC I/O Expansion card, slot 2	HP-HSC I/O card	8/8 (device addr.)
HP-HSC I/O Expansion card, slot 3	HP-HSC I/O card	8/12 (device addr.)
Secondary Dual Bus HP-HSC Expansion I/O (K5x0 only)		
HP-HSC I/O Expansion card, slot 0	HP-HSC I/O card	12/0 (device addr.)
HP-HSC I/O Expansion card, slot 1	HP-HSC I/O card	12/12 (device addr.)
HP-HSC I/O Expansion card, slot 2	HP-HSC I/O card	14/8 (device addr.)
HP-HSC I/O Expansion card, slot 3	HP-HSC I/O card	14/12 (device addr.)

4 HSC-to-HPPB Converter card

This Chapter provides upgrade/installation information about the following I/O expansion components:

- HSC-to-HPPB Converter card (A3699A)
- HSC I/O Expansion module (A3186A/A3696A (2-slot) or A2990A/A3695A (4-slot)).

The HSC-to-HPPB I/O Bus Converter, installed in the primary HSC I/O Expansion module, connects the External HP-PB I/O Card Cage (A1828A) with the HP 3000/9x9KS and HP 9000/K-Class System Processor Units (SPUs) of the servers listed in the following tables:

Table 4-1 HP 3000/9x9KS Servers

989KS	989KS	989KS	979KS	969KS	969KS	959KS	939KS	939KS	929KS
/650	/600	/020	/400	/420	/400	/400		/020	/020
/450	/400		/300	/320	/300	/300			
/250	/200		/200	/220	/200	/200			
/150	/100		/100	/120	/100	/100			

Table 4-2 HP 9000/K-Class Servers

K360	K370	K380	K400	K410	K420	K450	K460	*K460-EG	K570	K580

*VISUALIZE-EG graphics.

WARNING **Refer installation to qualified service personnel. High voltages are present that constitute a potential hazard.**

HSC-to-HPPB Converter card and HP-HSC I/O Expansion module

The two cards listed below provide the interface between the server and the HP-PB I/O card Cage:

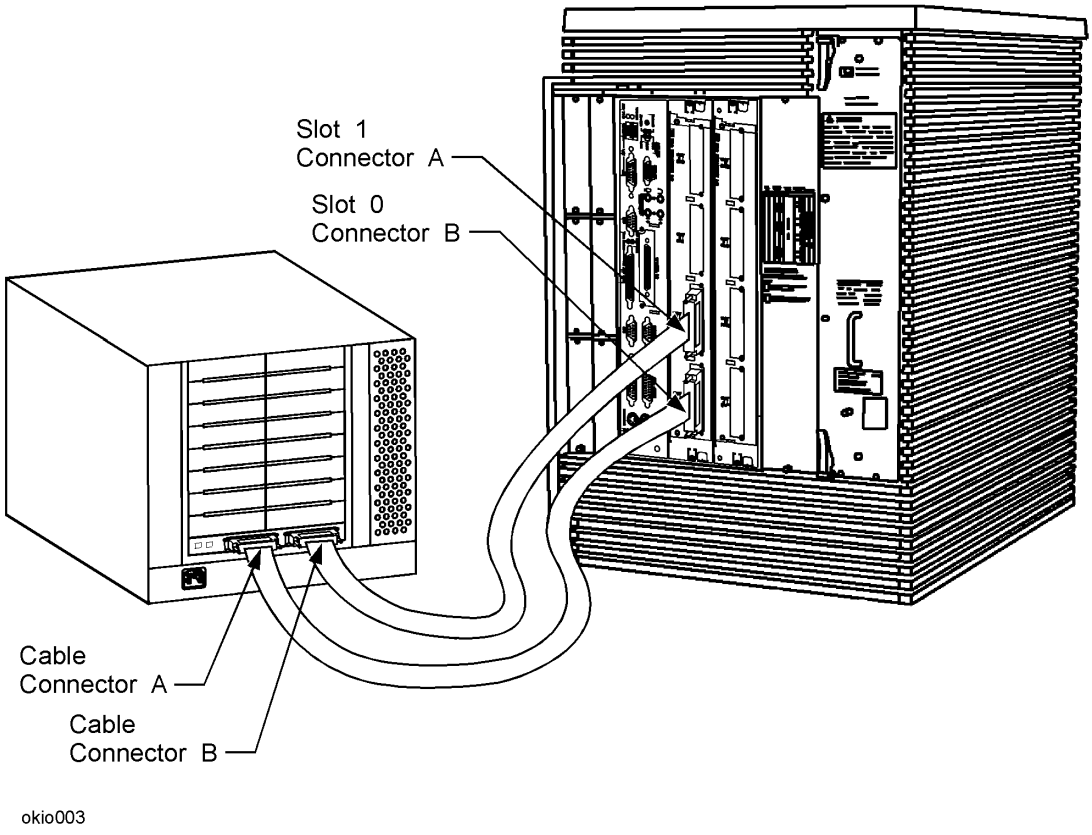
- The HSC-to-HPPB Converter card, installed on the primary HSC I/O Expansion module, uses two HSC slots.

