

**HP Apollo 9000 Model 720/730
Owner's Guide
for HP-UX Users**

HP 9000 Series 700 Computers



**HP Part No. A1926-90001
Printed in USA January 1991**

**Edition 1
E0191**

— |

| —

— |

| —

1

January 1991 ... Edition 1.

About This Guide

In this section you will find information about the organization of this guide and the audience for which it is intended. You will also find references to other documents and directions for you to comment upon or ask questions about this guide.

The *HP Apollo 9000 Model 720/730 Owner's Guide* describes your HP Apollo 9000 Model 720/730 workstation. It also refers to other documents that you have received with your computer and its system software.

How to Use This Guide

Use this guide to learn about these things:

- how to start up your system
- how to interact with your workstation
- how to expand your workstation by adding internal peripherals like memory cards and disk drives
- how to determine the cause of problems with the system hardware.

This guide will either give specific directions for each of these matters or direct you to other documents or online resources that will explain how to do these things.

When to Use This Guide

Use this guide *after* you have installed your system. To install your system follow the instructions in the *HP Apollo 9000 Model 720/730 Installation Guide*.

How This Guide Is Organized

Each chapter contains specific information about your system.

- Read Chapter 2 to learn about your workstation's parts, connectors, switches, controls and indicators.
- Read Chapter 3 to learn how to turn on the power, log in, log out and turn off the power safely.
- Read Chapter 3 to learn about the human interfaces that come with your system. This chapter will help you decide if you wish to use the HP Visual User Environment or an HP-UX shell to control your workstation.
- Read Chapter 4 to learn about HP-UX and to find out how to load applications on your workstation using `/etc/update`.
- Read Chapter 5 to learn how to add memory and internal peripheral devices to your workstation. This chapter will also show you where to attach the cables that connect your workstation to external peripherals.
- Read Chapter 6 to learn how to diagnose hardware problems and to learn when and how to ask for assistance from Hewlett Packard support and service personnel.

Audience

This guide is intended for use by service personnel and by owners of HP Apollo 9000 Model 720/730 workstations.

Read Me **Documents**

Please refer to the release documents you received with your system. These documents have titles that begin with the phrase “*Read Me*.” In these documents you will find information that may not have been included in this guide at the time of its publication.

Problems, Questions, and Suggestions

We appreciate comments from the people who use our computer systems. Use the *Reader Response Card* contained in this guide to submit comments about the guide.

Getting Help

You may need assistance from time to time. In this manual, the person who provides help is called the **designated service representative**. Check with the appropriate party (your purchasing department, for example) to find out where to request service.

Typeface Conventions

Unless otherwise noted in the text, this guide uses the following typeface conventions.

term	Marks the first appearance of a word and phrase that is used as terminology. Terms are explained immediately or defined further in a glossary. Example: The practice of copying files onto other media for safe storage is called backup .
Menu Item	The label of a menu item. Example: Select Network Configuration Tasks to continue.
computer output	Indicates one of the following: <ul style="list-style-type: none">■ Text output from a computer system, usually appearing on a terminal screen. Example: Console login:■ The literal name of software elements, such as files and programs. For example: "The <code>/etc/config</code> program ... "
user input	Text that is to be typed into a computer system by a user. Example: \$ pwd
<i>variable name</i>	A variable whose value must be supplied by the user. Example: <code>cp</code> is a command entered by the user, and <i>filename1</i> and <i>filename2</i> represent the names of the arguments to the command: \$ cp filename1 filename2
<i>emphasized text</i>	A point of emphasis. Example: <i>Back up all files before proceeding further.</i>
Keycap	The character(s) printed on a keycap. Example: Return
Function Key	This indicates the label of a function key as it appears at the bottom of a terminal screen or window. Example: PERFORM TASK

— |

| —

— |

| —

2

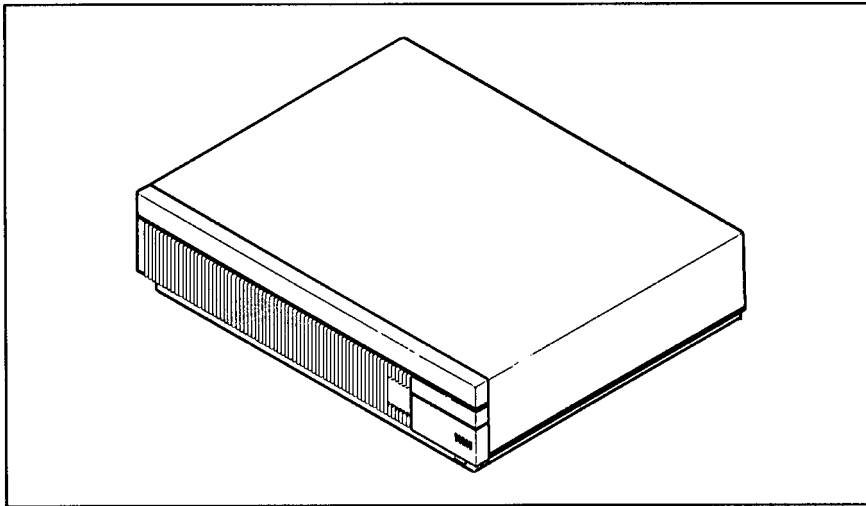
Your HP Apollo 9000 Model 720/730 Workstation

This chapter provides an introduction to your HP Apollo 9000 Model 720 workstation and its components. It describes the following:

- The locations of the system unit's switches
- How to interpret the LED indicators of system activity
- The parts of the rear panel of the system, including:
 - The disk tray bulkhead
 - The I/O bulkhead and its connectors
 - The power supply bulkhead
 - The VSC (graphic) interface bulkhead
- The monitor and its controls

System Unit Placement

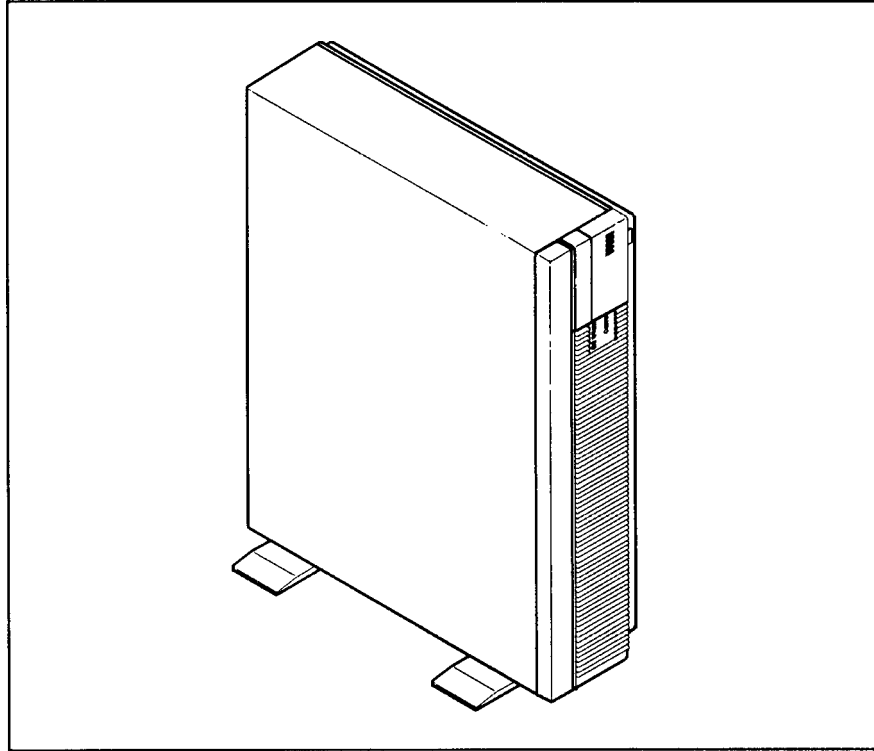
The **system unit** is the flat box that contains the computer itself. The system unit may be installed flat on the desktop (see Figure 2-1), or it may be set on its side for deskside placement. A “foot” stabilizer has been included for this purpose. (See the *HP Apollo 9000 Model 720 Installation Guide* for information about placement.) If your system has been installed vertically on its “foot,” it will resemble Figure 2-2. Most of the illustrations in this guide assume desktop (flat) placement.



LG200186_010

Figure 2-1. System Unit in Desktop Orientation

2-2 Your HP Apollo 9000 Model 720/730 Workstation



LG200186_007

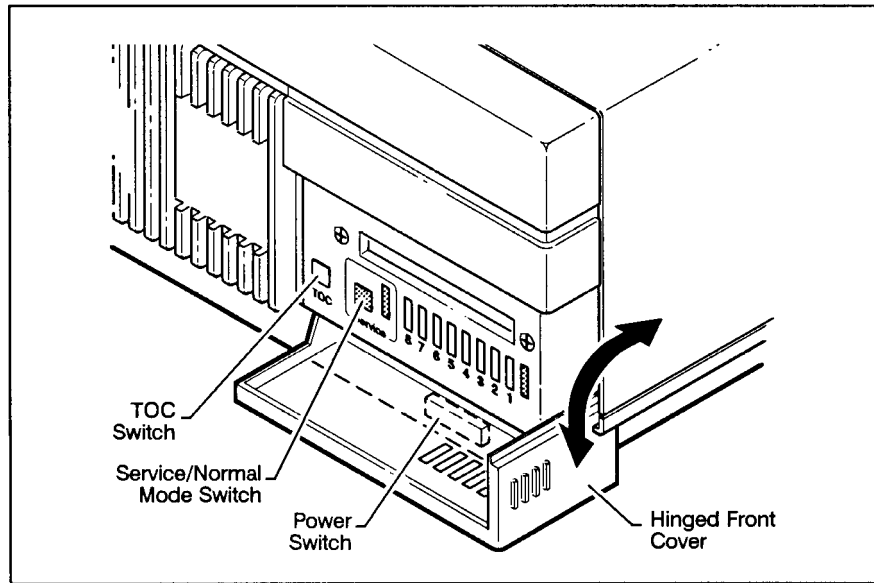
Figure 2-2. System Unit in Deskside Orientation

System Unit Switches

Before turning on your system, you should become familiar with the system unit switches. The power switch is in the front of the unit on the right side. The other switches are behind a small bezel door just above the power switch (see Figure 2-3).

These are the functions of the system unit switches:

Power switch	Turns system unit power on and off.
Transfer-of-control switch	Restarts the workstation by resetting the operating system.
Service switch	Used only during manufacturing. You will not need to use this switch.








LG200186_017

Figure 2-3. System Unit Switch Locations

Understanding the LEDs

On the front of the system unit is a bezel door. When the door is closed, five LEDs can be viewed through small “windows”. Beside each window is a symbol indicating the meaning associated with the activity of each LED.

Table 2-1. LED Symbols and Their Meanings

Symbol	LED Activity	Meaning
	On/Off	Power on/power off
	Flashing	Transmitting to LAN
	Flashing	Receiving from LAN
	Flashing	Disk activity
	Slow flash	System “heartbeat”

Note If the “heartbeat” LED remains off or on for a long period of time, it may mean that your system is “hung” (incapable of further processing). See Chapter 6 for suggestions on how to deal with this condition.

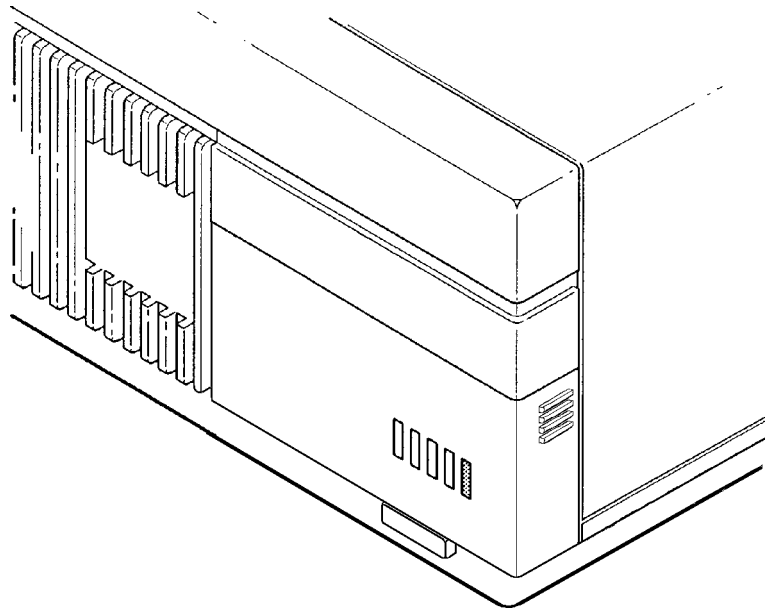


Figure 2-4. LED Windows

The Rear of the System Unit

On the rear of the system unit, you will find the connectors you will use to attach peripherals to your workstation. The connectors are mounted on **bulkheads**: metal panels that cover portions of the rear of the workstation. You can get access to most of the internal parts of your workstation by removing these bulkheads. You will find descriptions of these internal parts in Chapter 5.

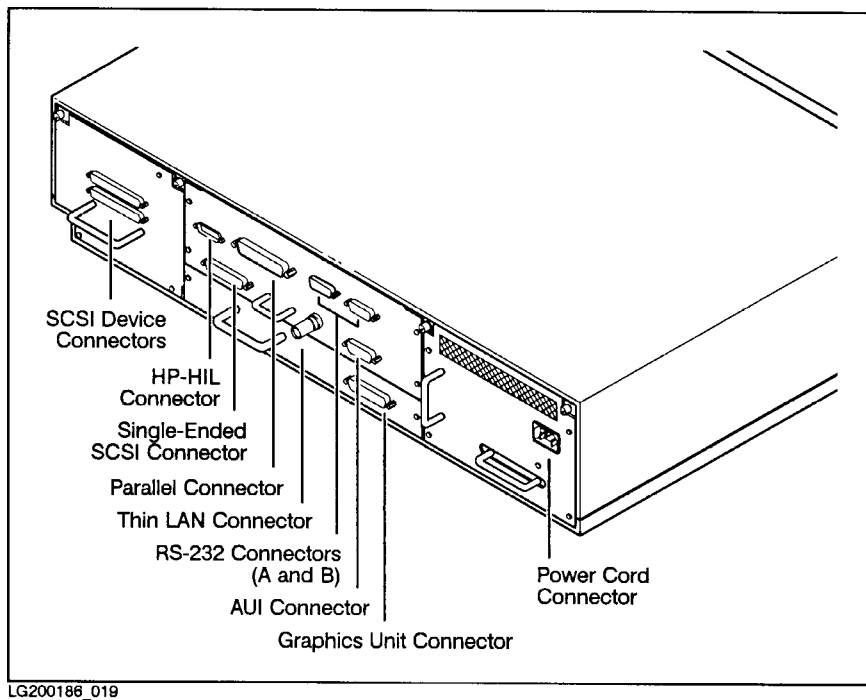


Figure 2-5. The Rear Panel of the System Unit

The Disk Tray Bulkhead

This panel covers the **disk tray**, which holds up to two 3.5 inch disk drives. The bulkhead is on the left side of the system unit as you view it from the rear. See Figure 2-5.

The disk tray bulkhead has a pair of SCSI (Small Computer Systems Interface) connectors. (See Figure 2-6. You will find more information about these connectors in Chapter 5.

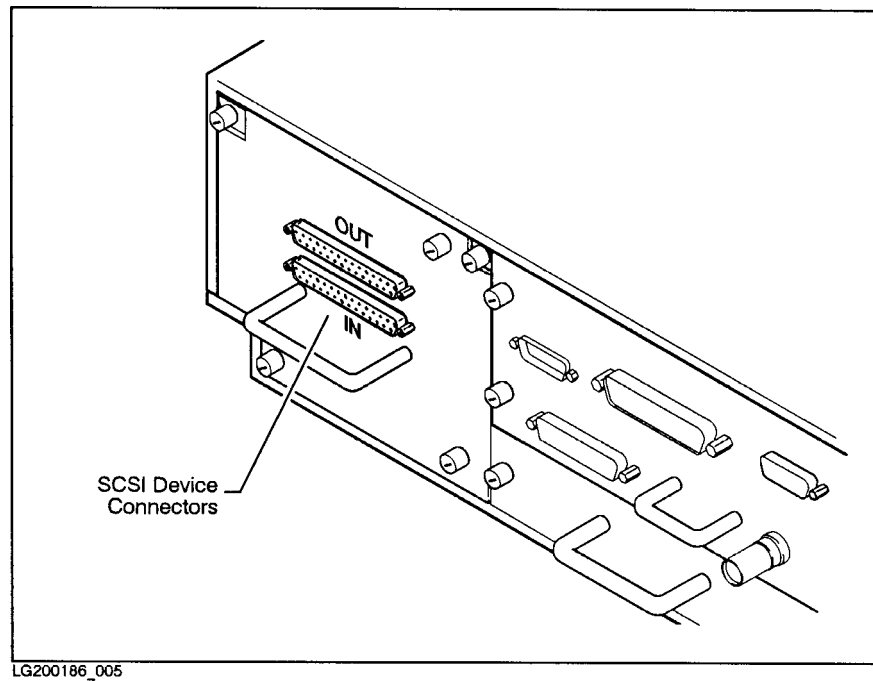
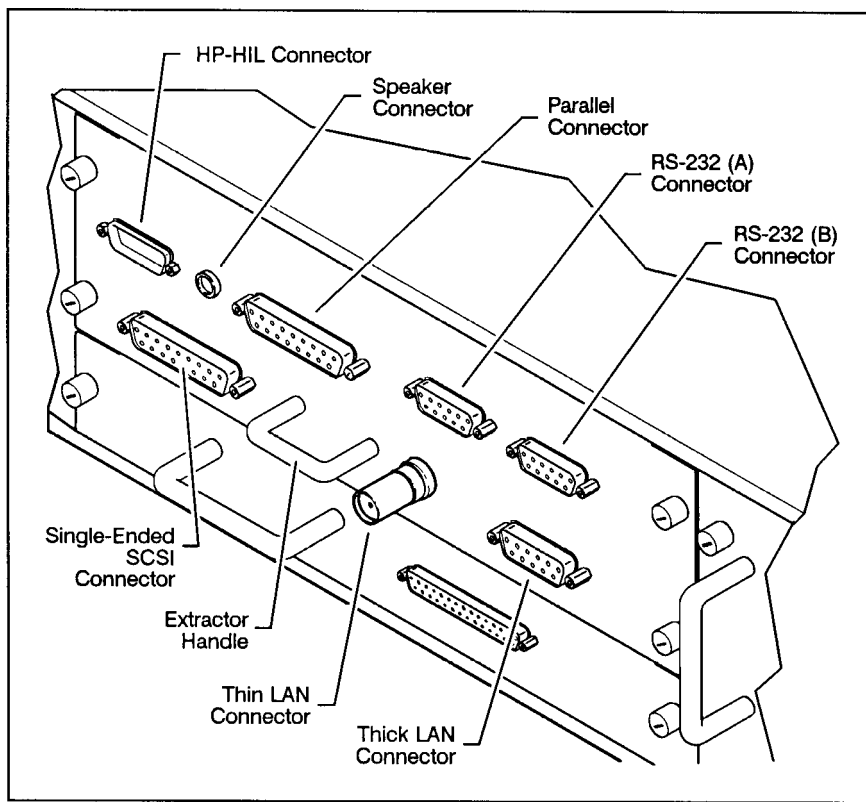


Figure 2-6. SCSI Connectors on the Disk Tray

The I/O Bulkhead

The I/O (input/output) connectors are mounted on the I/O bulkhead. The I/O bulkhead is in the center of the rear panel, above the graphics interface slot. (See Figure 2-5.)

The I/O connectors are illustrated in Figure 2-7.



LG200186_003

Figure 2-7. Connectors Mounted on the I/O Bulkhead

The Power Supply Bulkhead

This panel covers the power supply. It has a plug connector for the power cord. The power supply bulkhead is on the right side of the system unit as you view it from the rear. See Figure 2-5.

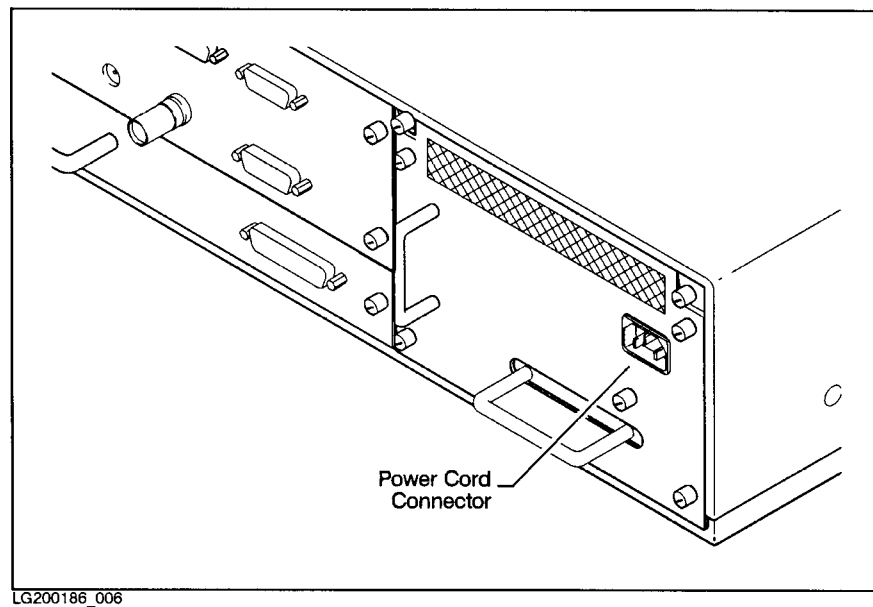


Figure 2-8. The Power Supply Bulkhead

VSC (Graphic) Interface Bulkhead

You will find the bulkhead for the graphic interface for your workstation just below the I/O bulkhead. (See Figure 2-5.) The connector to an external graphic processor will be mounted on this bulkhead.

The circuit card that is behind the bulkhead provides an interface that connects your workstation to an external graphic processor, which is in turn connected to a video display monitor. (See Figure 2-9.)

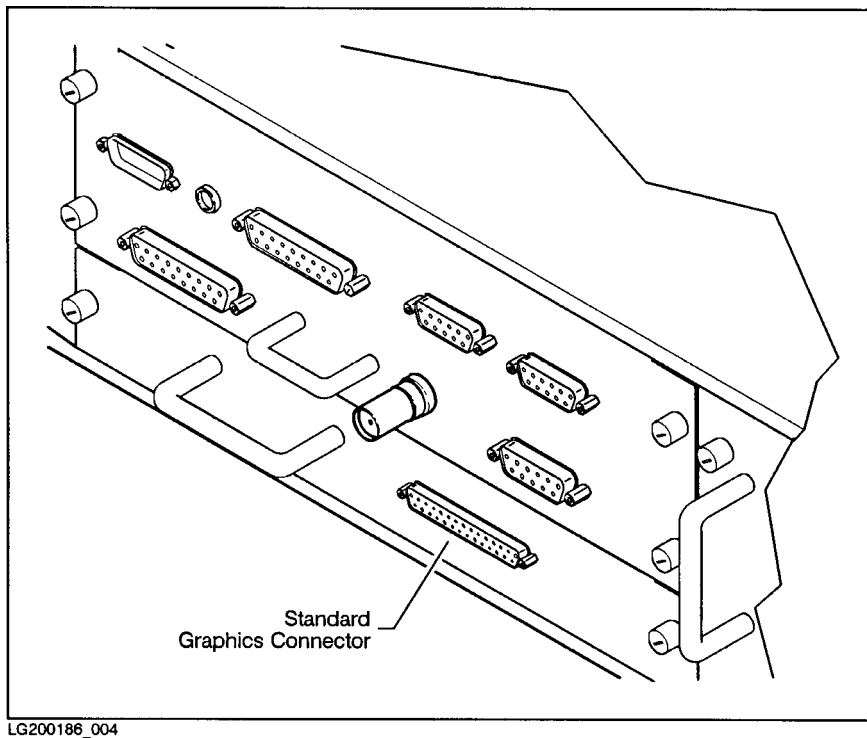


Figure 2-9. Graphic Interface Card Bulkhead

The Monitor and Its Controls

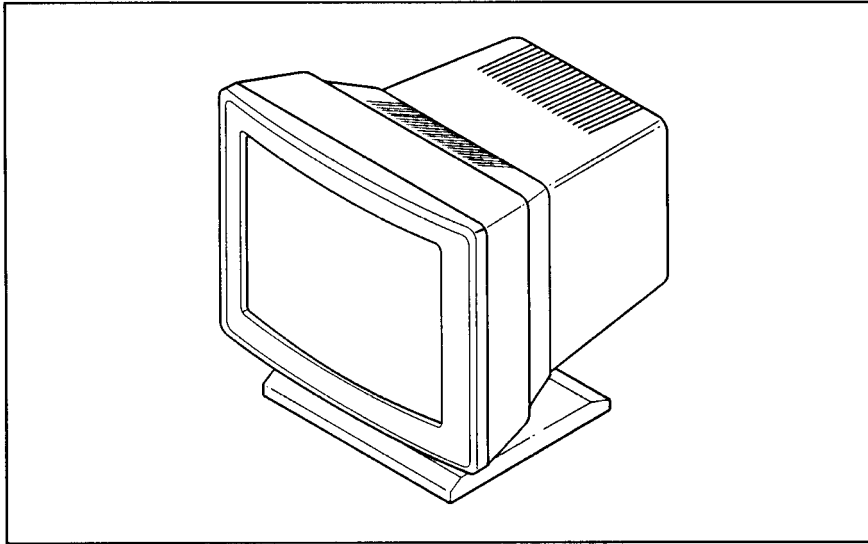
The monitor is the video display device for your HP Apollo 9000 Model 720/730 workstation. It is attached to your workstation through an external graphic device.

The monitor for your workstation is 98754A, a high-resolution 19-inch color monitor.

Before using your monitor, you should become familiar with the controls and indicator. The power indicator is an LED just to the left of the power switch. It is illuminated when power is on.

The actions of the controls are listed below:

V-STAT	Adjusts the vertical color convergence
H-STAT	Adjusts the horizontal color convergence
V-CENT	Adjusts the vertical centering of the displayed image
Contrast control	Adjusts the displayed ratio of bright-to dark
Brightness control	Adjusts the brightness of the display
Power switch	Turns the monitor on and off



LG200186_008

Figure 2-10. High Resolution 19-inch Color Monitor

Starting Up Your Workstation

This chapter tells you how to boot HP-UX and get started with the HP Visual User Environment. It describes the following:

- How to boot (start up) the HP-UX operating system on your workstation
- How to log in (start a work session) as the `root` user
- How to create a new user account for yourself
- How to log out (end a work session)
- How to shut down your workstation and turn off the power safely

Are You Ready?

This chapter assumes the following:

- Your workstation hardware has been unpacked and installed (including computer, keyboard, monitor, and any external peripherals) according to the instructions in the *HP Apollo 9000 Model 720 Installation Guide*.
- If your workstation is connected to a local area network, the physical connection to the network has been made.
- You know where your system unit's power switch is. Refer to Figure 2-3. You should also be able to locate the power switches for the monitor and the external graphic processor.
- Your workstation was delivered with the following software preinstalled on its disks:
 - The HP-UX Operating System, Release 8.01
 - The X Window System, Version 11, Release 4
 - The HP Visual User Environment (VUE)

Before Turning On the Power for the First Time

If you are turning on your workstation for the first time, you will be asked for some information about your system. You should know the following things:

- The **system name** of your workstation. This is sometimes called the **host name**. The system name should not exceed eight characters in length. Obtain a system name from your system administrator.
- The **time zone** where your computer is located.

