CPU Upgrade Manual

Model 9x9KS and Series Kxx0
HP 3000 and HP 9000 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 which are incorporated 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 6 technical changes include the addition of HP9000/K380/K580 information throughout the manual.

*   Minor changes and updates were also incorporated.

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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.

Preface

This edition of the CPU Upgrade Manual contains technical information about HP 9000 and HP3000 Servers. The HP 9000and HP3000 family of Servers includes the following models:

HP9000/Kxx0 Servers	HP9000 Workstations	HP3000 Servers	CPU Module Product No.
K100			N/A
K200			A2993A
K210			A2995A
K220			A3452A
K250			A3498A
K260	HP VISUALIZE K260-EG		A3261A
K370			A3669A
K380			A4872A
K400		939KS, 959KS/x00	A2993A
K410		969KS/x00	A2995A
K420		939KS/020, 969KS/x20	A3452A
K450			A3498A
K460	HP VISUALIZE K460-EG/XP	979KS/x00	A3261A
K570			A3669A
K580			A4872A

1   CPU Upgrade

The Central Processing Unit (CPU) upgrade for the HP 3000 and HP 9000 system is accomplished by adding CPU cards to the existing CPU card slots within the computer cabinet. The number of CPUs supported on each system model is as follows:.

Models	HP3000/ 9x9KS	HP9000/ K2x0	HP9000/ K4x0	HP9000/ K370/380	HP9000/ K570/580
CPUs Supported	1 to 4	1 to 4	1 to 4	1 to 6	1 to 6

NOTE CPUs for HP 9000/K100 models are an integral part of the system board. There is no CPU upgrade for these models.

939KS and 939KS/020 models support a single processor only.

Electrostatic Discharge

CPU cards and 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 an anti-static wrist strap when working around a system or handling the CPU 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 strap 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.

CPU Configuration Rules

The rules for adding a CPU to a system are as follows:

1. The computer must have a CPU installed in slot 0 (zero).

2. All additional CPUs are added in sequential order (1, 2,... and so on).

Once the CPU card is added to the computer, it is automatically configured into the system during the computer power on selftest process.

CPU Location

The CPU slots for both the HP 3000/9x9KS and HP 9000/K2xx and K4xx SPUs are the same. Figure 1-1 and Figure 1-2 shows the CPU locations for these systems. Figure 1-1, front view, shows the system with the front bezel and bulkheads (or cover plates) removed. Figure 1-2, rear view, shows the system with the back cover removed.

Figure 1-1   CPU Location, Front View (9x9KS, K2xx, K370/K380, K4xx, and K570/K580)
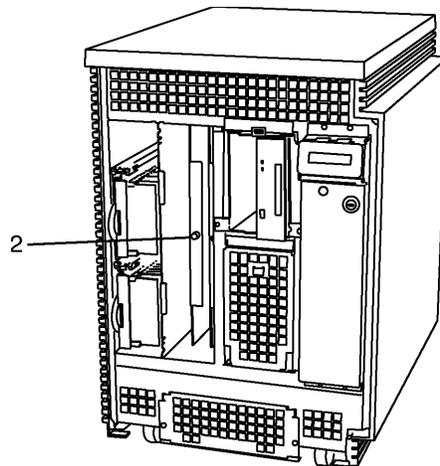
khsm005

Item 2 shows the location of CPU slots 0 and slot 1. Slot 0 is located next to the power monitor and Slot 1 is located next to the peripheral cage.

Figure 1-2   CPU Location, Rear View (9x9Ks, K2xx, and K4xx)
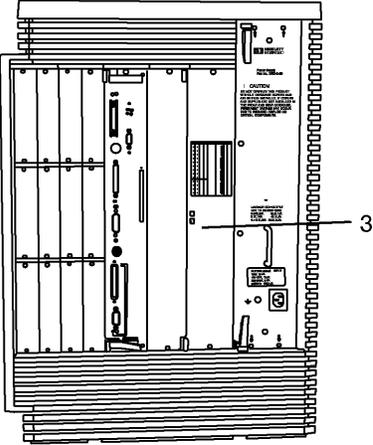
khsm006

Item 3 shows the location of CPU slot 2 and slot 3 (see the note following). Slot 2 is located next to the power spply and slot 3 is located to the left of CPU slot 2.