NOTE The HSC-to-HPPB Converter card is not supported on the secondary HSC Expansion I/O module found on Kx70 and Kx80 servers.

- The Lower Bus Converter Card, located in slots 14/15 of the external HP-PB I/O Card Cage.

Figure 4-1 shows a typical server-to-I/O Card Cage cabling format.

Figure 4-1 Server-to-I/O Card Cage Configuration



Two slot HSC I/O Expansion modules support one external HP-PB I/O Card Cage. Four slot HSC I/O Expansion module support capability is listed as follows:

- 9x9KS systems support a maximum of two external HP-PB I/O Card Cages, only. A combination of one Card Cage and two HSC I/O cards is not supported.
- Kxx0 systems can support either two external HP-PB I/O Card Cages, or one Card Cage and two HSC I/O cards.

Figure 4-2 shows an Expansion module configured with two Converter cards. Figure 4-3 shows an Expansion module configured with one Converter card and two HSC I/O cards.

Figure 4-2 HSC I/O Expansion module with two HSC-to-HPPB Converter cards.

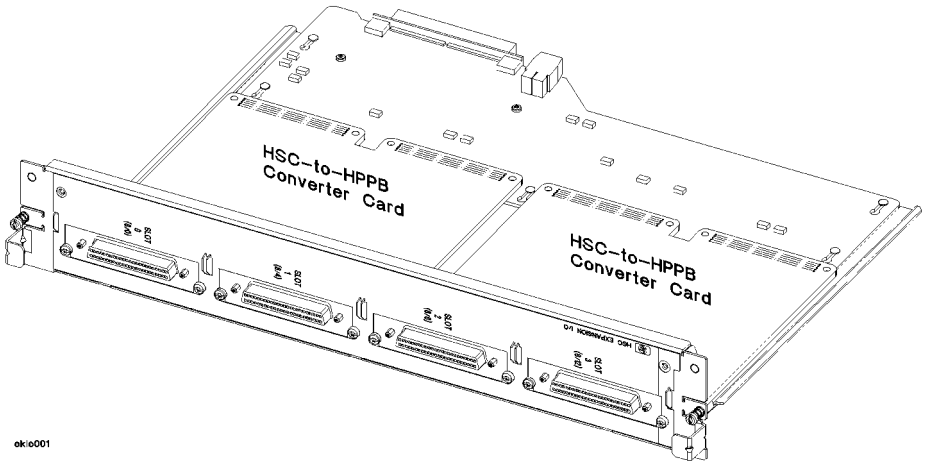
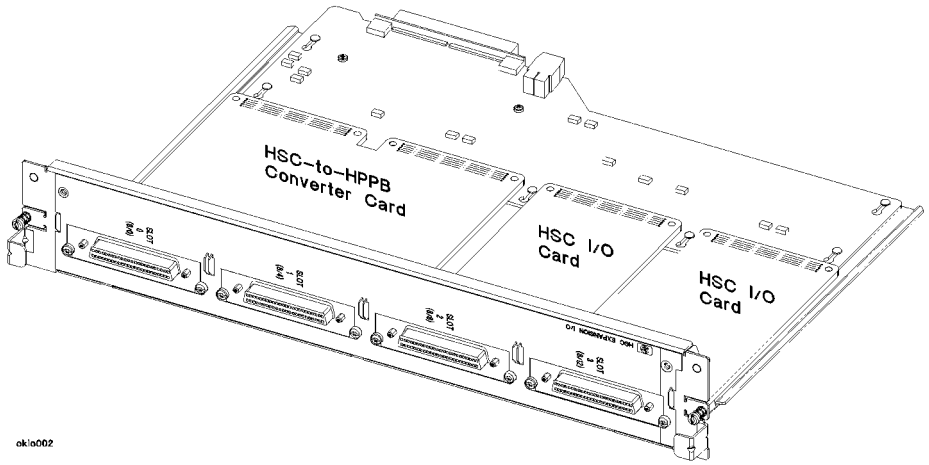