If you are connecting your system to a local area network, you will also need to know this:

- The **station address** of your workstation. This is a four-element code that uniquely identifies your computer among all those located on your network (or anyone else's). This is sometimes called the **internet protocol address** or **IP address**. Obtain this address from your network administrator.

Have this information at hand when you turn on the power for the first time. Enter the information when your system requests it. If you do not have the information when prompted for it, the system will allow you to exit and restart the system at another time when you can have the information ready at hand.

Booting HP-UX

When you turn on the power to your workstation, it will **boot** the HP-UX **operating system**. The expression “boot” is short for “bootstrap;” the computer loads a sequence of programs, each enabling more of the system than the previous program. Thus the computer “pulls itself up by its own bootstraps.”

A computer's **operating system** is a set of programs that controls the execution of other programs. HP-UX allows your workstation to run many programs simultaneously. HP-UX also allows a number of different users to run programs at the same time.

Once HP-UX is running on your system, you must **log in** as a user. If you are accustomed to working on single-user personal computers, this may strike you as odd, especially if you are the only user of your machine. However, the

3-2 Starting Up Your Workstation

process of user login is one of the ways that HP-UX prevents unauthorized persons from using your system. This is especially important if your system is attached to a network.

Turning On the Power

Turn on the power to the monitor and any external peripherals first. If necessary, wait for any external disk drives to come up to speed. (The installation documents that are supplied with the external drives will explain this.)

After the monitor and any other external devices have been turned on, turn on the workstation.

HP-UX Starts Up

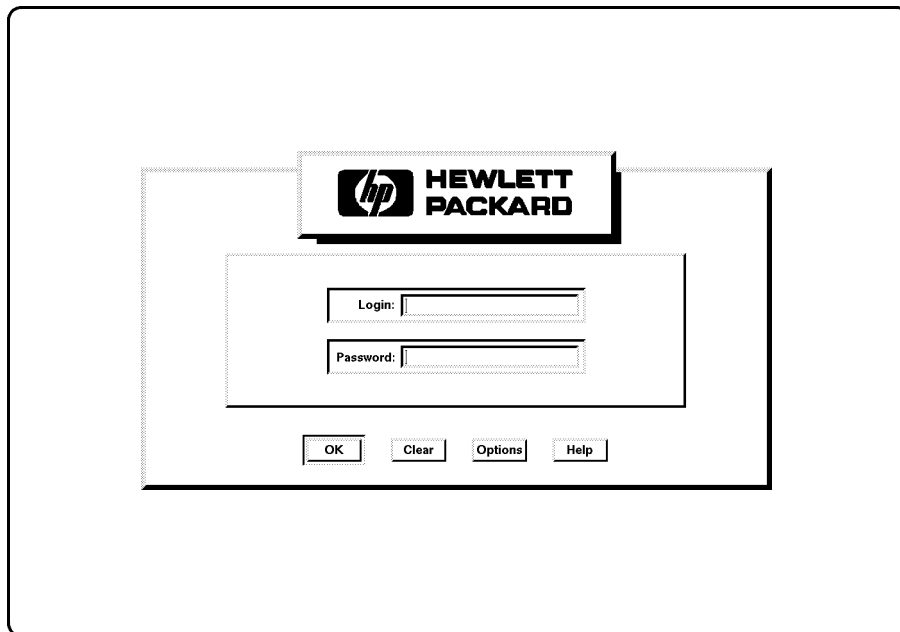
After about three minutes, many messages appear on your screen. These messages convey information about the various hardware and software subsystems that are being activated by the bootup process. Unless something is wrong with your system, you will not have to respond to any of these messages.

Logging In

- 1 After your computer has booted HP-UX, the login screen shown below appears.

This means your hardware installation was successful and HP-UX has booted. Your HP VUE has also loaded and started.

If this screen does not appear, see Chapter 6, or contact your designated service representative.

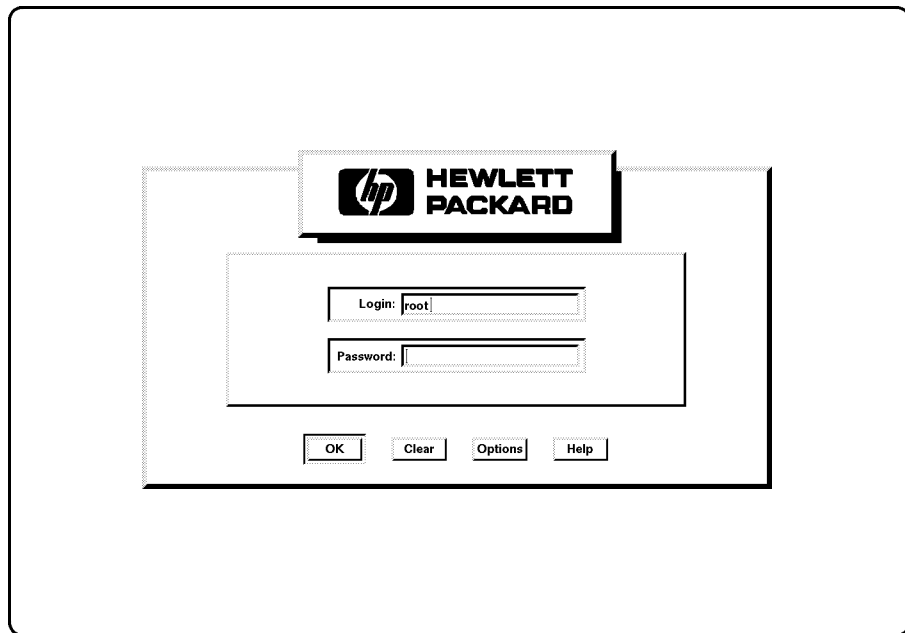


3-4 Starting Up Your Workstation

2 You must first login as `root`. To login as `root`, type:

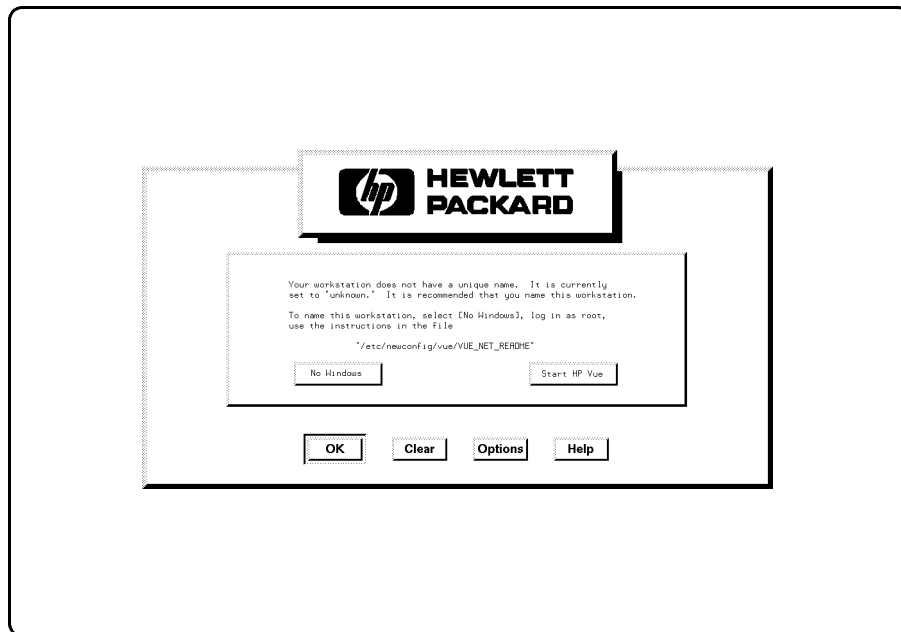
```
root 
```

If you have given your workstation a hostname other than `unknown`, skip to step 4. Otherwise, go on to step 3.



- 3 If a window appears over your login screen cautioning you about your workstation's hostname being **unknown**, you may continue and start HP VUE. Move your mouse to put the pointer on the **Start HP VUE** screen button, then click the left mouse button once.

Caution You should not click on the **No Windows** screen button until you have learned how to read and edit files.



3-6 Starting Up Your Workstation

4 The copyright screen shown below appears.

Your HP VUE **workspace** (the screen environment in which you interact with HP-UX) appears in about one minute.

Note

The windows displayed on your screen may not be exactly like those shown in this manual.

Starting the
Hewlett-Packard
Visual User Environment

(c)Copyright 1983, 1984, 1985, 1986, 1987, 1988, 1989 Hewlett-Packard Co.
(c)Copyright 1979, The Regents of the University of Colorado, a body corporate.
(c)Copyright 1979, 1980, 1983 The Regents of the University of California.
(c)Copyright 1980, 1984, 1986 AT&T Technologies. All Rights Reserved.
(c)Copyright 1986, 1987, 1988 Sun Microsystems, Inc.
(c)Copyright 1985, 1986 Massachusetts Institute of Technology
(c)Copyright 1986 Digital Equipment Corp.

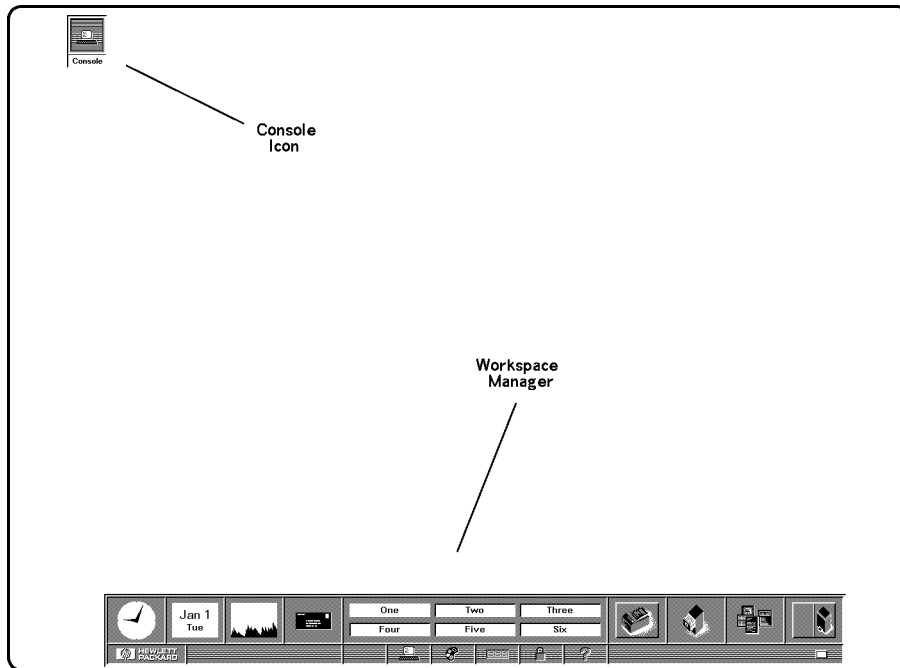
RESTRICTED RIGHTS LEGEND

Use, duplication, or disclosure by the Government is subject to restrictions as set forth in subdivision (b) (3) (ii) of the Rights in Technical Data and Computer Software clause at 52.227-7013.

HEWLETT-PACKARD COMPANY
3000 Hanover St.
Palo Alto, CA 94303

- 5 A screen similar to this one appears, with a **console icon** and the **workspace manager**. The workspace manager is also known as the **control panel**.

Move the mouse pointer over the console icon and press and release the left mouse button twice.

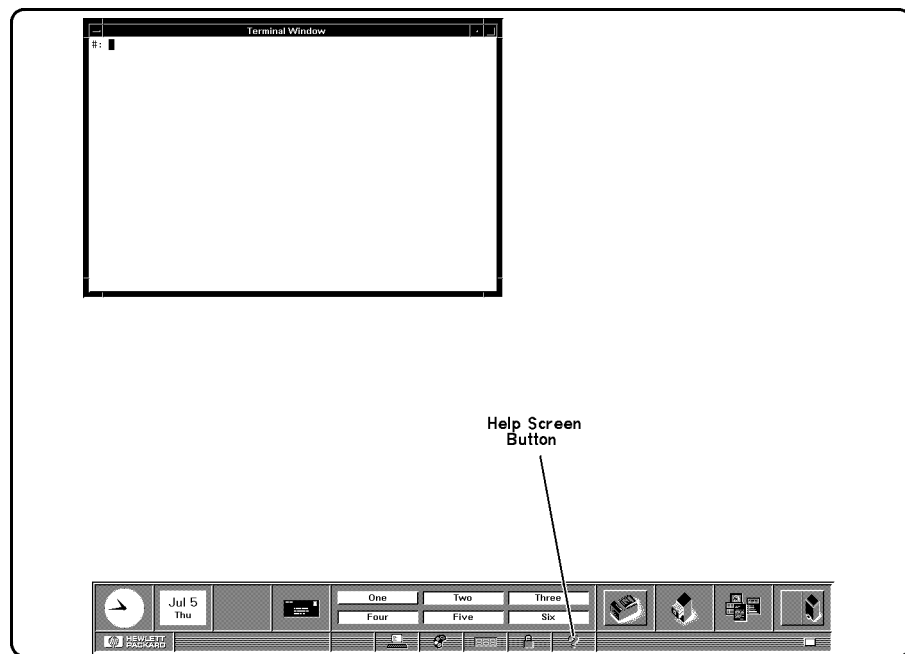


3-8 Starting Up Your Workstation

- 6 The console icon disappears and is replaced by the **console window**. This is a **terminal window**. It behaves just like any text terminal. You may type a command into it, and it will print the results of the command's execution.

For the moment, though, you will use another feature of the HP Visual User Environment: the Help System. Through interaction with the Help System, you may learn about HP VUE.

Move the pointer to the Help screen button. It's along the bottom of the control panel, and it has a question mark ("?") on it. Click the left mouse button once by pressing and releasing it.

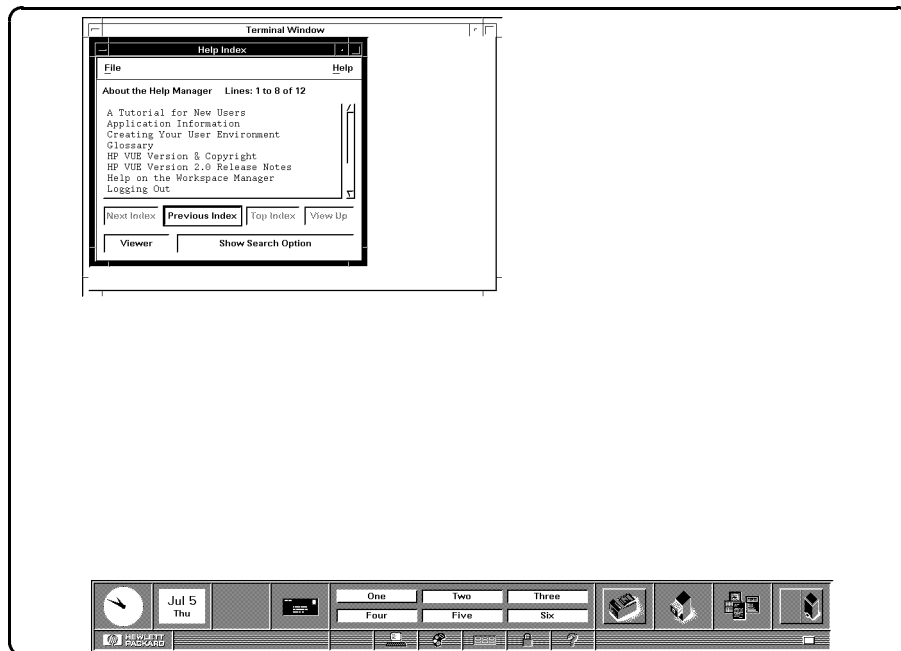


7 The Help Index window shown below appears.

Move the mouse pointer into the window and onto the line

A Tutorial for New Users

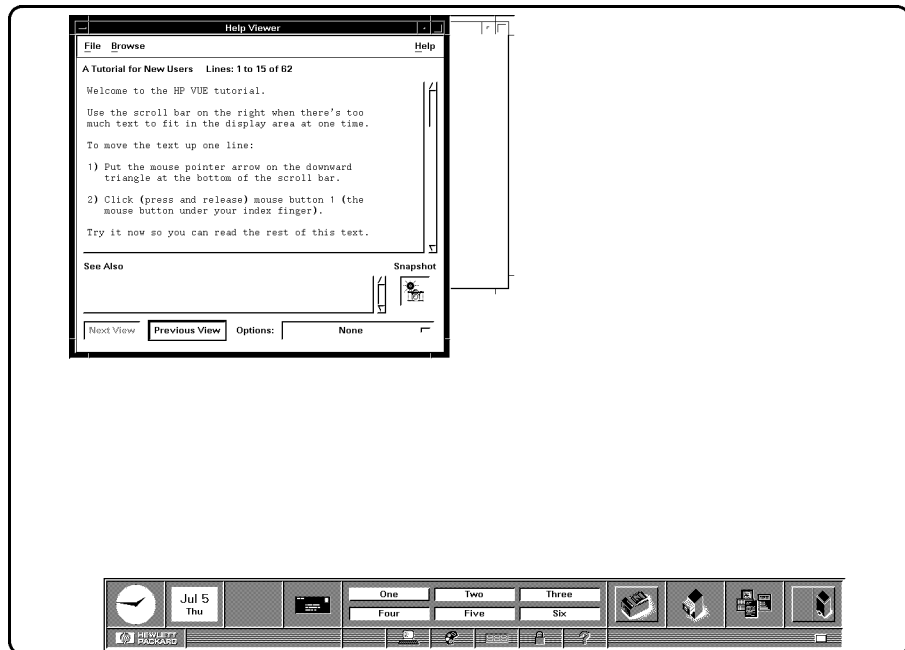
and click the left mouse button once to bring the next index into the window. Then click the left mouse button on the **Viewer** screen button to see the help information. You need not read all the information now. See *HP Visual Environment User's Guide* for information on using the scroll bars.



3-10 Starting Up Your Workstation

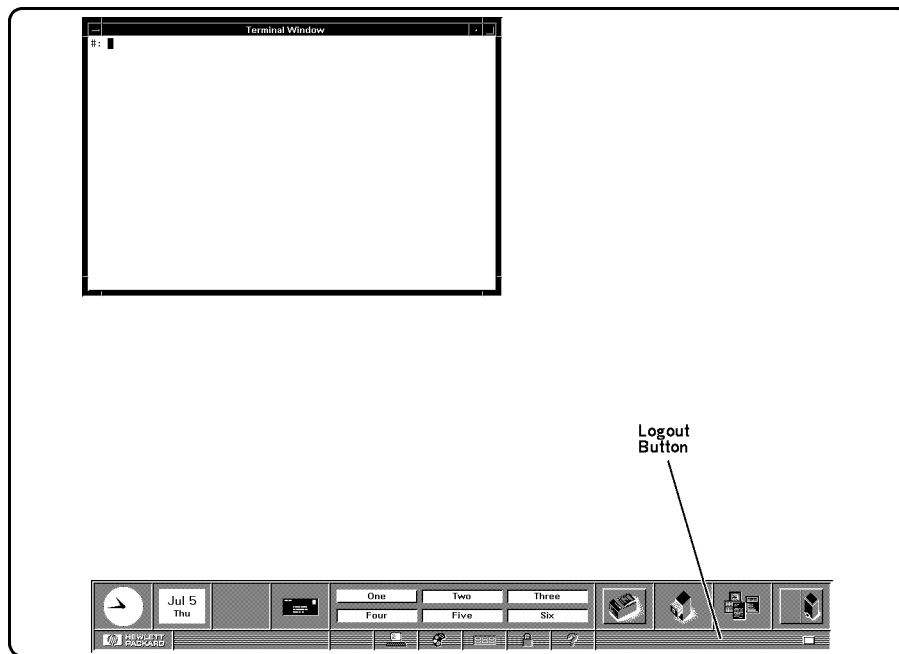
- 8** To close the Help window, move the mouse pointer over the Window Menu button in the upper left-hand corner of the Help window. Then click the left mouse button twice quickly.

To see all of a window that's behind another window, move your pointer onto the window you want to see, then click the left mouse button once.



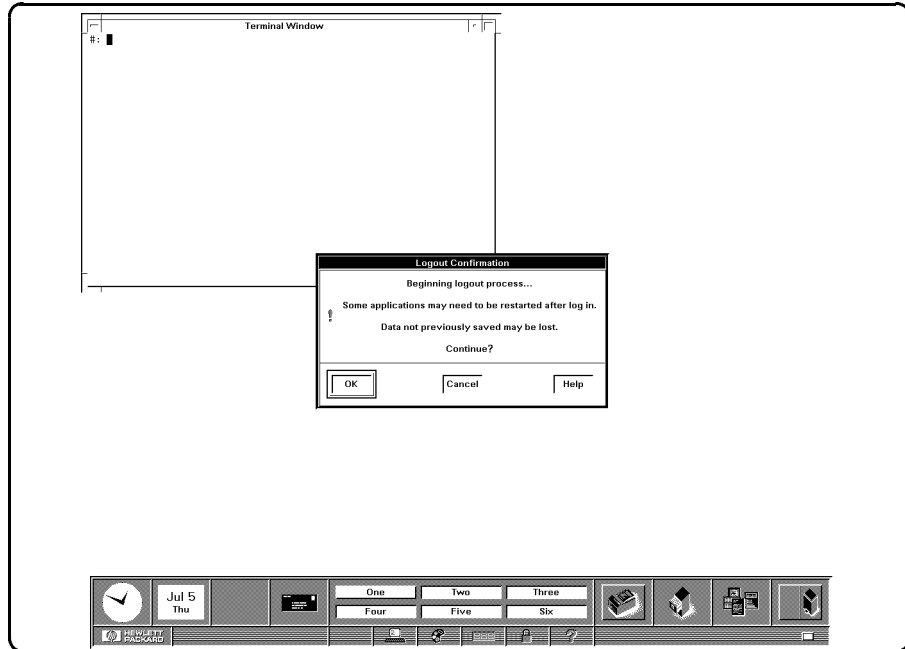
Logging Out

- 1 To logout, move your pointer onto the control panel's lower right-hand bar. This bar is called the **logout button**. Click the left mouse button once.



- 2** This confirmation box will appear. To confirm your logout, click on the screen button marked “OK.”

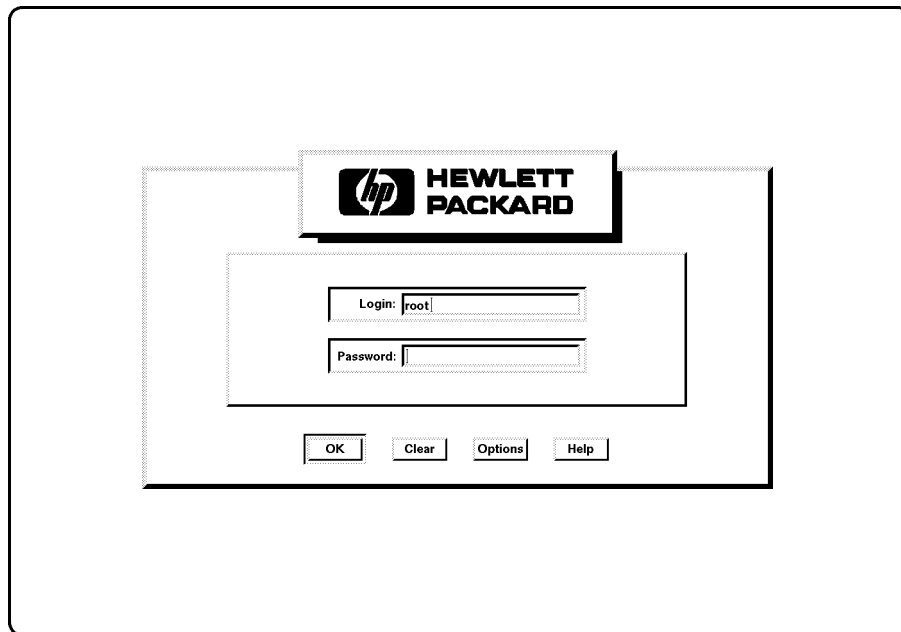
About a minute later, the login screen will reappear.



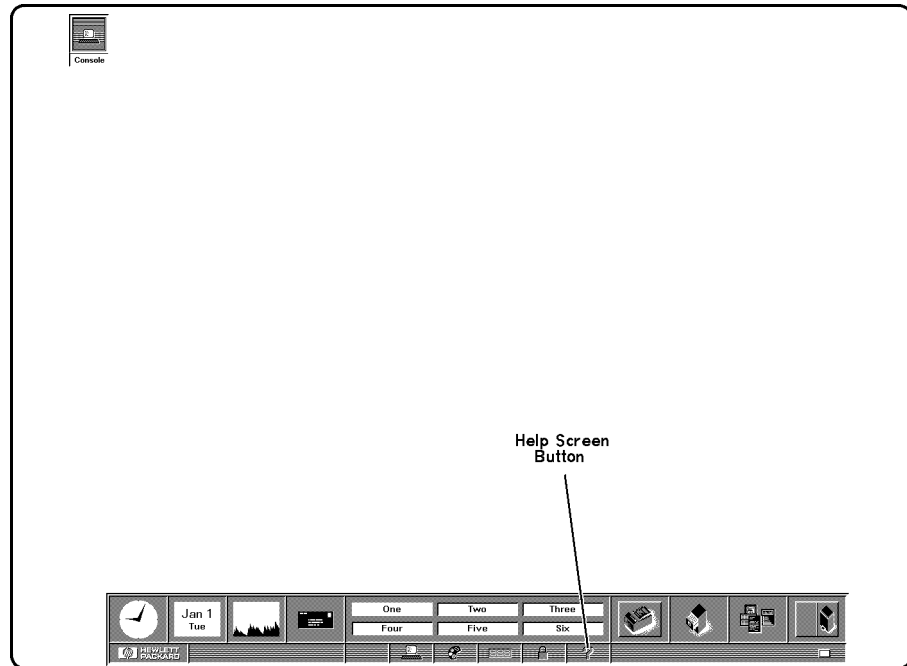
Creating a New User Account

- 1 To create a new user account that you will normally use, you must first login as `root`.

Caution `root` is a user account with special privileges and dangers. Only the system administrator should regularly login as `root`.



