HP Apollo 9000 Model 425s and 425t Owner's Guide for HP-UX Users

HP Apollo 9000 Series 400 Computers

HEWLETT PACKARD

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August, 1991 Edition 1
This edition applies to HP 9000, Series 425s/t computers only.

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Note	Notes contain important information set off from the text.

Caution	Caution messages indicate procedures which, if not observed, could result in loss of data or damage to equipment. Do not proceed beyond a CAUTION sign until the indicated conditions are fully understood and met.

Warning	**Warning messages indicate procedures or practices which, if not observed, could result in personal injury. Do not proceed beyond a WARNING sign until the indicated conditions are fully understood and met.**

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(For computers with a CD ROM disk drive installed.)

The CD ROM drive is certified as a Class 1 laser product under the U.S. Department of Health and Human Services (DHHS) Radiation Performance Standard according to the *Radiation Control for Health and Safety Act* of 1968.

This means that the device does not produce hazardous laser radiation. Since laser light emitted inside the device is completely confined within protective housings and external covers, the laser beam cannot escape from the machine during any phase of user operation.

Warning	■ **Use of controls, adjustments, or performing procedures different from those specified in this manual may result in hazardous invisible laser radiation exposure. None of the mechanisms within the mass storage system contain customer or field-replaceable parts.**
	■ **The CD ROM drive becomes a Class 3B laser mechanism when disassembled. If the CD ROM drive is disassembled, exposure to the invisible laser beam and hazardous invisible laser radiation could result in blindness.** *Do NOT disassemble the CD ROM drive for any reason.*

Laser Safety Statement (For Finland Only)

Turvallisuusyhteenveto
Laserturvallisuus
Luokan 1 Laserlaite
Klass 1 Laser Apparat
HP 9000 Model 425 tietokoneeseen voidaan asentaa muistilaitteeksi
laitteensisäinen CD-ROM-levyasema, joka on laserlaite. Tällöin myös
päälaitteena toimiva tietokone katsotaan laserlaitteeksi.

Kyseinen CD-ROM-livyasema on käyttäjän kannalta turvallinen luokan 1
laserlaite. Normaalissa käytössä levyaseman suojakotelo estää lasersäteen
pääsyn laitteen ulkopuolelle.

HP 9000 Model 425 tietokoneen on tyyppihyväksynyt Suomessa
laserturvallisuuden osalta Työsuojeluhallitus, Työsuojeluhallituksen
hyväksyntänumero TSH 222/6019/90. Laitteiden turvallisuusluokka on
määritetty valtioneuvoston päätöksen N:o 472/1985 ja standardin SFS-IEC
825 mukaisesti. Tiedot CD-ROM-levyasemassa käytettävän laserdiodin
säteilyominaisuuksista:

Aallonpituus 780 nm
Teho 0,4 mW
Luokan 1 laser

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1

Product Description

Your HP Apollo 9000 Model 425s and 425t Computer

The HP Apollo 9000 Series 400 is a family of high performance graphics workstations based on the Motorola MC68030 and MC68040 processors. Full object-code compatibility is maintained with most earlier Series 300 and 400 computers. Most 400x systems may be upgraded to 425x systems.

Both the 425t and the 425s use the 25 MHz MC68040 processor with a built-in floating point coprocessor.
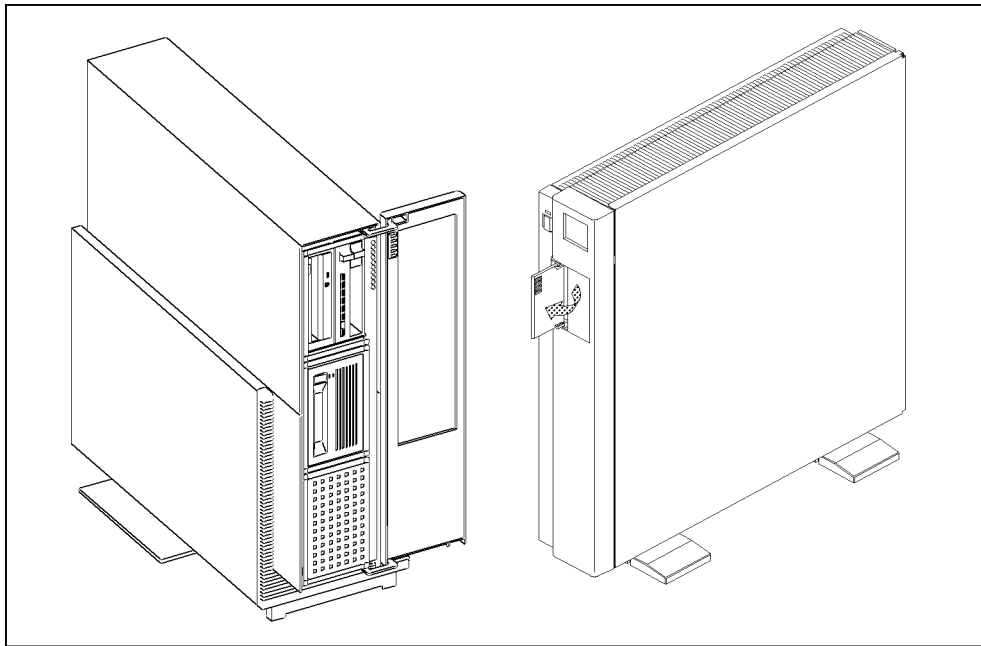
Figure 1-1. Model 425s Computer (left) and Model 425t Computer

Much of the functionality for the Series 425 computers is contained on a single system board. Most of the interface controllers, CPU circuits, memory controller and graphics/video circuits are on this system board. Each mass storage device has its controller circuits on a PC board that is part of the device. The 425s also provides slots for additional graphics and I/O interface boards.

Information on the Model 433 is also covered in this Owner's Guide. Since it is essentially the same as the 425 but with a faster processor speed (33 MHz), no distinction is made in the information.

Model 425t

The 425t may be used in either a desktop or deskside configuration. Up to 840 Megabytes of internal mass storage is available. HP-IB, SCSI, RS-232C and Centronics^{TM}-compatible ports provide additional interfaces for external peripherals. RAM may be expanded from 8 to 64 Megabytes on the 425t.

Model 425s

The 425s is an expandable deskside system designed to maximize both flexibility and performance. Internal peripherals include up to 2.6 Gigabytes of disk capacity, optional CD ROM drive and optional Digital Data Storage (DAT) tape drive. Up to 128 Megabytes of RAM are possible. HP-IB, SCSI, RS-232C and Centronics-compatible ports provide additional interfaces for external peripherals. In addition, options to add an internal I/O expander with 3 DIO-II slots or 4 EISA slots may be purchased.

Features

- MC 68040 CPU operating at 25 MHz.
- ECC RAM configurable from 8 Mbytes to 64 Mbytes (Model 425t) or from 8 Mbytes to 128 Mbytes (Model 425s).
- Optional 128 Kbyte Cache Memory (425s only)
- Three different 1280 X 1024 pixel, high-resolution monitors are supported:
  - □ 19 in. monochrome monitor
  - □ 19 in. color monitor
  - □ 16 in. color monitor
- I/O connectors for:

- □ 9-pin RS-232 serial I/O port, expandable to 3 interfaces
- □ 25-pin HP Parallel port (Centronics^{TM})
- □ Self-terminating SCSI Type 2 port (external terminator not required when cable is removed)
- □ HP-HIL port
- □ Ethernet IEEE 802.3 ThinMAU and AUI LAN ports
- □ HP-IB port
- □ Two 32 bit DIO-II Graphics Board slots (425s only)
- ■ Up to two mass storage devices, selected from the following:
  - □ Model 425t
    - ■ 210 Mbyte hard disk drive
    - ■ 420 Mbyte hard disk drive
  - □ Model 425s Full Height devices
    - ■ 660 Mbyte hard disk drive
    - ■ 1.3 Gbyte disk drive
    - ■ DDS (DAT) tape drive
  - □ Model 425s/t Half Height devices
    - ■ CD-ROM disk drive
- ■ Two operating systems are available:
  - □ HP-UX operating system, factory installed or user installed.
  - □ Domain operating system, user installed.

Every Series 400 workstation also requires a localization kit (Part No. A1098A for HP-UX Release 7.05 and A1099B for HP-UX Release 8.0). This kit supplies the necessary keyboard, mouse and power cords for the system. If external SCSI peripherals will be used, you must also order the appropriate SCSI cables and terminator.

When ordered with an internal disk, Model 425s/t computers feature HP's Run Time Instant Ignition software for quick start-up and operation. Also included is the HP Visual User Environment (VUE), a rich graphical user environment based on the industry standard OSF/Motif interface providing familiarity and ease-of-use.

The Personal VRX P3 or Turbo VRX graphics systems also come with HP's Personal Visualizer software.

Memory

User-installable RAM boards provide the 425 with RAM in increments of 8, 16 and 32 Mbyte blocks. They have an Error Checking and Correcting (ECC) ability. Standard RAM is 8 Mbytes, expandable to 64 Mbytes for the 425t and 16 Mbytes expandable to 128 Mbytes for the 425s.

RAM boards are used in pairs. There are eight sockets on the system board for four board pairs. RAM Upgrades are available as follows:

■ two 4 Mbyte boards that add an 8 Mbyte block of memory.

■ two 8 Mbyte boards that add a 16 Mbyte block of memory.

■ two 16 Mbyte RAM boards that add a 32 Mbyte block of memory (for 425s only)

For example, to obtain the maximum 64 Mbyte of RAM for the 425t would require four 16 Mbyte RAM Board pairs (i.e. eight 8 Mbyte boards) inserted in the eight sockets.

Graphics

Several graphics systems are offered on the Model 425s/t computers:

Table 1-1. Model 425 Graphics System Choices

System	Available on Models	Monitor Size	Refresh Rate
Monochrome VRX	425t, 425s	19 in.	72 Hz
Grayscale GRX	425t, 425s	19 in.	72 Hz
Color VRX	425t, 425s	16 or 19 in.	60 Hz
Color CRX	425t, 425s	19 in.	72 Hz
Personal VRX P2	425t, 425s	19 in.	60 Hz
Personal VRX P3	425t, 425s	19 in.	60 Hz
Turbo VRX T1	425s	19 in.	60 Hz
Turbo VRX T2	425s	19 in.	60 Hz
Turbo VRX T3	425s	19 in.	60 Hz

425s/t Built-In Interfaces

The 425's built-in interfaces have connectors on the rear panel as shown in Figure 1-2 and Figure 1-3 .

Graphics Board Connector(s)　　　　　　　　　　　　HP-IB Connector

SCSI Connector　　　　　　　　　　　　　　　　　　Spkr (Audio) Connector

　　　　　　　　　　　　　　　　　　　　　　　　　　HP-HIL Connector

Parallel Connector　　　　　　　　　　　　　　　　　RS-232 Connector

　　　　　　　　　　　　　　　　　　　　　　　　　　LAN Connector

Domain Keyboard Connector　　　　　　　　　　　　LAN AUI Connector

Monitor Power Cord　　　　　　　　　　　　　　　　System Power Cord
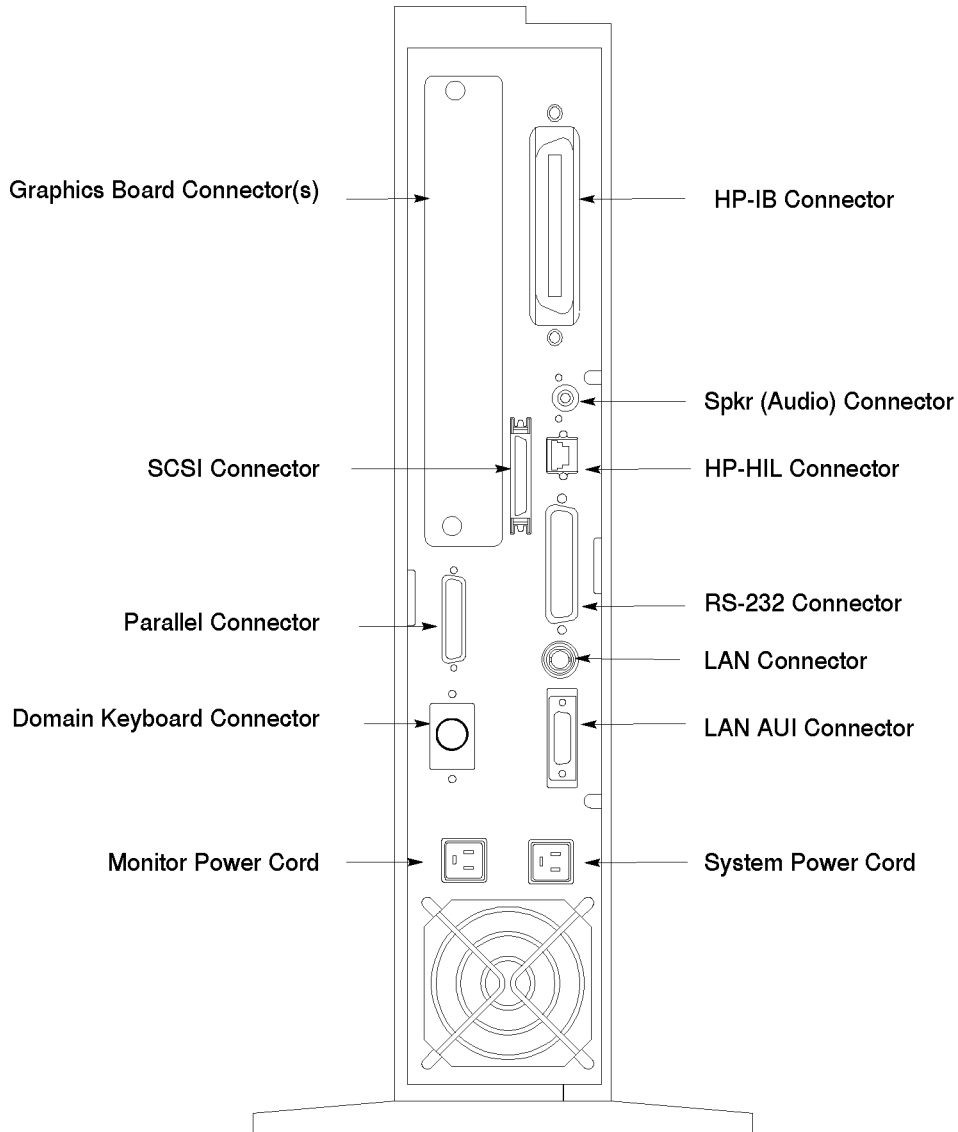
Figure 1-2. Model 425t Computer Rear Panel

DIO II Connectors
(Graphics Boards)

Four Optional Slots:
Can Be Used for
Four EISA Boards

HP-HIL Connector

Spkr Connector

Domain Keyboard Connector

Service Normal Switch

Reset Switch

RS-232 Connector

LAN Connector

LAN AUI Connector

Parallel Connector

HP-IB Connector

SCSI Connector

System Power Cord
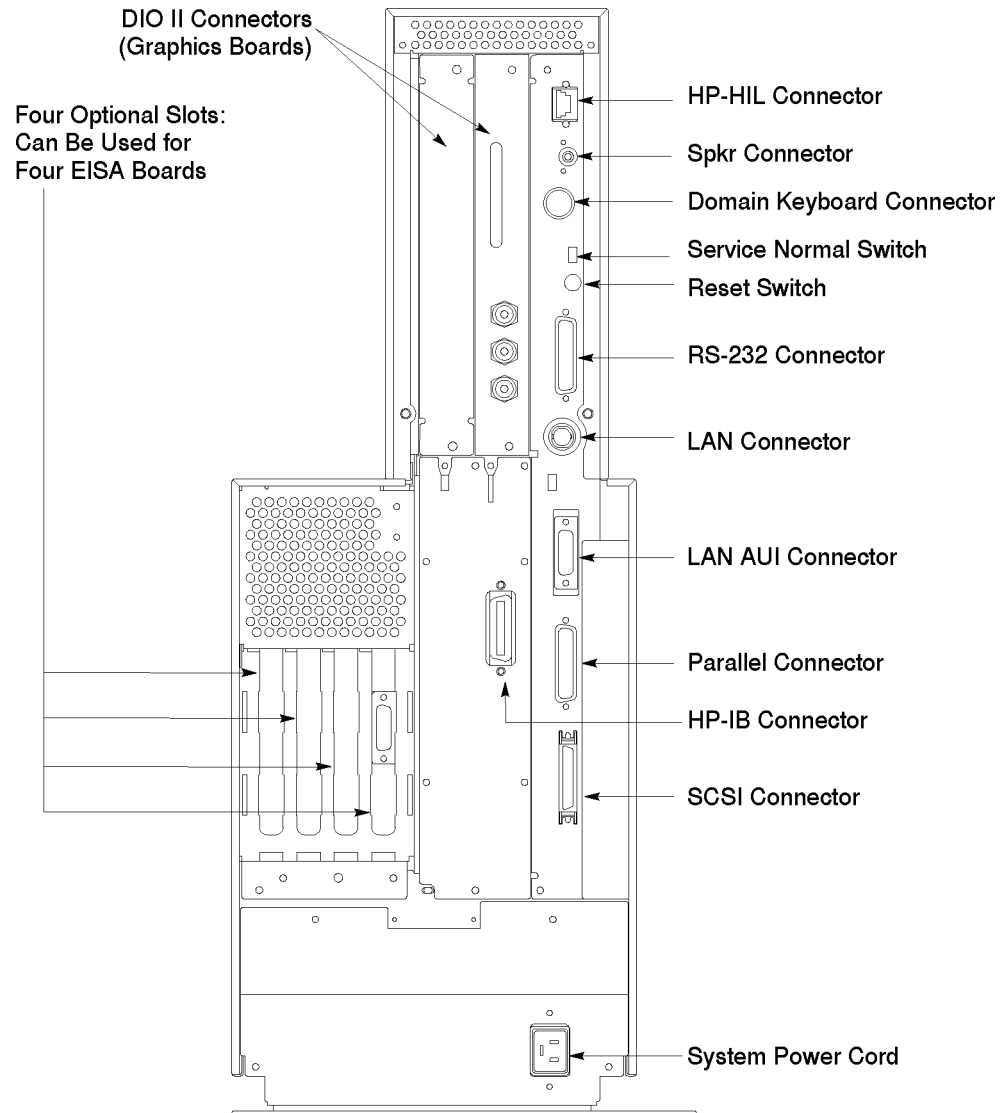
Figure 1-3. Model 425s Computer Rear Panel

SCSI Interface

The SCSI interface uses a high-density, shielded external connector for use with external mass storage devices. Internally, a ribbon cable connects to the optional mass storage devices. If no SCSI devices are attached, the 425s does not require a terminator (it is internally terminated). A terminator is included with all 425t systems.

RS-323 Serial Interface

A single 9-pin RS-232 serial interface port is provided. Unlike other Series 400 computers, the RS-232 interface for the Model 425s/t cannot be configured under Boot ROM control. Interface values such as remote/local are not used. Terminals are not supported as remote consoles on these RS-232 interface connectors. The graphics circuit provides video for monitors. A Utility Chip manages the RS-232 interface and does not provide for terminal control.

HP Parallel Interface

A 25-pin HP Parallel interface port is provided with all 425s/t models. It is compatible with most devices using Centronics^{TM} interface protocols. Some configuration parameters are available under Boot ROM control in Configuration Mode for internal interfaces.

HP-HIL Interface

The HP-HIL connector on the rear panel accepts a variety of HP-HIL input devices (keyboard, mouse, etc.). Keyboards are normally connected and both of these keyboards are available and supported only with HP-UX operating systems:

- HP 46021B Integrated Terminal Format (ITF) Keyboard.
- HP A1429A Personal Computer (PC101) Keyboard.

Note
Overlays are used on the HP A1429A Keyboard to identify certain keys for use with the HP-UX operating system.

Other HP-HIL devices may also be connected to the keyboard or HP-HIL connector.

LAN Interfaces

A standard IEEE 802.3 Ethernet Local Area Network (LAN) is available to two ports:

■ ThinMAU uses the BNC connector. An internal attachment unit interface is used.
■ AUI LAN uses the 15-pin connector. An external attachment unit interface is required for use on the network.

Either port is activated by the system board's LAN jumper position. Some LAN interface values can be configured by keyboard entry under Boot ROM control in Configuration Mode.

Internal Mass Storage Devices

The Model 425t computer may use up to two internal mass storage devices connected to the internal SCSI interface. The computer is available in diskless as well as disked configurations. Standard disked configurations have their hard disk drive bay fitted with a 210 or 420 Mbyte preformatted hard disk drive. To increase memory size up to the optional 840 Mbytes, a second 210 or 420 Mbyte drive is added. Model 425t mass storage options include:

■ 210 Mbyte Hard Disk Drive

■ 420 Mbyte Hard Disk Drive

■ A second 210 Mbyte Hard Disk Drive

■ A second 420 Mbyte Hard Disk Drive

On the 425s, a standard 660 Mbyte or 1.3 Gbyte disk is installed as a full-height device and a second one may be added to achieve the 2.6 Gbyte maximum. As an option, the HP-UX operating system may be preloaded on the disk. The 425s can support two full-height and two half-height mechanisms.

The second full-height peripheral bay can have one of several optional mass storage devices installed. These can be combinations of:

■ Full-height devices are:
  □ 660 Mbyte Hard Disk Drive
  □ 1.3 Gbyte Hard Disk Drive
  □ DDS (DAT) Tape Drive

■ Half-height devices are:
  □ CD ROM Disk Drive

Operating Systems

HP-UX and Domain/OS are both supported on the Model 425s/t. HP-UX 8.0 offers Instant Ignition which pre-loads the operating system and HP VUE on the internal hard disk drive. This allows users to start using their workstations immediately after hardware installation. Table 1-2 lists the HP-UX operating systems and languages available for the Model 425s/t computer.