Figure 4-3 HSC I/O Expansion Module with one HSC-to-HPPB Converter card and two HSC I/O cards (HP9000/K-Class only)



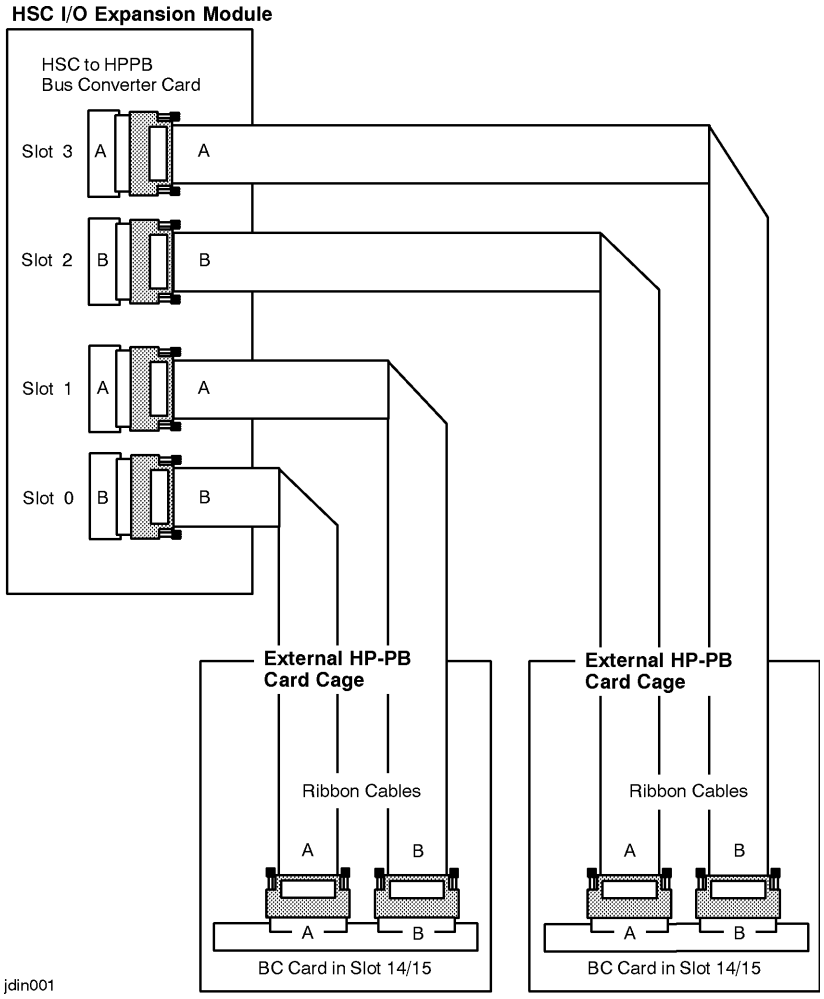
HSC-to-HPPB Converter card Location

HSC-to-HPPB Converter cards are installed in the Primary HSC I/O Expansion module, shown in Figure 4-1.