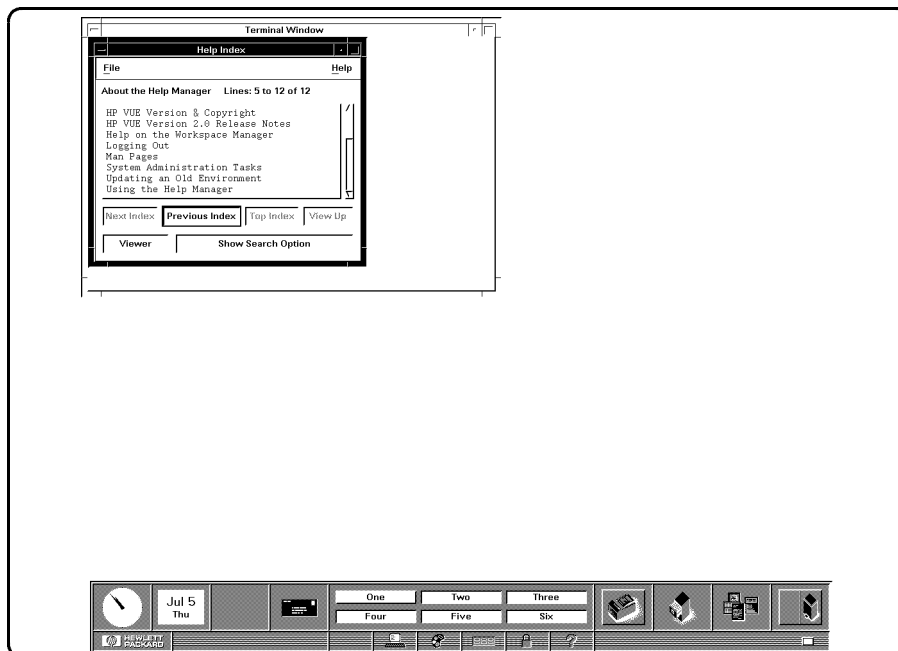
- 2 Activate the Help System by moving the pointer to the control panel's Help screen button (on the bottom, marked with a "?") and clicking the left mouse button once.



- 3** When the Help Index window appears, move your pointer onto **System Administration Tasks**

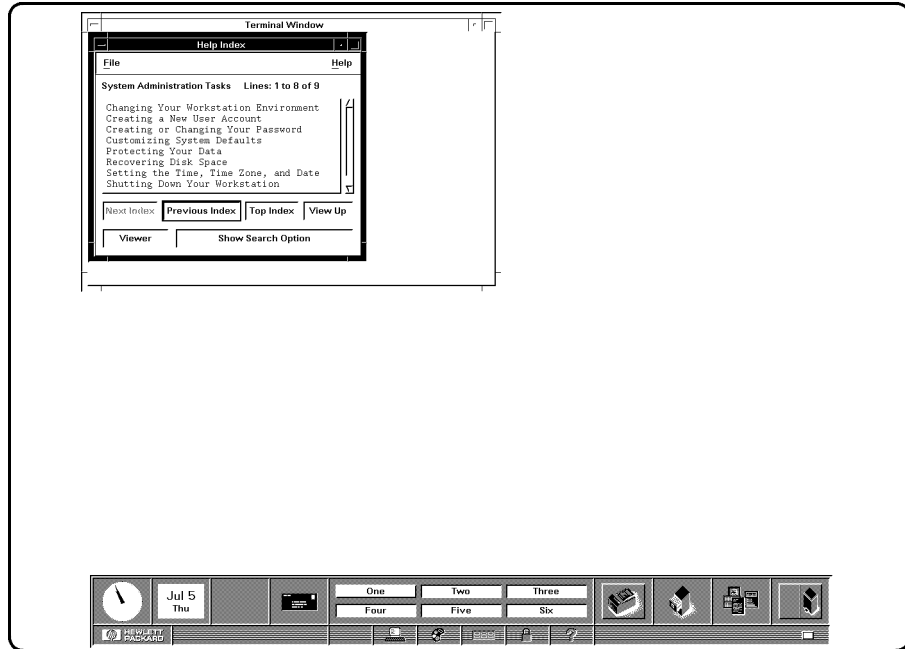
You may need to use the scroll bar or arrows to see **System Administration Tasks**.

Then click the left mouse button once.

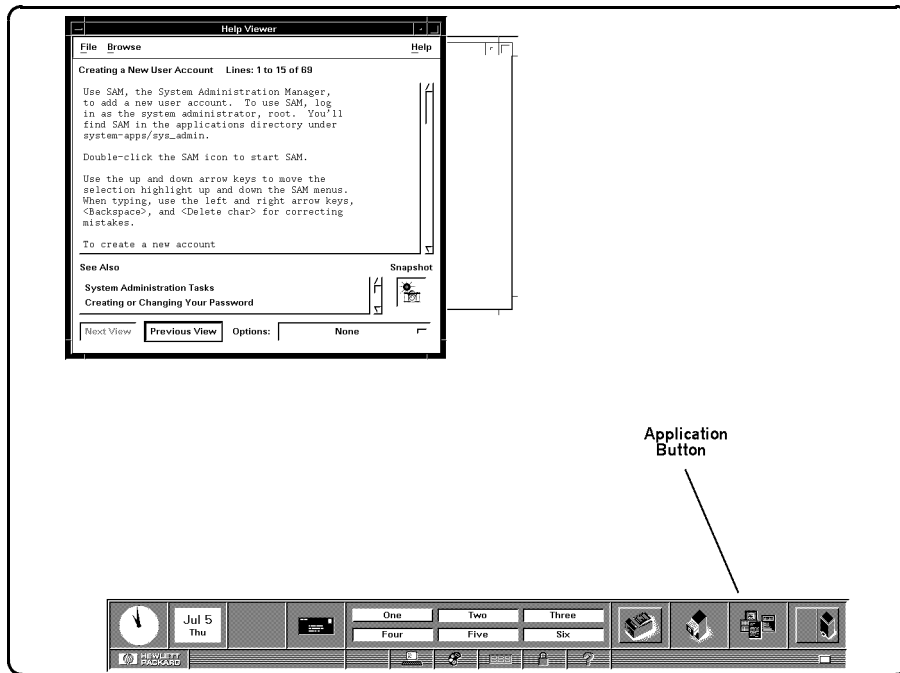


- 4 When the **System Administration Tasks** Help Topic window appears, select and click on

Creating a New User Account

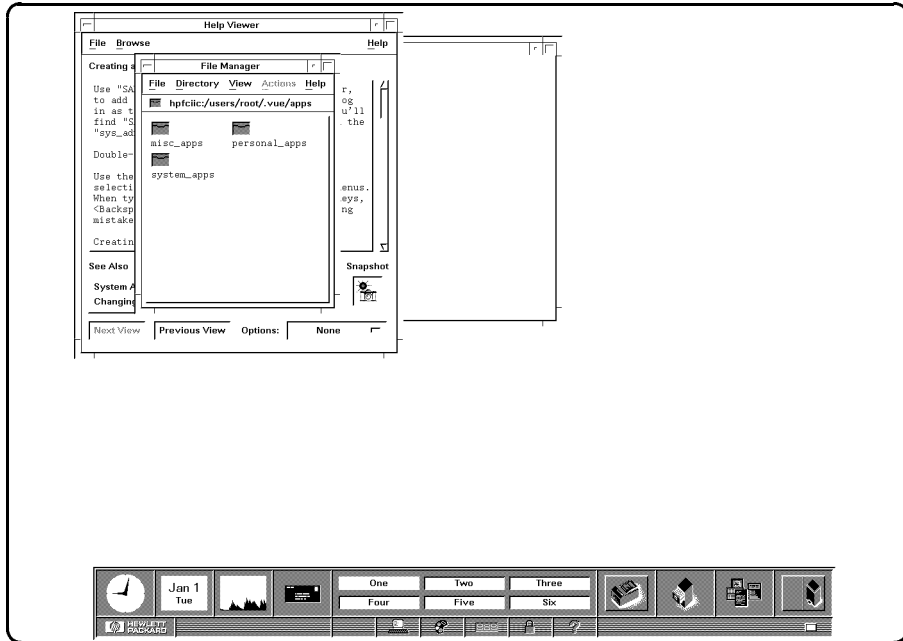


- 5 When you have finished reading the instructions, click on the control panel's application button. That button has a few sheets of paper pictured on it.



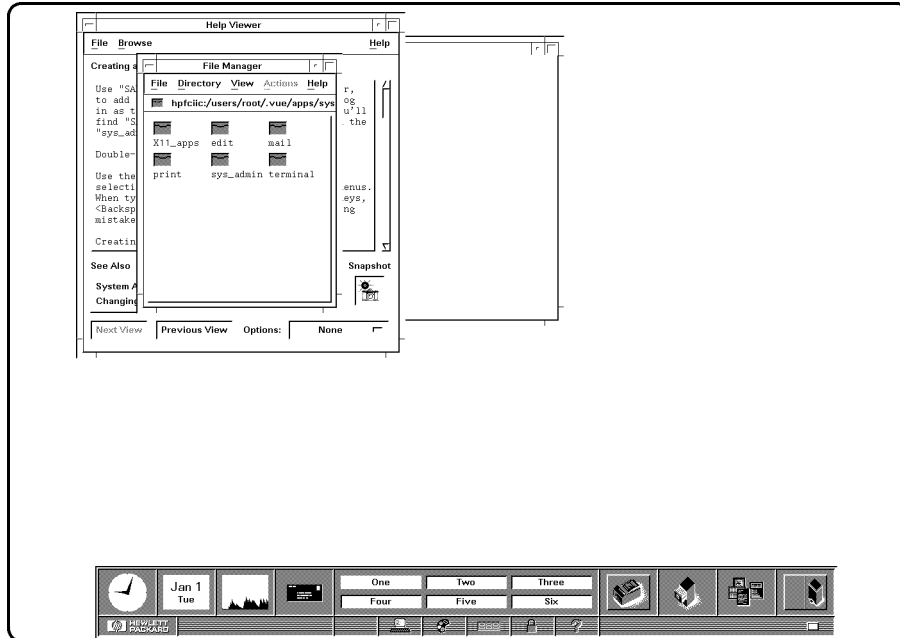
6 You will see a file manager window similar to this one.

To open the **system_apps** folder, move the pointer onto the **system_apps** folder icon, then click your left mouse button twice quickly.



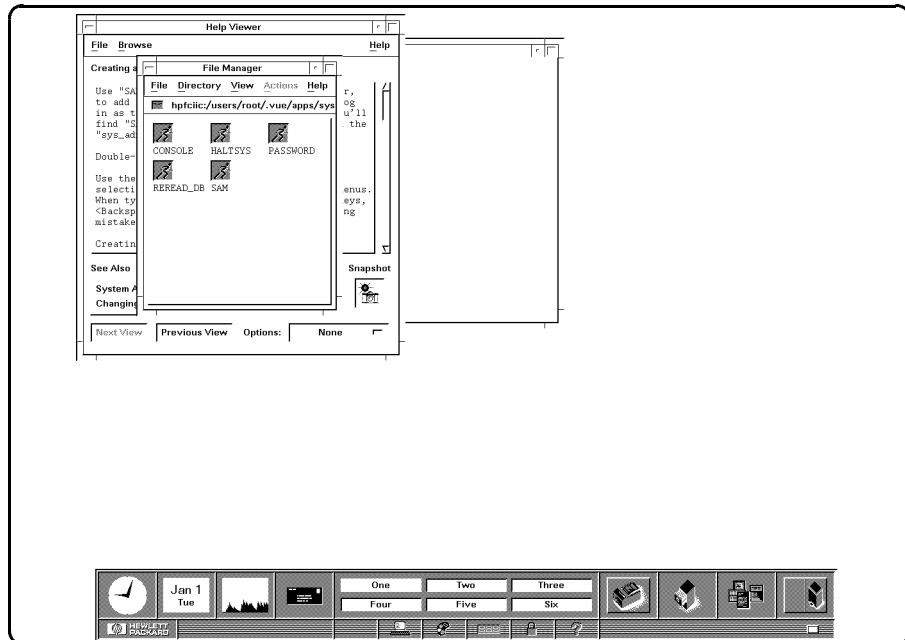
7 You will see a system applications window similar to this one.

Open the **sys_admin** folder by putting the pointer on it and clicking your left mouse button twice.



8 This system administration window appears.

Move your pointer onto the System Administration Manager (SAM) icon and click your left mouse key twice.

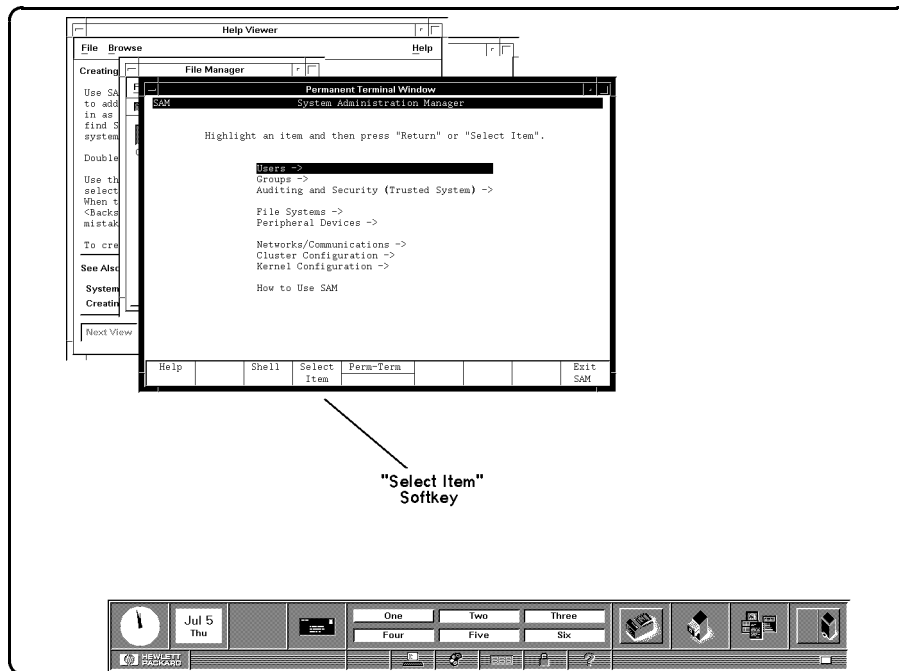


- 9 The System Administration Manager (SAM) is an application designed to run on text terminals. If you wish to move the highlight bar to another item, you must use the cursor keys. To press a softkey, you may either use the function keys on your keyboard or use the mouse to click on the softkeys in SAM's terminal window.

With this item highlighted,

`Users ->`

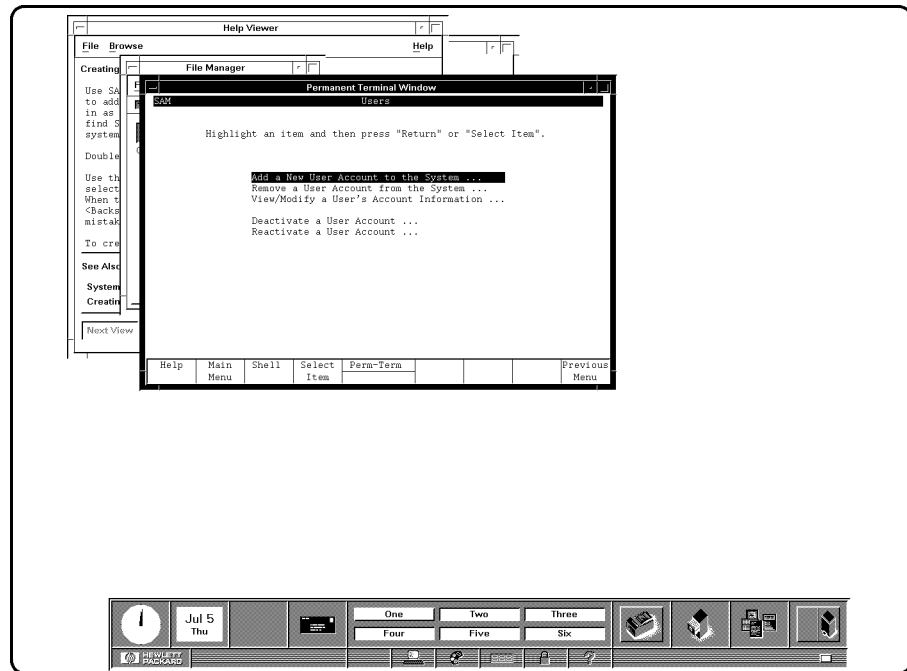
move the mouse pointer over the **Select Item** softkey and click your left mouse button once.



10 When this window appears, this line will be highlighted:

`Add a New User Account to the System`

Move the mouse pointer over the **Select Item** softkey and click the left mouse button once.

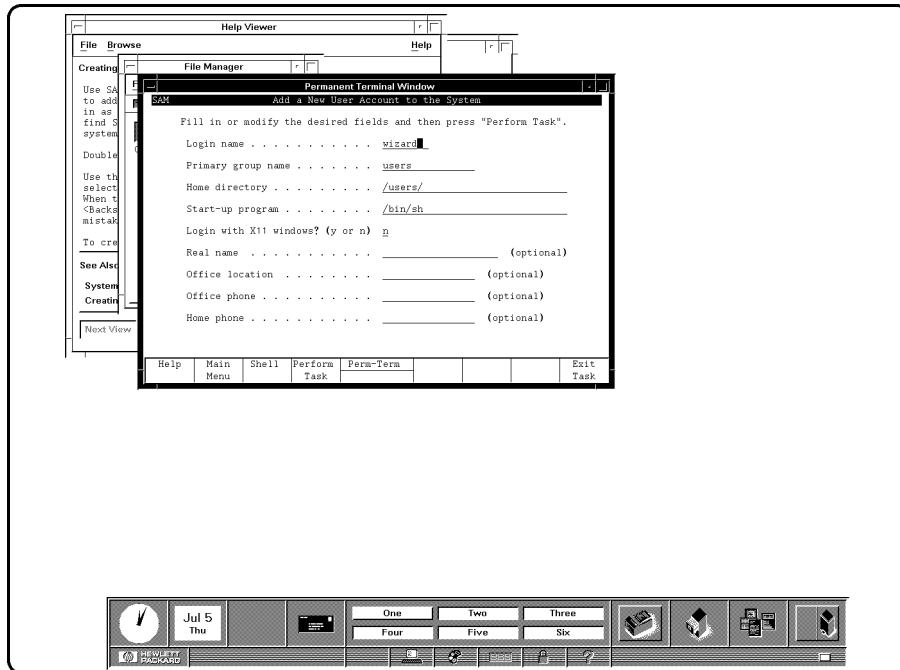


11 Type the login name you want to use for normal work, for example:

```
wizard
```

then click on the **Perform Task** softkey.

Some items are set to their default values and normally will not be changed.



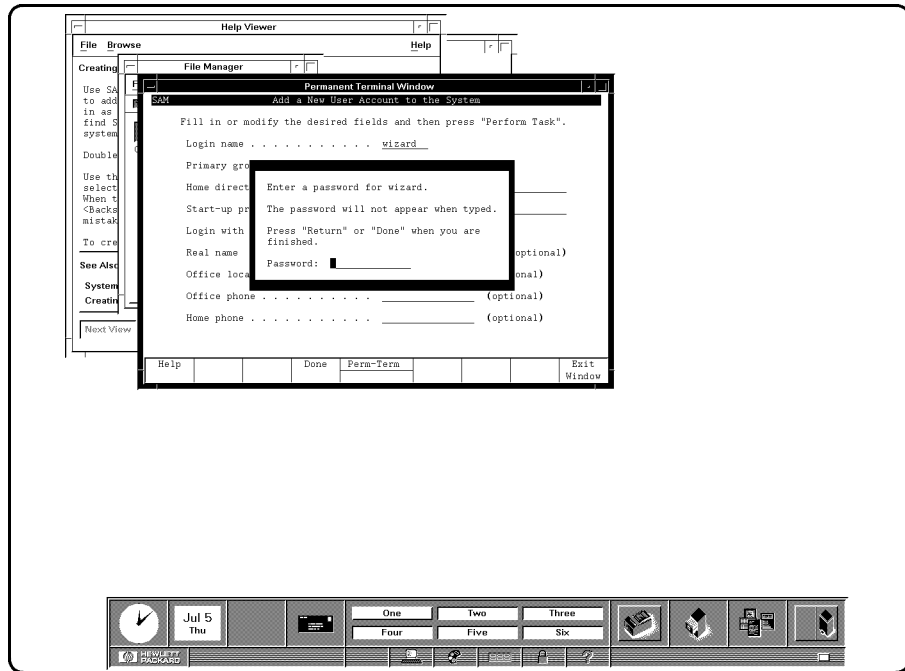
12 Type in the password for your new login account.

For example:

123four

then press the **Return** key or click on the **Done** softkey.

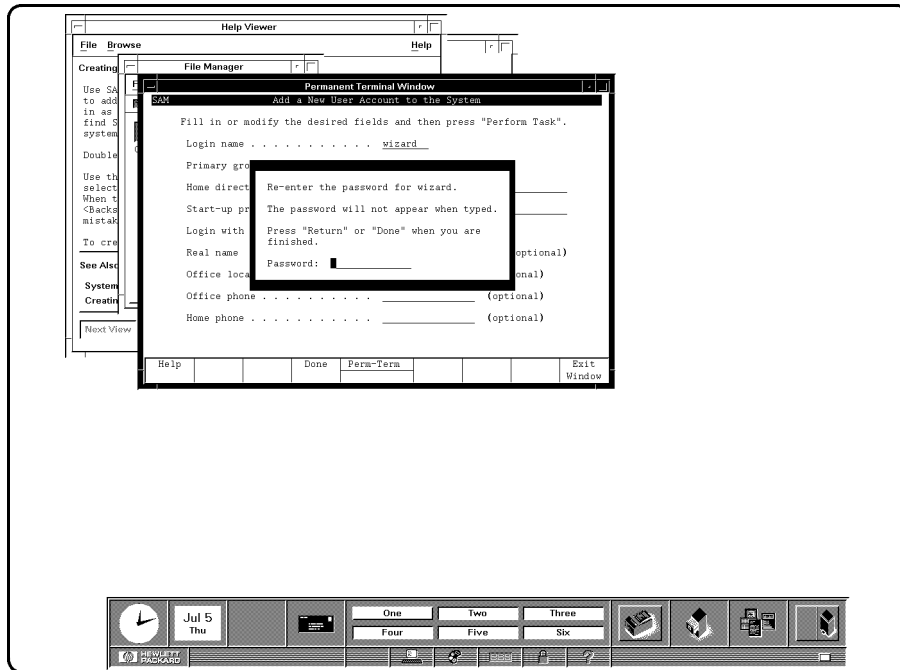
Caution *Remember your password!* If you forget your password for the system, you won't be able to log back in under the login name you have chosen.



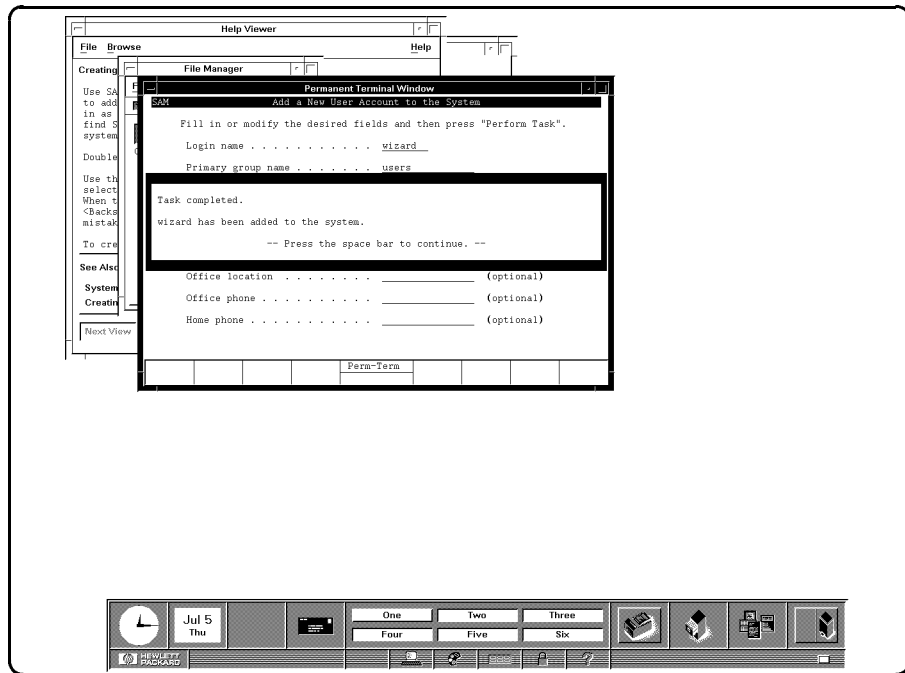
- 13** Reenter the password, then press **Return** or click on the **Done** softkey.

The new user will be added to the system.

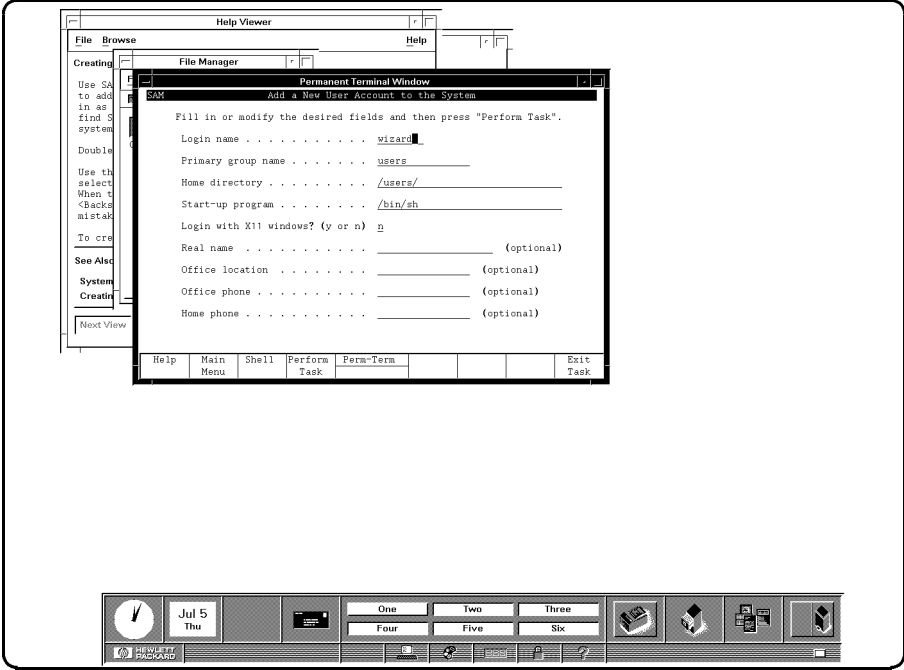
You should also create a password for **root**. Refer to Appendix A of the *HP Visual User Environment User's Guide*.



- 14 After the new user has been added to the system, press the keyboard space bar to get a blank form.