Table 1-2.
Model 425s/t HP-UX Operating Systems and Languages

Operating system:	HP-UX 7.05 or later
	HP-UX complies with XOpen, and POSIX specifications.
Window system:	X Window System Version 11 (X11) Release 4
Languages:	C, Pascal, FORTRAN, Ada, Common LISP, C++
User interface:	Visual User Environment (HP VUE) 2.01 or later

Network protocols supported by the 425s/t include:

■ S.25
■ SNA
■ RJE
■ TCP-IP
■ HP Diskless

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Using Your Manuals

Chapter Contents

- In this chapter you will find references to specific manuals to help you with various installation, configuration, and operation tasks for the HP Apollo 9000 Model 425s/t and its associated devices.

- For troubleshooting information, please see Chapter 10.

- If you need help with system hardware installation, please see your *HP Apollo 9000 Series 400 Installation Guide* HP Part No. A1630-90001 for the 425t and HP Part No. A1421-9000l for the 425s.

- If you have not yet installed your system and need basic guidance, see Chapter 3. For detailed help, see the appropriate *Installation Guide* for your computer (see above).

- If you have installed your system and want to get on with using it, please skip to Chapter 3 for HP VUE usage and/or Chapter 5 for command line usage.

Finding Documents for Specific Tasks

This section describes where to find the information you may need to properly install and start using your workstation.

Installation

To install/connect this:	Refer to this manual:
425s/t Computer, Keyboard, Mouse, and Monitor	Your applicable *Installation Guide* A1630-90001 (425t) or A1421-9000l (425s).
Additional external peripherals	*HP-UX Installing Peripherals*
CD ROM, Hard Disk, DDS (DAT) drives	Chapter 8 and Appendix A in this *Owner's Guide*
Additional RAM	Chapter 9 in this *Owner's Guide*
Network connections	Your applicable *Installation Guide* A1630-90001 (425t) or A1421-9000l (425s).
Replacement clock battery	Your applicable *Installation Guide* A1630-90001 (425t) or A1421-9000l (425s).

Configuration

To do this configuration task:	Refer to this manual:
Configuring boot ROM	Appendix B in this *Owner's Guide*
Configuring your computer for LAN	your *Installation Guide* for this computer; *HP 9000 Series 300, 400 and 800 Computers Networking Overview*; and *Installing and Administrating LAN*
Entering system name and IP address	Chapter 3 and Chapter 10 in this *Owner's Guide*, and your *Installation Guide*.
Creating New User Accounts	Chapter 3 or Chapter 5 in this *Owner's Guide*
Setting or changing passwords	Chapter 3 or Chapter 5 in this *Owner's Guide*
Setting permissions	*A Beginner's Guide to HP-UX*
Setting Swap Space	*System Administration Tasks*
Managing/Configuring HP VUE	*HP Visual User Environment User's Guide*, *HP Visual User Environment Configuration Guide*, and *HP Visual User Environment System Administration Manual*

Operation

To do this operation,	Refer to this manual.
Logging in and out	Chapter 3 in this *Owner's Guide*
Using HP VUE	Chapter 4 in this *Owner's Guide* and *HP Visual User Environment User's Guide*
Shutting down your workstation in HP VUE	Chapter 3 in this *Owner's Guide*
Shutting down your workstation without HP VUE	Chapter 5 in this *Owner's Guide*
Setting or changing passwords in HP VUE	Chapter 3 in this *Owner's Guide*
Setting or changing passwords without HP VUE	Chapter 5 in this *Owner's Guide*
Setting permissions	*A Beginner's Guide to HP-UX*
Entering commands in HP VUE	Chapter 4 in this *Owner's Guide*
Entering commands without HP VUE	Chapter 6 in this *Owner's Guide*, and *A Beginner's Guide to HP-UX*
Using the directory/file system in HP VUE	Chapter 4 in this *Owner's Guide*
Using the directory/file system without HP VUE	Chapter 6 in this *Owner's Guide*, and *A Beginner's Guide to HP-UX*
Using a shell	Chapter 6 in this *Owner's Guide*, *A Beginner's Guide to HP-UX*, and *Shells: User's Guide*
Viewing a file in HP VUE	Chapter 4 in this *Owner's Guide*
Viewing a file without HP VUE	Chapter 6 in this *Owner's Guide*
Editing a file	*A Beginner's Guide to HP-UX* and *The Ultimate Guide to the vi and ex Text Editors*
System backup/restoration	Chapter 7 in this *Owner's Guide*
System security	*HP-UX System Security* or *A Beginner's Guide to HP-UX*

Solving Problems

For troubleshooting common problems, see Chapter 10.

3

Starting Your System for the First Time

Chapter Contents

- Using Instant Ignition

- Starting Up with HP VUE

  - □ Logging In
  - □ Logging Out
  - □ Setting Up a User Account
  - □ Shutting Down

This chapter gives information on using your system for the first time, with HP VUE. See Chapter 5 for information on starting your system *without* HP VUE.

Using Instant Ignition

If you have already loaded your system and you have the VUE windows on your screen, go on to the next section.

If your system has HP-UX preloaded on its disk (this is indicated by a label over the power switch on your 425s/t), HP-UX will automatically load itself when you first turn the power on. During this installation process, you will be asked for several pieces of information needed to configure your system appropriately:

■ The time zone where your computer is located.

■ The System name (host name) for your workstation; any alphanumeric, single-word name with eight or fewer characters.

■ The network address number, also called an IP number, for your workstation. This consists of four address fields separated by periods: for example, *255.32.3.10.* You may need to consult with your system administrator for this information.

After you have assembled the hardware for your system, then have the above information ready before you turn on the power to your computer for the first time:
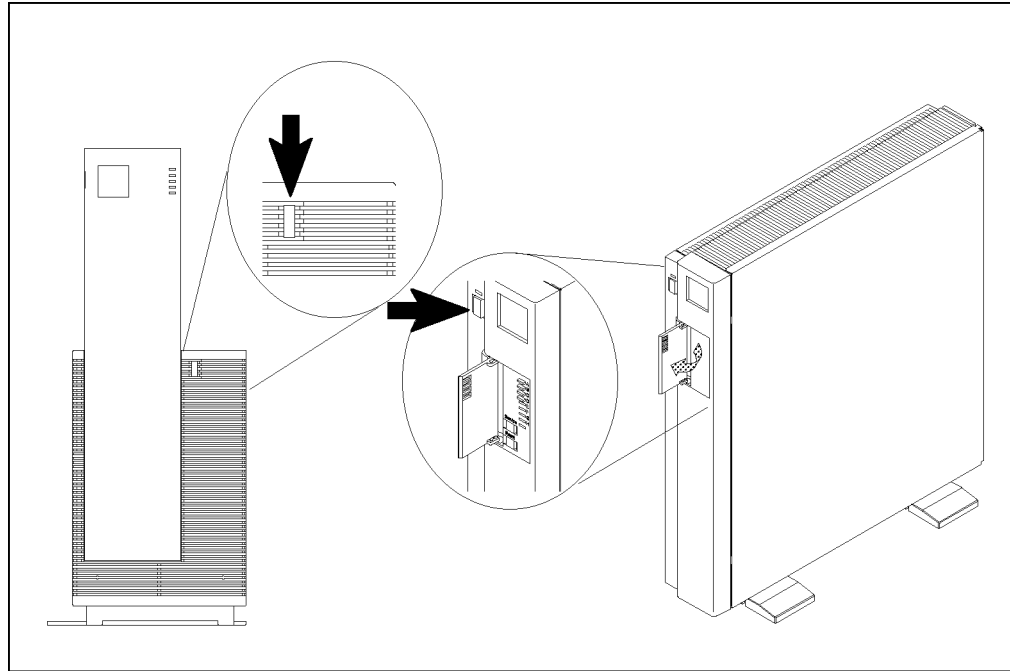
Figure 3-1. Model 425s/t Power Switches (arrows)

1. Turn on the power for your computer and display.
2. Enter the information when your system display requests it.

If you do not have the system name, network i.d., and time zone information when you are prompted for it, you can use the default values now and enter this information at another time. You would enter the information later by typing:

    `/etc/set_parms` *systemname*

The display will then prompt you for any information which is missing or which you may need to re-enter.

To review the steps of the Instant Ignition process in detail, please see the appropriate *Installation Guide* for this product.

Logging In with HP VUE

Once HP-UX is running on your system, you must log in. 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 process of logging in 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.

If you choose *not* to use HP VUE, you can select `Options` and `No Windows` from the VUE login screen, at this time. In that case, go to Chapter 5 for information on logging in from the command line.

Note	Selecting the `No Windows` option assumes that you are already familiar with how to read and edit files. If you are not, review Chapter 6.

■ During the login process, if you need help logging in, click the login screen `Help` button.

The help dialog box that appears will refresh your memory. For more information *after* login, push the Help Manager question mark icon `?`.

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 10, or contact your designated service representative.

3
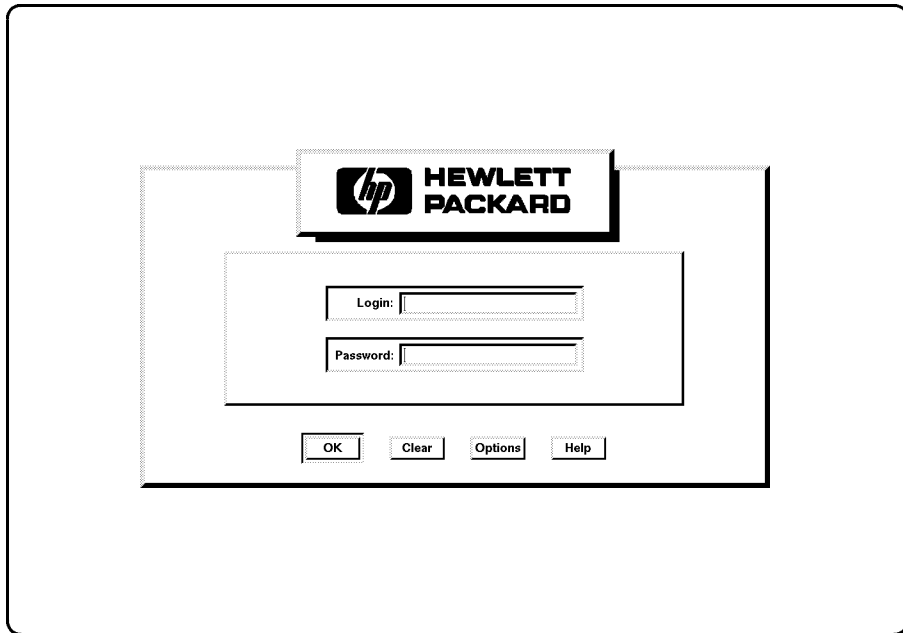
2 You must first login as `root`. To login as `root`, type:

`root` (Return)

(The (Return) key is labeled (Enter) on some keyboards.)

3
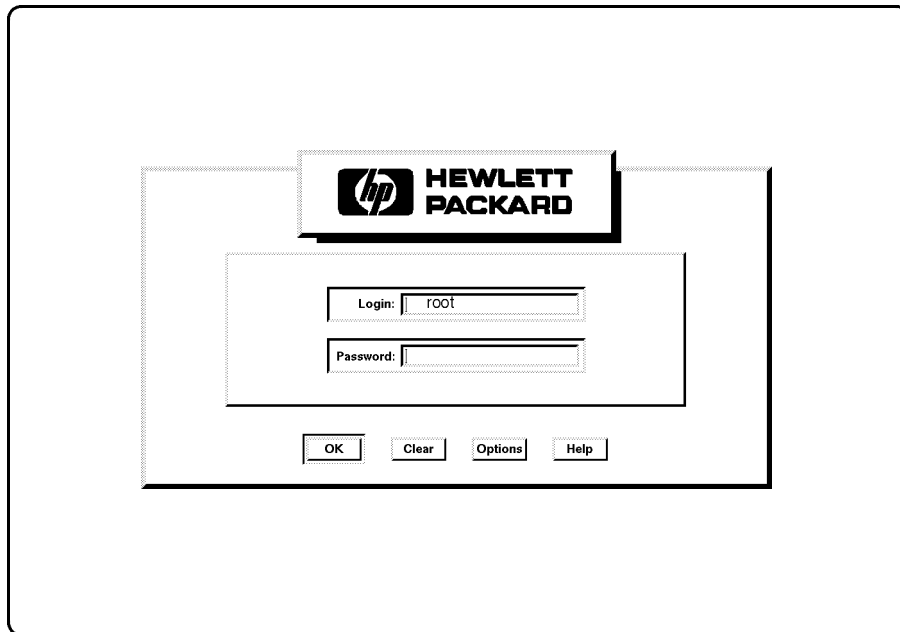
To correct an entry, use the (Backspace), (Insert), (Delete char), and arrow keys
(▶, ◀) to edit the box. Or start the login over by clicking on `Clear`.

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 pointer to the `Start HP VUE` screen button (shown by the arrow in the illustration below), then click the left mouse button (Mouse Button 1) once. (Later, you may want to to use the `/etc/set_parms` procedure to enter a host name for your system.)

3

Caution

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

✋
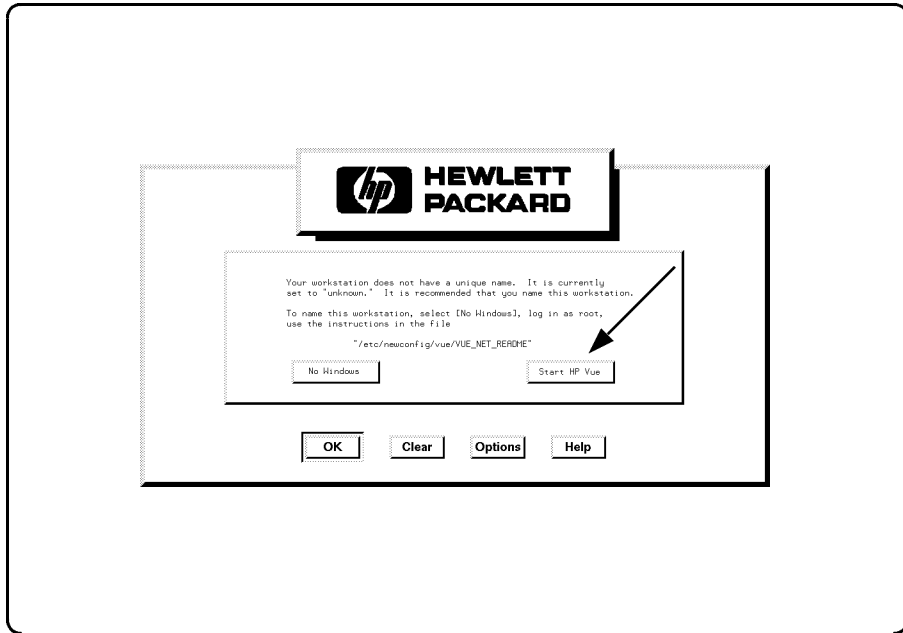
The copyright screen appears, and then your HP VUE workspace (the screen environment in which you interact with HP-UX) appears about one minute later.

4 The HP VUE workspace looks like this, with a Console Icon, a File Manager, and the Workspace Manager. (The Workspace Manager is also known as the Control Panel or "Dashboard").
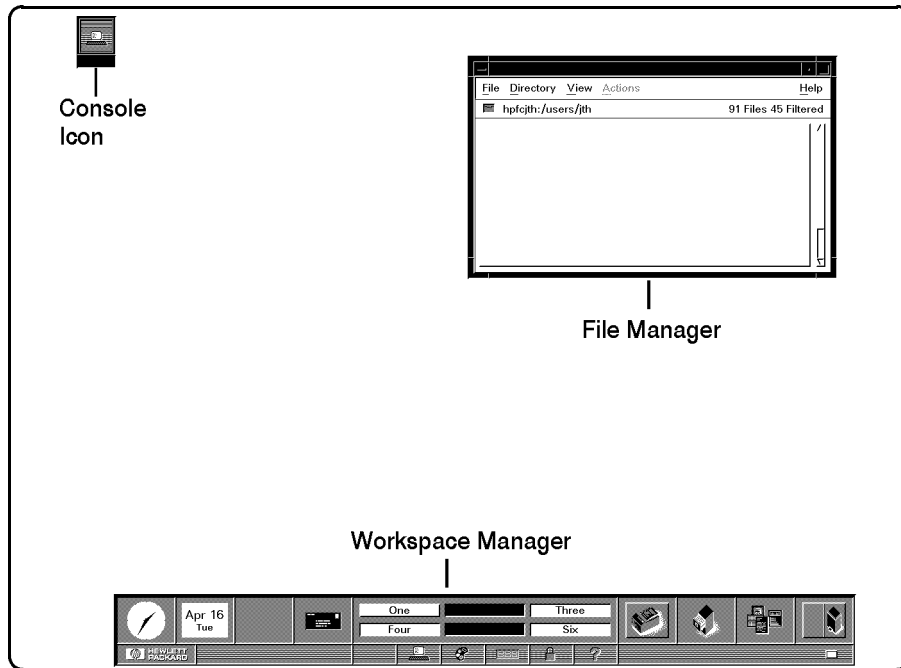
Opening Screen

VUE Functions on the Control Panel

■ At the bottom of your screen you will see the following buttons with icons on the HP VUE Workspace Manager
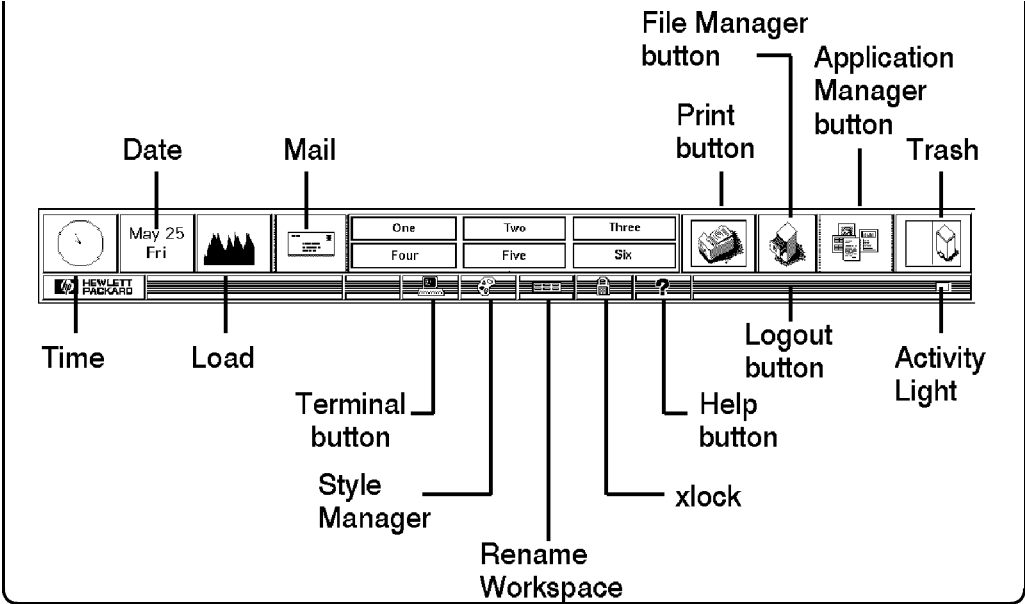
5 Close the File Manager window (on the upper right) by moving the mouse pointer to the window menu button (with a – on it) in the upper-left corner of the File Manager window and clicking the left mouse button twice quickly. The window will disappear.

File   Directory   View

▨ hpfcjth:/users/jth
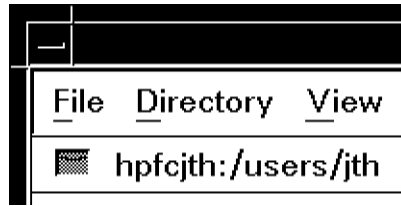
6 Open a terminal window by clicking the left mouse button once on the Terminal Button in the Workspace Manager panel at the bottom. A terminal window will appear after a few seconds.

Click to open a terminal window
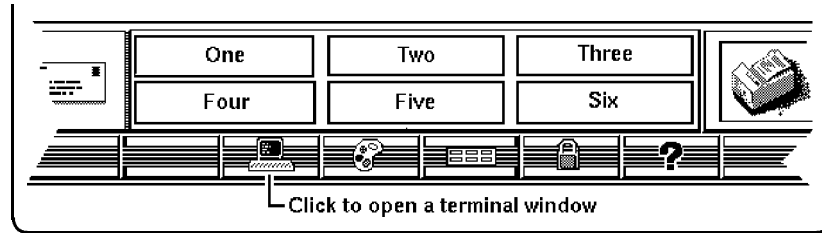
7 Now you will use another feature of the HP Visual User Environment: the Help System. Through interaction with the Help System, you may learn about HP VUE.

Move the pointer to the Help screen button. It's also at the bottom of your screen, on the Workspace Manager panel, and it has a question mark ? on it. Click the left mouse button once.
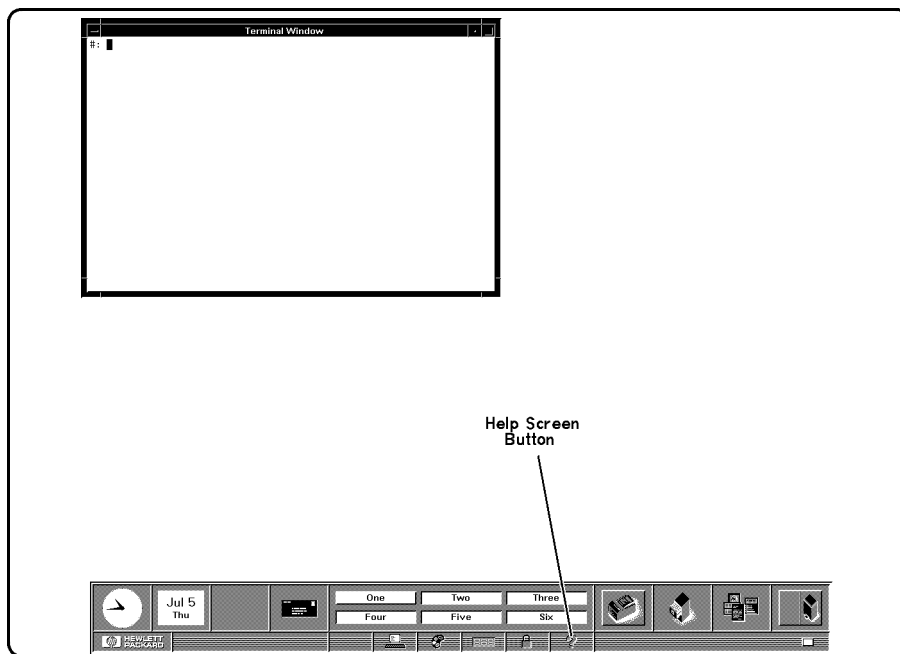
8 The Help Index window shown below appears.