NOTE   On HP3000/979KS and HP9000 models, the power supply and processor covers conceal slots 2 and 3. Access to these slots requires removal of the power supply.

Figure 1-3   CPU Location, Rear View (K370/K570, K380/K580, and 979KS)
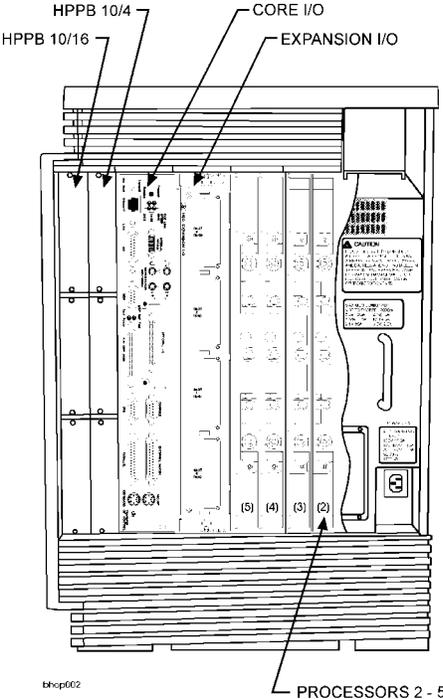
Figure 1-3shows the location of CPU slots 2 through 5. Slot 4 is located between slots 3 and 5. Slot 5 is located next to the Kx70/Kx80 HP-HSC expansion slot.

Tools required

To accomplish adding a CPU 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 (included with the CPU Upgrade Kit)

Adding a CPU Card

Be sure to observe all ESD precautions. The suggested time to perform the upgrade is at a non-peak usage time for the computer. You must also know how many CPUs are already in the computer, this will determine if you add to the available front slot (1) or the rear slots (2 and 3). Once you have identified which slot or slots to add to, reference the appropriate procedures for adding a CPU card.

Before starting the actual installation of a CPU card there are certain preparation procedures to perform:

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. Enter "/etc/shutdown -h" at the prompt.

4. Turn the computer key switch to the STANDBY position.

5. At the rear of the computer, unplug the power cord.

Adding CPU #1

1. Remove the computer key from the switch.

2. Reach down, under each front lower corner of the front Bezel (Figure 1-4), press the latch tabs (item 1) and pull the bottom of the front bezel away from the computer.

Figure 1-4 Front Bezel Removal
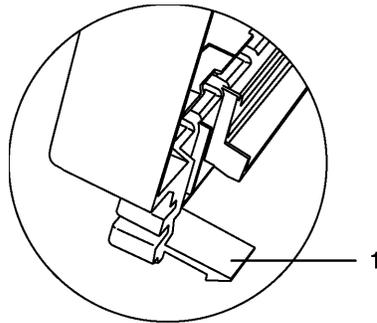
khsm003

3. The front bezel should unhinge from the top of computer with the bottom of the bezel angled away from the computer.

4. With the Torx driver (or flat blade screw driver) remove the CPU/Memory cover plate (Item1, Figure 1-5) by loosening the four (two top and two bottom) captive screws.

Figure 1-5 CPU/Memory Cover Plate
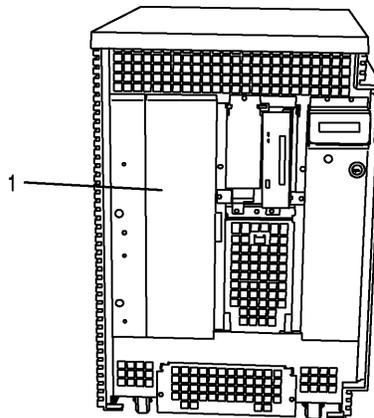
khsm004

5. Identify CPU slot 1 and carefully reach into the computer cabinet and remove the CPU connector dust cover, on the system board, by grasping the extended tab and pulling it out.