HSC-to-HPPB Converter card Function

The HSC-to-HPPB Converter card is connected to each external HP-PB I/O Card Cage by two ribbon cables that are plugged into the external HP-PB I/O Card Cage Lower Bus Converter Card, slots 14/15. A maximum of two I/O Card Cages can be attached to one server. Figure 4-4 shows the card cage-to-server connection configuration.

Figure 4-4 External HP-PB Card Cage Flat Ribbon Cable Connections



HSC-to-HPPB Converter card Installation

HSC-to-HPPB Converter card installation procedures are organized as follows:

- Shutting down the system.
- Installing the HSC-to-HPPB Converter card in an HSC I/O Expansion module. This procedure is divided into two sections:

  Installing the HSC-to-HPPB Converter card in an HSC I/O Expansion module that is not resident in the primary HP-HSC Expansion I/O slot, followed by instructions for initial installation of the HSC I/O Expansion module in the primary HP-HSC Expansion I/O slot.

  Installing the HSC-to-HPPB Converter card in an HSC I/O Expansion module that is resident in the primary HP-HSC Expansion I/O slot and returning the HSC I/O Expansion module to the primary HP-HSC Expansion I/O slot.
- Verifying the installation.

Be sure to observe all ESD precautions during the installation process.

Shut Down the System

1. Log Off all users and stop all active applications that may be running.
2. Perform a system backup of the entire Operating System and data base. If this is not feasible, perform a backup of the data base. (Backups should be performed at a scheduled interval as common practice for protecting any new data or changes to the existing data base.)
3. Perform a system shutdown as follows:
   - For HP 9000 systems: Enter "**/etc/shutdown -h**" at the prompt.
   - For HP 3000 systems (from the system console): Enter "**Control A** "(an equal sign (=) will be displayed), then type "**shutdown**" at the prompt.
4. Turn the computer key switch to the STANDBY position.
5. At the rear of the computer, unplug the power cord.

Installing the HSC-to-HPPB Converter card (HSC I/O Expansion module is not Resident in the Computer)

After shutting down the system according to the procedure listed on page 4-5, perform the following steps:

1. Unpack the HSC I/O Expansion module and place it on an anti-static mat.
2. If there are cover plates in the two slot positions where an HSC-to-HPPB Converter card is to be installed, loosen the two captive mounting screws located on either side of each of the two slot positions and remove the cover plates.

Installation Guidelines

- Install HSC-to-HPPB Converter cards only in slots 0/1 and/or 2/3.
- *Installation of an HSC-to-HPPB Converter card in slots 1/2 is not supported.*
- It is recommended (but not required) that HSC-to-HPPB Converter cards be installed in slots 0/1 first to keep slot 3 available for a Fibre Channel card. Fibre Channel cards achieve higher performance when installed in slot 3.

3. Line up the HSC-to-HPPB Converter card connector pins (at the back of the card) with the HSC I/O Expansion module connector (at the back of the module). Do not plug the card into the module at this time.
4. Angle the front of the HSC-to-HPPB Converter card so that the hooked tabs on the card slide through the mounting tab slots located on either side of each HSC I/O Expansion module bulkhead slot.
5. To plug the HSC-to-HPPB Converter card into the HSC I/O Expansion module, carefully align the connector pins at the back of the card with the connector at the back of the module and gently press the back of the card down until it is fully seated.
6. Tighten the two captive mounting screws located on either side of each of the two bulkhead slots to secure the HSC-to-HPPB Converter card to the bulkhead.