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 index for this topic 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. You can use the slider "scroll bar" at the right border of the window to scroll the information up or down. Place the mouse pointer on the bar and hold down the left mouse button while you move the pointer up or down. This action will scroll the text on the screen up or down at the same time.
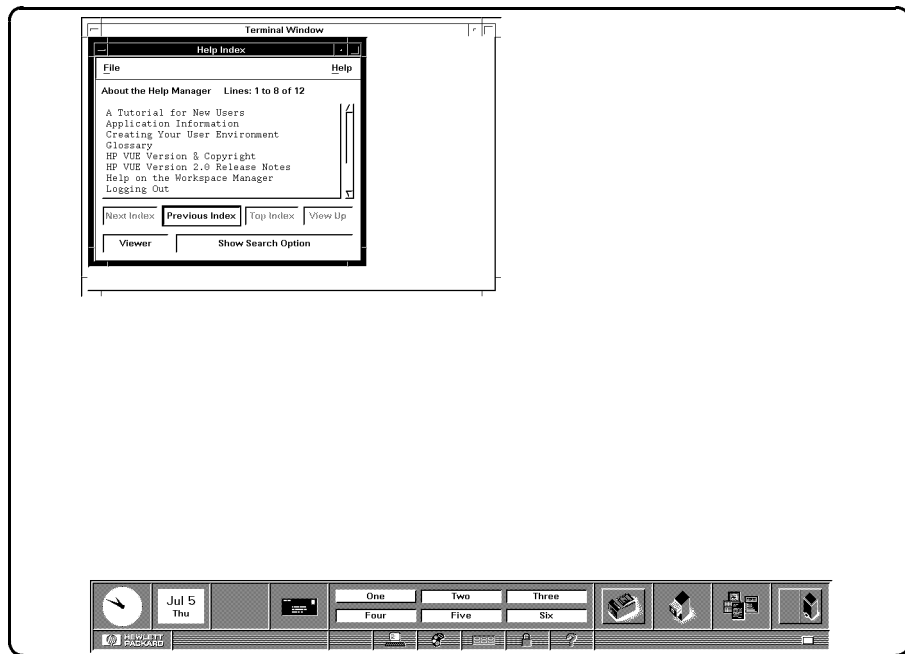
9 ■ To see all of a window that's behind another window, move the pointer onto the window you want to see, then click the left mouse button once.

■ Now, bring the Help window to the front.

■ To close the Help window, move the mouse pointer to the Window Menu button (the −) in the upper left-hand corner of the Help window. Then click the left mouse button twice quickly.
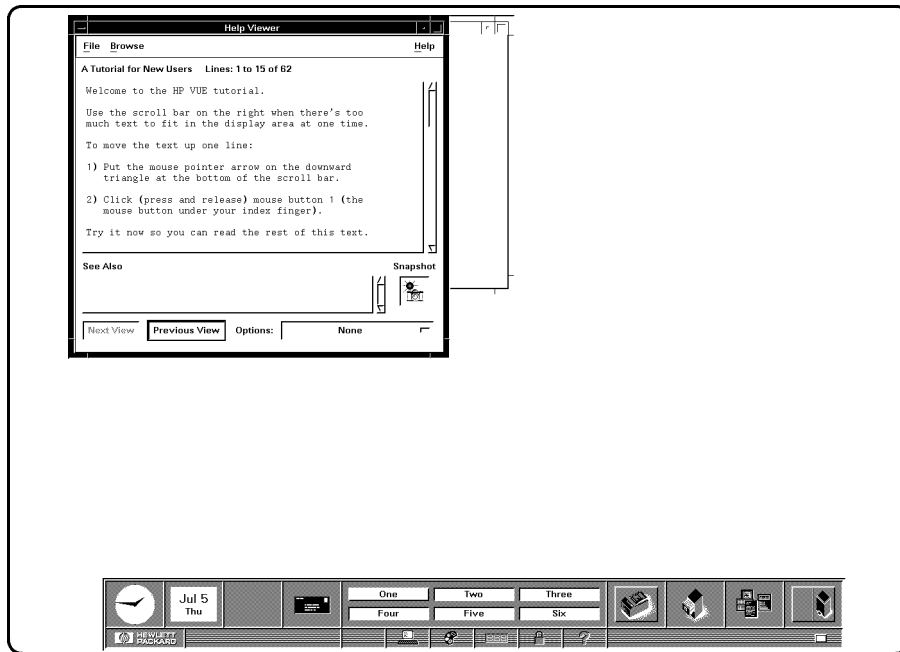
Logging Out

1 To logout, move the pointer onto the control panel's lower right-hand bar. This bar is called the **logout button**. Click the left mouse button once. The mouse pointer changes to a dash in a circle, indicating the logout process is working.
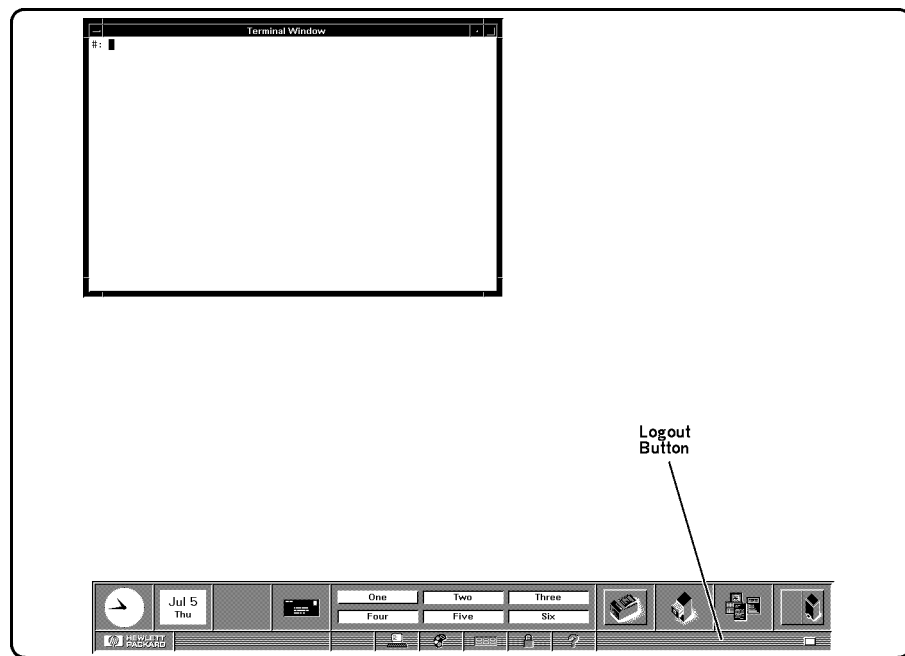
Logout
Button

2 This confirmation box will appear. To confirm your logout, move the logout mouse pointer into the box, to the button marked OK, and click the left mouse button. The logout process will proceed.

About a minute later, the login screen will reappear.
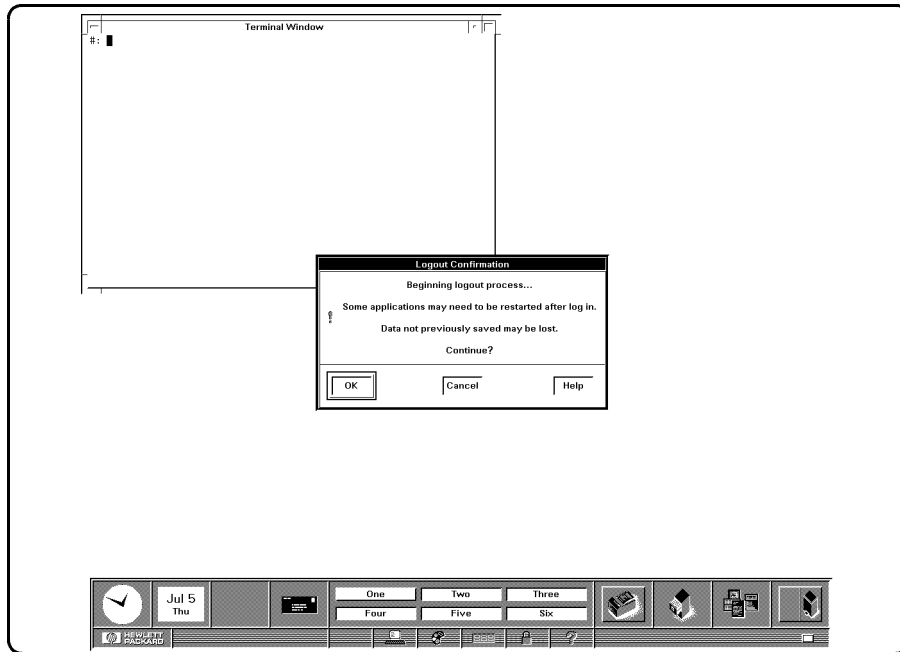
Creating a New User Account

1 To create a new user account, first make sure you are logged in as `root`. If you are not, click on the logout button, as described in the previous section. Then, log in as `root`.

Caution

✋

`root` status entails special privileges and dangers. You should only log in as `root` to do system administration tasks.

---

2 Activate the Help System by moving the pointer to the Help screen button on the Workspace Manager panel (on the bottom, marked with a ?). Then click the left mouse button once.

Help Screen
Button
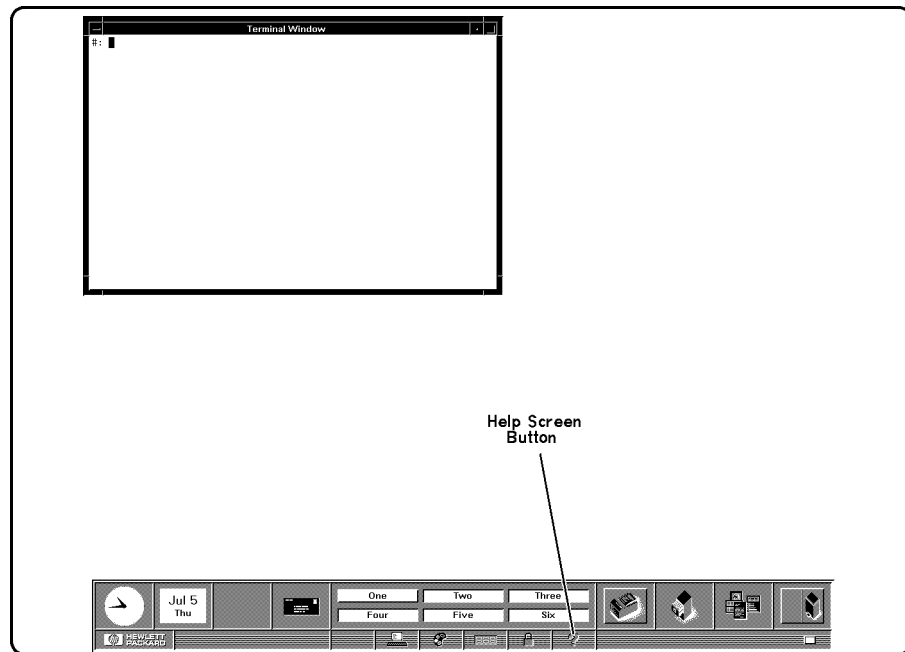
3 When the Help Index window appears, move your pointer onto

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.

3

Terminal Window

Help Index

File   Help

About the Help Manager   Lines: 5 to 12 of 12

HP VUE Version & Copyright
HP VUE Version 2.0 Release Notes
Help on the Workspace Manager
Logging Out
Man Pages
System Administration Tasks
Updating an Old Environment
Using the Help Manager

Next Index | Previous Index | Top Index | View Up

Viewer | Show Search Option

Jul 5
Thu

One   Two   Three
Four   Five   Six

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

`Creating a New User Account`

```
┌─────────────────────────────────────────────────────────┐
│ Terminal Window                                          │
│  ┌──────────────────────────────────────────┐           │
│  │        Help Index                          │           │
│  │ File                            Help       │           │
│  │                                            │           │
│  │ System Administration Tasks  Lines: 1 to 8 of 9       │
│  │                                            │           │
│  │ Changing Your Workstation Environment      │           │
│  │ Creating a New User Account                │           │
│  │ Creating or Changing Your Password         │           │
│  │ Customizing System Defaults                │           │
│  │ Protecting Your Data                       │           │
│  │ Recovering Disk Space                      │           │
│  │ Setting the Time, Time Zone, and Date      │           │
│  │ Shutting Down Your Workstation             │           │
│  │                                            │           │
│  │ Next Index  Previous Index  Top Index  View Up        │
│  │                                            │           │
│  │   Viewer         Show Search Option        │           │
│  └──────────────────────────────────────────┘           │
│                                                          │
│  ┌───┐ ┌──────┐  ┌────┐  ┌─────┬─────┬─────┐             │
│  │   │ │ Jul 5│  │    │  │ One │ Two │Three│             │
│  │   │ │ Thu  │  │    │  ├─────┼─────┼─────┤             │
│  └───┘ └──────┘  └────┘  │ Four│ Five│ Six │             │
└─────────────────────────────────────────────────────────┘
```

5 When you have finished reading the instructions, click on the application button at the right of the control panel. This button has sheets of paper pictured on it.

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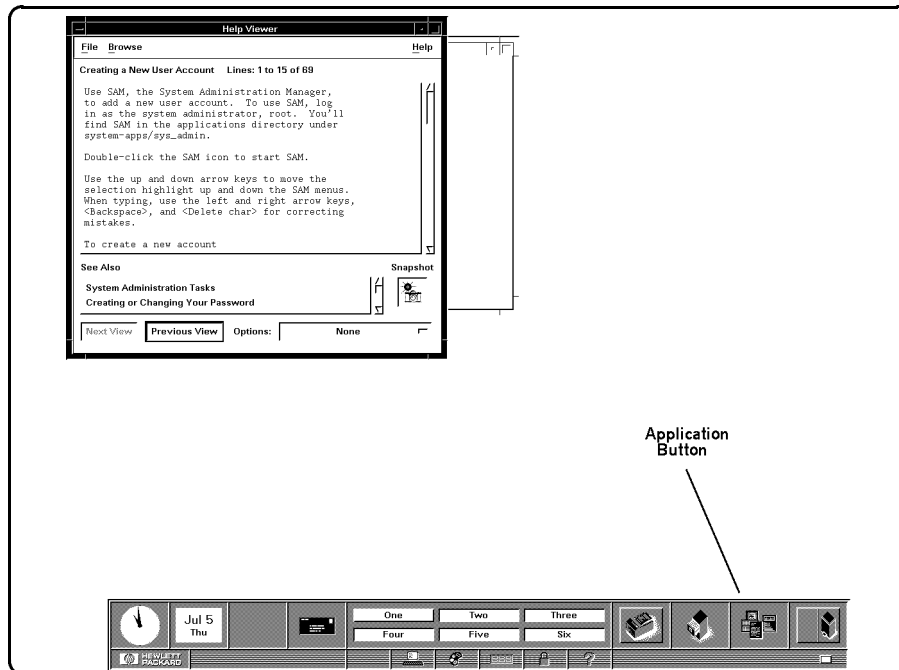
6 You will see a file manager window similar to this one.

To open the `system_apps` folder, move the pointer onto the `system_apps` folder icon, then click the left mouse button twice quickly.
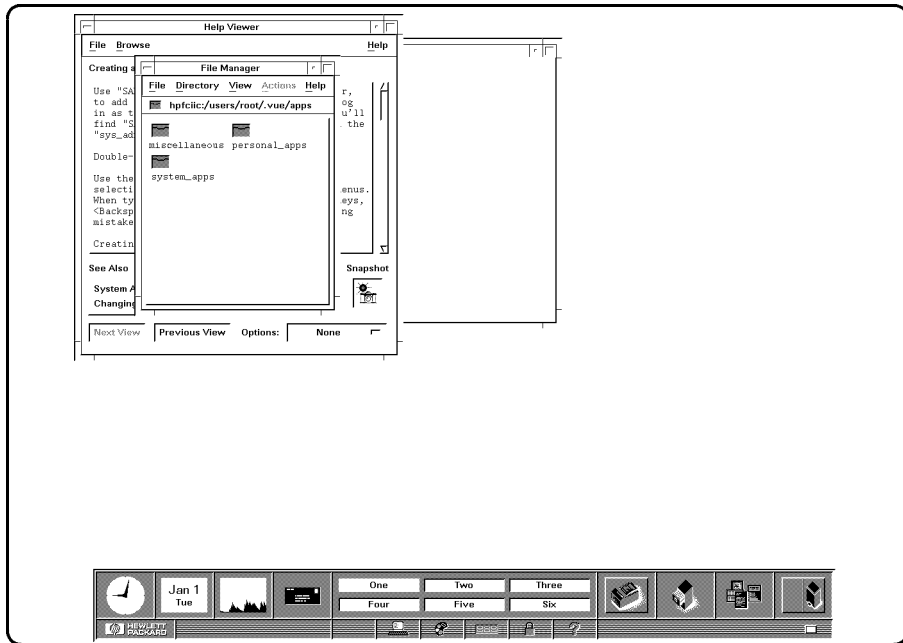
7 You will see a system applications window similar to this one.

Open the `sys_admin` folder by putting the pointer on it and clicking the left mouse button twice.
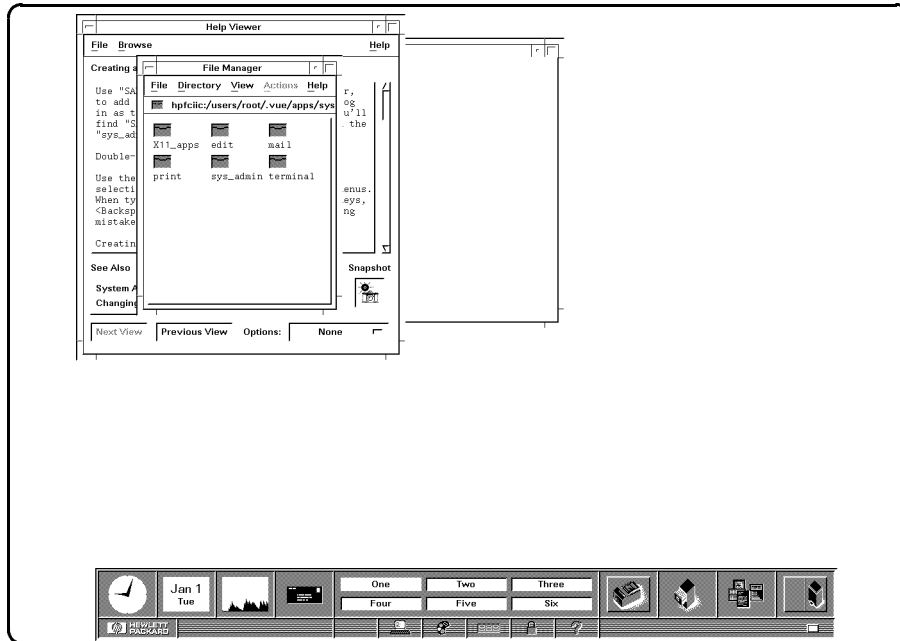
8 This system administration window appears.

Move your pointer onto the `SAM` (System Administration Manager) icon and click the left mouse button twice.
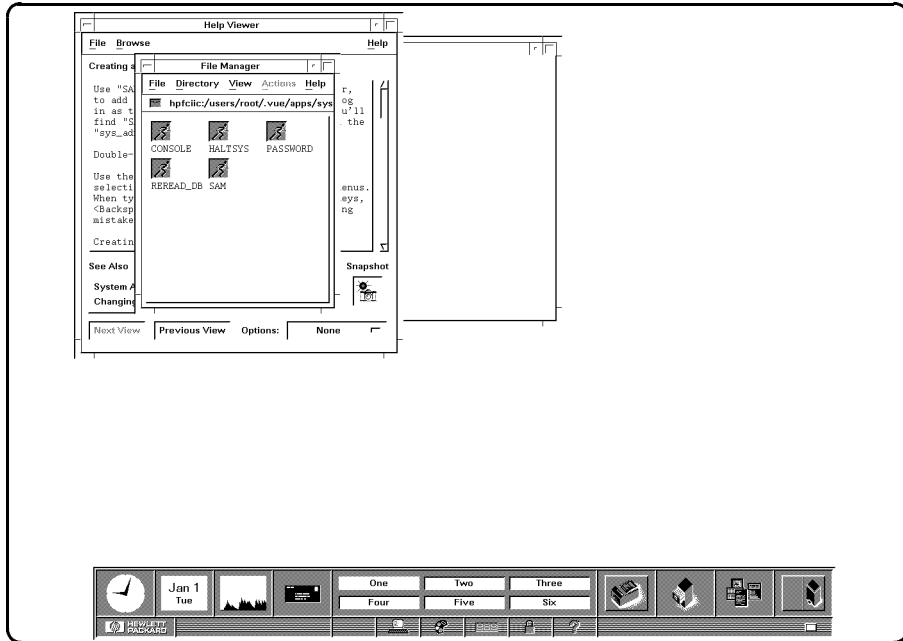
9 SAM is an application that is designed to run on text terminals. If you wish to move the highlight bar to another item, you must use the cursor keys. To press a softkey, you may either use the function keys on your keyboard or use the mouse to click on the softkeys in the SAM terminal window.

With this item highlighted,

`Users ->`

move the mouse pointer to the `Select Item` softkey and click the left mouse button once.