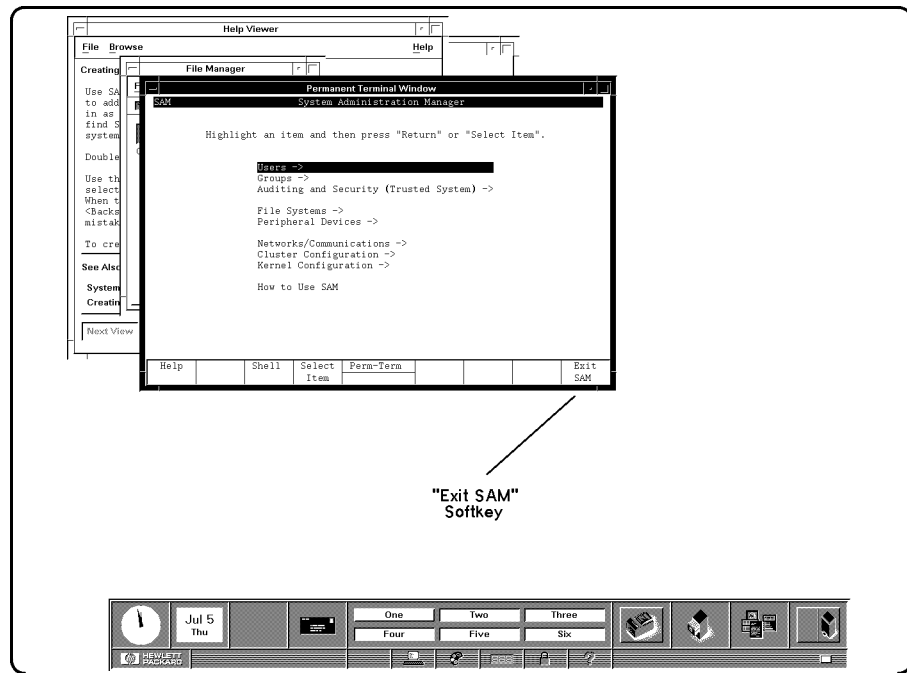


15 Click on the **Main Menu** softkey.



16 Click on the **Exit SAM** softkey.

To close the Permanent Terminal Window, move the mouse pointer over the Window Menu button in its upper left-hand corner and click the left mouse button twice quickly.

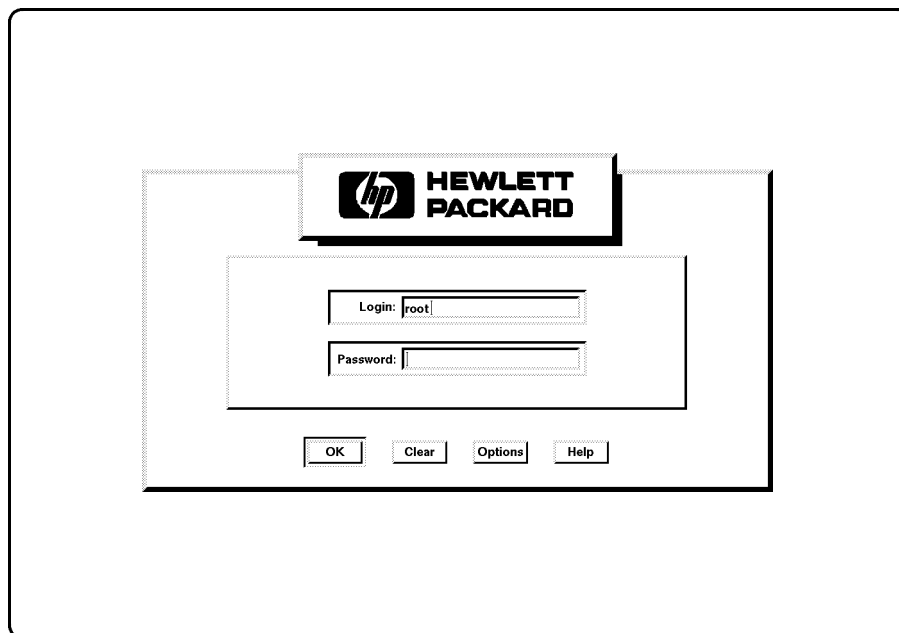


Shutting Down Your Workstation

Warning **Do not power off your computer without first doing these shutdown procedures. You may damage the programs and data on your disk.**

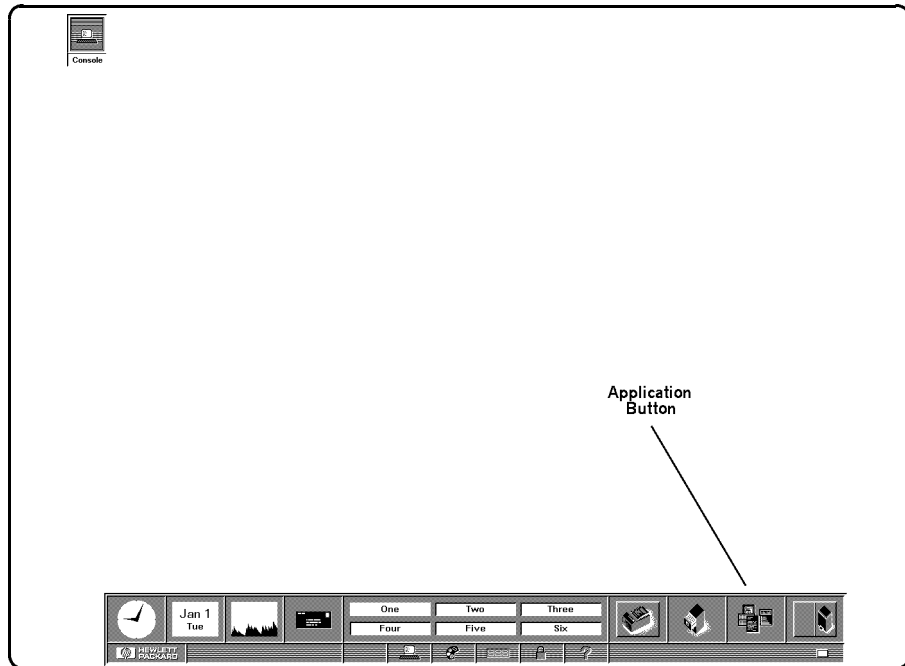
When you need to shut down your workstation so it can be powered off, you should follow these steps. Doing this will ensure that your file system remains intact and that you can power-up and login correctly.

- 1 You must be logged in as `root`. If you are not, logout, then login as `root`.

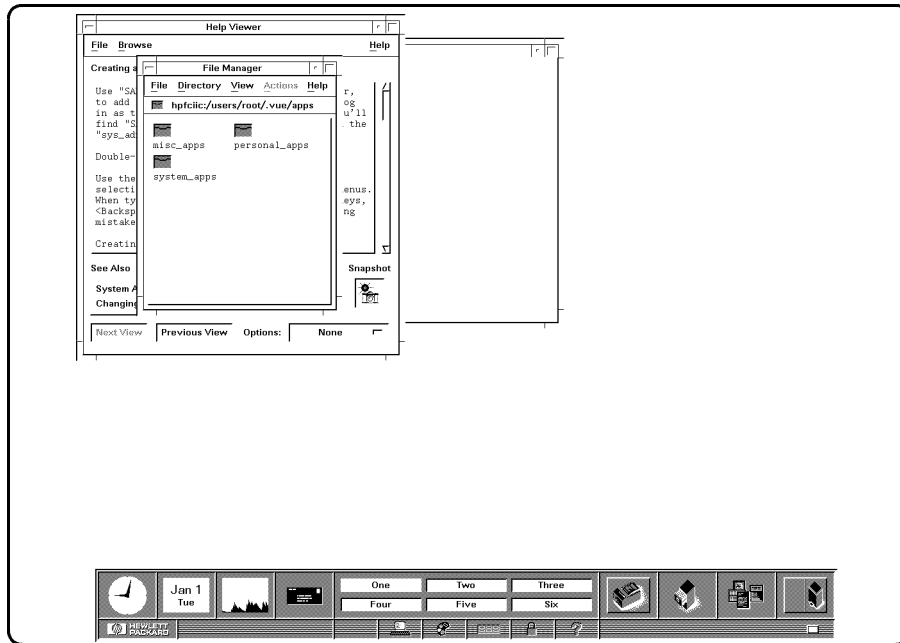


2 Open the terminal window by clicking on the console icon twice.

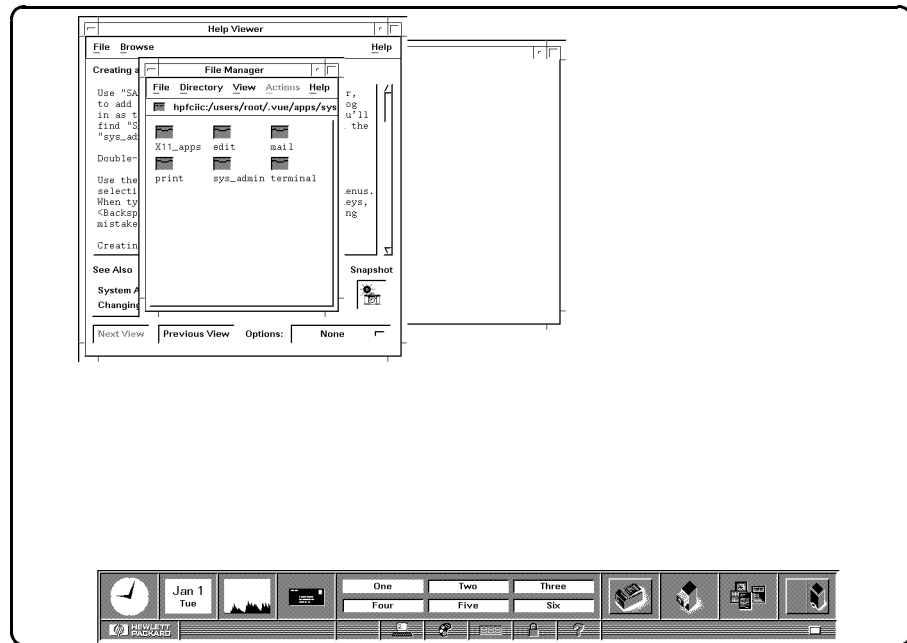
Click on the control panel's application button. That's the one with the pages on it.



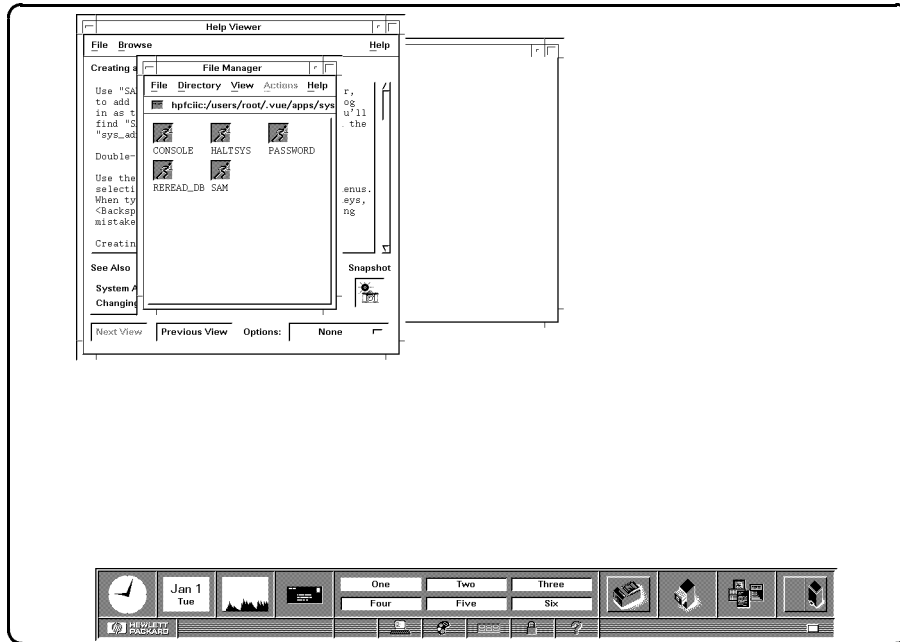
- 3 When this window appears, move your pointer onto the **system_apps** folder and click the left mouse button twice.



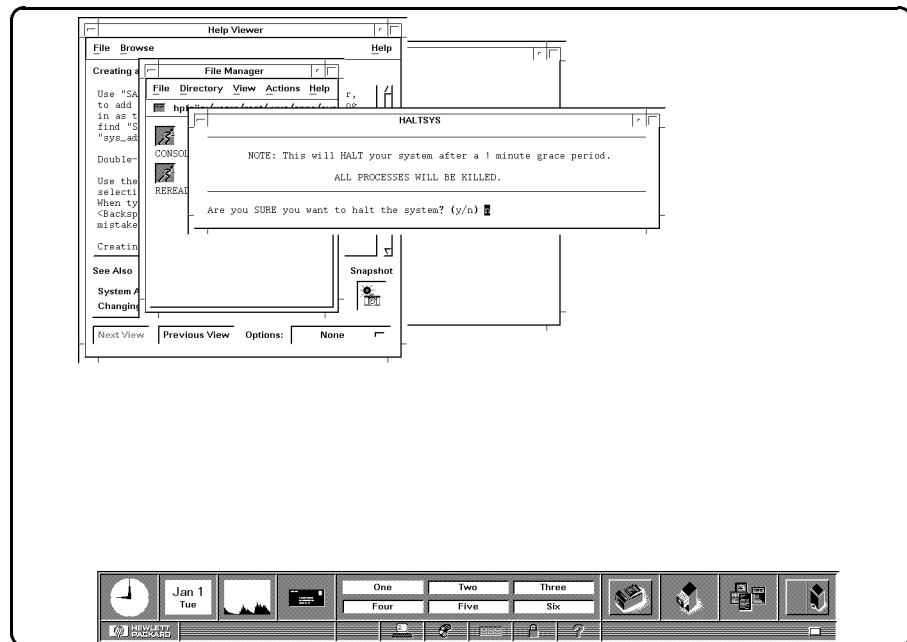
- 4 When this window appears, move your pointer onto the `sys_admin` folder, then click the left mouse button twice.



5 When this window appears, click on the HALTSYS icon twice.



- 6 When this Halt System window appears, you have three choices:
- If you press the **(N)** key and then press **(Return)**, you can continue and your workstation will not shut down.
 - If you press the **(Y)** key and then press **(Return)**, the shutdown process starts. You will have no control of your computer until you boot HP-UX and login again.
 - If you wait for one minute without pressing any keys, the system will halt itself.



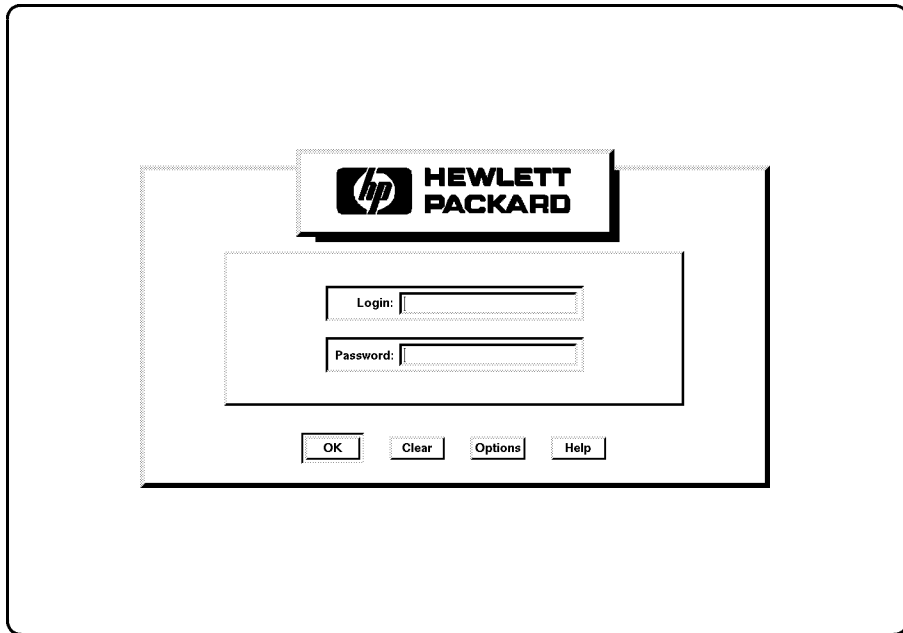
7 The shutdown process takes about one minute.

These lines appear at the lower left-hand corner of your screen:

```
Halting (in a tight loop) --  
OK to hit reset button
```

You may now turn OFF your computer.

- 8 The next time you turn on your workstation, its HP VUE login screen should appear in about three minutes.



For More Information ...

To learn more about the HP-UX window environments, refer to *HP Visual User Environment User's Guide*, *The HP Visual User Environment System Administration Manual* and *A Beginner's Guide to the X Window System*.

— |

| —

— |

| —

Using Your Workstation

This chapter will help you decide how to interact with your HP Apollo 9000 Model 720 workstation. It describes the following:

- The two types of environments you may use:
 - HP Visual User Environment (HP VUE)
 - HP-UX shells
- Sample interactions in each environment
- Further resources for learning more about the environments

Note Your HP Apollo 9000 Model 720 workstation has HP VUE pre-loaded, and it will start up in HP VUE. If you prefer not to use HP VUE, you may disable it by following the directions in “Disabling HP VUE from Your Workstation” in Appendix A of *HP Visual User Environment User’s Guide*.

About HP VUE

The HP Visual User Environment (HP VUE) is a **graphical interface** through which you can communicate with your workstation. It is similar to the windowing systems that are used on many personal computers. However, since the underlying operating system is HP-UX, you will be able to do much more with this system than you could with a machine equipped with less capable system software.

This added power does not mean that your computer must be difficult to use. HP VUE allows users to accomplish the most common interactions by manipulating graphical objects with a mouse, reducing the time it takes to learn how to use HP-UX.

Working with HP VUE

The following examples are typical of tasks to be accomplished with HP VUE. The details of the display appearance will differ from that of your workstation; these examples are only for the purpose of illustrating how you can interact with HP VUE and to help you to decide whether you prefer to work with the HP Visual User Environment or one of the shells.

Like other graphical user interfaces, HP VUE provides **windows** for various applications that run on your computer. In a networked environment, some of these applications may be running on other computers. The windows can accept input from the keyboard, mouse and other devices and display the applications in a variety of ways.

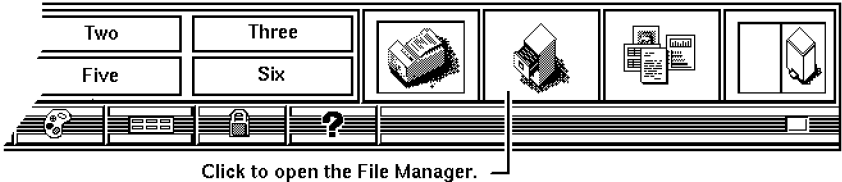
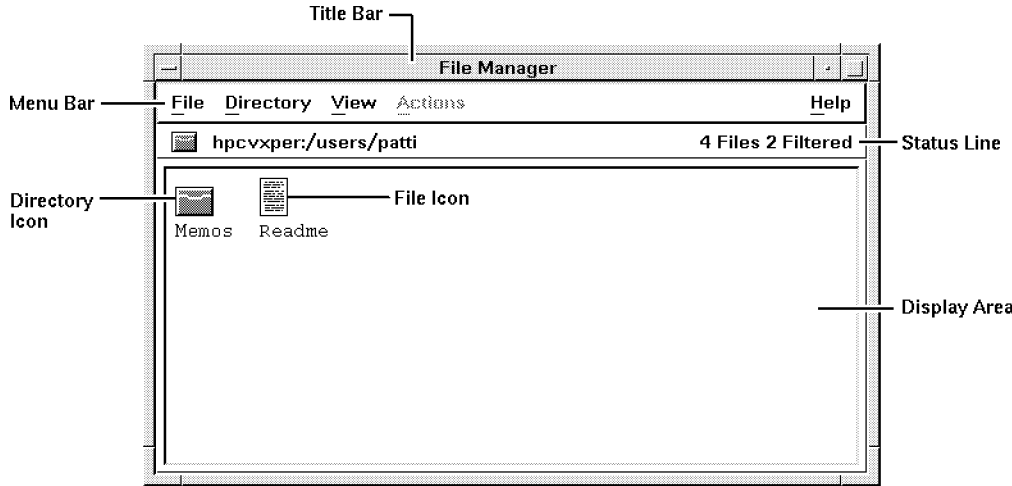
Many of the windows are under the control of **managers**, which are software systems that determine the nature and style of your interactions with parts of the HP-UX operating system. For more information about managers, see the *HP Visual User Environment User's Guide*.

One of the managers, called the Workspace Manager, works with the system's builtin terminal emulators to provide windows that act like the screens of text terminals. When you open one of these terminal windows, you will be able to use the command line interface, or "shell." For information on using a shell, see "About Shells" later in this chapter.

About Directories and HP VUE File Managers

Manage the information you store in your workstation with the **file manager**. Your workstation uses **files** to hold data. **Directories** are “folders” that hold files *and* other directory folders.

1. Move the mouse pointer over the file manager icon and press the *left mouse button* to open the file manager.

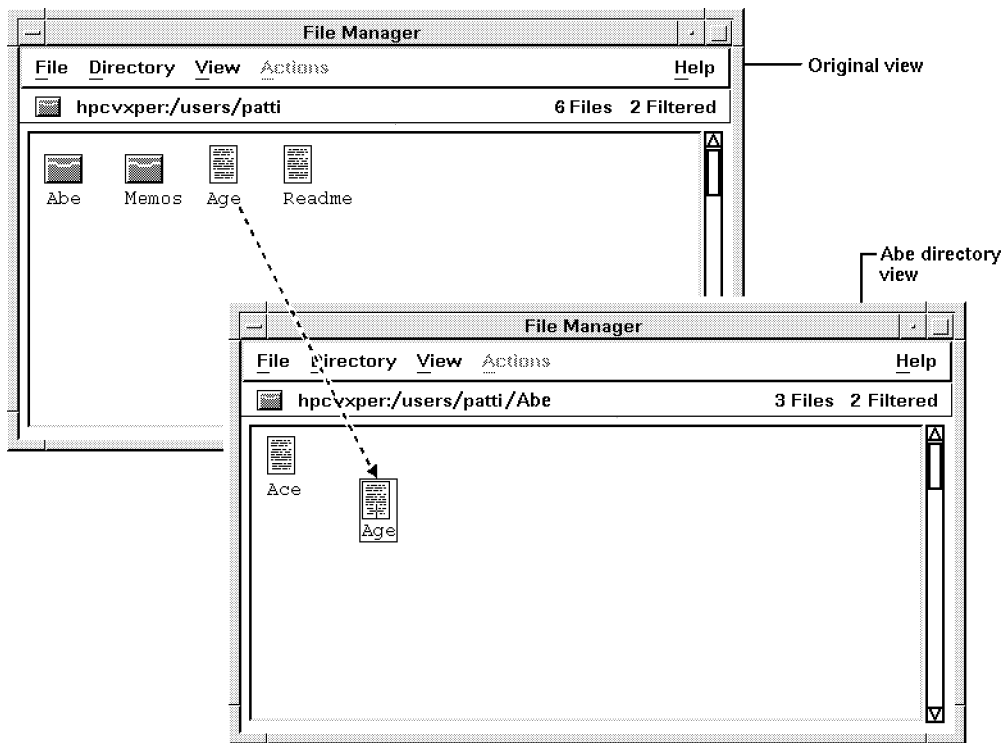


Note Your workstation shows different files than those pictured. The file manager illustrated here displays the **home directory** of the user **patti**.

The following examples assume that two file managers are open on the screen.

Example 1: Moving a File

1. If your two file manager views overlap, move the overlapping view below the underlying view by moving the mouse pointer onto the title bar (marked **File Manager**) of the overlapping window, pressing and holding down the *left mouse button*, dragging the window away from the underlying window so you can see the display areas of both, and releasing the mouse button.
2. Press and hold down the *middle mouse button* on the file to be moved from one of the file managers.
3. Drag the file to the other file manager display area, ensuring that it is over an empty area.

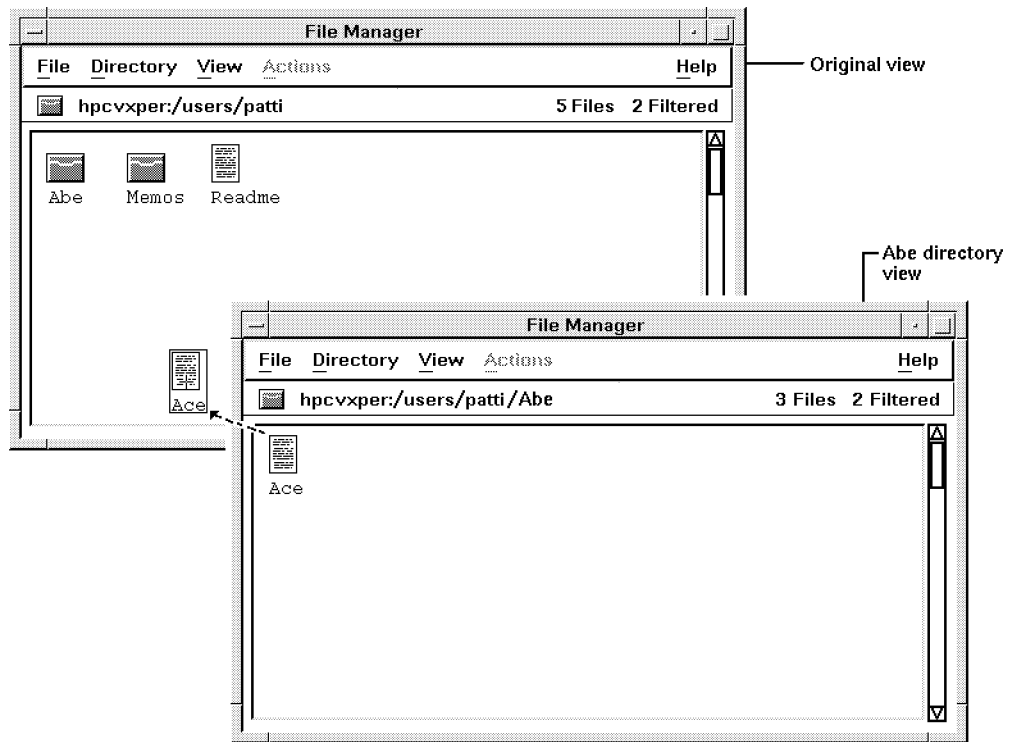


4. Drop the file (release the mouse button).

3-4 Using Your Workstation

Example 2: Copying a File

1. Move the pointer over the file to be copied.
2. Press and hold down **CTRL**.
3. Press and hold down the *middle mouse button*.
4. Drag the file over an empty area in the display area of the file manager window into which it is to be copied.



5. *While still holding down **CTRL***, drop the file (release the mouse button).
If you release **CTRL** before the mouse button, the file is moved instead of copied.
6. Release **CTRL**.

Learning More about HP VUE

To learn more about the HP Visual User Environment, read the *HP Visual User Environment User's Guide*. This book explains many of the features of the different HP VUE managers and provides examples of how they may be used.

About Shells

In systems equipped only with text terminals, HP-UX usually communicates with the user through a **shell**. A shell is a program that captures text typed on the terminal's keyboard, interprets the text into commands and data, transmits the commands to the operating system, and prints the results of the commands' execution (and any resulting messages) on the terminal's screen. A shell is sometimes also called a **command interpreter** or **command processor**.

When you interact with your workstation using the entire screen as a terminal (that is, if you do *not* use OSF/Motif or another window environment), you will use the shell in much the same way you would if you were working on a text terminal.

If you set up your workstation to run HP VUE or the OSF/Motif window environment upon which it is based, each terminal window that you open with **hpterm** or **xterm** runs a shell program. You may open many terminal windows, and they may communicate with your workstation's processor or the processors of other computers connected to a network.

Table 3-1 lists some of the features of the shells available in HP-UX.