6. **Remove the protective dust cover from the CPU card** and align the CPU card into slot 1. Be sure the air guide and card components are on the right-hand side of the card during installation.

7. Insert the CPU card until it contacts the system board connector, then press firmly to seat the card.

8. Replace the CPU/Memory cover plate and tighten the four captive mounting screws.

9. Replace the bezel by angling the top of the bezel toward the computer while slipping the top edge under and up into the top overhang of the computer.

10. Then push the bottom of the bezel onto the computer cabinet until the mounting tabs snap into place.

At this point, refer to the *Installation Verification* section to determine how to ensure that the computer has configured the new CPU(s).

NOTE	If there are more CPUs to add, proceed to the appropriate *Adding a CPU Card* procedures. If there are no more CPUs to add, proceed to *Installation Verification*.

Adding CPUs #2 - 3

Before removing the back cover and starting the installation procedures, position the computer to allow enough room to work behind it. Be careful doing this, however, because you may stretch, crimp, or disconnect cables attached to the back of the computer. Be sure that you have performed the procedures in the *Adding a CPU Card* section before beginning additional CPU installation.

Adding CPUs #2-3 to an HP3000/939KS, 959KS, 969KS and HP9000/Kx00/ Kx20

1. Remove the sheet metal case.

2. Identify the next available CPU slot in sequence. Carefully reach into the computer cabinet and remove the CPU connector dust cover by grasping the extended tab and pulling it out.

3. **Remove the protective dust cover from the CPU card** and carefully align the CPU card into the appropriate slot. Be sure the air guide and card components are on the right-hand side of the card during installation.

4. Insert the CPU card until it contacts the system board connector, then press firmly to seat the card.

NOTE	If there are more CPUs to add, proceed to the appropriate *Adding a CPU Card* instructions. If there are no more CPUs to add, proceed to *Installation Verification*.

5. Replace the back CPU cover plate and tighten the two captive mounting screws.

At this point, refer to the *Installation Verification* section to determine how to make sure that the computer has configured the new CPU(s).

HP3000/979KS and HP9000/K250/K260/K370/K380/K450/K460 and K570/K580 Power Supply Removal

Prior to adding CPUs to HP3000/979KS and HP9000/K250/K260/K370/K380/K450/K460 and K570/K580 systems, the power supply must be removed (see Figure 1-6). Perform the following steps:

Figure 1-6 **HP3000/979KS and HP9000/K250/K260/K370/K380K370/K380/K450/K460 and K570/K580** Power Supply

mksm500
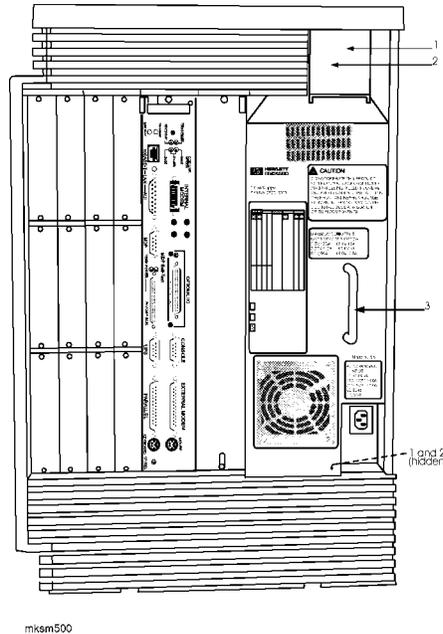
1. Loosen the six captive screws (item 1) along the top and bottom of the power supply unit.