"Select Item"
Softkey
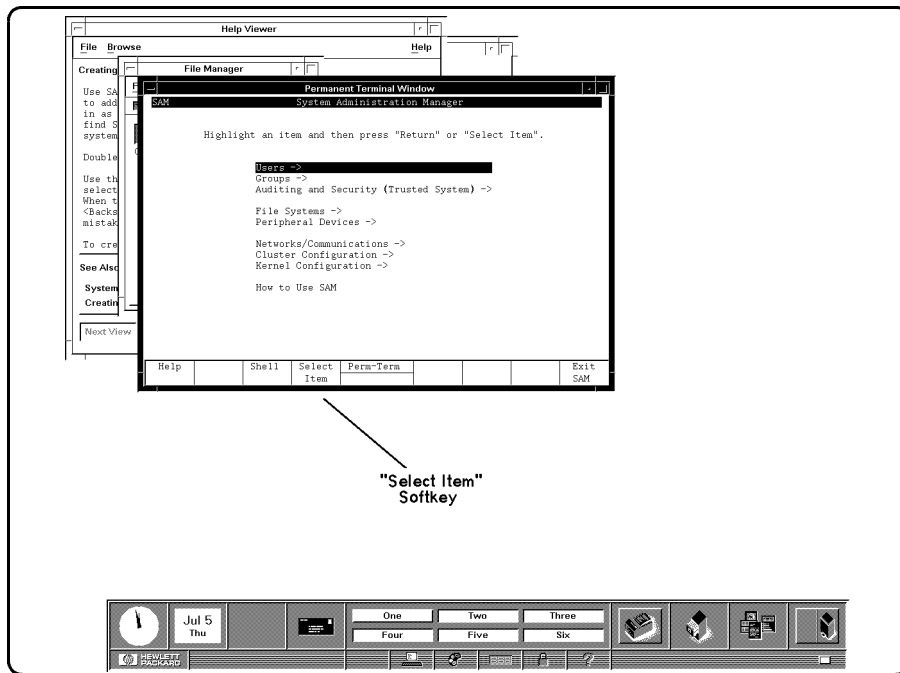
10 When this window appears, this line will be highlighted:

Add a New User Account to the System

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

3

Help Viewer

File Browse   Help

Creating   File Manager

Use SA   Permanent Terminal Window
to add   SAM   Users
in as
find S
system   Highlight an item and then press "Return" or "Select Item".

Double

Use th   Add a New User Account to the System ...
select   Remove a User Account from the System ...
When t   View/Modify a User's Account Information ...
<Backs
mistak   Deactivate a User Account ...
                Reactivate a User Account ...
To cre

See Also

System

Creatin

Next View

Help   Main   Shell   Select   Perm-Term   Previous
       Menu   Item   Menu

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                     Four   Five   Six

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SAM Main Menu

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

`wizard`

Make sure you fill in *all* the fields you want at this time. Changing fields later will require removing this user and re-adding it to change field values.

Then click the left mouse button on the `Perform Task` softkey.

Some items are set to their default values and normally will not be changed.
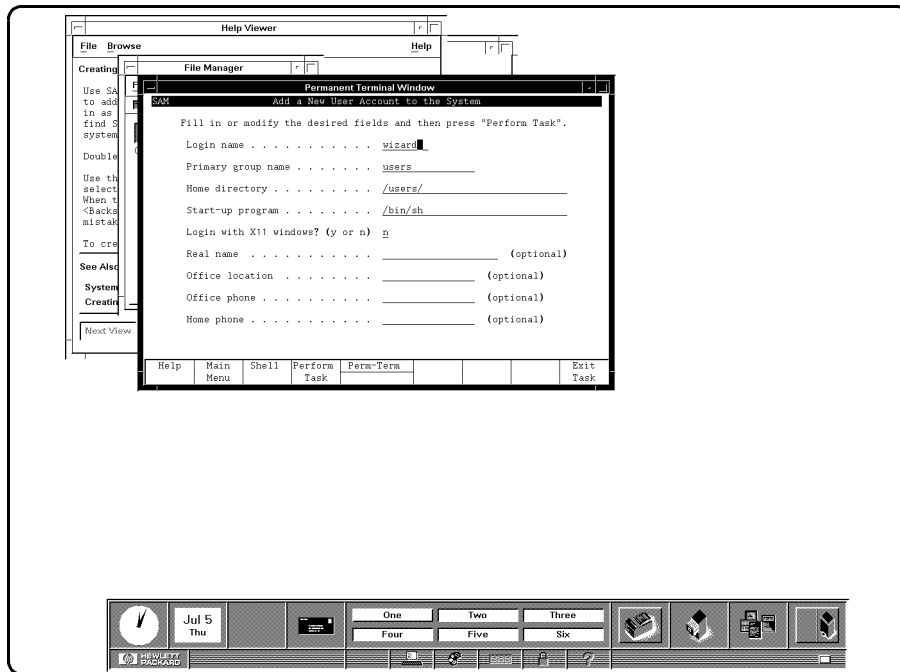
12 Type in the password for your new login account. (See the later section "Setting a New Password" for the rules for selecting a password.)

For example:

```
123four
```

then press the ⟨Return⟩ key or click on the **Done** softkey.
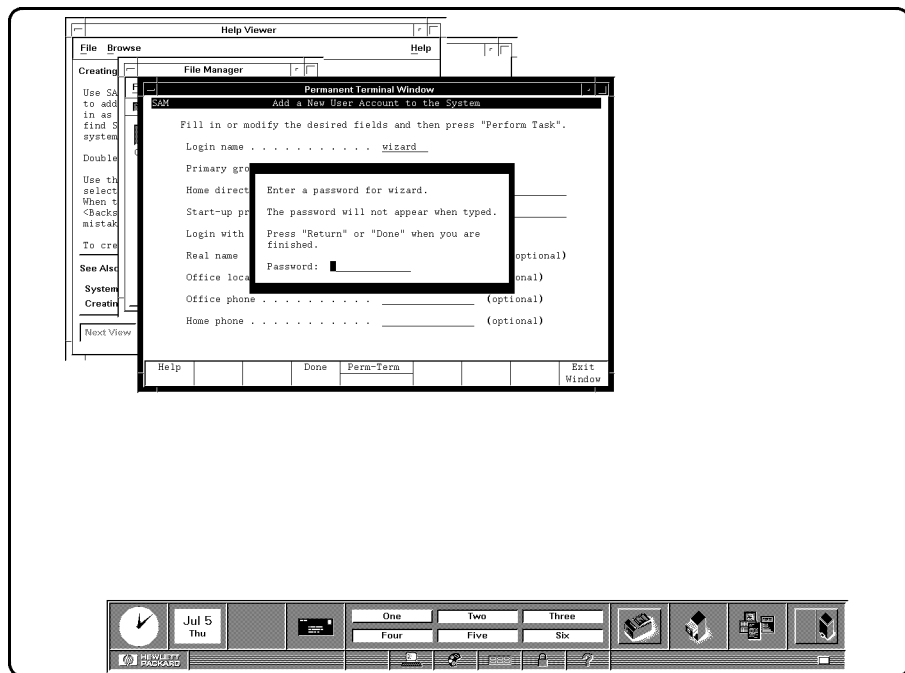
13 Reenter the password, then press ⌐Return⌐ or click on the `Done` softkey.

The new user will be added to the system.

Note

You can also create a password for `root` using `SAM`. To do so, return to the Main Menu and select `Change a user's password`. Enter `root` as the login name, and enter a password, when requested. See the later section in this chapter, "Setting a New Password", if you need help with selecting passwords.

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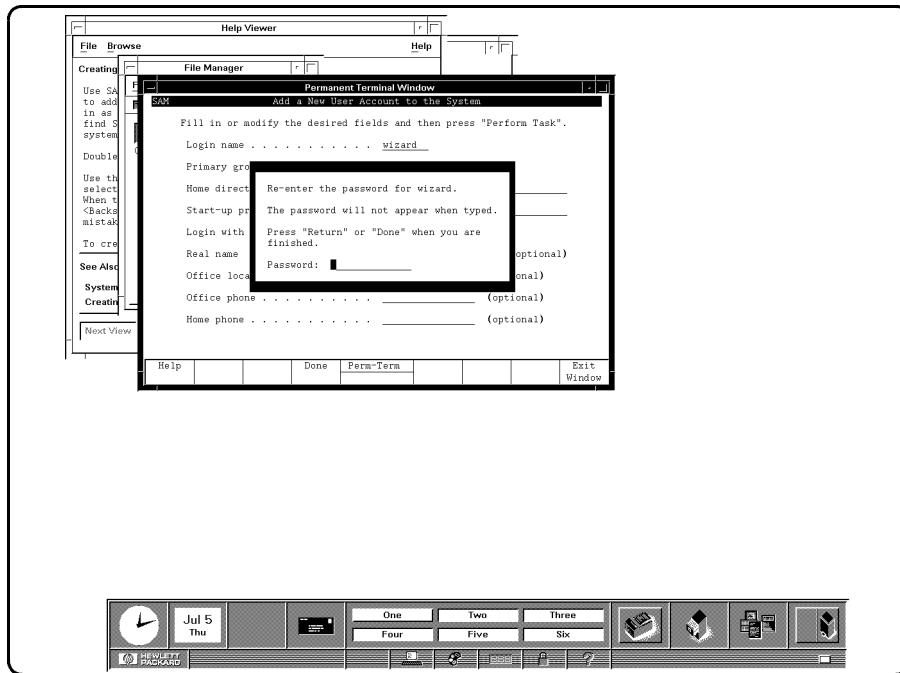
14 After the new user has been added to the system, press the keyboard `space` bar to get a blank form.

```
┌─────────────────────────────────────────────────────────────────────┐
│  ┌──────────────────────────────────────────────────────┐            │
│  ┌─┐              Help Viewer                        ╷ ┌┐ │            │
│  File  Browse                                 Help   ┌╴┌┐ │           3│
│  Creating ┌─┐        File Manager          ╷ ┌┐       │   │      ┌────┐│
│  Use SA┌─┐  ┌──── Permanent Terminal Window ───────────┐│       │    ││
│  to add│ │ SAM      Add a New User Account to the System │       │    ││
│  in as │ │                                                │       │    ││
│  find S│ │    Fill in or modify the desired fields and then press "Perform Task". │    ││
│  system│ │                                                │       │    ││
│        │ │      Login name . . . . . . . . . .   wizard   │       │    ││
│  Double│ │                                                │       │    ││
│        │ │      Primary group name . . . . . . .  users   │       │    ││
│  Use th│ │┌──────────────────────────────────────────────┐│      │    ││
│  select│ ││ Task completed.                              ││      └────┘│
│  When t│ ││                                              ││             │
│  <Backs│ ││ wizard has been added to the system.         ││             │
│  mistak│ ││                                              ││             │
│        │ ││            -- Press the space bar to continue. -- ││        │
│  To cre│ │└──────────────────────────────────────────────┘│             │
│  See Als│ │    Office location  . . . . . . . . _____  (optional) │
│        │ │                                                │             │
│  System │ │    Office phone . . . . . . . . . .  _____  (optional)│
│  Creatin│ │                                                │            │
│        │ │    Home phone . . . . . . . . . . .  _____  (optional) │
│  ┌────────┐                                              │             │
│  │Next View│           │    │    │  Perm-Term  │    │    │  │            │
│  └────────┘ └──────────────────────────────────────────┘│             │
└─────────────────────────────────────────────────────────────────────┘
```

15 Click on the `Main Menu` softkey.

```
┌─────────────────────────── Help Viewer ──────────────────────────┐
│ File  Browse                                          Help        │
│┌── Creating ──────── File Manager ──────────────────────┐         │
││ Use SA ┌────────────── Permanent Terminal Window ──────────────┐ │
││ to add │SAM        Add a New User Account to the System        │ │
││ in as  │                                                       │ │
││ find S │  Fill in or modify the desired fields and then press "Perform Task". │
││ system │                                                       │ │
││        │  Login name . . . . . . . . . . .  wizard█            │ │
││ Double │                                                       │ │
││        │  Primary group name . . . . . . .  users_____     │ │
││ Use th │                                                       │ │
││ select │  Home directory . . . . . . . . .  /users/_____ │ │
││ When t │                                                       │ │
││ <Backs │  Start-up program . . . . . . . .  /bin/sh_____ │ │
││ mistak │                                                       │ │
││        │  Login with X11 windows? (y or n)  n                  │ │
││ To cre │                                                       │ │
││        │  Real name  . . . . . . . . . . .  _____  (optional) │
││ See Also  Office location  . . . . . . . .  _____  (optional) │
││        │                                                       │ │
││ System │  Office phone . . . . . . . . . .  _____  (optional) │
││ Creatin│                                                       │ │
││        │  Home phone . . . . . . . . . . .  _____  (optional) │
││ Next View                                                      │ │
│         ├───────┬──────┬──────┬───────┬──────────┬──────┬──────┤ │
│         │ Help  │ Main │Shell │Perform│ Perm-Term │      │ Exit │ │
│         │       │ Menu │      │ Task  │           │      │ Task │ │
│         └───────┴──────┴──────┴───────┴──────────┴──────┴──────┘ │
└───────────────────────────────────────────────────────────────────┘
```

3-30 Starting Your System for the First Time

16 Click on the `Exit SAM` softkey.

To close the Permanent Terminal Window and the File Manager, move the mouse pointer to the Window Menu button in the upper left-hand corner of each window (the button has a – on it) and click the left mouse button twice quickly.

"Exit SAM"
Softkey
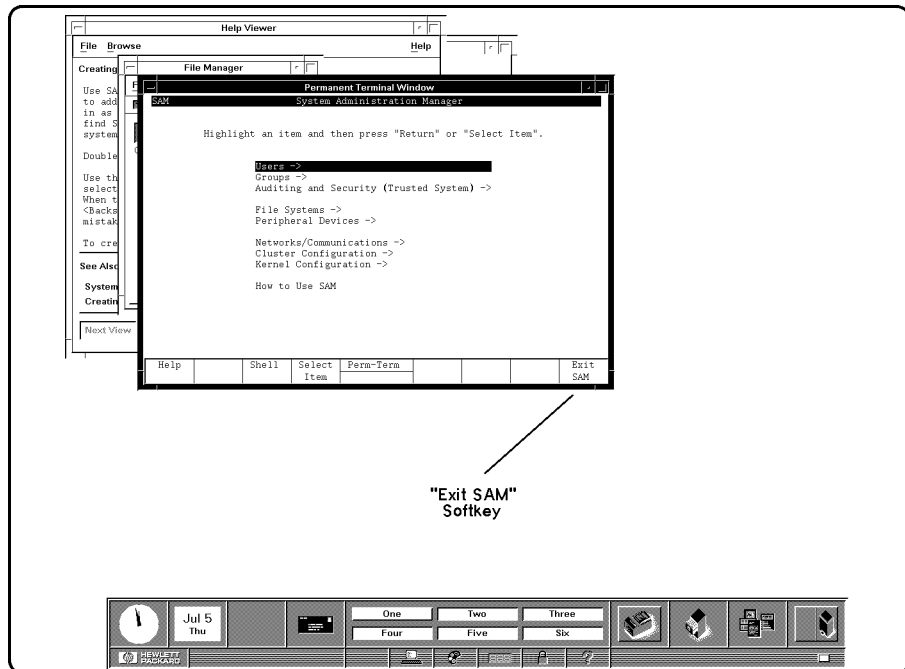
Setting a New Password

In addition to setting a password when you set up a regular user account, you will want to change your password from time to time as a matter of good security practice.

A password must meet four criteria to be valid:

- Contain at least six characters.
- At least two characters must be alphabetic.
- At least one character must be a number (0-9) or a special character (/, ?, !, or other punctuation mark).
- Differ from your previous password by at least three characters.

Your password is case-sensitive, so the password `?Secret` is different from the password `?secret`. Your password can also be as long as you want, but only the first eight characters are checked.

To set a password using VUE:

1. Click the applications directory button on the Workspace Manager to display the applications directory.
2. Double-click the `system_apps` folder to open that subdirectory.
3. Double-click the `sys_admin` folder.
4. Double-click the `PASSWORD` icon to start that application.
5. Type your new password after the `New password` prompt and press `Return`. What you type doesn't appear on the screen.
6. Verify your new password, as requested, by retyping it and pressing `Return`.

Use the same procedure to change an old password as to add a new password. If you already have one, you will be prompted appropriately for the old password.

Shutting Down with VUE

Caution

Turning off the power for your computer without first doing the shutdown procedure may result in damage to data on your disk. Always execute the shut-down process to completion first.

1 First make sure you are logged in as `root`. If you are not, click on the logout button, as described previously in Chapter 3 "Logging Out." Then, log in as `root`.

2 Click the left mouse button once on the Applications File Manager button (with pages represented on it).

Two   Three
Five   Six

Click to open a File Manager view of the Applications directory ─
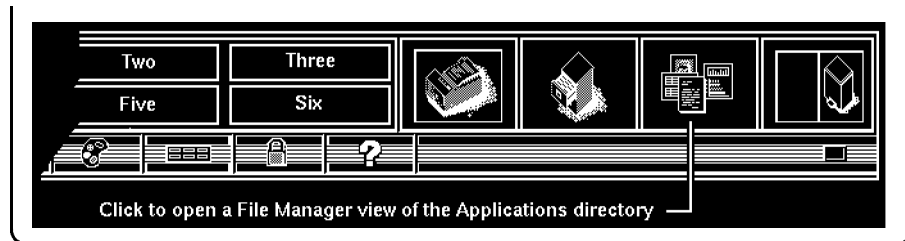
Applications Workspace Manager

3 When the Applications File Manager appears, move your pointer onto the
`system_apps` folder and click the left mouse button twice.
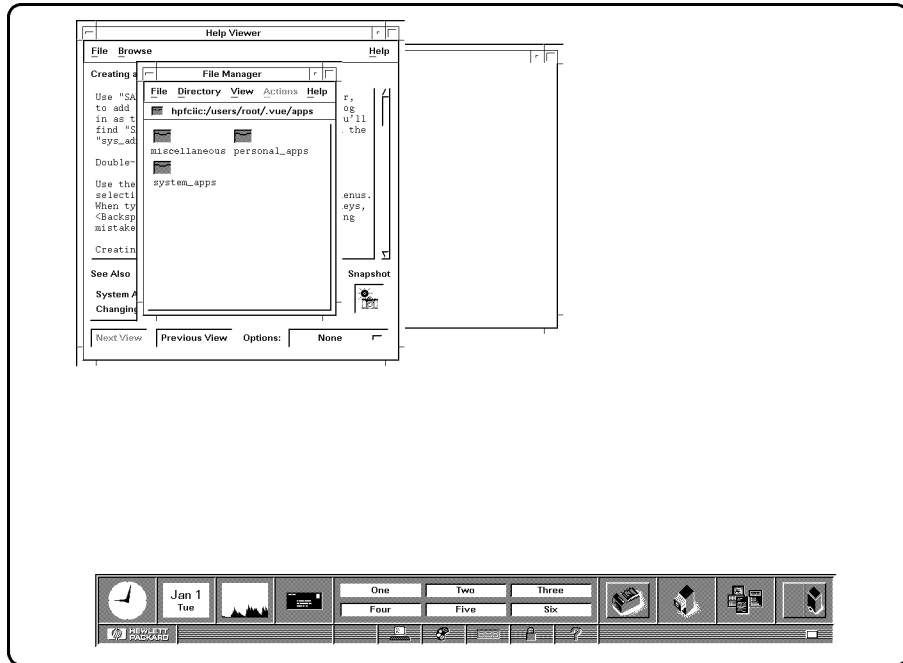
The `sys_apps` Folder

4 When the `system_apps` window appears, move your pointer onto the `sys_admin` folder icon, and click the left mouse button.
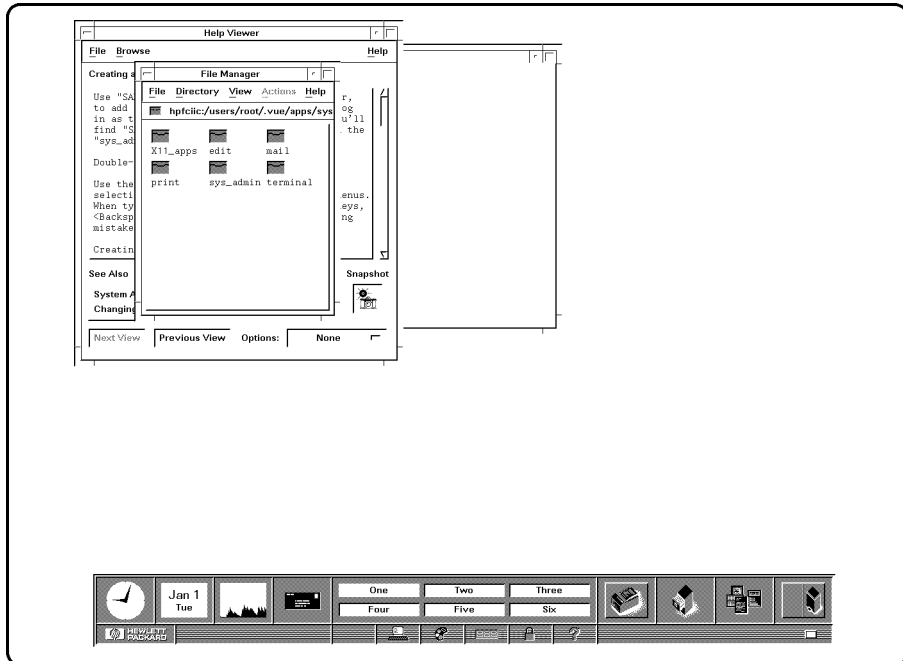
The `sys_admin` Folder

5 When the File Manager for `sys_admin` appears, move your pointer onto the `HALTSYS` button, and click the left mouse button twice.
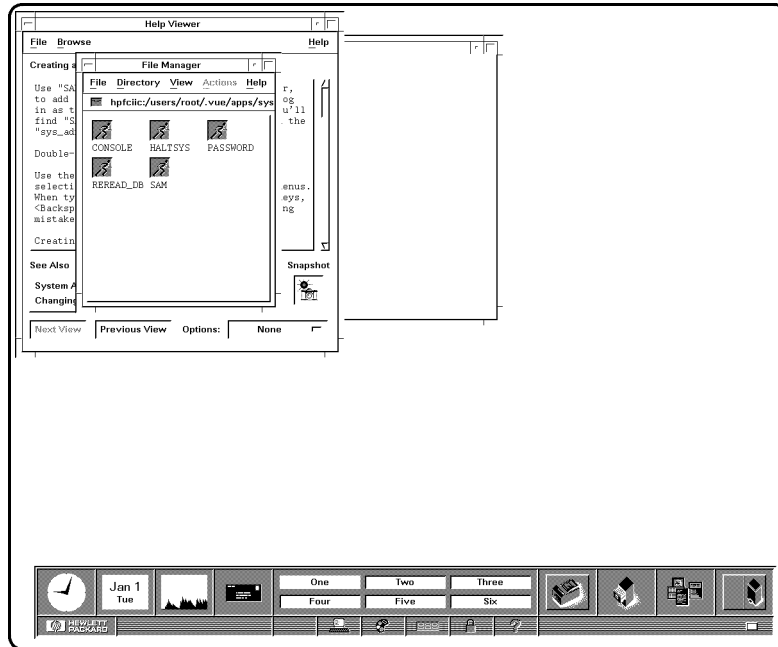
`HALTSYS` **Button**

6 When the Halt System window appears, you will get a question:

`Are you sure you want to halt the system? (y/n)`

- If you press **n** and (Return), you can continue and your workstation will not shut down.