Table 3-1. HP-UX Shells

Shell	Features
Bourne Shell	The default shell for HP-UX. It is compatible with most of the shell programs provided with your system.
Korn Shell	An upwardly-compatible extension of the Bourne Shell, with many new features: <ul style="list-style-type: none">■ A command history buffer■ Command aliases■ Pathname completion■ Job control■ Interactive command-line editing
Key Shell	An upwardly-compatible extension of the Korn Shell. It makes use of softkeys function keys to “build” HP-UX command lines, which are translated and executed automatically. Key Shell includes these features: <ul style="list-style-type: none">■ “Keystroke” execution of 22 commands■ Softkey display of options for 70 common HP-UX commands■ User-configurable status line■ Context-sensitive help■ Support for editing keys like Delete line
C Shell	This shell has a command syntax that resembles the C programming language. For this reason, it is often favored by C programmers.

Working with a Shell

The following examples are typical of tasks to be accomplished with a shell. They work in the same way in any of the four shells.

The filenames used in the examples will differ from those that are on your workstation; these examples are only for the purpose of illustrating how you can interact with an HP-UX shell and to help you to decide whether you prefer to work with the HP Visual User Environment or one of the shells.

This is the general form of the HP-UX commands used in the examples:

command_name argument(s)

3-8 Using Your Workstation

The *command_name* is the name of an HP-UX command. The *argument* is the data that the command will act upon. There may be more than one *argument*. In the following examples, all of the *arguments* are file names.

About Directories

You will understand the following examples better if you know something about **directories**. In HP-UX, a file is a “container” for data. A directory is a “container,” too, but it contains files. A directory may also contain other directories.

A file’s location may be described by writing the “chain” of directories one must pass through to find the file. In HP-UX, the highest-level directory is called the **root directory**. It is designated by the “slash” symbol:

`/`

A directory called **users** that is contained in the root directory is designated in this way:

`/users`

The directory **users** is said to be a **subdirectory** of the root directory. It may in turn contain other subdirectories. Here is how a **users** subdirectory called **terry** is designated:

`/users/terry`

If `/users/terry` contains a file called `myfile`, this is how it is designated:

```
/users/terry/myfile
```

Because this describes the “path” one must follow from the root directory to locate `myfile`, `/users/terry/myfile` is a **path name**.

Example 1: Moving Files

Use the `mv` command to move files from one directory to another. For example, to move `myfile` into the `projects` directory, type:

```
$ cd                                Move to your home directory first.  
$ mv myfile projects
```

Now verify that it worked:

```
$ lsf                                List your current working directory.  
projects/                            Where did myfile go?  
$ lsf projects                       Look in the projects directory.  
myfile      new/      old/        There's myfile. It worked!
```

A single dot (`.`) for a path name represents your current working directory. Therefore, to move `myfile` from the `projects` directory back to your current working directory, type:

```
$ mv projects/myfile .                Don't forget the dot.  
$ lsf                                List your current working directory.  
myfile      projects/          It worked; myfile is back.  
$ lsf projects                       List projects.  
new/      old/                The file myfile isn't there anymore.
```

The general form of the `mv` command is as follows:

```
mv from_path to_path
```

where *from_path* is the file name or path name of the file you want to move, and *to_path* is the name of the path to which you are moving.

3-10 Using Your Workstation

Example 2: Copying Files

To copy a file into a different directory, use the `cp` command. For example, to make a copy of `myfile` named `myfile2` in the `projects` directory, type:

```
$ cp myfile projects/myfile2
$ lsf
myfile    projects/    The file myfile still exists.
$ lsf projects
myfile2   new/    old/    The copy (myfile2) is in the projects directory.
```

To make a new version of `myfile2` named `myfile3` in your current directory, type:

```
$ cp projects/myfile2 myfile3
$ lsf
myfile    myfile3    projects/
```

The general form of the `cp` command is as follows:

```
cp from_path to_path
```

where *from_path* is the file name or path name of the file you want to copy, and *to_path* is the path name of the directory or file to which you are copying.

Changing Your Login Shell

If your system was installed for you, the installer may have chosen a shell for you. If you prefer to use another shell, you may change your shell permanently by using the `chsh` (**ch**ange **sh**ell) command:

```
chsh username full_shell_name
```

where *username* is your user name and *full_shell_name* is the full path name of the shell you want as your login shell. After you use the `chsh` command, you must log out and log in again for the change to take effect. For example, if the user `terry` changes the default login shell to the Korn Shell, the command reads:

```
$ chsh terry /bin/ksh
```

Learning More about Shells

To learn more about the HP-UX shells, read *A Beginner's Guide to HP-UX*. This book explains many of the features of the different shells and provides examples of how they may be used. For a more detailed exploration, read *A User's Guide to HP-UX Shells*, an extended tutorial on the uses of the shells. For a technical description of the shells, see *sh(1)*, *ksh(1)*, *keysh(1)*, and *csh(1)* in *HP-UX Reference*.

4

Putting New Applications on Your Workstation

This chapter describes how to install applications on your workstation using the `/etc/update` program. You will use the same procedure to install optional HP-UX products such as Network Services.

Caution Do not use this chapter to install the HP-UX operating system. If you have an HP-UX Install tape, use the instructions that came with your installation tape.

The following table tells you where to go for information.

If You Plan to ...	Where to Go Next ...
Add new optional applications or update existing applications on a system running HP-UX 8.0.1	Use this chapter, the online help screens, and the documentation accompanying the application software.
Perform a non-interactive update.	Refer to <code>update(1M)</code> in the <i>HP-UX Reference</i> and “Running Update Non-interactively” in this chapter.
Protect the applications you have added to your system by making copies of your system’s disks.	See the section “Protecting Your Programs and Data” in this chapter.
Convert a system into a network software distribution server.	See the section “Setting Up a Network Server to Update HP-UX” later in this chapter or <code>netdistd(1M)</code> in the <i>HP-UX Reference</i> .

Interactive Versus Non-interactive Update

The update program described in this book is **interactive** and uses menus, prompts, and help screens to guide you through the procedure.

A **non-interactive** (command line) interface is also available, but is less friendly than the interactive **update** program. You might want to use the non-interactive interface under these conditions:

- You are not working at your workstation and are using a non-HP terminal that is incompatible with the screen control used in the interactive version of **update**.
- You use **update** regularly and want to bypass the interaction.

If you want to do a non-interactive update, refer to *update(1M)* in the *HP-UX Reference* for descriptions of command line options.

If Problems Occur During an Interactive Update ...

Many errors can be handled immediately during an interactive update. If an error occurs during the **update** program, a message is displayed telling you what happened. This message (together with any other error messages) is also recorded in `/tmp/update.log`. For additional information, see “Checking the update.log File” and “Troubleshooting the Update Process” in this chapter.

If Problems Occur During a Non-interactive Update ...

Errors that occur *before* loading begins produce messages to the file `/tmp/update.log` and to standard error. These errors cause **update** to quit immediately.

Errors that occur *after* loading begins are also logged to `/tmp/update.log` and written to standard error. Review these errors after loading completes.

For additional information, see *update(1M)* in the *HP-UX Reference*. Also see “Checking the update.log File” and “Troubleshooting the Update Process” in this chapter.

4-2 Putting New Applications on Your Workstation

Before Running Update

Before All Updates

This section lists things you need to do *before* you update a system.

See the related documentation.

- See the *Read Me Before Installing HP Apollo 9000 Model 720/730* document supplied with your workstation.
- See the *Release Notes for HP-UX 8.01*.
- If you are installing optional products, you may need to see:
 - *Installing and Administering ARPA Services*
 - *Installing and Administering Network Services*
 - Any documentation supplied by your software vendor

Make sure you can recover your system.

- If you make a mistake during `update`, you will be able to recover your data *only if you have backed up the system*. Refer to the *System Administrator's Tasks* manual for information on how to do a system back-up.

```
cp /hp-ux /SYSBCKUP
```

- Check `/etc/checklist` to ensure that it is complete and correct, since `update` will mount all volumes (except local mounted file systems).

Find out how to access your update source media.

The following list indicates how to access the various types of update source media. Check the source media you are using.

If You are Updating from a DAT Drive. Find out the correct device file name for your DAT drive. On a Series 700, the program defaults to `/dev/update.src`. However, device file names can vary: if your system does not have the default device file, determine the name of the source device's device file name now.

If you don't know the device file name, determine its name from the information given in a directory listing:

- ll /dev (if all your device files are in the /dev directory).
- ll /dev/rct (if your device files are grouped in sub-directories).

If You Are Updating from a Network Server. Before you can update over the network, you must set up the `netdist` server. See the section “Setting Up a Network Server to Update HP-UX Applications” later in this chapter for instructions. If your server is already set up and you are ready to update, you need to find out the hostname of the `netdist` server from which you will update, and the port number. You can find the port number in the `/etc/services` file on the `netdist` server (typically, this number is 2106). To find the hostname, enter `hostname` on the `netdist` server. Then continue with this procedure.

Check the file systems to be mounted.

The `/etc/update` facility will mount all file systems listed in `/etc/checklist`. If you don't want a file system to be mounted (for example, `/users`), comment out the line in `/etc/checklist` before you start the `update` program. Leave NFS file systems (if any) in the checklist file.

Protect your user's sessions.

Your workstation may be running programs for other users. If you will be adding an application that requires a reboot during its installation, you must put the system into its **single-user state**. In this state, only you will be able to run programs on your system; the users' programs will be terminated. You have a responsibility to warn them that your workstation will soon become unavailable. Consult the application's installation documentation to see if a reboot is required.

More Tips on Updating

- Ensure that your `TERM` environment variable is set correctly; otherwise the display might behave strangely during the interactive update process (setting the `TERM` variable is described in *A Beginner's Guide to HP-UX*). You can use `CTRL-L` to refresh the screen except when `update` is loading filesets.
- Don't run console jobs in the background during an update: unexpected output to the terminal might result in unreadable update screens.

4-4 Putting New Applications on Your Workstation

- If you use a 700/92 terminal to add an application, your screen may go blank after a while if you don't enter anything from the keyboard. To turn the display back on, press the **(Shift)** key; this key is not interpreted as input. Do not use any other key for this.

Where to Go Next . . .

If You Plan to . . .	Move on to Section . . .
Update from a DAT drive or netdist server.	Work through the section "Running the Update Program." Then move to "Tasks to Perform after the Update."
Set up a netdist server to update over the network.	Go to the section "Setting Up a Network Server to Update HP-UX Applications" in this chapter. Then, if you want to perform an update, move to "Running the Update Program."
Update using the non-interactive mode.	Refer to <i>update(1M)</i> in the <i>HP-UX Reference</i> for instructions on running update using command line options.

Running the Update Program

Procedure

1. If you have not already done so, see the preceding section “Before Running Update”.
2. Become the superuser on the system you want to update.
3. Make sure you are in the root directory (`cd /`).
4. If you are loading optional filesets that do *not* require a system reboot, proceed to the next step. If you are not sure, proceed with the rest of this step.

If you are loading filesets that cause the system to reboot you should bring the system to a single-user state.

Note

The update program reboots the system if you select a fileset (or filesets) that are flagged to indicate a reboot is necessary. If a reboot is necessary, you will be warned before loading begins. You then have the option of proceeding or exiting the `update` program, bringing the system to a single-user state, and re-starting `update`.

Run the `shutdown` command. *First, make sure all users are logged off the system*, and then bring your system to a single-user state by entering:

```
/etc/shutdown
```

The system will take sometime (perhaps a minute or more) to shut down. Then it will start up in the single-user state and issue the `root` user prompt (normally `#`).

For additional information on system reboots, see `update(1M)` in the *HP-UX Reference*. For more information on the `shutdown` command, see `shutdown(1)` in the *HP-UX Reference*.

4-6 Putting New Applications on Your Workstation

Use this opportunity to run a simple check on the integrity of your file systems. The HP-UX program that performs this function is called `fsck`.

Enter:

```
fsck -p
```

For additional information on this command, see `fsck(1M)` in the *HP-UX Reference* and Appendix A of *Solving HP-UX Problems*.

5. To invoke the interactive `update` program, type:

```
/etc/update
```

6. When you invoke the interactive `update` program, you see the Main Menu. From this point, the update process is interactive: select items from a menu, and use the online help screens to explain specific options.

```
UPDATE                               Main Menu

Highlight an item and then press "Return" or "Select Item".
To refresh the screen press CTRL-L.

Source: Tape Device   Destination: Local System
/dev/update.src      /

Change Source or Destination ->

Load All Filesets on the Source Media ->
Select Only Filesets Currently on Your System ->
View/Select Partitions and Filesets ->

How to Use Update

-----
Help |      | Shell | Select |      |      |      |      | Exit
    |      |      | Item  |      |      |      |      |      | Update
-----
```

Note

Some tips on navigating in `update`:

You navigate in `update` the same way you navigate in SAM (the HP-UX System Administration Manager). For details on navigating, use the arrow key to highlight the “How to Use Update” menu item in the Main Menu, and press `Help` (function key `F1`). See also “Using the System Administration Manager” in chapter 1 of the *System Administration Tasks* manual.

During the update process, you will progress through a series of screens. If you are uncertain about the function of certain menu items or data entry fields, highlight that item or field, and press `Help`.

7. The default source for update on Series 700 systems is `/dev/update.src`, and the default destination is root (`/`). If you’re updating from a DAT drive, and the source and destination shown in the Main Menu are correct, go on to the next step *now*.

If the source or destination needs to be changed or if you are updating from `netdist` server or CD-ROM, choose the appropriate procedure from among the following panels:

To change the source or destination for a DAT drive:

Select "Change Source or Destination" from the Main Menu. Then select "From Tape Device to Local System". The following menu appears.

From Tape Device to Local System

Modify the desired field and press "Done".

Tape Device File (source): /dev/update.src -----

Destination Directory: / -----

| Help | | | Done | | | | Exit |
| | | | | | | | Window |

To change the **Source** field enter the name of the device file, or regular file containing a tar archive, from which you want to update. The default is /dev/update.src.

To change the **Destination** field enter the name of the directory on the local system where the files should be loaded. The default is / for update and /netdist for updist (if you are setting up a network update server.)

If the new source or destination entered is shorter than the old source name, you must use the space bar to "wipe out" the remaining characters in the field, or they will be considered part of the new name.

When you're finished making changes press **Done** to return to the Main Menu.

To update from a netdist server:

Select "Change Source or Destination" from the main menu. Then select "From Netdist Server to Local System". The following menu appears.

From Netdist Server to Local System

Modify the desired fields and press "Done".

Netdist Server (source): _____

Port Number: 2106

Specify the system type of the files to be loaded.

HP9000 Series (300,400 or 600,800): 800

Destination Directory: / _____

```
-----  
| Help |      |      | Done |      |      |      | Exit |  
|      |      |      |      |      |      |      | Window |  
-----
```

In the **Source** field enter the system name or the internet protocol address of the **netdist** server that will be the source of the update. To find out the system name, enter **hostname** on the **netdist** server, or look in the **/etc/hosts** file for the internet address. There is no default.

The **Destination** field indicates the name of the directory on the local system where the files should be loaded. The default is root (/).

The **Port Number** field indicates the network port number where the **netdist** server's **netdistd** command is responding to requests for updates. If you are updating Series 700 software, the port number is typically 2107. (The **netdistd** daemon for Series 700 must run under a different port number from that used for the 300 and 800 Series.)

When you're finished making changes press **Done** to return to the Main Menu.

4-10 Putting New Applications on Your Workstation

Note

If you are running `updist`:

During `updist`, the **HP9000 Series (300 or 800)** field indicates the type of system files (300 or 800) you want to load. The default displayed is the architecture of the system where update is being run.

The `update` and `updist` programs do not distinguish between Series 700 and 800 software, so if you are on a Series 700 system, you will see 800 displayed. A `netdist` server can be configured to offer any combination of 300, 700, or 800 filesets.

During `updist` (used when you're setting up a `netdist` server), this field is always displayed, since you may want to load files of either 300, 700, or 800 architecture for redistribution via `netdist`.

8. From the Main Menu, choose what software you wish to load from your update source media. The choices are:

Select All Filesets on the Source Media ->

Selecting this item directs update to automatically select every fileset on the source. You will then see the "Select All ..." screen appear. If you wish to examine the filesets selected for loading choose "View Partitions and Filesets before Loading." You can make adjustments to filesets marked for loading, deselecting those you don't want.

Select Only Filesets Currently on Your System ->

Selecting this item causes update to automatically select filesets from the source that match the functionality already existing on your system.

To match the functionality on your system, `update` surveys the `/etc/filesets` directory on the destination system and selects from the source new filesets whose names match those in `/etc/filesets`.

Select/View Partitions and Filesets->

Selecting this item directs update to advance you to the "Select/View Partitions and Filesets" screen. You can use this screen to tailor the functionality loaded on to your system.

9. When you are satisfied with your choice of software, select “Start Loading”; the system will calculate whether disk space is adequate to load the selected filesets. It accounts for the current sizes of files that will be updated. If adequate space is available, loading starts.

Note

If the system calculates that the amount of free disk space after loading will be below the recommended minimum or that there is insufficient space to load the selected filesets, you will receive a warning message.

You must have a certain amount (10% by default) of free disk space on each mounted file system to which you will load files. This space is called “minimum free space,” or *minfree*. Only the superuser (a person logged in as **root**) can allocate space on a file system with less than *minfree*.

If you are using **update** interactively, you can proceed with loading even if less than *minfree* will remain on one or more file systems to which you will load files. However, it is recommended that you first free the minimum free space.

If you do not have sufficient disk space on one or more file systems to complete your update, you cannot proceed with loading. You must free a sufficient amount of the file system’s disk space before you can proceed with the program.

To free up more disk space, see “How to Free Disk Space”.

As **update** (or **updist**) loads filesets, progress messages are displayed and are recorded in `/tmp/update.log`.

The system may reboot twice while loading filesets. When loading is completed, the login prompt appears. Go on to the section “Tasks to Perform After Update”.

4-12 Putting New Applications on Your Workstation

If You Need to Free Up Disk Space

The `update` program determines if you have sufficient disk space before it begins loading filesets. To calculate the amount of free disk space, `update` searches all mounted volumes to find where the files to be updated reside. It learns whether those volumes are writable (not NFS mounts or read-only disks) and it compares the sizes of existing files on the destination with the filesets on the update source.

The amount of disk space available on your destination depends on these factors:

- The files on your system.
- The size of your disk (or disks).
- The partitions and filesets you select to load.
- The minimum free space required on your system's mounted file systems.
- Swap space requirements on your system.
- Future expectations for space requirements on your system. To deal with space problems over the long term, you might consider mounting an additional disk device or adjusting swap space.

How to Free Disk Space

You can free disk space by de-selecting filesets or removing files, by mounting another file system, or by creating symbolic links.

Deselect Filesets or Remove Files Interactively

While in the `update` program, you can free disk space by deselecting filesets using the Partition Selection screen, the Fileset Selection screen, , or the Disk Space Analysis screen.

Alternatively, you can remove unnecessary files from the file system by pressing the `Shell` function key, removing files, and returning to the `update` program. To inspect files larger than *n* kbytes, use the `find` command with a size parameter (see `find(1)` in the *HP-UX Reference*).

The specific files you might want to remove will vary. To start, check the following for unnecessary files: `/tmp`, `/etc/*tmp*` (you might remove `wtmp` or `btmp`), `/usr/adm`, `/usr/local`, `/usr/contrib`, `/usr/tmp`, `/users`. You can remove unnecessary filesets using the `rmfn` command (see `rmfn(1M)` in the *HP-UX Reference*).

Note Do not remove files or directories under `/system`. If you do, you won't be able to convert to (or create) an HP-UX cluster. Also, system customization may fail if you decide to load new filesets later.

Mount Another File System

In the *System Administration Tasks* manual, the chapter titled “Managing the File System” describes how to mount additional file systems to free disk space.

Create Symbolic Links

You can free disk space by moving files or directories and creating “pointers” (or **symbolic links**) from the old locations to the new locations. Symbolic links can span file systems and refer to directories as well as files. Create symbolic links with the command `ln -s` (see `cp(1)` in the *HP-UX Reference*).

4-14 Putting New Applications on Your Workstation

For example, to move `/usr/man` from `/usr` to `/extra/man` (where `/extra/man` is a file system in which more free space exists), follow the steps below. Because `/usr/man` is approximately 5 Mbytes, you will be freeing 5 Mbytes in the `/usr` file system and consuming that amount in `/extra`:

- | | |
|---|--|
| 1. <code>cd /usr</code> | 1. Copy the subdirectory from <code>/usr</code> to <code>/extra</code> . |
| <code>find man -print cpio -pdumv /extra</code> | 2. Temporarily rename the original <code>man</code> (this is your “backup”). |
| 2. <code>mv /usr/man /usr/man.old</code> | 3. Create a symbolic link between the directory’s new location and its old location. |
| 3. <code>ln -s /extra/man /usr/man</code> | 4. List the contents of the directory. |
| 4. <code>ls /usr/man</code> | 5. List the contents of your “backup”; the output should match the output of Step 4. |
| 5. <code>ls /usr/man.old</code> | 6. If the outputs match, remove your “backup.” |
| 6. <code>rm -rf /usr/man.old</code> | |

If the outputs from Step 6 *don’t* match, remove the link, and start over at Step 1. To remove the link, type the following:

```
rm -rf /usr/man /extra/man
mv /usr/man.old /usr/man
```

Getting More Information

- Refer to `update(1M)` in the *HP-UX Reference* to learn more about using `update` non-interactively.
- Refer to `rmfn(1M)` in the *HP-UX Reference* to learn more about using the `rmfn` command.
- Refer to `cp(1)` in the *HP-UX Reference* to learn more about using the `ln` command.
- Refer to the *HP-UX System Administration Concepts Manual* for a more detailed discussion of swap space, disk space requirements, and `minfree`.

Tasks to Perform after the Update

After the `update` program has completed, you need to perform various tasks to set up the system for users. These tasks include the following:

1. Log in and check the following files and directories:

Check this ...	For this Information ...
<code>/tmp/update.log</code> file	Contains a description of the events and any errors that occurred during the update process. For more information, see “Checking the update.log File” in this chapter.
<code>/etc/newconfig/ReleaseNotes</code> directory	Contains files with software product update information.
<code>/etc/newconfig/README</code> file	Contains useful information about files in <code>/etc/newconfig</code> .

Checking the update.log File

After running the `update` or `updist` programs, check `/tmp/update.log` for a description of the events and any errors that occurred during the process. This log file has a date and time heading that corresponds to each update session. After you've reviewed this log, you might want to remove it: the `update` program will continue to append to this log file, and it could become large.

The `update.log` file contains three broad kinds of messages:

1. Output from `update` or `updist`. These messages are indented nine spaces and might be preceded by a message label:

=====
Indicates that a task is beginning or has completed. For example:

```
=====  
... BEGINNING UPDATE PROGRAM  
=====  
... COMPLETED UPDATE PROGRAM
```

ERROR: Indicates the program cannot proceed, or that it needs corrective action. For example:
ERROR: Destination directory `"/mount"` is invalid:
No such file or directory.

WARNING: Indicates the program can continue. However, something went wrong or requires attention, either now or later. For example:
WARNING: Cannot access `/etc/checklist` file: No such file or directory.

NOTE: Indicates that something out of the ordinary or worth special attention has happened. For example:
NOTE: Saved `/hp-ux` in `/SYSBCKUP`.

asterisk (*) Indicates generic progress and status messages. For example:
* Beginning to load fileset `"KERN_BLD"`.
* Successfully loaded fileset `"KERN_BLD"`.

All **ERROR** and **WARNING** messages are also displayed to the screen, whether `update` or `updist` runs interactively or from the command line.

2. Output from fileset customize scripts, which should be in the same format described above.
3. Output (standard output or standard error) from programs executed by `update`, `updist`, or a customize script. For example, the following output is from a program executed by `update`:

```
          Following is output from "/bin/make":  
=====
```

```
Compiling conf.c ...  
    /bin/cc  +O1 +M -Wc,-Wd3500,-Ns3500 -Dhp9000s200 -D_hp9000s300 -D_hp90  
  
...
```

Protecting Your Programs and Data

Your programs and data are of great value, and you should have procedures in place to make periodic copies of them on other media, such as DAT tape. Such a copy of your file system is called a **backup**.

There are two kinds of backups:

Disk image A special tape containing an exact bit-for-bit copy of your disk(s). In the event of a file system failure that prevents you from booting or logging into your workstation, you can boot the **secondary loader** from the image tape and copy the saved disk image to your disk.

A disk image of your preinstalled software was delivered on the support tape that came with your workstation. It is intended to be used only if your system fails to operate when you first turn it on. For instructions on its use, see “Troubleshooting the Update Process”.

You can also make your own disk images. See “Creating a Disk Image” for instructions.

Backup tape A tape that contains copies of some or all of the files on your workstation. The backup tape differs from the disk image in three ways:

- A backup tape need not contain all the files on your system, and files may be copied to or from it one at a time. This is not possible with a disk image. It is a much more flexible tool for maintaining the security of your data.
- A backup tape is made with the **fbackup** utility, and it is restored with the **frecover** utility. A disk image is made with the **dd** command (see “Creating a Disk Image”), and it is restored to disk with a special procedure described in “Recovering a Disk from an Image Copy Made with **dd**” in Chapter 6.
- You cannot boot your system from a backup tape. You can start your system only from a bootable image on a disk or on

a tape created with the procedure described in “Creating a Disk Image”.

Note You should back up your disks on a regular basis. You may use either `fbackup` or `dd`, or both in an appropriate combination.

For information about backing up your system, see *HP-UX System Administration Tasks*. For instructions on restoring a seriously damaged file system with a disk image, see “Restoring Your Disk(s)” in Chapter 6.

Creating a Disk Image

Create a **disk image** as soon as you have added applications or customized your system in any way.

You need some knowledge of **device files** to create a disk image. The DAT drive and the disks inside your system use device files to accept and transmit data. The DAT drive uses the device file called `/dev/rmt/0mn`. The root (`/`) disk uses `/dev/rdisk/6s0`, and the user (`/usr`) disk uses `/dev/rdisk/5s0`.

There is a file on the root disk called `/usr/lib/uxbootlf.700`. If you copy it onto the tape *before* you copy the image of the entire disk, you will be able to restore your disk from the tape. This can be very useful. If a disk becomes damaged, you will be able to recover its contents by using the tape, even if the workstation cannot be booted in the normal manner.

To create a disk image:

1. Shut down your system, and put it into single-user mode. See “Controlling Access to Your System” in the *System Administration Tasks* for information on how to do this.
2. Log in as superuser (`root`). See *A Beginner’s Guide to HP-UX* for information on how to log in from the shell prompt.
3. Put a DAT cassette into the system’s tape drive. Make sure that the cassette is *not* write-protected. To do this, check the rear of the cassette. You will see a sliding tab in one corner. This tab is used to open and close the “recognition hole” in the cassette. If the hole is open, the cassette

4-20 Putting New Applications on Your Workstation

is write-protected; if it is closed, data may be written on the tape. If necessary, slide the tab to *close* the recognition hole.

4. The command to copy a disk image onto tape looks like this:

```
$ dd if=disk_filename of=DAT_device_filename
```

If you want to copy the disk located at `/dev/rdisk/6s0`, type:

```
$ dd if=/usr/lib/uxbootlf.700 of=/dev/rmt/0mn bs=2k
```

The DAT drive will run for about one minute while the file is being copied.

When the DAT drive stops, type:

```
$ dd if=/dev/rdisk/6s0 of=/dev/rmt/0m bs=64k
```

This will cause the image of the disk to be copied to the DAT cassette. The length of time it takes to copy a disk image varies with the characteristics of different types of disks, but the copy could take up to an hour to complete.