CAUTION	The power supply unit weighs 26.5 lbs (12kg). Be careful removing and lifting the unit to avoid damage to the power supply.

2. Pull the extractor levers (item 2) out. Using the extractor levers, pull the power supply unit partially out of the chassis, then grasp the power supply unit by the handle (item 3) and remove it completely.

3. Place the power supply on an anti-static mat while proceeding with the CPU replacement procedure.

4. Remove the rear processor slot cover plate, which is now visible.

Adding CPUs #2-3 to an HP3000/979KS and HP9000/K250/K260/K370/K380/K450/K460 and K570/K580

1. Remove the sheetmetal case.

2. Identify the next available CPU slot in sequence. Carefully reach into the computer cabinet and remove the CPU connector dust cover by grasping the extended tab and pulling it out.

3. **Remove the protective dust cover from the CPU card** and carefully align the CPU card into the appropriate slot. Be sure the air guide and card components are on the right-hand side of the card during installation.

4. Insert the CPU card until it contacts the system board connector, then press firmly to seat the card.

NOTE	If there are more CPUs to add, proceed to the appropriate *Adding a CPU Card* section. If there are no more CPUs to add, proceed to *Installation Verification*.

5. Replace the back CPU cover plate and tighten the two captive mounting screws.

HP3000/979KS and HP9000/K250/K260/K370/K380/K450/K460 and K570/K580 Power Supply Replacement

Perform the following steps to replace the power supply (see Figure 1-6):

1. Holding the power supply by its bottom and handle (item 3),and align the power supply in the chassis.

2. Guide the power supply into the chassis slot, then lift the extractor levers (item 2) to firmly seat the power supply into place.

3. Close the extractor levers.

4. Secure the power supply in place using the six captive screws (item 1).

Adding CPUs #4-5 to a Kx70/Kx80

 Refer to Figure 1-7 for the location of CPU slots 2-5.

NOTE	The CPU 4 and 5 cover plate is found only in the K370/K380 and K570/K580 servers.

Figure 1-7   HP3000/979KS and HP9000/K250/K260/K370/K380/K450/K460 and K570/K580 CPU locations
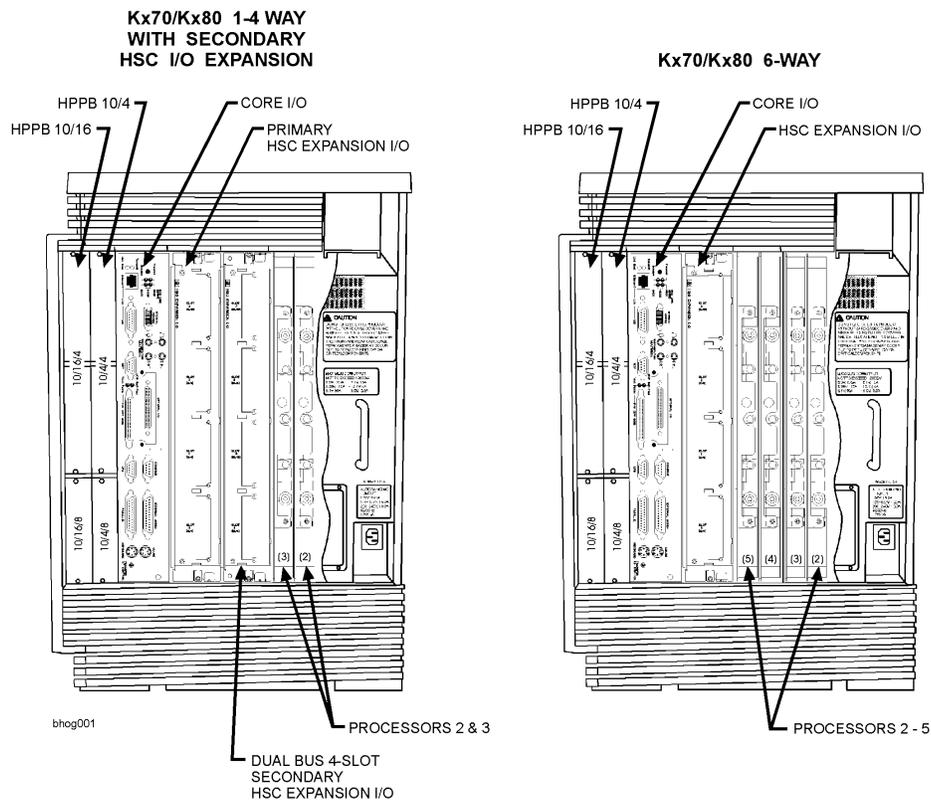
1. Remove the sheetmetal case.