- If you press **y** and (Return), the shutdown process starts.

To observe the **shutdown** messages, bring the Console Window to the front by clicking on it. Wait for the following message to appear on your screen:

    . . .

`Halted, you may now cycle power.`

7 You can now safely turn off the power for your computer.

4

Operating Your System with HP VUE

Chapter Contents

- Using HP Visual User Environment
- Using HP VUE Help
- Using Files and Directories
- Viewing and Printing Files
- Using HP VUE System Applications

See Chapter 6 for information on using HP-UX by working from the command line, within windows.

Using HP Visual User Environment

■ If your system has been loaded with Instant Ignition, you will already have the HP Visual User Environment (VUE) installed and running on your workstation. In that case, you can skip the next steps and go directly to "Opening a Window."

■ If you have loaded your system from tape, activate HP VUE as follows:

1. Open the file `/etc/inittab` with your text processor.
2. Search for the line that begins `vue:`. In this line, change the word `off` to `respawn`.
3. Deactivate the console `getty`.
   a. Search for the line that begins with `init:`.
   b. Change the second field to `3`. This changes the default run level to `3`. This should match the second field in the line that begins with `vue:`.
4. Save the `/etc/inittab` file.

Your HP VUE will start automatically the next time your system boots.

For general information on using HP VUE, please see the *HP Visual User Environment User's Guide*.

Opening a Window

After logging in, you will see an HP VUE screen as in the illustration, with a Workspace Manager at the bottom, a Console icon in the upper left corner, and a File Manager in the upper-right corner. If you open or close windows during your work session and then log out, HP VUE will restore the same workspace configuration at the next login.

To open a window, move the mouse pointer to the Terminal button on the Workspace Manager panel at the bottom and click the left mouse button once. The window will appear in a few seconds.

To change the Console icon to a window, move the mouse pointer to it and click the left mouse button twice rapidly.

Console Icon

File Manager

Workspace Manager
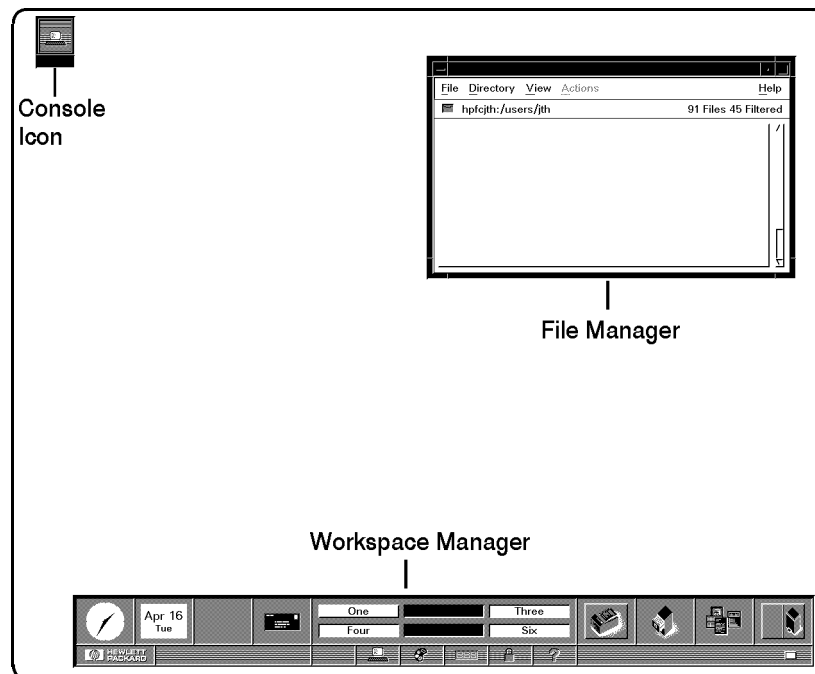
Note	Although you can work in the Console Window, this window is used to display system error messages which may overwrite some of your work area, should a system error condition occur. It is advisable to open a Terminal Window to do normal work.

Manipulating Your Windows

■ Open a Terminal Window by moving the mouse pointer to the terminal icon at the bottom of your screen. Click the left mouse button once.
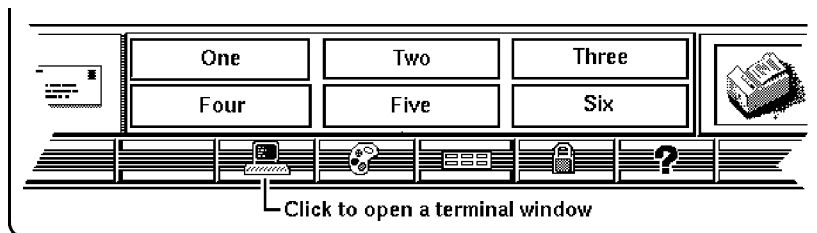
Figure 4-1. Opening a Terminal Window

As with all actions-in-progress, the mouse pointer changes to an hour glass and the activity light at the lower right corner of the Workspace Manager panel blinks, while the process is taking place. After a few seconds the window appears. You can now enter HP-UX commands at the command-line prompt.

☐ To move the window from its default location, move the mouse pointer to the top inside border (the "Title Bar": see Figure 4-2) and hold down the left mouse button to drag the window to the desired position. (Outlines will show you where the window will locate, while you are dragging it). Release the button to bring up the window in the new location.

☐ To iconize a window, click the left mouse button on the dot at the upper right corner of the window border.

☐ To restore an iconized window, click the left mouse button twice on the icon.

☐ To close a Terminal window, click the left mouse button twice on the Window Menu button (-) at the upper-left corner of the window border.

Using HP VUE Help

You can get help on any HP VUE application in the following ways:

- Click on the ? Help button in the Workspace Manager.
- Choose an item from an application's `Help` menu.
- Click on a `Help` button in a dialog box.

The Workspace Manager help index gives you the most generic help. The index starts at the top level of help topics and is organized in a topic-subtopic hierarchy like the table of contents in a book.

To get the help index from the Workspace Manager:

1. Click on the help button ? on the workspace manager.
2. When the index appears, click on a topic. You may also find a subtopic index entry.
3. When you get to the index or sub-index for the entry, click on `[Viewer]` in the index to view information about the topic. You can use the slider at the right border of the window to scroll the information up or down.

   Depending on how you window has been formatted, you may have to expand the right side of your window to see the entire line length of the text. You can do this by "grabbing" the right border, pressing and holding the left mouse button, and dragging the outline right. Release the button at an appropriate width, and the window will assume that dimension.

See Chapter 5 in the *HP Visual User Environment User's Guide* for detailed information.

Using Files and Directories with HP VUE

Your workstation uses files to hold data. Directories, in HP VUE, are "folders" that hold files and other directory folders.

Creating a New File

1. Click the File Manager button to open the File Manager window. As an example, your home directory files might look like this:

Click to open the File Manager
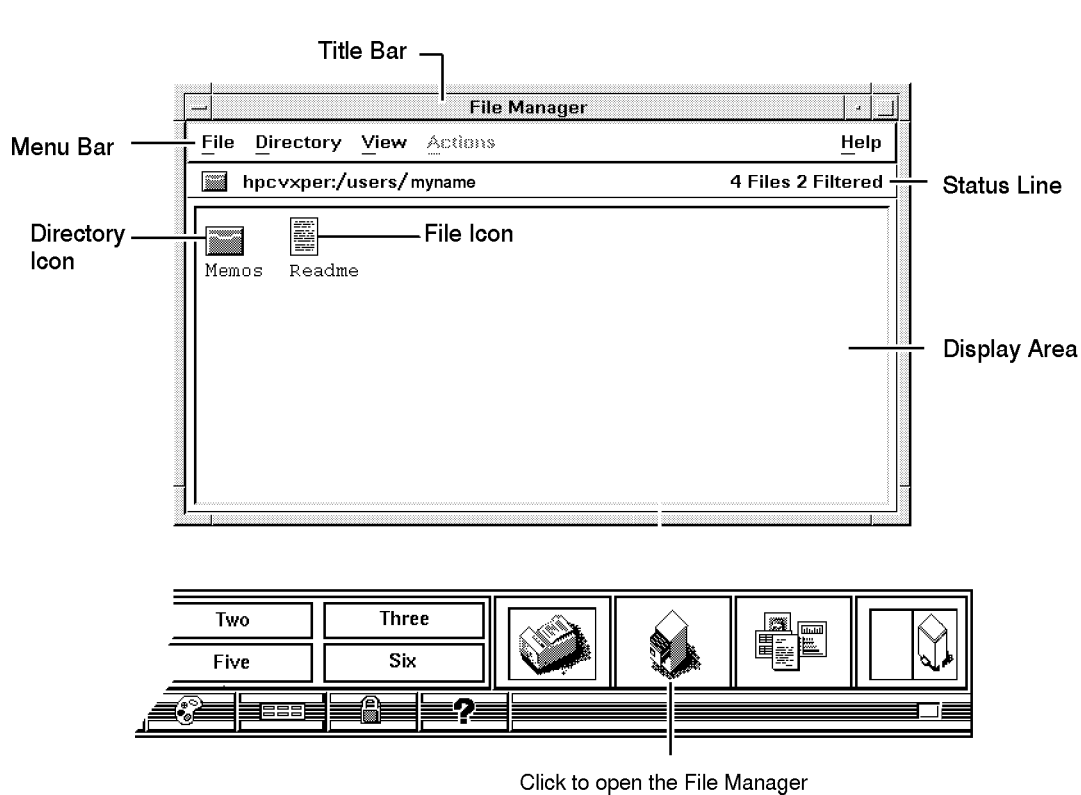
Figure 4-2. Creating a New File

2. Create a file in this directory by clicking on New in the File menu.

3. Type in a name, for example, Text, in the New Data File box which appears.

4. Follow your entry with ⌈Return⌉ or click on `OK`. This creates an empty file called `Text` in the current directory.

Creating a New Directory

1. Click on `New...` from the `Directory` menu to open the New Directory dialog box.

2. Click on the `New Directory Name` box to display the text insertion cursor.

3. Type `mydir`.

4. Follow your entry with ⌈Return⌉ or click on `OK`. This creates an empty directory named "mydir" under the current directory.

Moving Files

1. Press and hold down Mouse Button 2 on the `Text` file icon in the original file manager. (Mouse Button 2 is both buttons on a 2-button mouse. It is the center button on a 3-button mouse.)

2. While still holding down Button 2, drag the file to the File Manager in which the `mydir` directory is displayed and drop the icon (by releasing Button 2) over an empty area.

4
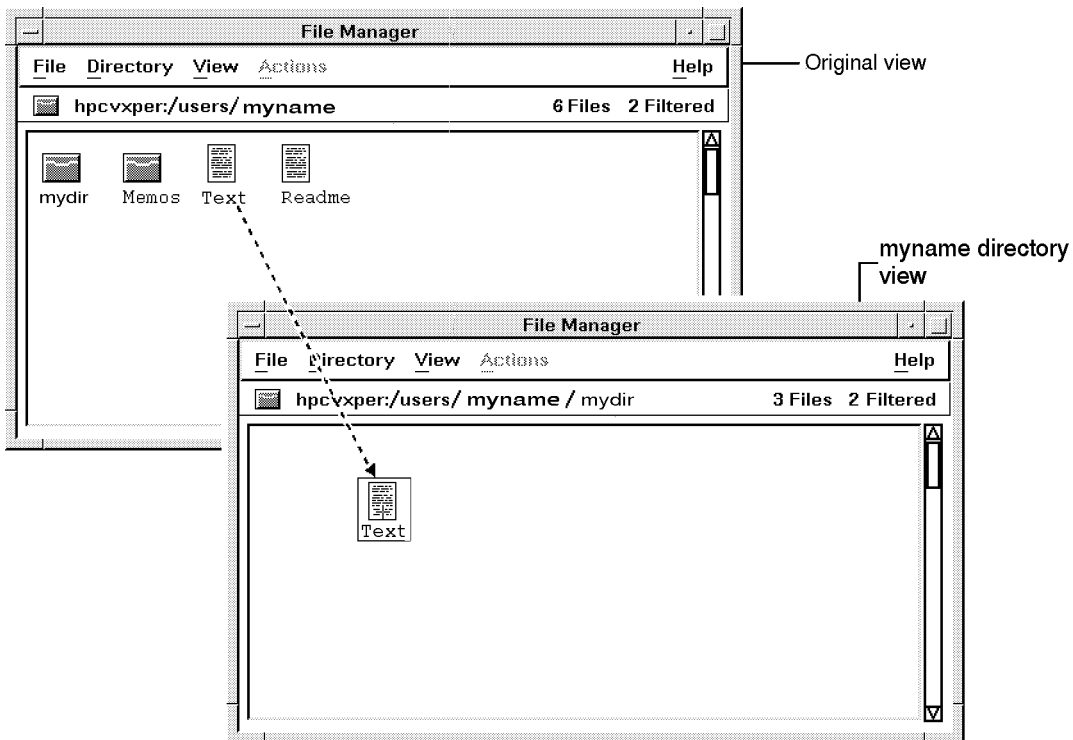
3. Drop the file (release Mouse Button 2).

Copying a File to Another Directory

1. Make a file, for example `text2`, in your home directory.

2. Move the mouse pointer over the `text2` file icon.

3. Press and hold down (CTRL).

4. Press and hold down Mouse Button 2.

5. Drag the `text2` file over an empty area in the `mydir` directory File Manager window.

6. *While still holding down* (CTRL), drop the file by releasing Mouse Button 2. (If you release (CTRL) *before* Mouse Button 2, the file is moved instead of copied.)

7. Release (CTRL). The file `test2` has been copied from the `myname` directory to `mydir` directory and now resides in both.

Renaming a File

1. Click on the `test1` file in your `myname` directory.

2. Choose `Rename...` from the `File` menu to display the `Rename File` dialog box.

3. Double-click the `New File Name` box.

4. Type the new name of the file, say `text3`.

5. Press (Return) or click `[OK]`.

Removing a File

1. Press and hold down Mouse Button 2 over the `text3` file icon.

2. Drag the file over the "trash can" in the Workspace Manager panel.

3. Drop the file. The file is removed from the File Manager display area.

You can also remove the file by clicking on it with the left mouse button, then choosing `Trash File(s)` from the file manager's `File` menu.

Trashed files can be restored.

To restore a file:

1. Click on the Trash button in the workspace manager to open the `Trash Can` window.
2. Click on `/users/myname/text3` in the Trash Can list area.
3. Choose `Restore` from the Trash Can window's `Edit` menu. The `text3` file is restored in the file manager display area.
4. Choose `Exit` from the Trash Can window's `File` menu.

Restored files are returned to the directory from which they were removed.

Caution

You can restore files or directories only during the current login session. They will be *permanently* removed when you log out.

Viewing, Editing and Printing Files

To view a file from a File Manager directory display:

1. Click the left mouse button on the item you want. The icon will become highlighted.

2. Click the the left mouse button on `Actions`, on the top border of the File Manager window.

3. Click the left mouse button on `VIEW`. A window appears displaying that file. Use the `Space` bar to scroll down through the file.

4. Click the left mouse button on `Close`, on the bottom border of the file display to close that file and window.

To edit a file from a File Manager directory display:

1. If you want to edit that file, click on `EDIT` in the `Actions` menu.

2. Make sure your preferred editor is specified in your `.profile` (the `vi` editor will be the default specification, if you have just set up your account).

3. An editor window will appear with that file opened in it.

To print a file from a File Manager directory display:

1. Select (highlight) a file icon by clicking on it; then, click on `PRINT` in the `Actions` menu.

   or

2. To print a file from the Workspace Manager panel, use Mouse Button 2 to drag a file icon from a File Manager display area and drop it onto the Printer icon.

printer

Three
Six
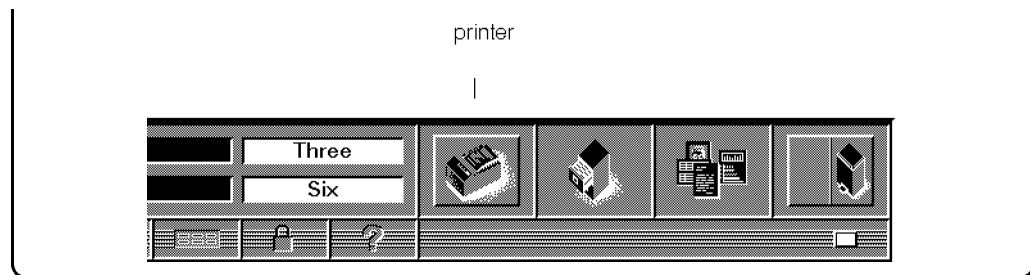
By default, the printer uses the HP-UX command

   `pr` *filename* `| lp`

However, you can customize this to suit your specific needs. See the chapter "Advanced Customizing", in *HP Visual User Environment User's Guide* for further information.

Click the printer button on the Workspace Manager to open a window showing the status of printers connected to your workstation. To close the window, double-click on the window menu button (-).

Getting Printer Information

You can get printer information by moving the mouse pointer to the printer icon in the Workspace Manager and clicking the left mouse button. After doing this, a window appears with something similar to the following `lp` status information:

```
Printer Information
-------------------


system default destination: lp2
scheduler is running

printer queue for lpnet
no entries

hpfcjth: lpnet: ready and waiting
```

For More Information

See *System Administration Tasks* for more information on `lp`. For more information on printing files while in VUE, see the *HP VUE User's Guide.*

Using VUE System Applications

The applications directory, `myname/.vue/apps`, gives you a way to easily access the applications available on your workstation. For customization information, see *HP Visual User Environment System Administration Manual*

Finding and Running an Application

1. Click the Application Directory button (represented by "pages") on your Workspace Manager to display a file manager view of the application directory. This will display a choice of `personal_apps` or `system_apps` folders. The latter gives you such functions as edit, print, and system administration utilities.

2. Double click on the folder containing the application you want to run. Occasionally, you may need to open several levels of folders before you get to the application icon.

Once you have the application icon on screen, you can start the application in several ways:

- Double click on the icon.

- Drag a file icon from the file manager and drop it on the workspace backdrop.

- Select a file of the file type associated with the application and then choose the application from the `Actions` menu in the file manager.

5

Starting Your System Without HP VUE

Chapter Contents

- Using the Command Line to Log In.
- Setting Terminal Characteristics.
- Setting Up a User Account.
- Selecting a Password.
- Logging Out.
- Shutting Down.

Using the Command Line to Log In

Following are the procedures you would use for logging in if you choose *not* to use HP VUE. For details on operating your system without HP VUE, skip to Chapter 6.

Logging in Without HP VUE

You may have reason to bypass HP VUE at login. When you log in without windows, a command-line prompt appears on the display, but no HP VUE and no windows.

To log in without windows:

1. Click `Options` on the login screen.
2. Choose `No Windows`.
3. Type your login name (or `root`) at the `login:` prompt.
4. Press `Return`.
5. If you have set a password then, when the password prompt appears, type in your password followed by `Return`

   You will now get a system prompt (`#` for root, or `$` for user) and you can begin using the system. See "Setting Up a User Account Without VUE", later in this chapter.

Setting Terminal Characteristics

If you log in without HP VUE, the default local login script prompts you to enter your terminal type as follows. You can simply respond with (Return):

    TERM = (hp) (Return)

Pressing (Return) sets the TERM environment variable to hp, the default value. This value works with Hewlett-Packard terminals, but it may not let you take full advantage of your terminal or graphics display features. Entering a different value sets the TERM environment variable to that value.

Selecting a Value for the TERM Variable

HP-UX supports many terminal types. The /usr/lib/terminfo database tells HP-UX how to communicate with each terminal type. When you assign a value to TERM, the value must equal a value in the terminfo database.

When you boot HP-UX on your 425s/t, the boot process should take care of creating the appropriate terminal settings. However, the following gives some typical settings, should you need to use them for a reconfigured system.

Term Environment Variable Settings for the 425s/t:

■ Setting for the 1280x1024 resolution: (equivalent to 98550 entry)

   For ksh users:

        export TERM=hp425s (or 425t)

   For csh users:

        setenv TERM hp425s (or 425t)

Setting Up the Special Device Files with mknod

The special device file for the internal VRX graphics hardware should already be set up correctly as /dev/crt by the system boot code. If /dev/crt does not exist, is deleted for some reason, or does not allow the device driver access to the hardware, use the information below to create a new /dev/crt:

The mknod command creates a special device file which is used to communicate between the SPU and the internal graphics. Superuser status is required to

set up special device files. See the *HP-UX Reference*, section 1M, for more information on the `mknod` command.