5. Copy any other disks in a similar fashion. Use a *separate tape* for *each* disk image. If you copy two or more images onto the same tape, only the first one can be restored.

Setting Up a Network Server to Update HP-UX Applications

Use this section to set up your workstation as a server to update HP-UX applications over the network.

Overview of the `netdist` Program

Setting up a network server to distribute update software is particularly useful if you have a large groups of networked systems that must be updated to a new application.

You can set up a network distribution (`netdist`) server on your network to distribute applications over the network. Other systems on the network can then run the standard `/etc/update` program, specifying the `netdist` server as their update source instead of tapes.

To set up a `netdist` server, you run the `updinst` program (a variant of `update`) on the server. The `updinst` program transfers files from the update tapes to the server disk.

You then start the `netdistd` daemon running on the server enabling other systems to draw filesets from a server distribution directory (typically called `/netdist.700` if you are distributing Series 700 software). This directory is set up when you run the `updinst` program. The `netdistd` daemon delivers the filesets from this distribution directory over the network to the requesting system.

Note that updating from a `netdist` server does *not* require a DAT drive on the system to be updated.

Before Setting Up a Network Distribution Server

You need to meet the following requirements before you can set up a `netdist` server.

- *Make sure the server has adequate disk space mounted at `/netdist.700`.*
The actual size will depend on the size of the filesets you wish to distribute. In fact, you might want to mount a separate disk on the `netdist` server to contain the directories from which the server distributes files. (For information on adding disks and mounting file systems, see the *System Administration Tasks Manual*).
- *Set up the networking software.* To transfer files, between the `netdist` server and client systems, set up `ftp` (file transfer protocol) in the “anonymous” mode. Anonymous `ftp` is not the only method you can use to transfer files, but it provides a fast, effective vehicle for file transfer among networked systems. If you do not have anonymous `ftp` on your system, you can set it up using `sam(1M)` or by consulting the manual *Installing and Maintaining NS-ARPA Services*.

Setting Up a Network Distribution Server

1. If you have not already done so, read the preceding section “Before Setting Up a Network Distribution Server”.
2. On the server, create the directory `/netdist.700` if it does not already exist. (The `netdist` program will build a hierarchy under this directory that includes a sub-directory labeled `800`; however, you’ll actually be loading 700 filesets. The `updlist` program does not distinguish between Series 700 and 800.)

Note If you are also setting up the server to distribute Series 300/400 or 800 software, make sure those filesets are loaded into a directory other than `/netdist.700`. Name the distribution directory for the other series `/netdist`. Since the `updlist` program is able to distinguish between 300/400 and 800 filesets, both of these architectures can be loaded into the same directory. If you specify the `/netdist` directory when you run `updlist` and you load both Series 300 and 800 filesets, the `updlist` program creates separate subtrees for 300 and 800 under `/netdist`.

3. Make sure the `/etc/services` file contains entries for the `netdist` server. The entries should look something like this:

```
netdist      2106/tcp      # network file distribution
netdist.700  2107/tcp      # network file distribution for Series 700
```

2106 and 2107 are the port numbers on the server for Series 300/400/800 and Series 700, respectively.

If the entry does not exist, add it by typing the above example into the `/etc/services` file on the server.

4. On the server, enter,

```
/etc/updlist
```

The `updlist` program (a variant of `update`, see the previous chapter) transfers filesets from tape or another server to a hierarchical structure beneath the distribution directory on the server. These filesets are the ones

4-24 Putting New Applications on Your Workstation

the `netdist` server delivers to other systems on request: the filesets you select using `updist` are the only ones the `netdist` server can provide.

To distribute software for Series 300, Series 700, and Series 800 systems, run the `updist` program with each series set of update tapes. After all sets of software are loaded, the Series 300 and 800 software is contained in separate directories beneath the `/netdist` directory. Series 700 software is contained in the 800 directory beneath `/netdist.700`.

5. When `updist` completes, to bring up the server to distribute Series 700 software, enter

```
/etc/netdistd -l -f /netdist.700/MAIN.pkg -P 2107
```

The `netdistd` program is the daemon that monitors the network for `netdist` requests. The `-l` (lowercase L) option causes the `netdist` daemon to log activity and error information to `/usr/adm/netdist.log`. The `-f` option causes `/netdist.700/MAIN.pkg` to list the filesets available for network distribution. These files are described later in this chapter. The `-P` option specifies the port number on the server. For other options to `netdistd`, see `netdistd(1M)` in the *HP-UX Reference*.

If you are also using the server to distribute Series 300 or 800 software, enter:

```
/etc/netdistd -l lowercase L
```

6. Make the `update` program on the server available for network distribution to client systems.

On the server, build the T00L archive.

Enter the following commands at the system prompt.

Series 700 To distribute software for a Series 700, type:

```
cd /netdist.700/800/T00L/product Remember, 700 filesets are stored under a directory labeled 800
```

```
tar -cvf /tmp/T00L.700 etc system
```

Series 300 To distribute software for a Series 300, type:

```
cd /netdist/300/T00L/product
tar -cvf /tmp/T00L.300 etc system
```

Series 800 To distribute software for a Series 800, type:

```
cd /netdist/800/T00L/product
tar -cvf /tmp/T00L.800 etc system
```

7. This step assumes that anonymous ftp has been set up on your system (see “Before Setting Up a Network Distribution Server” earlier in this chapter):

Make the T00L archive available to requesting systems by putting the archives in a place where other systems can get them. Type:

```
mkdir /users/ftp/dist
```

Then type the appropriate sets of commands at the system prompt:

Series 700: `mv /tmp/T00L.700 /users/ftp/dist/T00L.700`
 `chmod 444 /users/ftp/dist/T00L.800`

Series 300: `mv /tmp/T00L.300 /users/ftp/dist/T00L.300`
 `chmod 444 /users/ftp/dist/T00L.300`

Series 800: `mv /tmp/T00L.800 /users/ftp/dist/T00L.800`
 `chmod 444 /users/ftp/dist/T00L.800`

8. Check that the requesting systems have permission to access the `netdist` server. Permissions are set up in the `/usr/adm/inetd.sec` file on the server. See *inetd.sec(5)* in the *HP-UX Reference* for details.

Getting More Information

For additional information on the `netdist` daemon, see *netdist(1M)* in the *HP-UX Reference*.

For additional information on using or setting up anonymous ftp, see *sam(1M)* or *Installing and Maintaining NS-ARPA Services*.

For additional information on disk space, see the *HP-UX System Administration Concepts Manual*.

For additional information on networking hardware, see available hardware configuration manuals and data sheets, such as the *HP9000 Series 300 Hardware Configuration Guide*.

4-26 Putting New Applications on Your Workstation

Shutting Down the Network Distribution Server

You'll need to shutdown an existing `netdist` server before updating it to distribute a new version of software. Failure to do so can cause the `update` or `updist` program to terminate and trigger a core dump.

Procedure

1. The `netdistd` daemon spawns a child process to handle each incoming update request. Thus, if three update requests are being serviced, four copies of the `netdistd` daemon are running (one parent and three child processes).

Determine which process is the *parent* process by viewing the file in `/usr/adm/netdist.log`.

The line showing the parent process in the log file will look something like this:

```
netdistd.560 14:59:46...Started on port 2107
```

Lines in the log file beginning with `netdistd` indicate a “parent” daemon. The parent daemon’s process ID (PID) is the number immediately following `netdistd` (in the example above, this number is 560). (see the following section “Checking the `netdist.log` File” for additional information on the `netdist.log` file.)

2. Kill the original parent daemon using the PID number (see `kill(1)` in the *HP-UX Reference*), and wait for any child daemons to terminate normally. Killing the parent daemon prevents any new connections from being established.

Caution Kill the child process *only* if you must—if you do, you will interrupt an update in progress.

For example, to kill the parent process in the above example, enter:

```
kill 560
```

Adding and Updating Filesets on the Network Distribution Server

Prerequisite

- Read the previous section, “Shutting Down the Network Distribution Server”.

Adding New Filesets to an Existing Server

1. Run the `updist` program on the server, as described in Step 4 of “Setting Up a Network Distribution Server”. Load the new filesets you want.
2. When the `updist` program has completed, kill and restart the parent `netdistd` daemon. To kill the parent daemon see “Shutting Down the Network Distribution Server”.

To restart the `netdistd` daemon, enter the `netdistd` command appropriate to series architecture you are distributing.

For example, to start the `netdistd` daemon to distribute Series 700 software, enter:

```
/etc/netdistd -l -f /netdist.700/MAIN.pkg -P 2107
```

To start the `netdistd` daemon to distribute Series 300 or 800 software, enter:

```
/etc/netdistd -l lowercase L
```

Updating Existing Filesets on the Server

1. Shut down the `netdist` server (see the previous section “Shutting Down the Network Distribution Server”). If you don’t shut down the server, you might update files of a fileset that is being distributed to a remote system.
2. Run the `updist` program, as described in Step 4 of “Setting Up a Network Distribution Server” to update existing filesets with filesets on the update source media.

4-28 Putting New Applications on Your Workstation

3. When `updists` completes, restart the `netdistd` daemon, by entering the `netdistd` command appropriate to series architecture you are distributing.

For example, to start the `netdistd` daemon to distribute Series 700 software, enter:

```
/etc/netdistd -l -f /netdist.700/MAIN.pkg -P 2107
```

To start the `netdistd` daemon to distribute Series 300 or 800 software, enter:

```
/etc/netdistd -l lowercase L
```

Checking the `netdist.log` File

The `netdistd` daemon records events in `/usr/adm/netdist.log` if you specify the `-l` argument when you start the daemon (`/etc/netdistd -l`).

The `netdist.log` file contains the following information:

- The process ID of the parent `netdistd` daemon.
- The number of remote, incoming requests for the `update` program.
- The number of `update` program requests currently being serviced. By default, a `netdist` server can service twenty remote update sessions simultaneously. To change the default, use the `-C` option, as described in `netdistd(1M)` in the *HP-UX Reference*.

Here is an example of a `netdistd.log` file (the example is explained on the following page):

```
Version @(#) $Revision: 64.7 $ (1)
Building database 14:56:42
Database ready 14:59:46
netdistd.560 14:59:46...Started on port 2106 (2)
netdistd.560 14:59:46...Connection limit is 2
1.562 15:09:22...Begin service for hptest on port 2106 (3)
1.562 15:09:22 update @(#) $Revision: 64.492 $
1.562 15:09:22 HP-UX hptest A.B7.00 B 9000/800 15453
```

```
2.570 15:10:36...Begin service for hpclient on port 2106 (4)
2.570 15:10:36 update @(#) $Revision: 64.492 $
2.570 15:10:36 HP-UX hpclient 6.5 B 9000/300
1.562 15:13:02...End service for hptest
2.570 15:27:17...End service for hpclient
```

- (1) The first three lines in the preceding example print when you start the `netdistd` program. The first line shows the version of the `netdistd` program; the second and third lines indicate that the database was initialized successfully.
- (2) Entries beginning with `netdist` indicate a “parent” daemon. The parent daemon’s process ID (PID) is the number immediately following `netdist` (in the example, opposite, this number is 560). When shutting down the `netdist` server, use this PID to kill the parent daemon process.
- (3) and (4) Entries beginning with a digit indicate “child” daemons. The first number (for example, the 1 in 1.562) is a counter that increments by one each time a child daemon is spawned. This counter lets you determine the number of update sessions that have used this `netdist` server since the server was started. In the opposite example, two child daemons (1.562 and 2.570) have been spawned from the parent daemon (560).

The number following the counter (for example, the 562 in 1.562) is the child daemon’s process ID (PID). *Do not kill the child process*—if you do, you will interrupt an update in progress.

Finding Out What Filesets Are Available to Network Update

You can determine what filesets are available on the `netdist` server for network update by checking the `MAIN.pkg` file.

Checking the `MAIN.pkg` File

This `MAIN.pkg` file is automatically created or modified when you run the `updlist` program; it describes the filesets available on the server for network distribution. The file's contents will look something like this:

```
source "/netdist/800/ACCOUNTING/netdist.pkg";
source "/netdist/800/ALLBASE1/netdist.pkg";
```

Statements beginning with `source` identify which filesets are available for network distribution. To prevent a fileset from being distributed, place a pound sign (`#`) at the beginning of the statement, or remove the statement from the file (see the following section for the complete procedure).

Checking Dependencies between Filesets

Dependencies exist between some filesets. A fileset that depends on one or more other filesets will have a comment directly beneath its `source` statement. For example:

```
...
source "/netdist/800/NS_SERV/netdist.pkg";
#NOTE: NS_SERV depends on LANLINK
...
source "/netdist/800/NFS_RUN/netdist.pkg";
#NOTE: NFS_RUN depends on LANLINK
...
source "/netdist/800/LANLINK/netdist.pkg";
...
```

In the example above, the `NS_SERV` and `NFS_RUN` filesets depend on the `LANLINK` fileset. Do not comment out the `source` statement for `LANLINK` unless you also comment out the lines for `NS_SERV` and `NFS_RUN`.

The `update` program issues an error message if the `netdist` server from which the program is updating contains unsatisfied fileset dependencies.

To verify that the dependencies are correct, type the following command on the client system once the `netdist` server is running:

```
update -s server_hostname -c
```

Modifying What Filesets are Available to Requesting Systems

To change what filesets are available on the `netdist` server for distribution to requesting systems you can modify the `MAIN.pkg` file. To modify the `MAIN.pkg` file once `netdistd` is running, follow these steps:

1. Shut down the `netdist` server (see “Shutting Down the Network Distribution Server” in this chapter).
2. Determine which filesets you do not want to distribute over the network.
3. Edit the `MAIN.pkg` file. Use `vi` (or any appropriate text editor) to place a pound sign (`#`) at the beginning of the statement or to remove the line. Be aware of possible fileset dependencies, as described in the preceding section.
4. Re-start the `netdist` server. For example, to re-start the `netdistd` daemon to distribute Series 700 software, enter:

```
/etc/netdistd -l -f /netdist.700/MAIN.pkg -P 2107
```

For example, to re-start the `netdistd` daemon to distribute Series 300 and 800 software, enter:

```
/etc/netdistd -l lowercase L
```

Troubleshooting the Update Process

The table in this section describes some of the possible situations and error messages that you might encounter during the interactive update process.

Situation	Possible Message(s)	What to Do
Updating from a local tape drive.	... Cannot verify the specified source. Change the source specified, or ensure the media is loaded and ready to read.	<ol style="list-style-type: none"><li data-bbox="995 653 1385 741">1. Ensure either the tape drive is online and has queued up the tape.<li data-bbox="995 762 1385 850">2. Ensure your source is correct. For the Series 700, the default source is <code>/dev/update.src</code>. <p data-bbox="995 871 1385 1085">If your system does not have the default device file, if you are updating from a different source, you must specify the correct name of the source device's device file. See "Before Running Update" in this chapter.</p>

Situation	Possible Message(s)	What to Do
Updating from a local source.	<code>Cannot open source name:</code>	<p>Ensure your source is correct:</p> <ul style="list-style-type: none"> ■ <i>Series 700</i>: Default source is <code>/dev/update.src</code>. <p>If your system does not have the default device file, if you are updating from a different source, you must specify the correct name of the source device's device file. See "Before Running Update" in this chapter.</p>

This table is continued on the following page...

Situation	Possible Message(s)	What to Do
Updating from a <code>netdist</code> server.	<ol style="list-style-type: none"> 1. <code>Netdist server host name is not in the hosts database.</code> 2. <code>Cannot connect to netdist server running on host x at port y: Server not running or connection refused.</code> 3. <code>Connection closed by netdist server on host name: Access to this server is restricted.</code> 4. <code>... Server has no filesets for this architecture.</code> 	<p>For each of these messages, first check that the host name and port number are correct. If you do not know the correct name/number, see the network or system administrator.</p> <ol style="list-style-type: none"> 1. Either add an entry for the server host to the hosts database, or use the server host's internet address instead of its host name. 2. The <code>netdist</code> server probably is not running on the specified host. Contact the network administrator. 3. The network administrator must modify the server's security file so your system can use the <code>netdist</code> service. 4. The server specified is not distributing software for your system type. Either locate a server that can distribute software for your system type, or configure the server specified so it can distribute the appropriate software.

Situation	Possible Message(s)	What to Do
Configuring a <code>netdist</code> server (running <code>updist</code>).	The software on this update media cannot be distributed by a <code>netdist</code> server due to missing CDF information.	Network distribution requires CDF information that does not exist on pre-7.0 media. Obtain a 7.0 (or later) version of this software.
Starting the <code>netdistd</code> program.	<ol style="list-style-type: none"> 1. Network service <code>name/tcp</code> is not in the services database 2. Address already in use 	<ol style="list-style-type: none"> 1. Either add an entry to the <code>/etc/services</code> file, or specify a port number using the <code>-Pport</code> option (see <code>netdistd(1M)</code> in the <i>HP-UX Reference</i> and <code>services(4)</code> in the <i>Networking Reference</i>). 2. Another <code>netdist</code> server program is running on the specified (or default) port. Specify a different port using the <code>-P port</code> option.
Destination disk is almost full.	<ul style="list-style-type: none"> ■ It is recommended you free up <code>n</code> kbytes.... ■ Loading the selected filesets would result in less free disk space ... 	See the section “Analyzing Disk Space” in this chapter. For instructions on mounting file systems to free disk space, see “Managing the File System” in the <i>System Administration Tasks</i> manual. For a detailed discussion of disk space, see the <i>HP-UX System Administration Concepts Manual</i> .
Not enough disk space to complete the update.	<ul style="list-style-type: none"> ■ You MUST free up <code>n</code> kbytes. ■ Loading the selected filesets is impossible due to insufficient space on one or more file systems.... 	See “If You Need to Free Up Disk Space” in this chapter. For mounting file systems to free disk space, see “Managing the File System” in <i>System Administration Tasks</i> . For a discussion of disk space, see the <i>HP-UX System Administration Concepts Manual</i> .

4-36 Putting New Applications on Your Workstation

Situation	Possible Message(s)	What to Do
<p>You selected filesets that caused a system reboot, but unexpected processes are running.</p>	<p>... non-essential process (other than those expected at the time of system reboot) ...</p>	<p>You have several options:</p> <ul style="list-style-type: none"> ■ Continue, and the processes will terminate when update reboots the system; users may lose work in progress. ■ Do a shell escape, and run cat or more on <code>/tmp/update.procs</code> to get PIDs of nonessential processes. Kill those processes using <code>/tmp/update.killall</code>. ■ Do a shell escape and run ps to inspect all processes running on the system. ■ Exit update, and run shutdown; then restart the program by typing <code>/etc/update</code>). You will lose any partition/fileset selections already made. ■ Do a shell escape and run <code>/tmp/update.killall</code>, a script built by update to terminate non-essential processes.

Situation	Possible Message(s)	What to Do
A customize script has failed.	Type "exit" to return to update.	Check <code>/tmp/update.log</code> , and re-run the customize script as indicated.
The process quits at boot-up, either during or after an update.	Utility requires more memory than is configured.	Reset the ISL <i>fastsize</i> parameter: <ol style="list-style-type: none"> 1. Cycle power on the processor (turn the processor off and then on again). 2. When you see this prompt, interrupt the autoboot process by pressing any key: To override, press any key within 10 seconds. 3. Press <code>y</code> at this prompt: Boot from primary boot path 4. Press <code>y</code> at this prompt: Interact with IPL 5. When you see the ISL> prompt, type: <code>fastsize f</code> 6. Cycle power on the processor again. The autoboot should now succeed.
Garbled display or odd behavior after the update.	No error message	You may have set <code>TERM</code> incorrectly. Setting <code>TERM</code> is described in <i>A Beginner's Guide to Using Shells</i> . <code>(CTRL)-L</code> refreshes the screen.

Expanding Your Workstation and Replacing Its Parts

Your HP Apollo 9000 Model 720/730 workstation can be expanded and modified in many ways:

- additional memory
- additional disk storage, both internal and external
- different graphic display systems

This chapter contains descriptions and illustrations of how to add these options to the system unit.

It also contains the procedures for removing and replacing your workstation's internal components, should that ever be necessary. Each procedure references one or more illustrations for the task at hand. You will find a list of the replaceable parts under the heading "Replaceable Parts List".

This chapter does *not* include procedures to replace components in any external graphics unit that may be in your system, nor are there any procedures for the monitor or any peripherals. See the documents that accompanied these units for any such instructions.

Procedure Terminology

Pay special attention to the first word in each procedure's title. This keyword informs you of the type of operation you are about to undertake:

Terms	Definition
Replacing	Implies removing a component and installing another component of the same type. Example: to replace a bad component to resolve a hardware problem.
Changing	Implies changing the functionality of the component. Example: to change 802.3 LAN types between thin or thick cables.
Updating	Implies removing a component and installing another version of the same component type. Example: to change disk units to increase capacity.
Adding	Implies installing a component where no previous component was installed. Example: to increase main memory capacity.

5-2 Expanding Your Workstation and Replacing Its Parts

Electrostatic Discharge (ESD) Precautions

Electrostatic discharge (ESD) can result from the buildup of static electricity on or around the components you handle. You can even carry a charge on your own body, and the discharge of this energy through a component or your workstation can cause damage to the system.

Caution

Observe the following precautions at all times during these removal and replacement tasks to prevent damage to the system unit components from ESD:

- Wear a grounded static strap on your wrist to ensure that any accumulated electrostatic charge will be discharged from your body to ground.
 - Keep all uninsulated printed circuit cards in their protective antistatic bags.
 - Handle all printed circuit cards by their edges, once you have removed them from their protective antistatic bags.
-

Replaceable Parts List

System Unit Components

- Major components for the Base Package (PN A1094-62001):
 - Processor card (PN A1094-66510)
 - SIMM card (8 Megabyte) (PN A1094-66521)
 - Core I/O card (PN A1094-60005)
 - Power supply assembly (PN 0950-2081)
- Optional components include:
 - Disk tray assembly (PN A1094-62021)
 - 210 megabyte disk assembly (PN A1094-62025)
 - Graphic interface card (PN 987x5-6658x)

Getting Ready

Perform the following steps to safely power down your workstation:

1. Make sure that any user processes have been stopped. In particular, warn any persons who may be using the system that you are about to take it out of service.
2. If the system is running a windowing environment, exit it by holding down the **CTRL** and **Shift** keys. While you are holding them down, press the **Break** key. The window display will vanish and be replaced by a text display. At the bottom of the screen, you will see these words:

Console login:

3. Log in as **root** and give the superuser password for your system.
4. Soon the shell prompt (usually **\$** or **%**) will appear. When it does, type:

```
$ reboot -h
```

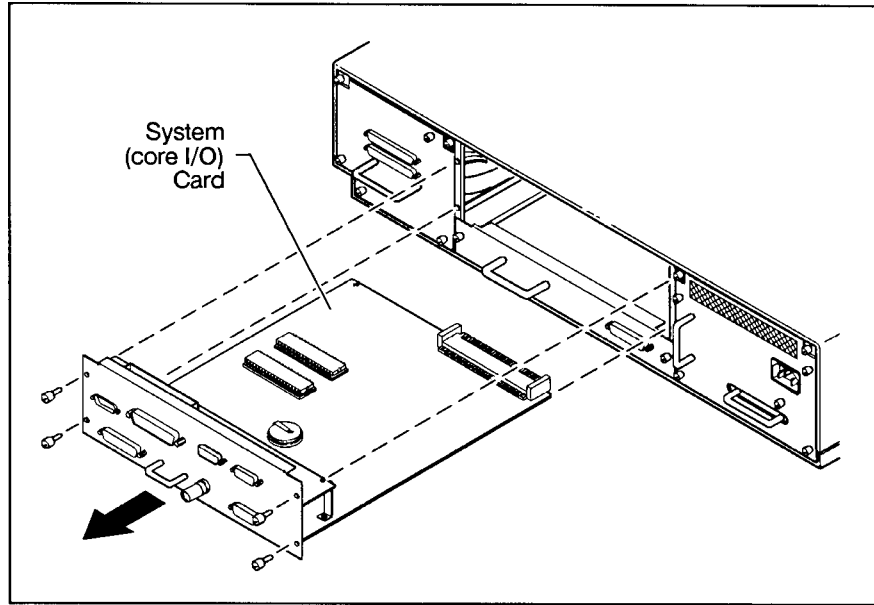
and press **Return**.

5. Wait for the word **halted** to appear at the bottom of the screen.
6. Turn off the power to all of the workstation's components and *remove the power cord* before replacing components or adding options to the system unit cabinet.

Replacing the Core I/O Card

Perform the following steps in the order given to replace the core I/O card:

1. Power down all the workstation components; disconnect the power cord from the system unit; disconnect all the cables connected to the core I/O card.
2. Remove the core I/O card from the middle slot of the system unit cabinet as shown in Figure 5-1.
3. Remove the two EEPROMs on the original core I/O card and install them on the other core I/O card. These EEPROMs contain boot path and LAN_ID information that must remain with the workstation.
4. Configure the LAN type jumper settings on another core I/O card with those on the original core I/O card.
5. Install the other core I/O card into the middle slot of the system unit cabinet and re-connect all the cables.



LG200186_012

Figure 5-1. Core I/O Card Removal

Replacing the Processor Card

The core I/O card must be removed to gain access to the processor card.

Perform the following steps in the order given to replace the processor card:

1. Power down all the workstation components; disconnect the power cord from the system unit.
2. Remove the core I/O card from the middle slot of the system unit cabinet as shown in Figure 5-1.
3. Remove the processor card from the top slot of the system unit cabinet as shown in Figure 5-2.
4. Remove all of the SIMM cards from the original processor card and re-install them on another processor card.
5. Install the other processor card into the top slot of the system unit cabinet.
6. Re-install the original core I/O card into the middle slot of the system unit cabinet.

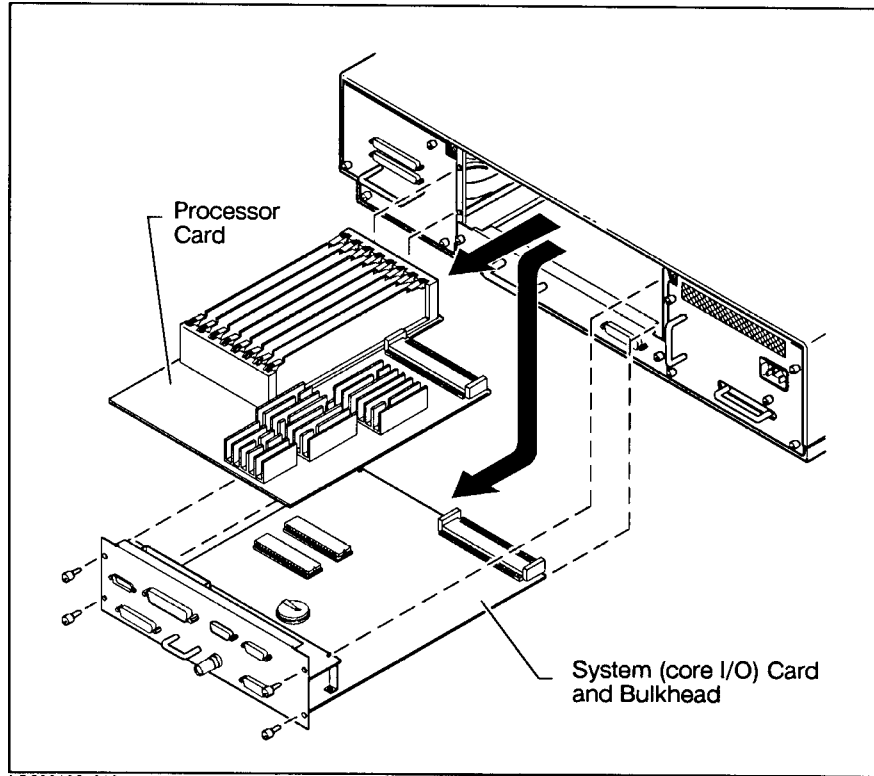


Figure 5-2. Processor Card Removal

Replacing or Adding SIMM Cards

The processor card must be removed to gain access to the SIMM cards.