2. Identify the next available CPU slot in sequence. Carefully reach into the computer cabinet and remove the CPU connector dust cover by grasping the extended tab and pulling it out. Only remove the dust cover(s) necessary to install the desired number of CPUs.

3. **Remove the protective dust cover from the CPU card** and carefully align the CPU card into the appropriate slot. Be sure the air guide and card components are on the right-hand side of the card during installation.

NOTE   CPUs 4 and 5 will use snap-in guides that should be installed in your server.

4. Insert the CPU card until it contacts the system board connector, then press firmly to seat the card.

NOTE   If there are more CPUs to add, proceed to the appropriate *Adding a CPU Card* steps. If there are no more CPUs to add, proceed to *Installation Verification*.

5. Replace the back CPU cover plate and tighten all captive mounting screws.

After performing CPU installation steps, replace the power supply according to the instructions in the preceding *HP3000/979KS and HP9000/K250/K260/K450/K460/Kx70 and Kx80 Power Supply Replacement* section.

Installation Verification

Before performing the procedures in this section, make sure that all cover plates removed are reinstalled and secure. This is for proper seating of the cards, as well as, cooling requirements.

1. Connect the power cord to the rear of the computer.

2. Insert the computer key into the switch and turn it to the ON position.

3. Observe the Front Panel Display and Console for any error or fault (FLT) messages (see CPU Fault Messages). Verify the number of CPUs shown in the Front Panel Display.

4. When the console displays the following message:

   To override, Press any key within 10 seconds

   Press a key, this puts you into Processor Dependent Code (PDC) mode.

5. The PDC Main Menu will be displayed (the appearance of the menus may vary slightly, depending upon your installed version of the PDC):

```
-------- Main Menu --------------------------------------------

Command                                  Description

BOot [PRI|ALT|<path>]                    Boot from specified path

PAth [PRI|ALT|CON|KEY] [<path>]          Display or modify a path

SEArch [DIsplay|IPL] [<path>]            Search for boot devices


COnfiguration menu                       Displays or sets boot values

INformation menu                         Displays hardware information

SERvice menu                             Displays service commands


DIsplay                                  Redisplays the current menu

HElp [<menu>\<command>]                  Display help for menu or command

RESET                                    Restart the system

---------

Main Menu: Enter command or menu > in
```

Type **IN** (for Information Menu) and press **Enter**. The Information Menu will be displayed:

```
-------- Information Menu ---------------------------------------------
 Command                           Description


 All                               Display all system information

 Bootinfo                          Display boot related information

 CAche                             Display cache information

 COprocessor                       Display coprocessor information

 IO                                Display I/O interface information

 MEmory                            Display memory information

 FwrVersion                        Display firmware version information

 PRocessor                         Display processor information


 BOot {PRI|ALT|<path>]             Boot from specified path

 DIsplay                           Redisplay the current menu

         HElp [<command>]          Display help for specified command

         RESET                     Restart the system

         MAin                      Return to main menu

---------

Information Menu: Enter command  > PR
```