The correct `mknod` command syntax to create an SGC bus special device file for the internal Entry Level VRX graphics hardware is:

```
mknod /dev/crt c 12 0x000300
                ^ ^     ^ ^ ^
                | |     | | +-> 00 = Not used
                | |     | +---> 03 = SGC bus
                | |     +-----> 00 = SGC slot number
                | +----------> 12 = Graphics device
                +------------>  c = Character based device
```

Setting Up a User Account

Your can use SAM (System Administration Manager), without HP VUE, to add a new user account.

If you aren't already logged in as root, type exit [Return] and log in as root.

To start SAM:

1. As root, type sam [Return].

A SAM menu will appear.

```
  Highlight an item and then press "Return" or "Select Item".


  Add a New User Account to the system ...
  Remove a User Account from the system ...
  View/Modify a User's Account Information ...

  Deactivate a User Account ...
  Reactivate a User Account ...
```

Opening SAM Screen

When running SAM, use the "↑" and "↓" keys to move the selection highlight up and down the menus. When typing, use the "←" and "→" keys, [Backspace], and [Delete char] for correcting mistakes.

From now on, the procedure is the same as in HP VUE:

To create a new account:

1. Highlight `Users ->` (if it isn't already) and press the `[Select Item]` softkey or press ⏎Return.

2. Highlight `Add a New User Account to the System...` (if it isn't already) and press the `[Select Item]` softkey or press ⏎Return.

3. Type the login name for the new user.

4. If you want to change any of the default information or enter any of the optional information press ⏎Return and continue filling out the `Add a New User Account to the System` form. Otherwise, press the `Perform Task` softkey.

5. Enter a password for the new login account and press ⏎Return. See the next section in this chapter, "Selecting a Password" for help with creating an HP-UX password.

6. Reenter the password and press ⏎Return.

7. Press the space bar to return to a blank form.

8. Repeat steps 4 through 7 for each new user or press the `[Main Menu]` softkey to stop.

9. Press the `[Exit SAM]` softkey, to return to the command line prompt.

10. Type `exit` at the `#` prompt to log out of `root`.

Selecting a Password

After you have set up a user account and password, you may want to change passwords at a later time for security reasons.

Choose your new password according to these rules:

- The password must contain at least six characters (only the first eight characters are significant to the computer).
- At least two characters must be letters (uppercase or lowercase).
- At least one character must be either of the following:
    □ Numeric (the digits 0 through 9).
    □ Special (neither letters nor numeric—for example, -, _, or $).

According to these rules, the following are all valid passwords:

    foo-bar $money$ Number_9   @rophy

Also, uppercase and lowercase letters are different. Thus, these are all different:

    foo-bar   Foo-Bar   FOO-BAR

When you choose a password, you want to ensure that no one can guess what you chose. If someone knows your password, that person may log in and access your files.

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Running the passwd Command

When you've chosen your new password, set it by running `passwd`:

```
$ passwd
```

After you've entered the `passwd` command, the program leads you through these steps:

1. If you haven't already set a password, skip this step. If you *have* set a password, `passwd` prompts you to enter it.

    ```
    Changing password for leslie    Your username appears here.
    Old password:                    Enter your current password.
    ```

2. When you see the following prompt, enter your new password. (The screen will *not* echo what you type.)

    ```
    New password: invisible password
    ```

3. Next, you need to re-enter the new password to verify it:

    ```
    Re-enter your new password:    invisible password
    ```

Now, when you log in again, use your new password.

Logging Out without VUE

With command lines, you can either use the screen-locking feature for temporarily leaving your workstation (and leave processes running), or you can log out of your current work session entirely.

Exiting Temporarily

If you want to leave your workstation for a short time without logging out, you can use the `lock` command. You will be asked to enter a password:

```
lock

Key:   invisible password
Again: invisible password
LOCKED

Now the keyboard cannot be used

Enter the password to unlock the system
```

Exiting for an Extended Period

Perhaps the most common way to log out from the command line is by using the `exit` command:

```
$ exit
```

Shutting Down Without HP VUE

Caution	Turning off the power for your computer without first doing the shutdown procedure may result in damage to data on your disk. Always execute `shutdown` to completion first.

To shut down using the command line:

1. Log in as `root`

2. Enter the following:

   ```
   shutdown -h
   ```

   The `-h` option will cause the system to halt. You or anyone networked to your system will have a grace period of one minute to stop processes and save work before the system halts. You can then turn off the power.

   Entering `shutdown` with *no* option will cause the system to halt after one minute and reboot in single user state. *It is not safe to turn off the power with the system running.*

3. If your system runs a clustered network, the `shutdown` process broadcasts a message including networked users:

   ```
   SYSTEM BEING BROUGHT DOWN IN ONE MINUTE
   ```

4. You will see a question:

   ```
   Do you want to continue? (y/n)
   ```

   a. If you press `n` and (Return), you can continue and your workstation will not shut down.

   b. If you press `y` and (Return), the shutdown process starts.

   Wait for the following message to appear on your screen

   ```
   Halted, you may now cycle power.
   ```

5. You can now safely turn off the power for your computer.

6

Using the Command Line

Chapter Contents

- The Command Line Prompt
- Running Commands
- Working with Shells
- Shell Features
- Determining Your Login Shell
- Using Key Shell: Visual Help for the Korn Shell
- Accessing On-Line Command Help: man pages
- Moving Within the HP-UX Directory Structure
- Using Files and Directories with Command Lines
- Creating Directories
- Moving and Copying Files between Directories
- Removing Files and Directories
- Viewing and Printing Files
- Printing a File with lp
- Using the vi text Editor

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The Command Line Prompt

When you are working within a window, or with the `No Windows` option of HP VUE, whenever you see the command line prompt, you can begin typing commands. If you are logged in as *user* (as opposed to *root*) , the command line prompt is either `$` or `%`, depending on your shell. HP-UX displays the prompt every time it finishes processing the information entered on the command line.

Running Commands

To run a command, type the command's name after the prompt and press `Return`. The command then will begin running. When the command finishes, the prompt reappears. For example, run the following `whoami` command now:

```
$ whoami Return
leslie          Your user name appears here.
$               Then the command line prompt reappears.
```

If you make a mistake when typing a command, use the `Back space` key to back up and correct it.

(To make examples as clear as possible, this book will *not* show the `Return` key at the end of each command line.)

Working with Shells

Whenever you enter a command you are making use of a command interpreter which interprets that command for HP-UX. The command interpreter is called a **shell**.

When you log in, you are said to be "in" a **shell**. HP-UX supports several different shells which behave in slightly different ways and give you varying amounts of interactive support at your display. These are called the Bourne, Korn, Key, and C Shells. Your system administrator determines which shell you get when you first log in, and you have the option of changing shells later.

Basics of Shells: Characteristics, Choosing and Using

HP-UX gives you your choice of several different shell-types which you can run: the Bourne, Korn, Key, and C Shells. Each of these shells has different characteristics, and you can increase the speed and efficiency with which you interact with HP-UX inside windows if you learn to use some of the built-in features of the shell of your choice.

For details on shell features and behavior, please see the *Beginner's Guide to HP-UX* and the *Shells: User's Guide*.

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Shell Features

Below are listed some of the features which may help you make a decision on which shell would be best for the kind of work you are doing:

Table 6-1. Comparison of Shell Features

Features	Description	Bourne	Korn Key	C
Command history	A feature allowing commands to be stored in a buffer, then modified and reused.	No	Yes	Yes
Line editing	The ability to modify the current or previous command lines with a text editor.	No	Yes	No
File name completion	The ability to automatically finish typing file names in command lines.	No	Yes	Yes
`alias` command	A feature allowing users to rename commands, automatically include command options, or abbreviate long command lines.	No	Yes	Yes
Restricted shells	A security feature providing a controlled environment with limited capabilities.	Yes	Yes	No
Job control	Tools for tracking and accessing processes that run in the background. See *Shells: User's Guide*	No	Yes	Yes

Determining Your Login Shell

The command `echo $SHELL` displays the file name of the shell you entered when you logged in.

```
$ echo $SHELL
/bin/sh
$ _
```

Temporarily Changing Your Shell

Unless you are in a restricted shell, you can temporarily change your shell by using this command:

   shell_name

where *shell_name* is the name of the shell (for example, `sh`, or `ksh`). Temporarily changing your shell lets you experiment in other shells. By typing the name of the shell you want to run, you *invoke* (enter) that shell, and the correct prompt is displayed. After experimenting in the new shell, return to your original shell by typing either `exit` or [CTRL]-[D].

Permanently Changing Your Shell

To permanently change your *login shell* (the default shell you get when you log in), use the `chsh` (change shell) command:

   `chsh` *username full_shell_name*

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

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

Using Key Shell: Visual Help for the Korn Shell

Key Shell gives you help on most HP-UX commands in Korn Shell by displaying softkey command-names and options in sequence. You can select from these and let Key Shell build your command lines "in English" before you have mastered the commands and command syntax of HP-UX.

The Key Shell gives you softkey displays at the bottom of your screen which provide a "menu" of basic Korn Shell commands, along with their options in sequence. You will first see a status line like the following

```
$ █
=== hpfcjdp === /users/jodi/keysh === No mail === 09:55:07 AM =================
--Help--|Mail   |Change |List       |  hpterm  |Edit   |Display|Print  |--More--
        |       |dir    |files      |          |file   |files  |files  |1 of 4
```

Figure 6-1. Key Shell Softkey Display

You can enter commands from the Key Shell softkey menu or you can enter standard HP-UX commands as usual. If you enter standard HP-UX commands, the Key Shell will often display an appropriate left-to-right set of menu options in the softkey label area at the bottom of your screen. Each label corresponds to a softkey, `f1` through `f8`. The `hpterm` at the center separates the softkeys into groups of four. You may select any or none of the options successively by pressing the corresponding softkey.

When you want to see more commands, or more options to go with a command you've already chosen, press the `--More--` softkey, `f8`. This will cause the Key Shell to display the next "bank" of softkeys in sequence, eventually cycling back to the first, if you press `f8` repeatedly.

After you make a selection by pressing a softkey, your choice will appear on the command line in "English," just as it appeared in the softkey display, with the correct order and spacing.

Accessing On-Line Command Help: man pages

The man (*man*ual) command displays a command's syntax plus a detailed
description of the command and its options and arguments (if any). Also, man
may display examples of command usage and provide other information such as
system files used, related commands, diagnostics, and possible problems.

For example, in command-line mode, you can use man to learn more about the
man command itself. Type:

```
$ man man
```

After a few seconds, an information display appears.

- The message --More--(11%) at the bottom of the screen means you've
  viewed 11% of the file, and 89% remains. Type (Space) to scroll to the next
  screen-full of text or type (Return) to scroll up one line at a time. Type (q) to
  quit.

- Note that you can only move *forward* through a file.

To learn more about the ls command, type:

```
$ man ls
```

Note	If you are using the VUE application, you can also access man command information by clicking on VUE Help, the ? icon at the bottom of your VUE Workspace Manager. Select Man Pages from the initial menu, and use the index and search functions.

For More Information

Your shell has many productivity-enhancing capabilities you may find useful.
To learn about shells in detail, also refer to *A Beginner's Guide to HP-UX* and
to *Shells: User's Guide*.

Using Files and Directories with Command Lines

If you choose not to use HP VUE, the following tasks will accomplish the same thing, using command lines. If you need more information, see *A Beginner's Guide to HP-UX*.

Creating Directories

The `mkdir` (make directory) command creates a new directory. After you create a directory, you can move files into it, and you can even create more directories underneath it. For example, to create a sub-directory in your current working directory named `projects`, type:

```
$ mkdir projects
```

To verify that it worked, you can use either the `ls` or `lsf` command. Both commands display the new directory, but `lsf` appends a slash (`/`) to the end of directory names to differentiate them from file names. For example:

```
$ ls                    List files, directories in your current working directory.
myfile  projects        It worked!
$ lsf
myfile  projects/       The lsf command appends a slash to directory names.
```

Figure 6-2 shows the resulting directory structure.
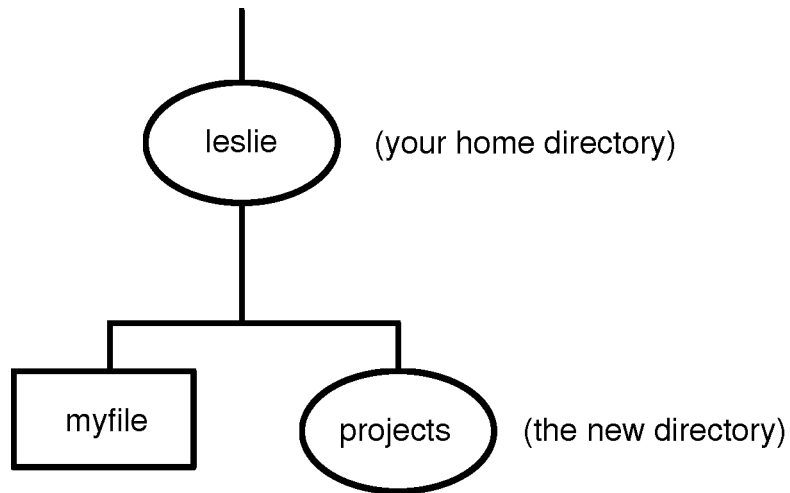
Figure 6-2. Creating the "projects" Directory

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

    `mkdir` *new_dir_path*

where *new_dir_path* is the path name of the directory you want to create.

Moving and Copying Files between Directories

The `mv` command can be used to move files from one filename to another or 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`

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 where you are moving the file.

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

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

    $ cp projects/myfile2 myfile3

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.

Caution

If you move or copy a file to a directory, even if the directory has the same name as the file, the directory will not be destroyed. But a file of the same name *in* that directory would be.

As a general rule, before using `mv` or `cp`, use `ls` or `lsf` to ensure that the target file name to which you want to move or copy doesn't already exist.

Removing Files and Directories

If you have files that are no longer needed, you should remove (delete) them. Deleting unnecessary files leaves more room on your system. For example, suppose you've finished using `myfile2`, and it is no longer needed. To remove `myfile2`, type:

    $ rm myfile2

To remove an *empty* directory, type the following:

    rmdir *dirname*

If there are any files, visible or invisible (i.e. files with names that begin with a "." also known as "dot" files), still in the directory (with the exception of .

and .. which are the current directory and parent directory, respectively), this command will not be executed, and you will get a message that the directory is not empty. Also, if there are any subdirectories in the directory, you will get a message. In either case you can do the following:

```
cd dirname
rm *
ll -a
```
Any invisible "dot" filenames remaining will be displayed

```
rm .filenames
```
You may have to repeat this command for all dot files (other than . and ..)

```
rmdir *
```
This removes any empty subdirectories

```
cd ..
```
To get to the parent directory again

```
rm dirname
```
To avoid this process and remove a directory *and all its files and directories* in one action, type the following:

```
rm -rf dirname
```

Caution	Use `rm -rf` with great caution, since it does remove a directory and all its contents, irretrievably, in one action.

Viewing and Printing Files

The `more` command displays a text file's contents on the screen. For example, the following line displays the contents of `myfile`:

```
$ more myfile
This is the text of "myfile", which I had previously
entered.
$
```

If the file contains more lines than are on your screen, `more` pauses when the screen is full. With a longer file, you can press space to continue looking at additional screens, and press Q when you are finished. Then `more` returns you to the system prompt.

For using the `vi` text editor, see *A Beginner's Guide to HP-UX* or *The Ultimate Guide to the vi and ex Text Editors*.

Printing a File with lp

If your system is appropriately configured, you can print a text file using the `lp` (*line printer*) command. Before using the `lp` command you may need to find out whether your system is set up so that you can use the `lp` command. If it is not, you may have to use a command other than `lp` to get printouts. You can find information on managing printers and other peripherals in *System Administration Tasks*.

If `lp` does work on your system, you can print `myfile` by running the `lp` command:

```
$ lp myfile
```

If the `lp` command is working properly, it should display a message indicating that it sent your file to the printer. For example:

```
request id is lp-number (1 file)
```

The *number* is an i.d. number assigned to the print job by the `lp` command. If you don't see this message, or if you get an error message, consult your system administrator. If `lp` works successfully, you should get a printout with your username displayed on the first page. The time required for a printout depends on the number of tasks being run by the system and the speed of the printer.

To display a report on the printer status, including the order of your print job in the printer queue, type:

```
$ lpstat -t
```

To cancel a print job, enter the `cancel` command, with the i.d. number for your job:

```
$ cancel request_id
```

6

Using the vi Text Editor

The HP-UX command `vi` is a powerful interactive text editor which enables you to view and alter text files within your file system. It allows you to create, delete, and edit files. This section provides a very rudimentary overview of the basics of operating `vi`.

Starting vi

Start your editing session by entering the command `vi` *filename* at the prompt, where *filename* is the name of the file that you wish to either create, view, or alter. If a file called *filename* already exists, the first screen of that file will be displayed, see Figure 6-3. If the file does not exist, it is created and you will see an empty screen, ready for text entry, see Figure 6-4.

```
Here is a sample of a new file that
consists of only three lines.  It is ready for
you to edit or view with the vi command.
~
~
~
~
~
~
~
~
~
~
~
~
~
~
~
~
~
"example" 3 lines, 122 characters
```

Figure 6-3. Displaying an Existing File

```
~
~
~
~
~
~
~
~
~
~
~
~
~
~
~
~
~
~
~
~
~
"example" [New file]
```

Figure 6-4. Creating a New File

Performing Editing Functions

Once you start **vi**, you are either in command or text mode. Press the `ESC` key to ensure that your file is in command mode so that you can execute any of the following commands:

The **insert** command: `i`
Places your file in text mode and enters whatever you type preceding the cursor. Everything on and after the cursor will be moved to the right.

The **append** command: `a`
Places your file in text mode and enters whatever you type after the cursor. Everything after the cursor will be moved to the right.

The `delete character` command: (x)
Deletes the character that is highlighted by the cursor. This command does not put your document in text mode.

The `delete line` command: (d) (d) (press "d" twice)
Deletes the line that is highlighted by the cursor. This command does not put your document in text mode.

If the command expects you to type something after entering your command to complete the operation, you are placed in text mode; otherwise, you remain in command mode.

Each command that puts you into text mode allows you to perform only that specific function before leaving text mode. For example, if you place your file in text mode via the append command, then you may only perform append functions. Your file must be placed in command mode and returned to text mode via the insert command before you can insert text.

Leaving Text Mode

Press the (ESC) key to leave text mode and re-enter command mode.

Positioning the Cursor

You may have noticed that the editing functions are performed relative to cursor position. For example, you can make text changes before, after, or at the cursor location. Many commands exist within `vi` that provide cursor movement and placement. This section introduces the basic cursor commands.

Some keyboards have arrow keys labeled (Prev) and (Next). The (Prev) key will move the cursor to the last screen displayed on the page and (Next) moves the cursor to the page that will be displayed next. The arrow keys move the cursor in the indicated direction.

The most commonly used method to move the cursor is to use the h, j, k, and l keys, since they are the home keys on the keyboard for the right hand. The keys perform these functions:

Key	Moves The Cursor
ⓗ	Left
ⓙ	Down
ⓚ	Up
Ⓘ	Right

Saving Your Work

You can save your work with or without quitting `vi`. Your document must be in command mode for you to be able to use the following commands to save your work. Press the (ESC) key to ensure that your document is in command mode.

- `ZZ` (press the capital letter Z twice in succession)

- `:wq` (think of it as "write, quit")

- `:w!` *filename*

Both the `ZZ` and `:wq` commands save your file and leave `vi`. You execute fewer keystrokes by using the ZZ command.

Use the `:w!` *filename* command to save your work without leaving `vi`. Omitting the filename from the `:w!` *filename* command saves the current file with the same name.

Leaving vi

You can quit `vi` and save your work. You can also quit `vi` without saving your work. Your document must be in command mode for you to be able to use the following commands to leave `vi`. Press the (ESC) key to ensure that your document is in command mode.

- `ZZ` (press the capital letter Z twice in succession)

- `:wq` (think of it as "write, quit")

- `:q!`

Both the `ZZ` and `:wq` commands save your file and leave `vi`. The `q!` command causes your document to leave vi without saving your changes.

For More Information on vi

This section presents only the most basic information about a very powerful word processing feature of HP-UX. Refer to *The Ultimate Guide to the vi and ex Text Editors* or *A Beginner's Guide to Text Editing* for more detailed information about `vi`.

7

Backing Up, Installing, and Updating Your Software

Chapter Contents

- Backing Up Your File System

- Backing Up Selected Files

- Creating a Recovery System

- Restoring Your File System

- Restoring Selected Files

- Restoring Your Operating System

- Recovering Your Disk Space

- Installing HP-UX from Cartridge Tape or CD ROM

- Recreating an Instant Ignition Disk from CD ROM

- Updating from a Network Server

7

Backing Up Your System and Software

The most important part of your system is the data you have accumulated. You can protect it from loss by periodically making an archival *back up tape* of your file system(s).

To back up a file system structure to a cartridge or a DDS-Format tape drive, you can take advantage of the interactive features of SAM ("System Administration Manager"). First you must make sure you have the correct device files in place so that SAM will be able to find your tape drives.

1. The device files should exist on your operating system, as shipped, but it is a wise idea to check for their existence before proceeding.