Perform the following steps in the order given to update, replace, or add SIMM cards plugged into the processor card:

1. Power down all the workstation components; disconnect the power cord from the system unit.
2. Remove the core I/O card from the middle slot of the system unit cabinet as shown in Figure 5-1.
3. Remove the processor card from the top slot of the system unit cabinet as shown in Figure 5-2.
4. The next step depends on whether you are replacing a SIMM card or adding additional SIMM card pairs:

- a. To replace a SIMM card:

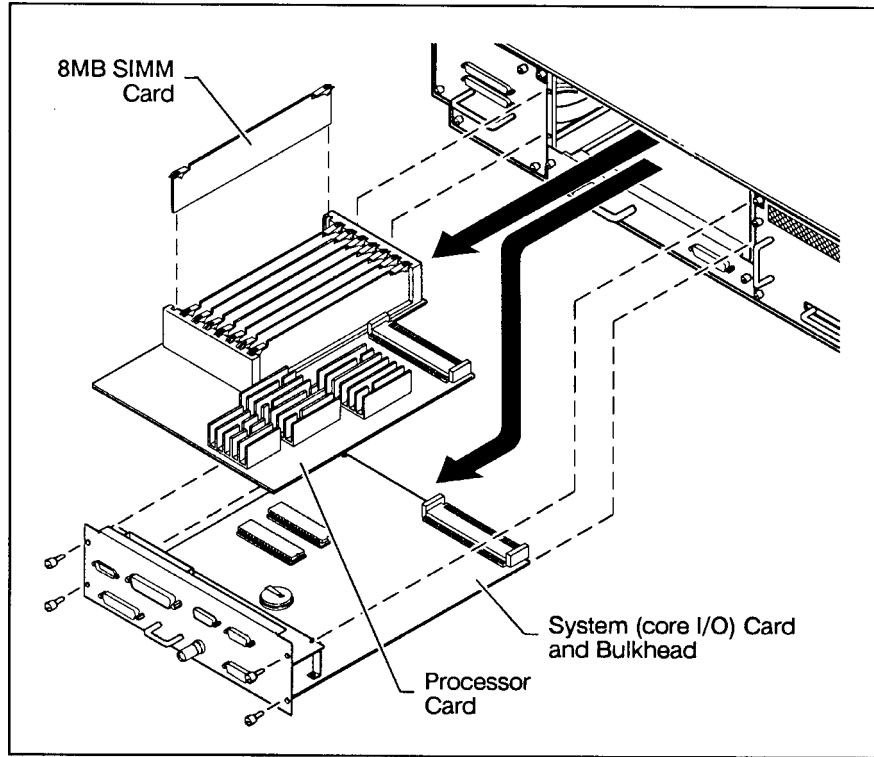
Remove the *suspect* SIMM card on the processor card and replace it with another SIMM card the same size as shown in Figure 5-3.

- b. To add additional SIMM card pairs:

SIMM cards must be added in pairs. If you add a SIMM card to slot B1, you must also add a card to slot B2. The same is true for the other paired SIMM slots: C1/C2 and D1/D2.

Install the new SIMM card pairs into the next adjacent empty connector pairs on the processor card.

5. Re-install the processor card into the top slot of the system unit cabinet.
6. Re-install the core I/O card into the middle slot of the system unit cabinet.



LG200186_014

Figure 5-3. SIMM Card Removal

Replacing an Internal Disk

Perform the following steps in the order given to replace the internal disks attached to the disk tray assembly:

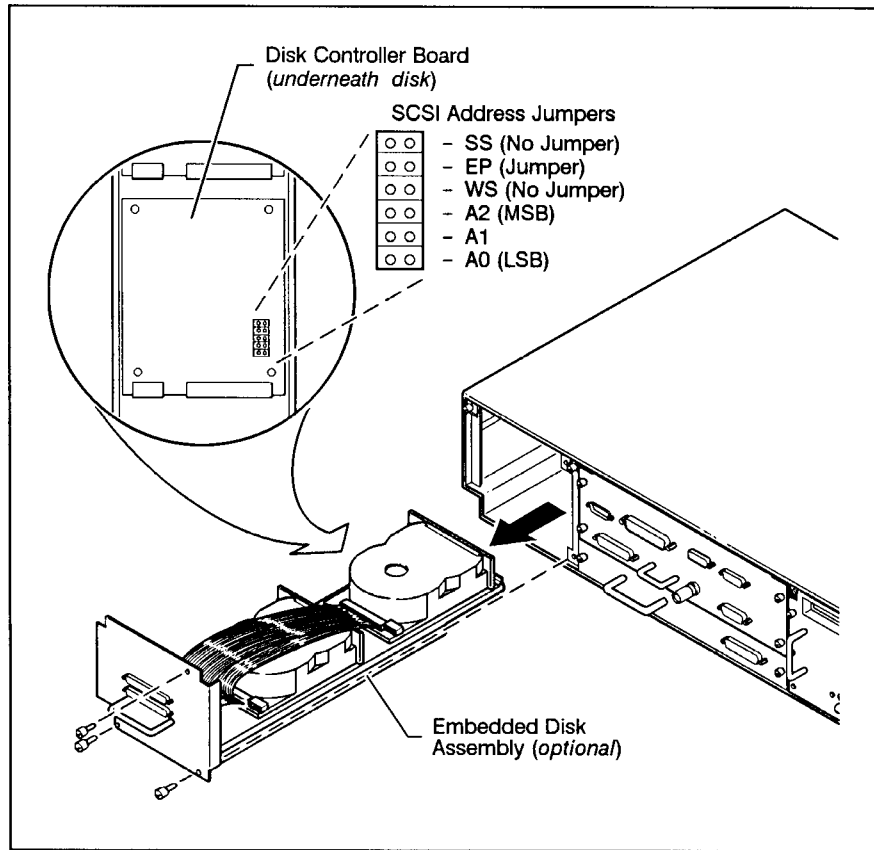
1. Power down all the workstation components; disconnect the power cord from the system unit; disconnect the SCSI cables/terminator.
2. Remove the disk tray assembly from the rear of the system unit cabinet as shown in Figure 5-4.
3. Remove the flat ribbon cable and the power cable from the drive to expose the holding screw.
4. Use a Pozi-drive screwdriver to remove the single screw that holds the drive in the disk tray assembly.
5. Remove the drive and turn it over. Examine the SCSI address jumpers. If the jumpers are set to SCSI address 6 (jumpers on both A1 and A2), you are replacing the disk that holds the root (/) filesystem. If the jumpers are set to SCSI address 5 (jumpers on both A0 and A2), you are replacing the disk that holds the user (/usr) filesystem.

Warning **If the jumpers are set in any other way, the system is no longer in its original configuration. Proceed with caution. Make sure that you are replacing the correct disk.**

6. Set the SCSI address jumpers on the replacement drive to the same settings as those on the unit which you are replacing.
7. Install the replacement drive into the empty space on the disk tray assembly.
8. Use a Pozi-drive screwdriver to replace the single screw that holds the drive in the disk tray assembly.
9. Install the disk tray assembly back into the system unit cabinet and re-connect the SCSI cables/terminator.

Note One SCSI terminator must always be installed at the end of the last device (internal/external).

5-12 Expanding Your Workstation and Replacing Its Parts



LG200186_015

Figure 5-4. Internal Disk Removal

Replacing the Lithium Battery

The lithium battery provides power for the system clock and stable storage. It is located on the core I/O card.

Caution There is danger of explosion if this battery is not replaced correctly. Replace this battery *only* with Panasonic BR-2325 or equivalent. Discard the used battery according to the battery manufacturer's instruction.

Perform the following steps in the order given to replace the lithium battery:

1. Power down all the workstation components; disconnect the power cord from the system unit.
2. Remove the core I/O card from the middle slot of the system unit cabinet as shown in Figure 5-1. Note the location of the lithium battery and its holder (see Figure 5-5).
3. Remove the used battery by sliding it from beneath the metal spring clip that holds it in place.
4. Making sure that the *positive (+)* side of the replacement battery is *up*, slide it into place underneath the metal spring clip.
5. Re-install the core I/O card into the middle slot of the system unit cabinet.

Figure LITHBAT here.

Figure 5-5. Lithium Battery Location

Changing 802.3 LAN Types

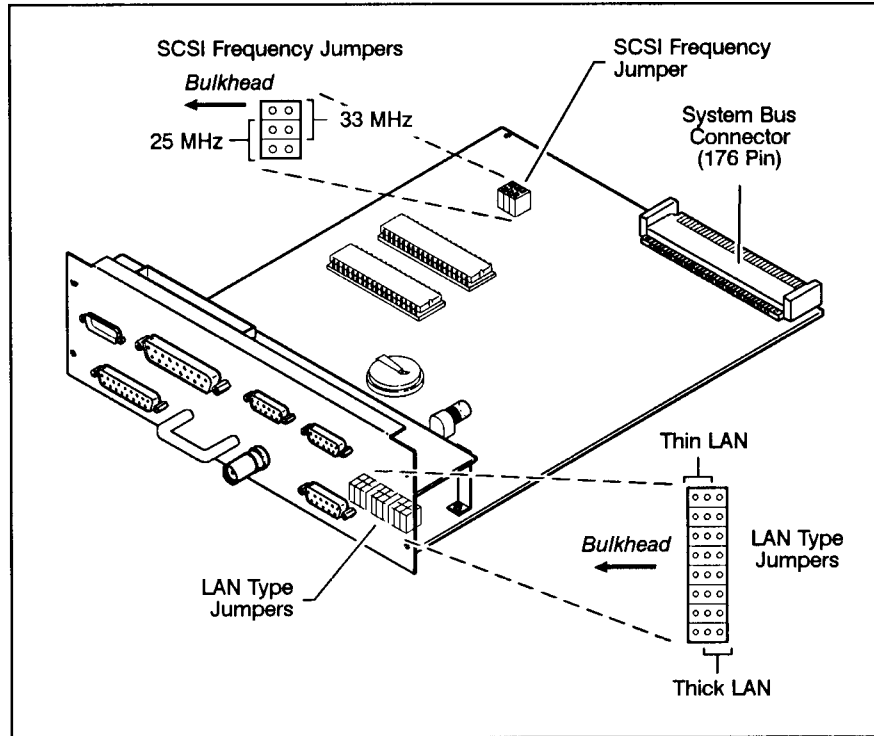
Your workstation accepts two different types of LAN connectors. Only one of the connectors on the I/O bulkhead may be used. To change connector types, you must reset some jumpers on the core I/O card. Perform the following steps in the order given to change the 802.3 LAN type jumpers on the core I/O card:

1. Power down all the workstation components; disconnect the power cord from the system unit.
2. Remove the core I/O card from the middle slot of the system unit cabinet as shown in Figure 5-1.
3. Change the LAN type jumper settings on the core I/O card as shown in Figure 5-6.
4. Re-install the core I/O card into the middle slot of the system unit cabinet.

LAN Cable Connections

For thick LANs, an external MAU must be connected between the AUI port on the core I/O card and the thick LAN cable.

For thin LANs, a “T” is used to connect the internal MAU on the core I/O card to the BNC cables.



LG200186_016

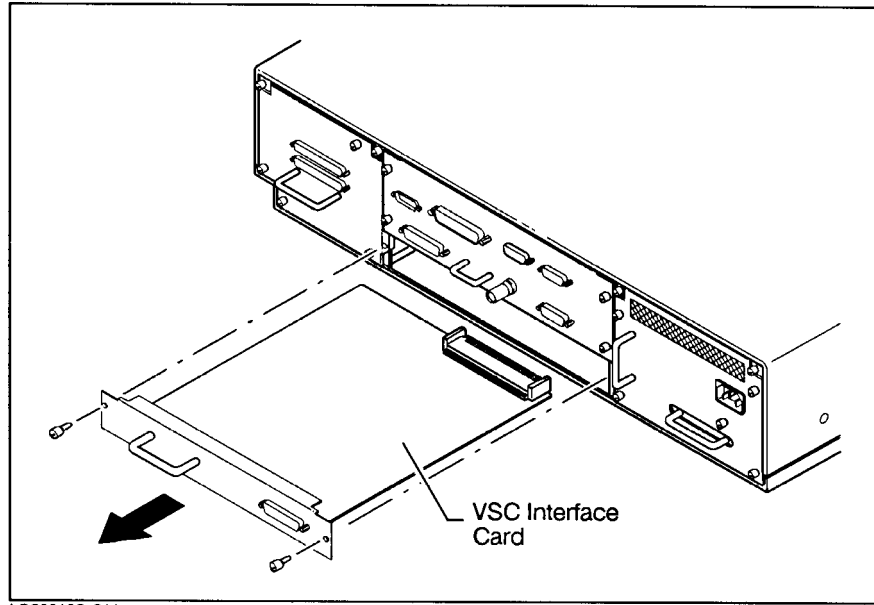
Figure 5-6. Location of the LAN Type Jumpers on the core I/O Card

Replacing the VSC Interface Card

The VSC interface card connects your workstation to an external graphics processor.

Perform the following steps in the order given to replace the VSC interface card:

1. Power down all the workstation components; disconnect the power cord from the system unit; disconnect any cables connected to the graphics card.
2. Remove the VSC interface card from the bottom slot of the system unit cabinet as shown in Figure 5-7.
3. Install another VSC interface card of the same type into the bottom slot of the system unit cabinet and reconnect the cable(s).



LG200186_011

Figure 5-7. VSC Interface Card Removal

Replacing the Power Supply Assembly

Perform the following steps in the order given to replace the power supply:

1. Power down all the workstation components; disconnect the power cord from the system unit.
2. Remove the power supply bulkhead from the system unit cabinet as shown in Figure 5-8.
3. Remove the power supply assembly from the system unit cabinet as shown in Figure 5-9.
4. Install another power supply assembly into the same slot in the system unit cabinet.
5. Re-install the power supply bulkhead in the system unit cabinet.
6. Reconnect the AC power cord.

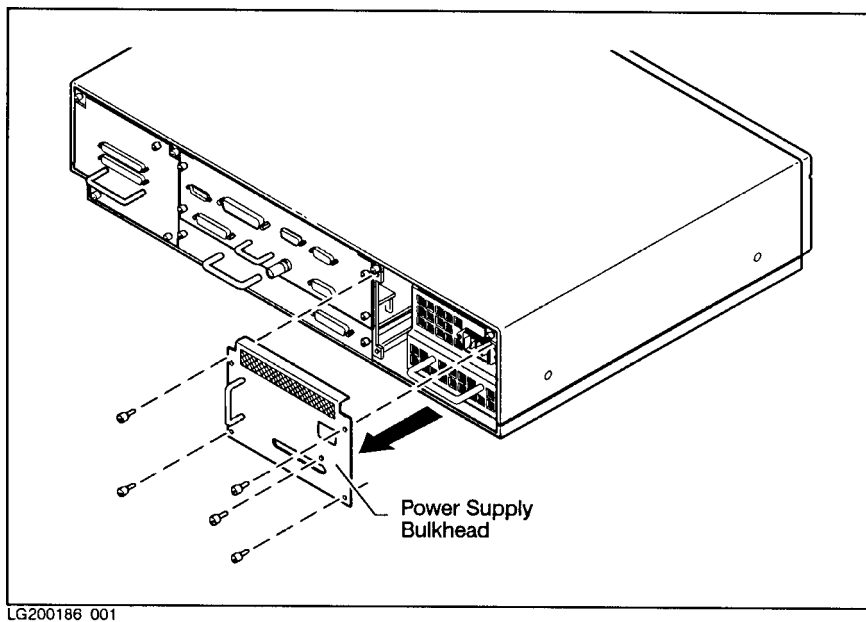
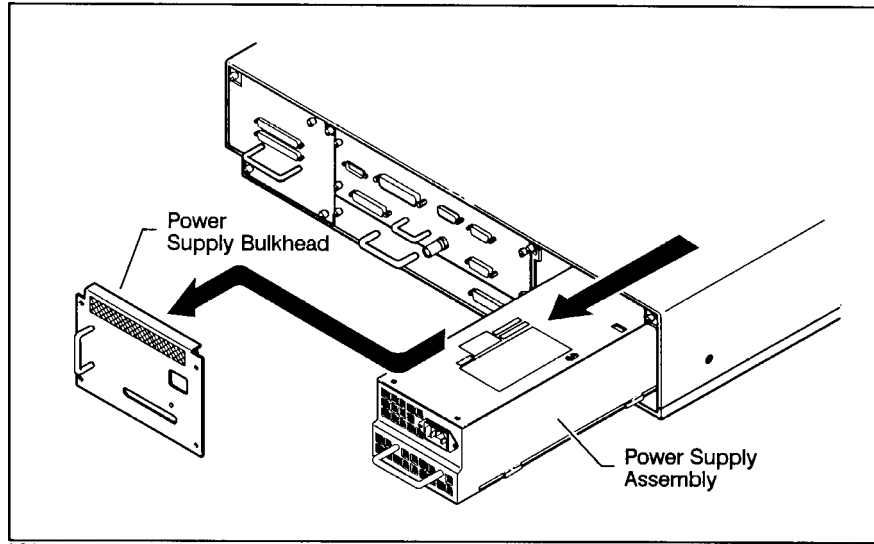


Figure 5-8. Power Supply Bulkhead Removal



LG200186_002

Figure 5-9. Power Supply Removal

— |

| —

— |

| —

Troubleshooting

This chapter contains information that will help you determine what's wrong with your system when you have problems.

Your workstation comes with many tools to help you understand operating faults:

- Front panel LEDs
- Power-on selftests
- Boot Administration commands
- System Acceptance Test

You will learn how and when to use these resources in this chapter.

Troubleshooting Strategies

This is an outline of what you should do in the event of trouble.

1. If you turn on the power, and your workstation is completely unresponsive (the *green-colored* LED on the front panel is not ON and nothing appears on the monitor for more than 20 seconds), see “System Unresponsive”.
2. If the workstation responds, but the operating system does not begin loading, see “Operating System Will Not Load”.
3. If the operating system loads, but the system *hangs* (if it is no longer responsive to input from the keyboard or mouse, and the cursor stops flashing or disappears) or the system works intermittently, see “System Loses Network Communications”.
4. If your workstation has a *hard crash* (stops working altogether and displays an **HPMC error**), call your designated service representative. An HPMC

error is an unrecoverable hardware error, and it may require the use of special diagnostic tools and replacement of a hardware component which you cannot access.

5. If your workstation cannot be turned *off*, call your designated service representative. This requires replacement of a hardware component which you cannot access.

System Unresponsive

Try the actions listed in Table 6-1 if your system does *nothing* in response to turning on the power.

Table 6-1. Problems with Powering Up the System

Problem	Action
The power LED doesn't come on.	Make sure the AC power cables are connected securely to the system unit. Make sure the power cord is plugged into a working AC outlet. Make sure the power switch is set to the ON position. Depress it several times to see if the system can be made to respond.
None of the <i>amber-colored</i> LEDs in the front panel turn ON after the power switch is depressed.	Replace the power supply. See "Replacing the Power Supply Assembly" in Chapter 5.

6-2 Troubleshooting

Operating System Will Not Load

Try the actions listed in Table 6-2 if the operating system will not begin loading.

Table 6-2. Problems with Loading the Operating System

Problem	Action
The <i>green-colored</i> power LED is on, but the screen is blank or is flickering.	If your system is equipped with an external graphics unit, make sure that its power switch is set in the ON position. Turn the Brightness control on the monitor <i>clockwise</i> . If the screen is still blank, turn off the power switches. When the power LED goes off, check the video cable connections.
The <i>green-colored</i> power LED is <i>not</i> ON, but the <i>amber-colored</i> LEDs are ON.	Replace the power supply. See “Replacing the Power Supply Assembly” in Chapter 5.
The power LED is ON, and text has appeared on the screen, but more than two minutes have passed without any sign of disk activity.	Check all SCSI cables and the SCSI terminator to make sure that they are correctly routed, connected, and secured. Consult <i>Installation Guide for HP Apollo 9000 Model 720/730 Workstations</i> for information on cable connections for your SCSI devices.
System still won't boot.	Rotate the bezel near the power switch so that you can see all eight of the <i>amber-colored</i> LEDs (see Figure 6-1). Make a note of the pattern displayed by these indicators. Press the TOC switch. (See Figure 2-3 for the location of this switch.) This should cause the system to reboot (restart the HP-UX operating system).
System does not boot.	See “Dealing with a Boot Failure” later in this chapter.

System Loses Network Communications

If the program you have been running uses resources from a local area network, and it stops unexpectedly, see Table 6-3.

Table 6-3. Problems with the 802.3 Network

Problem	Action
No systems respond to the <code>/etc/ping</code> command.	Check the network connection at the back of your workstation. Make sure that the cable is securely fastened to the appropriate connector.
Your system does not respond to <code>/etc/ping</code> from another system on the network.	Check to see if the networking software is still running on your system. If it is not running, restart it by logging onto your system as superuser and running <code>/etc/rc</code> .
Some systems respond to <code>/etc/ping</code> , but others do not.	Contact the network administrator immediately. This condition most probably indicates a serious fault with the network. Contact the network administrator.

System Works Intermittently

If your system works intermittently, see Table 6-4.

Table 6-4. Intermittent Failures

Problem	Action
Parts of the system seem to work, but others do not.	Run the SAX tests to verify that the system's hardware is functioning properly. (See the section "Running the SAX (System Acceptance Exerciser) Tests" in this chapter.)
The hardware passes the SAX tests, but operation is still intermittent.	Call your designated service representative.

Dealing with a Boot Failure

If you have reached this section, your usual boot device (typically a disk) is not responding as it should. You must attempt to boot from the disk (or another boot device) by selecting it manually.

To boot a device manually, follow these steps:

1. Turn off the power to the workstation, wait a few seconds, then turn the power back on.
2. Press the **(ESC)** key. In a few seconds, this message appears:

```
Terminating selection process.
```

A short time later, this message appears:

```
Searching for potential boot devices.  
To terminate search, press and hold the ESCAPE key.
```

```
Device Selection Device Path Device Type and Utilities  
-----
```

Your workstation is now searching for devices that *may* hold file systems from which it can boot HP-UX. As they are found, they appear in a list.

A list of devices might look like this:

```
P0                scsi.6.0                QUANTUM PD210S  
P1                scsi.5.0                QUANTUM PD210S  
P2                scsi.4.0                DAT_tape_drive_identifier  
P3                scsi.3.0                TOSHIBA CD-ROM DRIVE:XM  
P4                lan.123456-789abc        homepage
```

This process may take several minutes. When the search ends, this list of actions appears:

```
b) Boot from specified device  
s) Search for bootable devices  
a) Enter boot administration mode  
x) Exit and continue boot sequence  
?) Help
```

```
Select from menu:
```

- If *no* devices are listed, there is a serious problem. Contact your designated service representative for assistance.

6-6 Troubleshooting

- If no disk devices are listed, then your workstation is failing to communicate with its disks. Recheck the SCSI connections and try again.
3. If the search locates a disk, attempt to boot from it. Enter the boot command (**b**) with your choice from among the listed devices. For example, if a SCSI disk is listed as item **PO** (as in the example list above), type:

Select from menu: b PO

It may be several seconds before the boot messages begin to appear on the screen. You may hear sounds coming from the disk drive and see a sequence of changing patterns on the LED display.

4. If your workstation still fails to boot, there is either something wrong with the file system or with the hardware. If you suspect a file system failure, see “Dealing with File System Failures” later in this chapter. If you think that something is wrong with the hardware, see “Dealing with Hardware Faults”. If you are not certain, continue with the next section.

Dealing with File System Failures

If you have reached this section, it is very probable that your filesystem has been **corrupted** (damaged). Don't panic! There are ways to recover your filesystem, at least to the point of being able to start your system.

- If you are trying to get your system started for the first time, and you have reached this point, you must restore your file system from the Support Tape that was shipped with your workstation. See “Restoring Your Disk(s)” for instructions.
- If you have been using your workstation for some time, you have modified many files and probably added many others. If you have followed the backup procedures recommended in *HP-UX System Administration Tasks*, you should have no difficulty in restoring your file system with the **frecover** utility. Follow the steps in “Restoring Your Disk(s)” to restore your basic filesystem, then consult *HP-UX System Administration Tasks* and the *frecover(1M)* manual page in *HP-UX Reference* to restore the rest of your files.

Restoring Your Disk(s)

If your system still will not boot, you must restore your disk(s) from the disk images stored on tape.

The exact procedure you will use depends on the configuration of your system. If you ordered a development system, both the disks in your workstation contain programs and data supplied by the manufacturer, so both of these disks will have to be restored. If you purchased a runtime system, only one disk (the root disk) need be restored.

There are four steps to the restoration process:

1. Boot the **recovery kernel**. This is a special version of HP-UX that resides on the Support Tape. This process is described in “Booting the Recovery Kernel” later in this section.
2. Perform a file system check with **fsck**. This may solve your disks’ problems without having to go through the rest of the procedure.
3. Back up the disks. Even if the disks are corrupted, there may be valuable data on them which might be restored. Also, the reason for the failure may be determined through an analysis of the backup.
4. Select a **disk image** to be restored. A disk image is a bit-for-bit copy of the programs and data that are on your disks.

There are two types of sources for disk images:

HP-UX Support Tape This DAT cassette (HP part number B2380-13400) was packaged with your system. It contains images of the files that were originally shipped with your system. There are separate disk images for development and runtime systems. You may choose only one image, and you must possess a license for the image you choose.

Disk images made with the **dd** command You may make an image of your disk(s) at any time with the **dd** command. You should have made such an image after you installed any applications on your workstation. See the instructions in “Creating a Disk Image” in Chapter 4.

6-8 Troubleshooting

To copy these disk images, your computer must have at least a minimum operating system (called the **recovery kernel**). Follow the instructions in “Booting the Recovery Kernel”. then select the disk image source you will use to restore your disk(s).

Warning **The following procedures will prompt you for the hardware paths of the boot device and the disks that are being restored. An error in specifying the target disks could lead to loss of data.**

Booting the Recovery Kernel

To boot the recovery kernel:

1. Turn off the power to the workstation, wait a few seconds, then turn the power back on.
2. Press the **ESC** key. In a few seconds, this message appears:

```
Terminating selection process.
```

A short time later, this message appears:

```
Searching for potential boot devices.  
To terminate search, press and hold the ESCAPE key.
```

```
Device Selection Device Path Device Type and Utilities  
-----
```

Your workstation is now searching for devices that *may* hold file systems from which it can boot HP-UX. As they are found, they appear in a list.