Installing the HSC I/O Expansion module

1. Remove the cover plate on the primary HSC I/O Expansion module slot (next to the Core I/O card) by loosening the two (one top and one bottom) captive mounting screws and pulling the cover plate away.
2. Inside the computer, remove the plastic dust cover from the connector on the system board.
3. Remove the dust cover on the HSC I/O Expansion module connector.
4. Align the HSC I/O Expansion module in the expansion module slot and slide it into the computer until it seats in the connector on the system board.
5. Tighten the two captive mounting screws into the HSC I/O Expansion module bulkhead.

When you are finished with this installation, go to the section entitled, “Verify the Installation” to validate the process.

Installing the HSC-to-HPPB Converter card (HSC I/O Expansion module is Resident in the Computer)

After shutting down the system according to the procedure listed on page 4-5, perform the following steps:

1. Loosen the two (one top and one bottom) captive mounting screws on the HSC I/O Expansion module bulkhead and pull it straight back until it clears the slot. Place the module, connector side up, on an anti-static mat to install the HSC-to-HPPB Converter card.
2. If there are cover plates or HSC I/O cards in the slot positions where an HSC-to-HPPB Converter card is to be installed, remove them.

Installation Guidelines

- Install HSC-to-HPPB Converter cards only in slots 0/1 and/or 2/3.
- *Installation of an HSC-to-HPPB Converter card in slots 1/2 is not supported.*
- It is recommended (but not required) that HSC-to-HPPB Converter cards be installed in slots 0/1 first to keep slot 3 available for a Fibre Channel card. Fibre Channel cards achieve higher performance when installed in slot 3.

3. Line up the HSC-to-HPPB Converter card connector pins (at the back of the card) with the HSC I/O Expansion module connector (at the back of the module). Do not plug the card into the module at this time.
4. Angle the front of the HSC-to-HPPB Converter card so that the hooked tabs on the card slide through the mounting tab slots located on either side of each HSC I/O Expansion module bulkhead slot.
5. To plug the HSC-to-HPPB Converter card into the HSC I/O Expansion module, carefully align the connector pins at the back of the card with the connector at the back of the module and gently press the back of the card down until it is fully seated.
6. Tighten the two captive mounting screws located on either side of each of the two bulkhead slots to secure the HSC-to-HPPB Converter card to the bulkhead.
7. Attach cover plates to the remaining openings (if any) in the HSC I/O Expansion module.

Reinstalling the HSC I/O Expansion module

1. Align the HSC I/O Expansion module in the expansion module slot and slide it into the computer until it seats in the connector on the system board.
2. Tighten the two captive mounting screws into the HSC I/O Expansion module bulkhead.

When you are finished with this installation, go to the section entitled, “Verify the Installation” to validate the process.

Verify the Installation

Before performing the procedures in this section, verify that all removed cover plates are reinstalled and secure.

1. Reconnect the power cord to the rear of the computer.
2. Turn the computer key to the ON position.
3. Observe the Front panel Display and console for any error or fault (FLT) messages.

When all procedures are complete with no errors or faults, reconfigure the system to add the new HP-HSC path addresses. Refer to the Owner's Guide for configuration instructions. HP-HSC Slot path addresses are shown in Table 4-3.

Table 4-3 HP-HSC Slot Addresses

Location	Device Type	Address Path
Primary Four Slot HP-HSC Expansion I/O:		
HP-HSC I/O Expansion card, slot 0	HP-HSC I/O card	8/0 (device addr.)
HP-HSC I/O Expansion card, slot 1[a]	HP-HSC I/O card	8/4 (device addr.)
HP-HSC I/O Expansion card, slot 2	HP-HSC I/O card	8/8 (device addr.)
HP-HSC I/O Expansion card, slot 3[a]	HP-HSC I/O card	8/12 (device addr.)

a. The HSC-to-HPPB Converter card will only use these addresses.