   You can look up the device files currently on your system by running

   ```
   ll /dev
   ```

2. If the conventional subdirectories **/dev/rmt** and **/dev/rct** do not appear, create them by entering the following:

   ```
   mkdir /dev/rmt
   mkdir /dev/rct
   ```

   a. By convention, the device file name for a cartridge tape drive (HP 9144-type) is **/dev/rct/3s0**. (The **3s0** part depends on the bus address. The bus address is here assumed to be **3**). If necessary, create the device file for the cartridge drive by entering the following:

   ```
   mknod /dev/rct/3s0 c 4 0x070300
   ```

   b. The device file name for the DDS-Format drive should be **/dev/rmt/4m**, if you use it with the same SCSI bus address that it is shipped with. (The **4m**, by convention, depends on the bus address (**4**) and density (**m**) of the device you're using.) To create this device file, enter the following:

   ```
   mknod /dev/rmt/4m c 54 0x0e0400
   ```

When you do a backup on tape to protect your data from accidental loss, you can choose to back up either all or any part of your file system. HP-UX has many utilities that can be used for creating backups. SAM ("System Administration Manager") invokes **fbackup** to create the backup interactively.

Archiving Your Entire File System

Periodically, you will want to back-up your complete file system just in case your operating system ever needs to be recovered. Use the following procedure to create an archive of your file system on DDS or cartridge tape.

Note	It is best to create an archive when very few users are logged into the system (e.g. late at night or on weekends).

1. Enter `sam`

2. Select:

   `Backup and Recovery ->`
   ↓
   `Backup Files Interactively ...`

   SAM will then present you with a data entry screen, requesting that you enter your list of files and directories to include in the backup.

3. On the left side of the screen, enter

   `/users`

4. Leave the right side of the screen blank for a full archive.

5. Enter the name of the device file for the device that will receive your backup in the field called `Device file`. This will be the device you set up for the cartridge or DDS drive.

6. For the question `Create index file (y or n)`, enter y, if you want SAM to make an index file of the backup on the system disk. An index file helps keep track of what was included on each backup. To view it later, go to the `Backup and Recovery` menu and select the menu item `View Information on Last Full Backup`.

7. SAM will validate the information that you provided on the data entry screen and check to see if there are other active users on the system. If there are other active users, SAM will warn you that there might be files that will not be backed up because they were open.

7

Further prompts and error messages will be issued by the program `fbackup` until your backup is complete. `fbackup` will prompt you to put your backup media on (or in) the device you are using for your backup and will prompt you to change media as necessary.

8. When your backup is complete, SAM will return you to the "Backup and Recovery" menu.

9. Remove your tape(s), label them, and store them in a safe place.

Backing Up Selected Files Using SAM

You will need to be prepared with the following information to work with specific files:

- Which files on your system you want to back up.

- Whether you want selected backups to be done on an automated, unattended basis. For details on setting up automated backups, see *System Administration Tasks*.

- Which tape device you will use to create your backup. You will also need to know the name of the device file associated with this device. The device file for the backup device can be either of the block or character type.

  You can look up the device files for your DDS or cartridge drive by running

      ll /dev

Note Back up your system when there are few or no users logged in, as the backup utilities will not act on files which are currently open.

Doing a Partial Backup to a Cartridge or DDS Drive

If you just want to back up some of your files contained to a cartridge or DDS drive, you would proceed as follows:

1. Enter s am

2. Select:

       Backup and Recovery ->
             ↓
       Backup Files Interactively ...

   SAM will then present you with a data entry screen, requesting that you enter your list of files and directories to include in the backup.

3. On the left side of the screen, enter the list of files or directories you want to include in the backup

4. You can also enter files to be excluded (e.g., from specific directories), in the "Excluded" column on the right.

5. Enter the name of the device file for the device that will receive your backup in the field called `Device file`. This will be the device you set up for the cartridge or DDS drive.

6. For the question `Create index file (y or n)`, enter `y`, if you want SAM to make an index file of the backup on the system disk.

7. SAM will validate the information that you provided on the data entry screen and check to see if there are other active users on the system. If there are other active users, SAM will warn you that there might be files that will not be backed up because they were open.

   Further prompts and error messages will be issued by the program `fbackup` until your backup is complete. `fbackup` will prompt you to put your backup media on (or in) the device you are using for your backup and will prompt you to change media as necessary.

8. When your backup is complete, SAM will return you to the "Backup and Recovery" menu.

9. Remove your partial backup tape(s) and, label them, and store them in a safe place.

Creating a Recovery System

You should protect against time loss from operating system damage by making a *recovery tape* for your system, especially if you are running a standalone system with one or more disks. You can use either a DDS-Format (DAT) tape drive or an external cartridge tape drive to do so. Then, your data and your system can be easily restored from tape should you experience any unforeseen accidents.

A *recovery system* is a special tape containing a subset of the HP-UX operating system. In the event of a file system failure that prevents you from booting or logging into your system, you can boot from the recovery system tape and use the tools on the tape to repair your disk's file system.

A recovery system can consist of one of the following:

- A recovery tape which you make yourself on an external DDS-Format or cartridge tape.
- A CD ROM disk which you purchase, containing the HP-UX operating system.

For your data file system, a proper back up routine consists of:

- Archiving your entire file system.

- Performing periodic backups of the active parts of your file system.

From this you can restore all or part of your file system when needed.

When to create a recovery system:

- Immediately after you set up your new system.

- After each time you update your operating system.

What you will need for a recovery system

You will need an external DDS-Format tape drive connected to the SCSI internal connector or an external cartridge tape drive connected to the HP-IB connector. You will also need one or more tapes.

For the cartridge tape drive, use one 150-foot cartridge which is *not* write protected.

- *If you have a DDS-Format (DAT) tape drive, skip the next procedure and use the one after it, "To create a recovery system on a DDS-Format tape drive".*

- *If you have an HP-IB (9144-type) cartridge tape drive, proceed with the following steps, on the next page.*

Time Note	Building a recovery system typically takes 4 to 6 hours with cartridge tape and an hour or more with DDS-Format (DAT) tape. For most of this time you can leave the system unattended.

To create a recovery system tape on a HP-IB (9144-type) cartridge drive:

This process requires the `hpib cs80`, and `98624` drivers, which are already configured in the kernel. This can be confirmed by entering `more /etc/conf/dfile`.

1. Make sure your cartridge drive is connected appropriately to the HP-IB port on your controller.

2. Log in as `root`.

3. Set the bus address on the tape drive to be the same as in the device file which you will set in list item 4. (If you have to change the address on this external tape device while it is powered on, you will need to turn it off, and then on again for the new address to take effect.)

4. Verify that a device file called `/dev/update.src` exists. Remove it and create a new one with the following commands:

   ```
   rm /dev/update.src ⎡Return⎤
   mknod /dev/update.src c 4 0x070#00 ⎡Return⎤
   ```

   For `#`, type the bus address you set the tape drive to (typically `3`). This must be the same as the bus address set on the device itself.

5. Verify that the tape is *not* write-protected by checking that the write-protect device is disabled.

6. Load the tape into the tape drive. You can proceed when the lights stop flashing, indicating that the drive is ready to accept data.

7. Type the following:

   ```
   mkrs ⎡Return⎤
   ```

   This creates the recovery tape. Once you have created the tape, label it and store it in a safe location.

To create a recovery system tape on a DDS-Format tape drive.

This process requires the `scsi` and `scsitape` drivers, which are already configured into the kernel. This can be confirmed by entering `more /etc/conf/dfile`.

1. If your DDS-Format drive is external, make sure it is connected appropriately to the SCSI port on your controller.

2. Log in as `root`.

3. Verify that a device file called `/dev/update.src` exists. Remove it and create a new one with the following commands:

    rm /dev/update.src (Return)
    mknod /dev/update.src c 54 0x0e0#00 (Return)

   For `#`, type the bus address you set the tape drive to. (The DDS drive will be shipped with the bus address set to **4**).

4. Verify that the tape is *not* write-protected by checking that the write-protect device is disabled.

   ■ For the DDS-Format drive, this means making sure that the slider at the rear of the cartridge is *closed* and covers the write-protect opening. The cartridge will then be writable.

5. Load the tape into the tape drive. You can proceed when the lights stop flashing, indicating that the drive is ready to accept data.

6. Type the following:

    mkrs (Return)

   This creates the recovery tape. Once you have created the tape, label it and store it in a safe location.

Restoring Your File System

If your file system becomes corrupted and not usable, you can restore part or all of your file system with your archive backup tape(s).

Restoring All Your Files Using SAM

If you want to restore all your files do the following:

1. Run `sam`

2. From the opening SAM screens, select:

   `Backup and Recovery`
   ↓
   `Recover Files or Directories ...`

   SAM will present a data entry screen.

3. Enter an "x" in:

   `_entering names of individual files and directories`).

   SAM will present a screen asking for the names of the files to include in the restore process and, of those, which ones to exclude the restore process.

4. When you are asked for the list of files to include/exclude, use as your include list the directory ("/") and do not specify any exclusions.

5. Answer ⓨ to the question:

   `Overwrite newer files?  (y or n)`.

6. Answer ⓨ to the following question:

   `Maintain original file ownership?  (y or n)`.

7. Use the default value ("y") for the next question:

   `Recover files using full path name?  (y or n)  . . y`

8. Use the default value ("/") for the next item:

   `Place recovered files relative to this directory:  /`

9. The last piece of information you need to supply is the name of the device file associated with the device from which the files will be restored. Enter the device file name for your drive in the field on the data screen.

10. When you have completed the data entry screen, press the `Perform Task` softkey `f4`. SAM will then schedule `frecover` to restore your files.

11. Follow any prompts from `frecover` until your recovery is complete. SAM will inform you when `frecover` is finished and will ask you to acknowledge by pressing the `space bar`. After you press the `space bar`, SAM will return you to the "Backup and Recovery" menu.

Restoring Selected Files Using SAM

Restoring selected files follows the same procedure as in the previous section with the following exceptions:

1. When you are asked for the list of files to include/exclude, enter the files or directories that you want to restore and specify any exclusions from those files or directories.
2. Answer `y` to the question:
   `Overwrite newer files?  (y or n)`.
3. Answer `y` to the question:
   `Maintain original file ownership? (y or n)`.
4. Leave the default "/" for the question:
   `Place recovered files relative to this directory:  /`.
5. As with the partial backup, the last piece of information you need to supply is the name of the device file associated with the device from which the files will be restored. Enter the device file name for the cartridge or DDS drive in the field on the data entry screen.
6. When you have completed the data entry screen, press the `Perform Task` softkey `f4`. SAM will then schedule `frecover` to restore your files.
7. Follow any prompts from `frecover` until your recovery is complete. SAM will inform you when `frecover` is finished and will ask you to acknowledge by pressing the `space bar`. After you press the `space bar`, SAM will return you to the "Backup and Recovery" menu.

Restoring Your Operating System:

If your operating system itself becomes inoperative, you can restore it from the recovery tape you made in "Creating a Recovery System", at the beginning of this chapter.

1. Turn off the system, except for the tape drive.
2. Load the recovery system tape (DDS or cartridge) into its drive and wait for the indicator lights to indicate "ready" status.
3. Turn on the Model 425 and hold down the keyboard space bar until you see the SEARCHING FOR A SYSTEM message.
4. Wait for the display to show a list of available operating systems on the recovery tape, with a message in the upper right part of the screen similar to the following:

   ```
   :HP35450A -A REMV,1401,0
      1R SYSRECOVER
   ```

5. Type the digit-character combination to the left of SYSRECOVER (1R in the example above). The system will boot HP-UX from the tape. This will take several minutes, because the tape is being treated as a random-access device.
6. Eventually, a menu similar to the following appears:

   ```
   1) Remove the root password

   2) Work in a shell to perform recovery manually

   3) Perform an automatic recovery

   4) Exit recovery system and reboot root file system

   5) Help
   ```

   Choose option 3. This replaces key files so that the disk can be used as a root disk again. The replaced files are saved in a directory under /tmp.
7. Choose option 4 to reboot the file system from the disk.

8. After your system has successfully rebooted, unload the recovery tape and load the first archive tape. Wait for the lights on your tape device to stop flashing, indicating "ready" status.
   - For the cartridge (9144-type) tape drive, type the following command exactly as it is shown here, and press ⎡Return⎤:

     ```
     cd / ; tcio -i /dev/update.src | /etc/frecover -f -
     ```
   - For the DDS-Format (DAT) tape drive, type the following command and press ⎡Return⎤:

     ```
     cd / ; /etc/frecover -f /dev/update.src
     ```

   You will be prompted for the remainder of your backup tapes, as they are needed.

9. Load your latest incremental backup tape into the tape drive. This tape contains all the files that changed or were added since the archive tape was made. Wait for the lights to indicate "ready" status. Then type the same command line (as above) to read in the changed files.

For More Information

For more information, see the *HP-UX System Administration Tasks* and the man pages for fbackup(1m), frecover(1m), mkrs(1m), cpio(1), and tcio(1).

7

Recovering Your Disk Space

You may wish to remove unused files to make more space on your disk(s), from time to time. Following are instructions for removal of specific files relating to the pre-installed system ("Instant Ignition").

Removing the "Instant Ignition" Toolset

All of the "Instant Ignition" files copied to your system can be found in /etc/filesets/IGNITION. Use rmfn to remove these files by typing:

    rmfn IGNITION (Return)

7

Installing HP-UX From Cartridge Tape or CD ROM

The procedures for installing a new system, updating your current system, or updating with new software are fully described for HP 9000 Series 400 computers in *Installing and Updating HP-UX*. For the HP 9000 Model 425, installing and updating can be done from a CD ROM, or from cartridge (9144-type) tape. Updating can be done from a network server which is configured for that purpose.

This section gives some basic information and pointers to get you started on installing your system from a tape or CD ROM. You can use the `/etc/update` program as a self-prompting process, or you can use *Installing and Updating HP-UX*, if you need more details about the procedure.

Preparing to Do an Update or Installation from a CD ROM

1. If you do not already have a CD ROM drive installed in your system, see your *Installation Guide* for hardware installation guidance and Chapter 8 for configuring HP-UX to communicate with the device.

2. Obtain the CD ROM installation disk(s) for the appropriate software.

3. If you have purchased software other than the 2-user Runtime product, you will need a codeword to extract your purchased software from the CD ROM disk. Have this codeword available when you are installing.

   In most cases, the one or more codewords you need are listed on the CD ROM Certificate you received along with your software purchase.

   If there is no codeword specified, follow the instructions in the CD ROM Certificate to obtain a codeword. For additional information, see the HP-UX CD ROM Booklet shipped with the CD ROM disks.

4. At the end of the installation process, you will be prompted for:
   a. Time zone.
   b. Current time and date.
   c. Your system host name and Internet protocol address.

Time Note	A typical installation takes 4 to 6 hours from cartridge tape and 2 to 3 hours from CD ROM disks. For most of this time, the system loads filesets, and you can leave the system unattended, except for changing tapes or CDs.

Installation Procedure

Preparation

■ If you have new hardware and are currently diskless (running your system as a C-node), first, turn OFF your controller and all peripherals.

■ Check you source devices, depending on whether you are using a cartridge tape drive or a CD ROM:

☐ Make sure your cartridge drive is connected appropriately to the HP-IB.

☐ If your CD ROM is external, make sure it is connected appropriately to the external SCSI port.

1. Installation

1. If the install drive is *external*, turn it on. Otherwise, it turns on at the same time as your system.

   This drive is called the *source device* later when you see the installation menus.

2. If the hard disk drive you will use as the system disk for HP-UX is external, turn it ON. If it is internal, it turns on at the same time as your system.

   a. This drive is called the *destination device* later when you see the installation menus.

3. Give the drive a few minutes to warm up. If it is external, the green light will be steady.

   a. If you are installing from tape ensure that the protect switch on the HP-UX cartridge tape points to `SAFE` or `PROTECT`. Then insert the HP-UX cartridge tape in the tape drive, and wait until the busy light stays OFF.

b. If you are installing from CD ROM, insert the Install disk in the CD ROM drive.

4. Turn ON the monitor.

   Leave other peripheral devices OFF until the installation is complete.

5. Turn ON the controller, and *immediately press the space bar* holding it down until you see `Keyboard` shown on the left side of the display.

6. Release the space bar and wait. In a moment, a list of available systems will be displayed on the upper right of the screen.

   a. If you're installing a new system from tape you'll see something like:

      ```
      : HP9144 TAPE, 700, 1, 0
      1H SYSHPUX
      ```
      The model number (e.g., 9144) indicates your tape drive.

   b. If you're installing a new system from CD ROM, you'll see something like:

      ```
      HP1707, REMV, 707, 0, 0
      1H SYSHPUX
      ```
      The model number (e.g, 1707) indicates your CD ROM drive.

7. Type the characters (e.g., `1H`) preceding the system shown for the install medium. If you have a bit-mapped display, do not shift for a capital "H" and do not press (Return)).

If you are installing from tape, the tape drive's busy light will come on. The system takes several minutes to boot. You will soon see some messages (messages will differ differ depending on your configuration):

```
Booting /hp-ux

CONSOLE is ITE
...
Root device major is 0, minor is 0xe0010, root site is 0
```

2. Starting the Update program

In a few minutes you see the Welcome Screen, which provides an overview of the installation process:

```
Welcome to HP-UX install.  There are basically 4 steps to install-
ing HP-UX, which this and other utilities will lead you through.
⋮

Press "Return" when you're ready to proceed ... >
```

Read the overview carefully.

You will use the following keys in subsequent steps:

- Arrow keys (▲, ▼, ▶, ◀) to highlight menu items.

- `Select Item` (softkey f4) to select highlighted menu items.

- Return: This functions the same as the `Select Item` function key. Also use this after entering values which you have typed at the keyboard.

3. Selecting the Destination Device

You should see the Destination Menu, below. (If you do not see this menu, unload the install tape or CD ROM and restart the process)

```
              HP-UX INSTALLATION UTILITY -- DESTINATION MENU

      If the disk shown below (name and system location) is the
      desired destination device, press "Select Item".
      If the desired disk is not listed, make sure it is connected
      properly and turned on, then select the "Search Again" option.
      If your disk is still not recognized, you can use the
      "Other disk" option to enter the Disk address.


                      Select   Bus    Unit    Vol
      Disk            Code     Addr   Num     Num
      -------------------------------------------------
      :
      :


      Search Again
      Other disk



                          Select                          Exit
                          Item                             Install
```

The Destination Menu lists all connected disks, including the disk's select code, bus address, unit number, and volume number. From the Destination Menu, select the *destination disk* (that is, the disk on which you want to install HP-UX) as follows:

1. Using the arrow keys, move the highlight bar until you've highlighted the name of the disk that will be the destination disk.

2. Press either "Select Item" ($\boxed{f4}$) or $\boxed{\text{Return}}$.

From this point on, the CD ROM or cartridge tape will be referred to as the "Source Device", and the disk drive will be the "Destination Device". Follow the instructions given by the /etc/update screens. Refer to *Installing and Updating HP-UX* if you should require further details.

Recreating an Instant Ignition Disk from CD ROM

In most cases you will not be required to change default parameters when the installation process initializes the file system. However, if you are installing a system with Instant Ignition functionality on your disk, you will need to enter the amount of swap space required, depending on the size disk you are loading to.

1. At the Opening Menu for `etc/update`, use the arrow keys to highlight the following, and press `Select Item`:

   `Change FILESYSTEM parameters ...`

2. Use the arrow keys to highlight `swap space`, and type in the appropriate values, for example:

   a. For a 420 Mbyte disk: `184680 blks`

   b. For a 210 Mbyte disk: `102550 blks`

3. Proceed with installing the 2-user Runtime Product.

4. After completion of the installation, read the `/etc/newconfig/ignition/README` file for information on the remaining configuration steps.