A list of devices might look like this:

```
P0                scsi.6.0                QUANTUM PD210S  
P1                scsi.5.0                QUANTUM PD210S  
P2                scsi.4.0                DAT_tape_drive_identifier  
P3                scsi.3.0                TOSHIBA CD-ROM DRIVE:XM  
P4                lan.123456-789abc        homebase
```

This process may take several minutes. When the search ends, this list of actions appears:

```
b) Boot from specified device  
s) Search for bootable devices  
a) Enter boot administration mode  
x) Exit and continue boot sequence
```

?) Help

Select from menu:

3. Insert the Support Tape in the SCSI tape drive.
4. Scan the **Device Selection** list. Look for the SCSI tape drive and note its *Pn* number. For example, if the SCSI tape drive is listed as item **P2**, type:

Select from menu: b P2 IPL

This command calls on device **P2** (in this case, the SCSI tape drive) to boot the Initial System Loader (also known as the Initial Program Loader or IPL). It may be several seconds before the boot messages begin to appear on the screen. You may hear sounds coming from the tape drive and see a sequence of changing patterns on the LED display.

The prompt for the Initial System Loader (ISL) appears:

ISL>

5. Type:

ISL> support

You will receive many messages on the screen. Eventually, you will receive this prompt:

Press <return> to continue

The following menu appears:

SUPPORT TAPE RESTORE DISK IMAGE MENU

b. Backup System Disks
d. Restore Development Environment
r. Restore Run-time Environment
s. Shutdown System
x. Exit to shell

Select one of the above:

Checking the File System

Reimaging your disk(s) is a very serious matter. It is best to check the file system first with the `fsck` command.

6-10 Troubleshooting

Your workstation contains two disks. They were originally installed at special locations, and if you have not made changes to your hardware configuration, they will still be in those locations.

HP-UX uses **device files** to communicate with the disks in your workstation. A device file is used to transmit information to the disk and read information from it. In your system's original configuration, **root disk** uses the device file `/dev/rdisk/6s0`. The other disk uses the device file `/dev/rdisk/5s0`.

1. Press **X** **Return**. A shell prompt appears:

```
$
```

2. Type:

```
$ /etc/fsck -p /dev/rdisk/6s0
```

As the file system check progresses, many messages appear on the screen. Some of them may indicate that files have been corrupted and are being repaired.

3. If the **fsck** program reports that it has successfully repaired your root file system, and the shell prompt reappears, check the other (**/usr**) disk. Type:

```
$ /etc/fsck -p /dev/rdisk/5s0
```

As the file system check progresses, many messages appear on the screen. Some of them may indicate that files have been corrupted and are being repaired.

4. If the **fsck** program reports that it has successfully repaired your **/usr** file system, and the shell prompt reappears, type:

```
$ menu
```

The **SUPPORT TAPE RESTORE DISK IMAGE MENU** reappears. Press **S** **Return**. This will cause your system to reboot from the repaired file system.

Do *not* return to this section if the system reboots successfully. In the unlikely event that the system fails to reboot, begin the troubleshooting process again from the beginning of this chapter.

5. If the **fsck** program determines that it cannot repair either or both of the disks, it will print a message to this effect, stop running and return to the shell prompt. If this happens, you must continue with the reimaging process.

Type:

\$ menu

The SUPPORT TAPE RESTORE DISK IMAGE MENU reappears.

Backing Up Your Disks

Before you restore your disk(s) from disk images on tape, back up the data that is on your disks now.

Obtain a **scratch tape**. This is a DAT tape which may be written on without destroying needed data. Make sure that the tape is *not* write-protected. To do this, check the rear of the cassette. You will see a sliding tab in one corner. This tab is used to open and close the “recognition hole” in the cassette. If the hole is open, the cassette is write-protected; if it is closed, data may be written on the tape. If necessary, slide the tab to *close* the recognition hole.

1. At the menu prompt, press **(B)** **(Return)**. This prompt appears:

```
Legal tape drive paths :
    SCSI.0.0, SCSI.1.0, SCSI.2.0, SCSI.3.0,
    SCSI.4.0, SCSI.5.0, SCSI.6.0, SCSI.7.0
```

```
Enter Tape Drive Path :
```

2. Type in the hardware path of the SCSI tape drive from which the system is currently booted (the hardware path of the SCSI tape drive that contains the Support Tape).

```
Enter Tape Drive Path : SCSI.4.0
```

These lines appear:

```
Remove Support Tape from tape drive.
Insert writable scratch tape into tape drive.
```

```
Press "c" then <return> to continue, or
press "a" then <return> to abort backup process.
```

3. If you do not wish to continue, press **(A)** **(Return)**. You will receive a prompt that will allow you to return to the main menu.
4. Remove the Support Tape from the tape drive by pressing the eject button, and insert the scratch tape into the tape drive.
5. Press **(C)** **(Return)**.

6-12 Troubleshooting

If the tape is write-protected, you will see this message:

```
Unable to access tape at address for writing.  
Insert writable scratch tape into tape drive.
```

```
Press "c" then <return> to continue, or  
press "a" then <return> to abort backup process.
```

If you receive this message, remove the scratch tape, render it writable, put it back in the tape drive, and press **C** **Return**.

These lines appear:

```
Press "r" then <return> to back up Root ( / ) Disk, or  
press "u" then <return> to back up User ( /usr ) Disk, or  
press "a" then <return> to abort backup process.
```

6. Press **R** **Return**. This prompt appears:

```
Legal disk drive paths :  
    SCSI.0.0, SCSI.1.0, SCSI.2.0, SCSI.3.0,  
    SCSI.4.0, SCSI.5.0, SCSI.6.0, SCSI.7.0
```

```
Enter Path for Root ( / ) Disk :
```

If you have not changed the configuration of your workstation, the root (*/*) disk is located at SCSI.6.0. If you have changed your configuration, check your records to determine the location of the root disk.

7. Type in the hardware path of the disk which contains the root (*/*) partition:

```
Enter Path for Root ( / ) Disk :SCSI.6.0
```

The backup of the root disk begins. It takes about half an hour.

When the backup of the root disk is finished, this prompt appears:

```
Press "r" then <return> to back up Root ( / ) Disk, or  
press "u" then <return> to back up User ( /usr ) Disk, or  
press "a" then <return> to abort backup process.
```

8. Press **U** **Return**. This prompt appears:

```
Legal disk drive paths :  
    SCSI.0.0, SCSI.1.0, SCSI.2.0, SCSI.3.0,  
    SCSI.4.0, SCSI.5.0, SCSI.6.0, SCSI.7.0
```

```
Enter Path for User ( /usr ) Disk :
```

If you have not changed the configuration of your workstation, the user (/usr) disk is located at SCSI.5.0. If you have changed your configuration, check your records to determine the location of the user disk.

9. Type in the hardware path of the disk which contains the user (/usr) partition:

```
Enter Path for User ( /usr ) Disk :SCSI.5.0
```

The backup of the user disk begins. It takes about half an hour.

When the backup of the /usr disk is finished, this prompt appears:

```
Press "r" then <return> to back up Root ( / ) Disk, or  
press "u" then <return> to back up User ( /usr ) Disk, or  
press "a" then <return> to abort backup process.
```

10. Press (A) (Return). This prompt appears:

```
Remove scratch tape.  
Insert Support Tape.  
Press <return> to get back to main menu
```

Remove the scratch tape from the drive, and put it in a safe place. Put the Support Tape back in the drive, and press (Return). The SUPPORT TAPE RESTORE DISK IMAGE MENU reappears.

Now you may proceed with the restoration of your disks.

- To restore your disk(s) from the images on the Support Tape, see “Restoring Your Disks from the Support Tape”.
- To restore your disk(s) from an image made with the dd command, see “Recovering a Disk from an Image Copy Made with dd”.

Restoring Your Disks from the Support Tape

To restore a development environment, press (D) (Return) at the SUPPORT TAPE RESTORE DISK IMAGE MENU.

To restore a runtime environment, press (R) (Return) at the SUPPORT TAPE RESTORE DISK IMAGE MENU.

The recovery procedure for both is identical:

1. This prompt appears:

```
Legal tape drive paths :
```

6-14 Troubleshooting

SCSI.0.0, SCSI.1.0, SCSI.2.0, SCSI.3.0,
SCSI.4.0, SCSI.5.0, SCSI.6.0, SCSI.7.0

Enter Tape Drive Path :

2. Type in the hardware path of the SCSI tape drive from which the system is currently booted (the hardware path of the SCSI tape drive that contains the Support Tape).

Enter Tape Drive Path : SCSI.4.0

These lines appear:

Press "r" then <return> to restore Root (/) Disk, or
press "u" then <return> to restore User (/usr) Disk, or
press "a" then <return> to abort restoration process.

3. Press **(R)** **(Return)**. This prompt appears:

Legal disk drive paths :
SCSI.0.0, SCSI.1.0, SCSI.2.0, SCSI.3.0,
SCSI.4.0, SCSI.5.0, SCSI.6.0, SCSI.7.0

Enter Path for Root (/) Disk :

If you have not changed the configuration of your workstation, the root (/) disk is located at SCSI.6.0. If you have changed your configuration, check your records to determine the location of the root disk.

4. Type in the hardware path of the disk which contains the root (/) partition:

Enter Path for Root (/) Disk : SCSI.6.0

The restoration of the root disk begins. It takes about half an hour.

When the restoration of the root disk is finished, this prompt appears:

Press "r" then <return> to restore Root (/) Disk, or
press "u" then <return> to restore User (/usr) Disk, or
press "a" then <return> to abort restoration process.

5. Press **(U)** **(Return)**. This prompt appears:

Legal disk drive paths :
SCSI.0.0, SCSI.1.0, SCSI.2.0, SCSI.3.0,
SCSI.4.0, SCSI.5.0, SCSI.6.0, SCSI.7.0

Enter Path for User (/usr) Disk :

If you have not changed the configuration of your workstation, the user (/usr) disk is located at SCSI.5.0. If you have changed your configuration, check your records to determine the location of the user disk.

6. Type in the hardware path of the disk which contains the user (/usr) partition:

```
Enter Path for User ( /usr ) Disk :SCSI.5.0
```

The restoration of the user disk begins. It takes about half an hour.

When the restoration of the /usr disk is finished, this prompt appears:

```
Press "r" then <return> to restore Root ( / ) Disk, or  
press "u" then <return> to restore User ( /usr ) Disk, or  
press "a" then <return> to abort restoration process.
```

7. Press **(A)** **(Return)**. This prompt appears:

```
Press <return> to get back to main menu
```

Remove the Support Tape from the drive, and put it in a safe place. The SUPPORT TAPE RESTORE DISK IMAGE MENU reappears.

8. Press **(S)** **(Return)**. This will cause your system to reboot from the restored disks.

If your system boots successfully, and you have backup tapes containing files that should also be restored, use **frecover** to copy these files from your backup tapes. See *HP-UX System Administration Tasks* and the *frecover(1M)* manual page in *HP-UX Reference* for instructions on how to restore the rest of your files.

If your system still fails to boot, see “Dealing with Hardware Faults” later in this chapter.

Recovering a Disk from an Image Copy Made with dd

Warning This procedure will completely destroy any data on the disk to which the dd copy is made. Be *absolutely certain* that you are using the *correct* designation for the destination disk.

To recover your disk, boot the system from the dd copy:

1. Turn off the power to the workstation, wait a few seconds, then turn the power back on.
2. Press the **ESC** key. In a few seconds, this message appears:

```
Terminating selection process.
```

A short time later, this message appears:

```
Searching for potential boot devices.  
To terminate search, press and hold the ESCAPE key.
```

```
Device Selection Device Path Device Type and Utilities  
-----
```

Your workstation is now searching for devices that *may* hold file systems from which it can boot HP-UX. As they are found, they appear in a list.

A list of devices might look like this:

```
P0                   scsi.6.0                   QUANTUM PD210S  
P1                   scsi.5.0                   QUANTUM PD210S  
P2                   scsi.4.0                   DAT_tape_drive_identifier  
P3                   scsi.3.0                   TOSHIBA CD-ROM DRIVE:XM  
P4                   lan.123456-789abc           homebase
```

This process may take several minutes. When the search ends, this list of actions appears:

```
b) Boot from specified device  
s) Search for bootable devices  
a) Enter boot administration mode  
x) Exit and continue boot sequence  
?) Help
```

```
Select from menu:
```

3. Place the tape which contains the `dd` copy of the disk image in the DAT drive.
4. Scan the **Device Selection** list. Look for the SCSI tape drive and note its `Pn` number. For example, if the SCSI tape drive is listed as item `P2`, type:

```
Select from menu: b P2 IPL
```

This command calls on device `P2` (in this case, the SCSI tape drive) to boot the Initial System Loader (also known as the Initial Program Loader or IPL). It may be several seconds before the boot messages begin to appear on the screen. You may hear sounds coming from the tape drive and see a sequence of changing patterns on the LED display.

The prompt for the Initial System Loader (ISL) appears:

```
ISL>
```

5. To recover the image of a disk, issue a command that looks like this:

```
ISL> hpux restore destination_disk
```

For example, if the root (`/`) disk is located at `SCSI.6.0`, type this to recover the root disk:

```
ISL> hpux restore disc(scsi.6;0)
```

It may take up to an hour to restore the disk.

6. Once the root disk is recovered, remove the tape.
7. Reboot the system by turning off the power to the workstation, waiting a few seconds, then turning the power back on again.

If there are problems with the other disk (although this is very unlikely), you may recover its image in a similar fashion.

If your system still fails to boot, see “Dealing with Hardware Faults” later in this chapter.

See the manual page for `hpux_700(1M)` in the *HP-UX Reference* for more information about this process.

6-18 Troubleshooting

Dealing with Hardware Faults

If your system still fails to boot, match the LED pattern that you had noted in the list of steps in Table 6-2 earlier in this chapter against those listed in Table 6-5 and take the recommended action.

If the action has no effect, contact your designated service representative for assistance.

LED Error Codes

This section contains information about the error codes displayed by the LEDs that are located behind the fold-away corner bezel (see Figure 6-1). There are eight amber LEDs and two green LEDs. One green LED indicates whether the power is on or off. It is not labeled. The other green LED indicates whether or not the service mode has been activated. It is labeled “Service,” and it is placed next to the service-mode switch. The service mode is used only during manufacturing.

The eight amber LEDs (labeled 8—1) display different patterns that correspond to a variety of hardware error conditions.

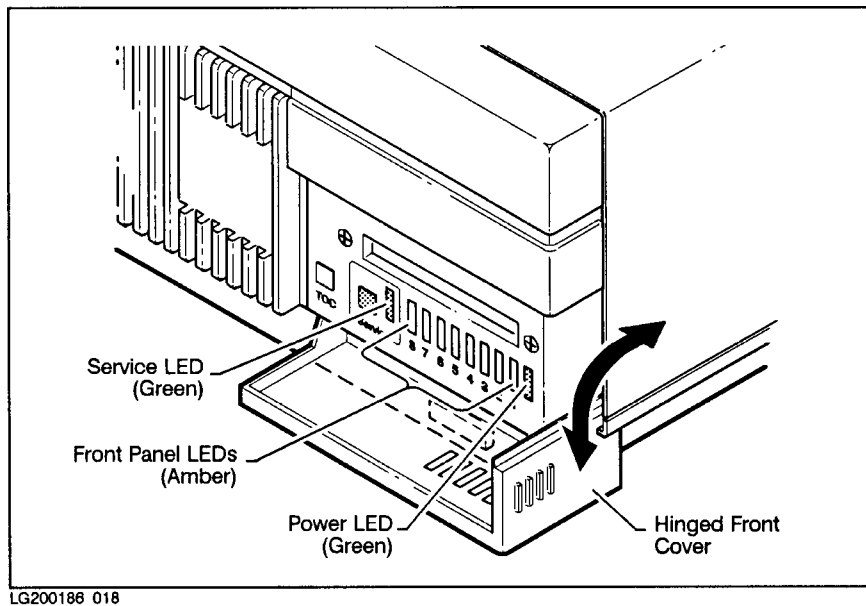


Figure 6-1. LED Array

Table 6-5 lists some of the LED display patterns generated by the selftests that your workstation runs on its processor, memory, input/output, and graphic interface cards. Usually, these patterns will flash by quickly. However, if your workstation cannot complete its booting process, and one of these patterns is displayed on the LEDs, it may be necessary to take some corrective action.

Component Error Codes

The patterns in Table 6-5 indicate that there is something seriously wrong with one of the components of your workstation. If your workstation “freezes up” while it is booting and displays one of the patterns in this table, you must replace one of more of the system’s components.

6-20 Troubleshooting

**Table 6-5.
LED Codes Which Indicate That a Component Must Be Replaced**

8 7 6 5 4 3 2 1	Component To Be Replaced
o o o x e e e e	Processor card
o o x o e e e e	Processor card
o o x x e e e e	Processor card
o x o o e e e e	Processor card
o x x o o o o o	SIMM card in slot A1
o x x o o o o x	SIMM card in slot A2
o x x o o o x o	SIMM card in slot B1
o x x o o o x x	SIMM card in slot B2
o x x o o x o o	SIMM card in slot C1
o x x o o x o x	SIMM card in slot C2
o x x o o x x o	SIMM card in slot D1
o x x o o x x x	SIMM card in slot D2
x o x x o o x o	I/O card
x o x x o x o x	Processor card
x o x x o x x o	Processor card <i>or</i> one of the SIMM cards
x o x x o x x x	Processor card <i>or</i> I/O card
x o x x x o o e	Processor card <i>or</i> I/O card
x = ON, o = OFF, e = either ON or OFF	

Note The LED patterns displayed during the selftests are not related in any way to the patterns described in “Understanding the LEDs” in Chapter 2. Those patterns apply only when the system has successfully booted HP-UX.

Running the SAX (System Acceptance Exerciser) Tests

SAX is an online system-level exerciser. You will use SAX in its CIT (Customer Installation Test) mode to verify that your system is correctly installed and configured.

You must have permission to access the `/etc/diag` directory. If you receive a message that you do not have access rights to this directory, change them.

- If you have superuser login privileges on your workstation, log in as `root` and use the `/bin/chmod` command to allow access to the directory. See *A Beginner's Guide to HP-UX* and the manual page for `chmod(1)` in *HP-UX Reference* for information on `/bin/chmod`.
- If you do not have superuser privileges, contact your system administrator to arrange your access to the `/etc/diag` directory.

1: Insert Writable Media

SAX includes tests of any drives that accept removable media (such as a DAT tape drive). If you have peripherals that accept removable media, be sure to insert a write-enabled medium in the drive before running SAX in CIT mode. If you do not, SAX will not be able to complete its tests.

2: Invoke SAX

To run the SAX tests, type:

```
$ /etc/diag/sax/sax -cit
```

If you are running the SAX tests from a windowing environment, the program will open many windows on the screen. These will display information about the conduct of the tests.

3: Track the Progress of the SAX Run

The Tracker window, which appears at the bottom of the display when SAX runs in a windowing environment, shows information about your system, including:

- the node ID and network name
- elapsed run time of the tests

6-22 Troubleshooting

- current time (by the system clock)
- the time at which the tests were started
- system loading information

The last item, system loading, is measured in terms of the number of microseconds it takes to do a unit of work. The system load has a **threshold value**, and whenever this value is exceeded, a **system overload** occurs, and an overload indicator appears in the Tracker window. It's important to be aware of overloads, because any errors that appear during an overload are usually attributable to the overload and *not* to a hardware error.

4: Note Any Errors

If an error occurs, it is reported in the Supervisor window. Such errors have the following format:

```

*** Error detected by Test Process "device_error_code"
during SAX pass x, Test Process pass y.
Current time: mm/dd/yy hh/mm/ss
Elapsed runtime: hhhh:mm:ss
Loading: Average = xxx.xx, Discrete = xxx.xx, Threshold = xxx.xx
Logfile pathname: //working_directory_pathname/device_error_code/device_error_code.log
Error text from test process...

```

Make careful note of these errors and the names of the log files in which they are stored. They will be useful in identifying which component (if any) you must remove to correct the error condition.

If you need assistance in understanding or acting upon the error messages produced by the SAX tests, contact your designated service representative.

For Further Information

Using DEX and SAX with HP-UX (HP part number A1926-90002) is a useful document to have if you intend to perform extensive diagnostic tests on your workstation.

Calling for Service

If you have a problem that is not dealt with in this manual, contact your designated service representative for assistance.

When calling for service, always have your system's model and serial number ready.

Index

A

A Beginner's Guide to the X Window System, 3-37

adding applications. *See* update

address, station, 3-2

B

battery, lithium

 replacement, **5-14-15**

boot administration commands, 6-1

boot device, 6-6

boot failure, 6-6-7

booting the workstation, 3-1, 3-2

C

color monitor, 2-13

commands

cp, 3-10, 3-11

dd, 6-17

 “fsck”, 6-8, 6-10

mv, 3-10, 3-11

netdistd, 4-25. *See also* netdist

update, 4-7. *See also* update

updist, 4-24. *See also* update

commands, boot administration, 6-1

component replacement, **5-1**

console icon, 3-8

control panel, 3-8

copying

 files, 3-5

copyright screen, 3-7

core I/O card

 replacement, **5-6-7**

cp command, 3-10, 3-11

D

dd command, 6-17

directories

 moving and copying files with **mv** and

cp, 3-10, 3-11

disk activity LED, 2-6

disk drives, external, 3-3

disks, external

 termination, 5-12

disks, internal

 installation, 5-12

 replacement, **5-12-13**

disk space

 analyzing, 4-13

 errors, 4-37

 freeing, 4-14

 insufficient, 4-12

disk tray bulkhead, 2-9

display, video, 2-13

E

expanding the workstation, **5-1**

external disk drives, 3-3

external peripherals, 3-3

F

file manager

 opening, 3-3

files

- copying, 3-5
- copying between directories, 3-10, 3-11
- moving, 3-4
- moving between directories, 3-10, 3-11

file system failures, 6-7

fsck command, 6-8, 6-10

G

graphic interfacebulkhead, 2-12

graphics card

- replacement, **5-18-19**

H

“heartbeat” LED, 2-6

host name, 3-2, 3-6

HP-UX

- updating, 4-1-32

HP-UX operating system, 3-2

HP-UX Support Tape, 6-8

HP Visual User Environment. *See* HP VUE

HP Visual User Environment User's Guide, 3-37

HP VUE

- starting up, 3-1

I

icon

- console, 3-8

installing software. *See* update

installing the workstation, 3-1

internet protocol address, 3-2

I/O bulkhead, 2-10

IP address, 3-2

L

LAN, 802.3 LAN

- changing types, **5-16-17**

LED. disk activity, 2-6

LED display

- location, 2-6

- used for troubleshooting, 6-1, 6-19, 6-21

- used in troubleshooting, 6-3

LED, “heartbeat”, 2-6

LED, power

- not illuminated when power is turned on, 6-2

LED, power, 2-6

LED, “receiving from LAN”, 2-6

LED, “transmitting to LAN”, 2-6

logging in, 3-2, 3-4

M

monitor, 3-3

- brightness control, 6-3

monitor, color, 2-13

moving

- files, 3-4

mv command, 3-10, 3-11

N

netdist daemon

- log file, 4-29

- starting, 4-28

- starting (errors), 4-37

netdist daemon

- starting, 4-25

netdist, defined, 4-22

netdist server

- adding filesets, 4-28

- administering, 4-22*ff*

- configuring, 4-5, **4-22-26**

- configuring (errors), 4-37

- log file, 4-29

- shutting down, 4-27

- updating from, 4-5

- updating from (errors), 4-35

netdist server

- administering, 4-32

Index-2

- network connection, 3-1
- network distribution server
 - defined, 4-22
- networking
 - host name, 3-2
 - station address, 3-2
 - system name, 3-2

O

- operating system, HP-UX, 3-2

P

- peripherals, external, 3-3
- powering up the workstation, 3-1
- power LED, 2-6
- power supply bulkhead, 2-11
- power supply
 - replacement, **5-20-21**
- power switch, 2-4
- processor card
 - replacement, **5-8-9**

R

- “receiving from LAN” LED, 2-6
- recovery kernel, 6-8
- replacement of components, **5-1**
- restoring a damaged file system, 6-8-16
 - using **dd**, 6-17
- root user, 3-5

S

- SAX, 6-1, 6-5, 6-22
- serviceswitch, 2-4
- SIMM card
 - installation, 5-10
 - replacement, **5-10-11**
 - updating, 5-10
- starting up the workstation, 3-1
- station address, 3-2
- Support Tape, HP-UX, 6-8
- switches, 2-4

- System Acceptance Test, 6-1, 6-5, 6-22
- system name, 3-2, 3-6
- system unit
 - defined, 2-2
 - placement, 2-2
 - powering down, **5-5**
 - power switch, 2-4
 - rear panel, 2-8
 - serviceswitch, 2-4
 - static electricity, **5-3**
 - switches, 2-4
 - TOC switch, 2-4

T

- terminal window, 3-9
- The HP Visual User Environment System Administration Manual*, 3-37
- time zone, 3-2
- TOC switch, 2-4
- “transmitting to LAN” LED, 2-6
- troubleshooting, **6-1-24**
 - boot failure, 6-3, 6-6-7
 - file system failures, 6-7
 - hard crash, 6-2
 - HPMC error, 6-2
 - intermittent operation, 6-5
 - network problems, 6-4
 - operating system does not load, 6-1, 6-3
 - restoring a damaged file system, 6-8-16
 - strategies, 6-1
 - workstation can not be turned off, 6-2
 - workstation hangs, 6-1, 6-4, 6-5
 - workstation unresponsive, 6-1, 6-2
- turning on the workstation, 3-1

U

- update
 - adding applications, 4-1

- cartridge tape, updating from (errors), 4-33-34
- changing source or destination, 4-11
- cluster updates, 4-1, 4-14
- command line, 4-1, 4-2
- DAT drive, updating from, 4-5
- deselecting filesets, 4-14
- destination, changing, 4-11
- device files, **4-3-4**, 4-4
- disk space. *See* disk space
- error information, 4-12, 4-17, **4-33-38**
- `/etc/newconfig`, reading, 4-16
- fileset dependencies, 4-31
- interactively, 4-7
- local source, updating from, 4-5
- local source, updating from (errors), 4-33-34
- log file, 4-16, **4-17-18**, 4-29, 4-38
- main menu, illustration, 4-7
- main menu, using, 4-7*ff*
- minfree* requirements, 4-12
- mounting file systems, 4-14
- navigation, 4-7
- netdist**. *See* netdist, **netdist**
 - daemon, **netdist** server
- nine-track tape, updating from (errors), 4-33-34
 - non-interactively, 4-2
 - prerequisite information, 4-3-5
 - removing files, 4-14
 - source device, **4-3-4**, 4-4
 - source device, changing, 4-11
 - symbolic links, creating, 4-14
 - update** program, 4-6
 - updist** program, **4-24**, 4-28, 4-31
 - updist** program (errors), 4-37
- updist** program. *See* commands, update
- upgrade. *See* update

V

- video display, 2-13
- VSC bulkhead, 2-12
- VSC interface card
 - replacement, **5-18-19**

W

- window objects
 - console icon, 3-8
 - control panel, 3-8
 - terminal window, 3-9
 - workspace manager, 3-8
- workspace manager, 3-8
- workstation
 - installing options, **5-10-17**