HP-PB I/O Card Cage Connection

After you have installed, verified, and configured an HSC-to-HPPB Converter Card, you are ready to connect it to an External HP-PB I/O Card Cage and install I/O cards. Preparation and connection instructions for the External HP-PB I/O Card Cage are located in the *External HP-PB I/O Card Cage Installation Guide (P/N A1809-90013)*.

HSC-to-HPPB Converter Indicators

LEDs located on the HSC-to-HPPB Converter card provide two indicators for status information relative to HSC-to-HPPB Converter card and HPPB I/O Card Cage connection:

1. The “HSC <--> Connect” (GREEN) LED, located at the lower right side of connector “A,” is normally ON. The GREEN LED Illuminates when both link cables are properly connected to the A1828A I/O Expansion module.
2. The “HSC to HPPB Fault” (RED) LED, located at the lower right side of connector “B,” is normally OFF. The RED LED illuminates when the A3699A HSC-to HPPB Converter card detects a fatal error, which may be caused by either a hardware or a software fault.

I/O Card Order of Installation

The correct order of I/O Card installation is also included in a table in the *External HP-PB I/O Card Cage Installation Guide*. Following the priorities listed in the table will ensure optimum system performance.

Appendix A OS Requirements and Diagnostic Support for I/O Upgrade Cards

I/O Upgrade Card OS Support

HSC-to-HPPB Converter Card System Requirements

Tables A-1 and A-2 contain HSC-to-HPPB Converter card system information as follows:

Table A-1 HSC-to-HPPB Converter Card System Requirements - HPUX:

K-9000

Models	PDC Revision	OS Revision
K410/420	Requires PDC Rev. 2.4 (or later) to run.	Requires HP-UX 10.20 With IPR 9804 (H/W extensions 2.0) or later.
K450/460	Requires PDC Rev. 2.4 (or later) to run.	
K360	Requires PDC Rev. 38.21 (or later) to run.	
K370/570	Requires PDC Rev. 37.52 (or later) to run.	
K380/580	Requires PDC Rev. 37.52 (or later) to run.	

Table A-2 HSC-to-HPPB Converter Card System Requirements - MPEiX:

9x9KS

Models	PDC Revision	OS Revision
939-969KS	Requires PDC Rev. 2.4 (or later) to run.	MPE/iX Release 5.5, Express 4 with MPEJXP5 and MPEJXR9.
979KS	Requires PDC Rev. 38.01 (or later) to run.	
989KS	Requires PDC Rev. 38.22 (or later) to run.	MPE/iX Release 5.5, Express 5

Obtaining Software Patches for HP-UX Operating Systems

Hewlett-Packard routinely responds to defect reports by creating HP-UX software "patches." Access to these HP-UX patches is available via free subscription to a special e-mail address on the Internet called, "HP Electronic Support Center." This service is also accessible via the World Wide Web or dial-up modem in the U.S. and Canada. Subscribing to the HPESC patch service offers you:

- Patch notification digests sent automatically when they are published.
- An archive list of patches issued prior to subscription.
- Copies of the HPESC User's Guide.

How to subscribe to HPESC Patch notifications:

Electronic Mail.

To automatically receive future NEW patch notifications from the HPESC, send an e-mail message (no SUBJECT line required) to:

support@support.mayfield.hp.com

The TEXT portion of the message should contain instructions for the type of service wanted:

- To ADD your name to the subscription list for NEW Patches, type the following text on a single line:
  subscribe hpux_800_patch
- To get a copy of the HPESC User's Guide, type the following (on a single line):
  send guide.txt

World Wide Web

Use a World Wide Web browser to access the following URL:

http://us-support.external.hp.com

Click on the Browse Patches button to see the available patch topics.

To subscribe to patch digests, click on the word, "subscribe" and follow the instructions indicated.