6. Type **PR** (the processor command) and press **Enter.** This will display all the installed and configured processors, as shown in the following example:

```
PROCESSOR INFORMATION

Processor  Speed   HVERSION Model  SVERSION Model/Op  CVERSION  Processor State

---------  -----   --------        --------           --------  ---------

    0      100 Mhz     0x0583          0x0000            2         Active

    1      100 Mhz     0x0583          0x0000            1         Active


Central Bus Speed (in Mhz)   :              100

Software ID (dec)            :                   0

Software ID (hex)            :              0x000000000

Software Capability          :              0x1000000F1
```

The example shows that CPU 0 and CPU 1 are both **Active**. A *Non-Responding* message indicates a problem. For example, a non-responding CPU could be one that failed its selftest when the computer was turned on. A *Deconfigured* message indicates that the processor was deconfigured by the user from the PDC Configuration Menu.

Table 1-1   **HVERSION Model Numbers**

HP3000	
959KS/x00 - 582	969KS/x20 - 58D
969KS/x00 - 583	979KS/x00 - 590
HP9000	
K200 - 58B	K410 - 583
K400 - 582	K420 - 58D
K210 - 581	K450 - 58F
K220 - 58C	K460 - 590
K250 - 5A4	K460-EG - 590
K260 - 5AF	K460-XP - 590
K260-EG - 5A5	K570 - 51B
K370 - 5AE	K580 - 5B6
K380 - 5B7	

7. If all CPUs are listed as "active" or "idle," type BO PRI at the Information menu prompt, and press Enter. This boots the system from the primary boot path. If your computer uses a different boot device or path, you should boot from that path.

8. If there is a failure or non-response, reseat the CPU identified as *Non- Responding* by following the *Adding CPU #1* procedures, or if applicable, the *Adding CPUs #2 - 3 or #4 - 5* procedures to access the CPU. Perform the following steps:

   a. Make sure that the key is in the OFF position.

   b. Grasp the CPU by the edge and gently pull until it comes loose.

   c. Check the CPU slot alignment and re-insert the CPU card into the appropriate slot until it is fully seated.

   d. Perform the Verification procedures again.

CPU Warning Messages

There are two possible CPU warning messages that may be displayed, they are as follows:

```
A Processor has failed selftest and has been deconfigured. Refer to
the PR command in the INFORMATION menu for a list of deconfigured
processors.
```

If this message is displayed, perform the following steps:

1. Turn the key switch to the STANDBY position.

2. Turn the key to the ON position

3. See if the same sequence happens again. Do you get the same warning message? Do you get the same four digit code displayed on the front panel?

4. If the answers to the questions in step 3 are YES, you probably have a CPU failure. Call your local Hewlett-Packard representative for maintenance.

5. If the answers to the questions in step 3 are NO, but the computer still will not boot, you may have an installation or CPU card seating problem. The CPU card needs to be taken out and re-installed. If that does not correct the problem, call your local Hewlett- Packard representative for maintenance.

```
Processors are not installed in numerical order (0 to 3). Boot process
has been halted. Refer to PR command in the INFORMATION menu for
processor configuration information.
```

If this message is displayed, you may have skipped a CPU slot when installing a CPU card. Use the *Installation Verification* procedures to check for proper installation sequence. If the sequence is not correct, remove and reinstall the appropriate cards to achieve sequential order.

CPU Fault Messages

There are three CPU fault messages that can occur due to procedure error or component failure during an upgrade involving system boards and/or CPUs. These fault messages are displayed as hex codes.

Fault Code[a]	Description	Action
1x08	Illegal Instruction Trap	Check for properly installed crystal in System Board socket (XY1).
1xBC	Bad CPU Clock Speed Detected	Verify that System Board Crystal (XY1) and Clock Switch (SW1) are appropriate for speed of installed processor.
3xBC	Bad System Clock Speed	Check for proper setting of Clock Frequency Switch (SW1) on System Board.

a. x = indicates slot number of processor (0, 1, 2 ...) that detected failure.