7

Updating from a Network Server

To update from a Netdist Server

1. Run /etc/update.

2. Select Change Source or Destination from the main menu.

3. 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



          Destination Directory:  /


  Help              Done                              Exit
                                                      Window
```

4. In the Netdist Server 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 Port Number field indicates the network port number where the
   netdist server's netdistd command is responding to requests for updates.
   The default is 2106, or the number associated with the "netdist" entry in
   the /etc/services file on your system.

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

5. When you're finished making changes, press `Done` to return to the Main Menu.

For More Information

See Chapters 4 and 5 of *Installing and Updating HP-UX* for detailed procedures for updating from a netdist server.

7

8

Configuring HP-UX for New Drives

Chapter Contents

- Preparing for Installation

- Configuring for a Hard Disk Drive

- Configuring for a CD ROM Drive

- Configuring for a DDS format (DAT) Tape Drive

Preparing for Installation

■ See the *Installation Guide* for the information specific to your hardware installation. This User's Guide covers only those subjects that deal with the software or operating system aspects of new disk drives.

■ It is important to ensure that each of the devices used on the SCSI bus (select code 14) has a *unique bus address*. A procedure for determining the bus addresses currently in use by existing devices is given below:

Finding the Status of Existing SCSI Bus Addresses

To ensure that the SCSI bus address of your device is unused, you can use the script listed below to help determine which devices are currently connected.

To determine the active bus ID's, do the following:

1. Log in as root.

2. If you are not using Korn Shell or Bourne Shell, type `sh`.

3. Type the following after the system prompts, which are shown at the left:

```
# mkdir /dev/tmp
# cd /dev/tmp
# for i in 0 1 2 3 4 5 6
> do
>       mknod $i.rdsk c 47 0x0e0"$i"00
> done
# for i in *
> do
>       echo $i
>       diskinfo $i
> done
```

(Afterwards you can remove the **/dev/tmp** directory you created.)

This will give a display of information, such as the following (if only one disk were installed only at address 5):

```
0.rdsk
diskinfo: can't open 0.rdsk: No such device or address
1.rdsk
diskinfo: can't open 1.rdsk: No such device or address
2.rdsk
diskinfo: can't open 2.rdsk: No such device or address
3.rdsk
diskinfo: can't open 3.rdsk: No such device or address
4.rdsk
diskinfo: can't open 4.rdsk: No such device or address
5.rdsk
SCSI describe of 5.rdsk:
              vendor: Quantum
          product id: XXXXXXX
                type: direct access
                size: 200000000 bytes
    bytes per sector: NNN
6.rdsk
diskinfo: can't open 6.rdsk: No such device or address

#
```

Note   If you find that the bus address corresponding to the number set on your device is already in use, you will have to determine if it is easier to change that device to another bus address or to remove the hard disk drive from the computer in order to set its jumpers to another address.

■ If you should need to change the bus ID on a SCSI device, be sure to shut down and turn off your system first.

8

Configuring for a Hard Disk Drive

After hardware installation has been completed (see the *Installation Guide* for this device), you'll need to ensure that your operating system is prepared to exchange data with the device. This section provides instructions for configuring HP-UX to communicate with the available Hard Disk Drives, in order to use the disks for mass storage and/or swap space.

- Setting Up the Device Files.
- Finding the Status of Existing SCSI Bus Addresses.
- Building a File System with `newfs`.
- Mounting the New Hard Disk Drive.
- Testing Your Installation.

These disks are pre-formatted. The sizes for the disks are:

Product Number	Size
HP A1440A	210 Mbytes
HP A2075A	422 Mbytes
HP A1443A	660 Mbytes
HP A2076A	1.3 Gbytes

The factory-set SCSI addresses for these devices are:

- For a factory-installed disk in your 425s/t: SCSI bus address: 6

- For an upgrade disk drive: SCSI bus address: 5

As it is possible that the SCSI bus address jumpers may be shipped with different settings, please see the appropriate *Installation Guide* for guidance on resetting jumpers, should it be necessary.

The jumper connections on the upgrade disk are factory set at bus address 5. If you are upgrading a diskless system and want to install HP-UX from CD ROM onto this disk, see *Installing and Updating HP-UX*, and install the disk at bus address 6.

To install the disk for file system and swap usage, verify that you have access to an HP-UX system and that you have selected "HP-UX" in the boot process, when you started your system.

The following list outlines the software procedures you'll find in this section for installing the hard disk drive as a file system disk:

- Verify that you have an unused device file with the correct select code and bus address for your device.

- Build a file system on the disk.

- Mount the disk so that you can access it as a file system.

When you add your hard disk drive to your system, you will need to ensure that the system has SCSI device files in **/dev/dsk** (for block device files) and **/dev/rdsk** (for character device files).

8

Using mknod to Set Up Device Files

You will need to have both a *character* device file and a *block* device file to communicate with your SCSI hard disk drive on the system.

If you need to set up a device file or change the specifications for an existing one, you can use the `mknod` command. For example, if you wanted to add a character device file with a bus address of 1, you could do so by entering:

```
mknod  /dev/rdsk/1s0 c 47 0x0e0100
```

To add a block device file with the bus address of 1 instead of 5, for example, enter the following:

```
mknod  /dev/dsk/1s0 b 7 0x0e0100
```

By convention, the "1" in the device name (`/dev/rmt/1s0` or `/dev/mt/1s0`) corresponds to the bus address of the device.

See "Setting Up Devices Using HP-UX Commands", in the manual *Installing Peripherals* for further information on device files.

Formatting Your Disk

Since these disks are pre-formatted, you do not need to run `mediainit`.

Building a File System on Your Disk

The `newfs` command is a "front end" command that automates the use of `mkfs` in order to build a file system on the new disk. `newfs` looks up the type of disk on which a file system is being created in the disk description file `/etc/disktab` and calculates the appropriate parameters to use in calling `mkfs`. This call builds the file system, and installs the necessary bootstrap programs in the initial 8192 bytes of the device.

The disktab entries for these disk drives are under the following names:

- A1440A is listed as: QUANTUM_PD210S
- A2075A is listed as: QUANTUM_PD425S
- A1443A is listed as: MICROP_1588T
- A2076A is listed as: MICROP_1528

For example, if your drive is at bus address 5 and you are installing an HP A1440A drive, you can build a file system on the disk as follows:

■ Log in as root.

■ Enter the following (using the *character* device file to lay out the file system):

```
newfs QUANTUM_PD210S /dev/rdsk/5s0
```

■ Using the -n option with newfs prevents the bootstrap programs from being installed. You should use the -n option, if this hard disk drive is not being mounted as the root disk.

If you do *not* intend to use this disk for swap and you would like to preserve as much space as possible, then it may be appropriate to use the specification hpxxxxA_noswap. In this case, you would enter the following for the A1440A drive, using the names in /etc/disktab:

```
newfs QUANTUM_PD210S_noswap /dev/rdsk/5s0
```

For further details on newfs, see *newfs*(1M) in the *HP-UX Reference*, or enter man newfs to get online help. The general procedure is discussed in *System Administration Tasks*.

To maximize file system performance, execute the following command before mounting the disk:

```
tunefs -d0 /dev/rdsk/5s0
```

Mounting a Hard Disk Drive

In order for your system to address the new disk as a file system each time you boot, you will need to edit your /etc/checklist to mount it on your system.

■ If you are intending to use your hard disk drive as the root file system containing your operating system, set the SCSI bus address on the disk drive and your device file for it at bus address 6. Add the following line to the /etc/checklist file:

```
/dev/dsk/6s0  /  hfs rw 0 1  # dsk1
```

This causes /etc/rc to automatically mount the disk whenever you boot the system. Until then, you can mount the disk by using the command:

```
mount -a
```

■ For a simple file-system disk, the following line in `/etc/checklist` will mount the drive on `/users`, with bus address 5 (normally not used by a root disk).

```
/dev/dsk/5s0 /users hfs rw 0 1  # userdsk
```

■ To mount the drive immediately, for this login session only, for instance, on the directory `/users`, you can execute the **mount** command directly from the command line:

```
mount /dev/dsk/5s0 /users
```

The **mount** command announces to the system that a removable file system is to be attached on the directory `/users`. This directory must exist already; it becomes the name of the root of the newly-mounted file system.

Testing Your Installation

A simple test to make certain that the drive has been installed correctly (whether it is mounted or not) is to execute the command `diskinfo` (using the appropriate device file name as the argument):

```
diskinfo /dev/rdsk/5s0
```

If the disk is installed correctly, `diskinfo` will display a listing of information about it, such as the following:

```
5.rdsk
SCSI describe of 5.rdsk:
            vendor: Quantum
        product id: XXXXXXX
              type: direct access
              size: 200000000 bytes
   bytes per sector: NNN
```

After mounting a new disk on a directory, an `ll` listing of the directory should give you at least one file:

```
total 1024
drwxr-xr-x   2 root      root         8192 Aug 31 15:24 lost+found
```

Configuring for a CD ROM Drive (425s only)

After hardware installation has been completed (see the *Installation Guide* for this device), you'll need to ensure that your operating system is prepared to exchange data with the device. This section provides instructions for configuring HP-UX to communicate with the HP A2074A CD ROM drive. (Note that the CD ROM drive cannot be locally mounted on a diskless node.)

- Setting Up the Device Files.
- Finding the Status of Existing SCSI Bus Addresses.
- Reconfiguring the Kernel with `scsi` and `cdfs` drivers.
- Mounting the New CD ROM.
- Removing and Inserting a Disk.

The factory-set SCSI address for this device is:

- SCSI bus address: 2

As it is possible that the SCSI bus address may be shipped with a different setting, please see the appropriate *Installation Guide* for guidance on resetting the switches, if needed.

The following list outlines the procedures you'll find in this section for installing the CD ROM drive on your operating system:

1. Verifying that you have an unused device file with the correct select code and bus address for your device.

2. Inserting the disk in your CD ROM drive.

   Note that a rigid plastic caddy holds and protects the disk. Before inserting the disk, make sure you have the appropriate disk caddy. When inserted into the disk port, data is read from the disk through a shutter in the caddy. When you eject the caddy, the shutter closes to protect the disk's data surface.

   The HP A2074A Drive's disk caddy is not interchangeable with the HP C1707A CD ROM Drive disk caddy. However, you can remove the disk from one caddy and use the other, if necessary, in order to fit the appropriate drive. Disk caddies for the A2074A (part number C2293-80001) are available from Hewlett-Packard.

8

Caution	Do not open the disk caddy shutter manually. Opening the shutter will expose the disk's data surface to dust and damage. If the data surface gets too much dust or damage, its readability by the CD ROM drive's laser read head will be reduced.

3. Mounting the disk so that you can access it as a file system.

Setting Up the Device Files

If you do not have device files, you will need to add them. You will need both a *character* device file and a *block* device file.

1. The Character Device File

The /dev/rdsk directory contains the character ("raw") device files.

You will see lines such as the following, which applies to a SCSI device:

```
cr--r--r--   2 root   other  47 0x0e0200 Dec 10   1990    /dev/rdsk/2s0
```

You will need to ensure that this line (or one appropriate to the bus address to which your CD ROM drive is set) is in /dev/rdsk.

2. The Block Device File

In addition to the character device file, you will need to have a block device file, which will be in the directory /dev/dsk. This is to allow for the device to be mounted. The entry for your device should be like the following:

```
br--r--r--   2 root   other  7 0x0e0200 Dec 10   1990    /dev/dsk/2s0
```

As with the character device file, you will need to ensure that this line (or one appropriate to the address to which your CD ROM drive is set) is in /dev/dsk.

8

Using mknod to Set Up Device Files

If you only need to change a device file specification, you can use the mknod command to set up the device file. For example, if you wanted to change the bus address of your character device file to 6, you could do so by entering the following:

```
mknod  /dev/rdsk/6mn c 47 0x0e0600
```

For a block device, enter:

```
mknod  /dev/dsk/6s0 b 7 0x0e0600
```

By convention, the "6" in the device name (/dev/rdsk/6s0 or /dev/dsk/6s0) corresponds to the bus address of the device.

Finding the Status of Existing SCSI Bus Addresses

See the procedure at the beginning of this chapter for determining the addresses of devices currently connected to your system.

Reconfiguring the Kernel

You will need to have two kinds of drivers in the kernel in order to operate the CD ROM drive: a scsi device driver and a cdfs configurable file system.

Adding the scsi Device Driver

To check for the presence of the scsi device driver, enter the following:

```
grep scsi /etc/conf/dfile
```

- If the display shows one or more lines with scsi, the driver is in place and active.

- If the display shows *scsi, the driver is not active (commented out), and you will need to edit the dfile to activate the driver.

- If the display shows nothing, then you will need to add the scsi device driver line to dfile by typing the line scsi at the end of the file.

8

Adding the cdfs Configurable File System

To check for the presence of the `cdfs`, enter the following:

```
grep cdfs /etc/conf/dfile
```

- If the display shows a line with `cdfs`, it is present and active.

- If the display shows `*cdfs`, the driver is not active, and you will need to edit the `dfile` to activate it.

- If the display shows nothing, then you will need to add the `cdfs` line to the `dfile` by typing the line `cdfs` at the end of the file.

- If you are running a clustered system, you will also need to do the same procedure to the kernel of each node to make sure that the `cdfs` is installed, before you reboot.

Rebuilding the Kernel

If you have changed the configuration of the kernel, you must rebuild it in order to cause HP-UX to execute the new configuration.

Caution	▪ If you are in a clustered environment, do these tasks in "Single-User State" by executing `shutdown` first.
	▪ Exit from any networked connections.
	▪ If you have added the `cdfs` to a cluster server, you must also add it to the kernels of all the nodes before you reboot. In the case of a mixed cluster, failing to do so can cause a system panic.

The following sequence of commands, ending with rebooting your system (the `reboot` command), will accomplish the kernel rebuild:

```
cd /etc/conf
config dfile
make -f config.mk
mv /hp-ux /SYSBCKUP     Save a backup copy of your system
mv hp-ux /              Move the operating system to root
reboot
```

After rebuilding the kernel of the cluster server, rebuild the kernels of the server nodes by logging into each node and repeating this process.

Testing Your Installation

A simple test to make certain that everything has been installed correctly is to execute the command `diskinfo`. To do so, first make sure a CD ROM is inserted in the drive. Then, for example, type the following (using the appropriate device file name as the argument):

```
diskinfo /dev/rdsk/2s0
```

If the disk is installed correctly, `diskinfo` will display a listing of information about it, such as the following:

```
2.rdsk
SCSI describe of /dev/rdsk/2s0:
            vendor: TOSHIBA
        product id: CD-ROM DRIVE:XM
              type: CD-ROM
              size: 0 bytes
   bytes per sector: 0
```

Mounting the New CD ROM Drive

In order for your system to address the new disk as a file system, you will need to edit your **/etc/checklist** to mount it on your system. Add the following line to the file:

```
/dev/dsk/2s0 /cdrom cdfs ro 0 0 # CD ROM
```

If you have only made this change to your system, executing `mount -a` will mount the new disk automatically. (Note that using the `-a` option mounts *all* unmounted devices in **/etc/checklist**.)

After mounting a new disk on a directory, an `ll` listing of the directory should give you at least one file:

```
    total 1024
    drwxr-xr-x   2 root     root         8192 Aug 31 15:24 filename
```

See the next section for information on unmounting when you remove a disk.

Removing and Inserting a Disk

You must mount a CD ROM disk every time you insert it into the drive, and you must unmount the disk before the system will allow you to eject it from the drive.

■ Before you remove a disk:

1. For example, if the disk is designated by the block device file **/dev/dsk/2s0**, temporarily unmount the disk's file system by executing the following:

   ```
   umount /dev/dsk/2s0
   ```

2. Press the eject button to remove the disk

■ After you insert a disk:

1. Mount the CD ROM file system so that HP-UX will recognize it. If, for example, you are mounting the CD ROM designated by the device filename **/dev/dsk/2s0**, create a directory **/cdrom** (if it doesn't exist already) and execute the following:

   ```
   mount /dev/dsk/2s0 /cdrom
   ```

   (Note that the directory **/cdrom**, in the example, must be given an absolute path name).

   In this example, the **mount** command announces to the system that a removable file system is to be attached at the directory **/cdrom**. This directory becomes the name of the root of the newly-mounted file system.

2. Now you can access the CD ROM as you would any other disk, except that you cannot write to it.

3. A flashing busy light indicates normal activity with the system. For abnormal indications, see Chapter 10.

For More Information

- For more information on the `mount`, `umount`, `mknod`, `config`, `shutdown`, and `reboot` commands, please see the appropriate entries in *HP-UX Reference*. You can also use your online command help system by entering `man`, followed by the name of the command.

- Information on the installation of external peripheral devices can be found in *Installing Peripherals*.

8

Configuring for a DDS-Format Drive

Details of hardware installation for the drive are given in the *HP A1447A DDS-Format Drive Upgrade Installation Guide*.

When you add your HP A1447A DDS-Format (the HP-supported version of the format commonly known as a "DAT") Drive to your system, you will need to ensure that the system has the following:

- `scsi` device driver (SCSI interface driver)

- `scsitape` device driver (SCSI tape driver)

- `scsi` device files

If you have to add the `scsi` device drivers, you will need to rebuild the kernel, which includes rebooting the system. This section will give you basic procedures for doing these tasks. If you should need further information, please see the manual *System Administration Tasks*.

Adding the DDS-Format Drive

To add the device, you will have to make sure your system has both a `scsi` device driver and an appropriate `scsi` device file. You will need a character ("raw") device file `scsi` in `/dev` or in a subdirectory of `/dev`. Since the HP DDS-Format drive is similar to 9-track tape devices, it will be convenient to place the DDS-Format device files in the `/dev/rmt` directory which is dedicated to magnetic tape device files.

Setting Up the Device Driver

To check for the presence of a device driver, enter the following:

```
grep scsi /etc/conf/dfile
```

- If the display shows both `scsi` and `scsitape`, the driver is in place and active.

- If the display shows only `scsi`, then the tape driver is not present.

- If the display shows `*scsi` (with an asterisk), the driver is not present (commented out), and you will need to edit the `dfile` by removing the asterisk (*) to activate the driver.

- If the display shows nothing, then you will need to add the `scsi` device driver line to `dfile`, by typing the line `scsi`.

You can also determine if the kernel contains the actual driver by typing:

```
nm /hp-ux  | grep scsitape
```

or

```
nm /hp-ux | grep scsi
```

If you get a list of names - such as `scsitape_open` and `scsitape_close`, then you have the correct tape driver installed.

Adding the Device Files

You will only need to have a *raw* device file to communicate with your DDS-Format drive on the system.

The Raw Device File

The `/dev/rmt` directory contains the raw (character) device files. You will see lines such as the following, which apply to a `scsi` device:

```
crw-rw-rw-   2 root   other  54 0x0e0303 Dec 10   1990    /dev/rmt/0mn
crw-rw-rw-   2 root   other  54 0x0e0302 Dec 10   1990    /dev/rmt/0m
```

These lines specify characteristics of the installed device. They are explained below. Your installed drive, if you have not changed its jumper settings, will have a bus address of 3.

Note   This directory is shared by HP-IB tape drives, which have a major number of '9'. Be careful not to confuse these files.

The following table explains the parts of the line you need to be concerned with and the roles they play:

```
crw-rw-rw-    2 root   other 54      0x0e0303    Dec 10 /dev/rmt/3mn
                                                  1990
```

The **c** signifies a "raw" device. You (only) have read, write, and execute permission.	Owned by "root".	Major number for the **scsi** tape drive.	Select code=14 ("0e" in hex); "03" is a bus address of "3", corresponding to the jumper settings on the DDS-Format drive unit; The next "03" is the unit number, which affects how the drive operates.		The device file name.

Using the Unit Number

The unit number, the pair of numbers following the bus address, can be set two ways for the DDS-Format drive:

- "03" signifies "no rewind on close", i.e. the tape is not repositioned after the application terminates.

- "02" signifies "rewind on close"

Ordinarily, the tape will automatically reposition itself by rewinding to the beginning during the eject sequence.

Using mknod to Set Up Device Files

If you only need to change the specifications for the device file, you can use the `mknod` command. For example, if you wanted to add the directory, and add the raw device file with the bus address of 6 (instead of 3), you could do so by entering the following:

```
mkdir /dev/rmt
mknod  /dev/rmt/6s0 c 54 0x0e0603
```

8

Finding the Status of Existing SCSI Bus Addresses

To ensure that an existing scsi bus address is unused, you will need to inspect the /dev/tmp subdirectory for lines ending with rmt and then see which ones are actually being used by devices connected to your system. The script listed below will help by telling you what devices are currently connected.

To determine the active bus ID's, do the following:

1. Log in as root.

2. Type ksh if you are using Bourne Shell or C Shell.

3. Enter the following (system prompts are shown at the left):

```
# mkdir /dev/tmp
# cd /dev/tmp
# for i in 0 1 2 3 4 5 6
> do
>       mknod $i.rdsk c 47 0x0e0"$i"00
>       mknod $i.rmt c 54 0x0e0"$i"00
> done
# for i in *
> do
>       echo $i
>       diskinfo $i
> done
```

8

Note	If you find that the bus address corresponding to the number set on your device is already in use, you will have to determine if it is easier to change that device to another bus address or to remove the DDS-Format Drive from the computer box in order to set its jumpers to another number so that its address can be changed.

Rebuilding the Kernel

If you have added a driver to the system, you must rebuild (or regenerate) the kernel to cause HP-UX to execute the new configuration.

You may use SAM (System Administration Manager) for generating a new kernel, by entering `sam` as root. The appropriate driver to use is `scsitape`, in the `Change I/O Configuration` menu. Instructions for using SAM are in your *System Administration Tasks* manual.

Caution	If you are in a clustered environment, do this task in "Single-User State" by executing `shutdown` first. Also, to avoid possible accidents, exit from any networked connections.

The following sequence of commands, ending with rebooting your system (the `reboot` command), will accomplish the kernel rebuild:

```
cd /etc/conf
                        edit dfile if necessary
config dfile
make -f config.mk
mv /hp-ux /SYSBCKUP     Save a backup copy of your system
mv hp-ux /              Move the operating system to root
reboot
```

Your system is now running the added driver for the DDS-Format Drive `scsi`. You are ready to use the drive to load a tape into your system.

A simple test to make certain that everything has been completed satisfactorily is to execute a command. For example, if you have created the device file `/dev/rmt/3s0`, type:

8

```
mt -t /dev/rmt/3s0 rew
```

The LED on the drive will flicker briefly if the command has completed
successfully.

Inserting and Removing Cassettes

As you face your Model 425s in its normal, vertical position:

1. Insert the cassette with its label facing left into the cassette port.

2. A load sequence automatically loads it into the drive mechanism and
   threads the tape. A tape test is performed that checks the read/write
   circuitry in the DDS-Format drive. This takes about 25 seconds. Refer to
   Table 10-7 for an explanation of the cassette and drive busy light status
   during the cassette load operation.

3. To eject a cassette, press the eject button on the top of the drive's front
   panel. The drives starts an eject sequence lasting about 15 seconds. First,
   the tape is rewound to its beginning, then the drive unthreads the tape and
   ejects the cassette. After the cassette is ejected, pull the cassette straight
   out of the cassette port. Refer to Table 10-7 for an explanation of the
   cassette and drive busy light status during the cassette eject operation.

You do not need to initialize a cassette with a operating system command.
DDS-Format cassettes are initialized as data is stored on the tape.

Note   Some application software may prohibit the ejection of a
                cassette until the user exits the application program.

Writing and Reading Data

After the DDS-Format cassette has been loaded, data can be written to and read from the cassette.

For More Information ...

Refer to *Installing Peripherals* for further details.

9

Installing Additional Memory

Chapter Contents

- Precautions.

- Determining Existing Memory.

- RAM Board Installation Requirements.

- Determining Your New RAM Configuration.

- Removing and Installing RAM boards.

- Verifying the Upgrade.

Note	The four RAM board upgrades covered in this section include RAM boards as follows:
	■ HP 98229C; two 2 Mbyte RAM boards that add a 4 Mbyte block of memory. (425t)
	■ HP 98229B; two 4 Mbyte RAM boards that add an 8 Mbyte block of memory. (425s/t)
	■ HP 98229D; two 8 Mbyte RAM boards that add an 16 Mbyte block of memory. (425s/t)
	■ HP 98229E; two 16 Mbyte RAM boards that add an 32 Mbyte block of memory. (425s)

Precautions

An anti-static grounding wrist strap has been provided with your memory upgrade. Use this wrist strap to ground yourself to the computer to reduce the chance of static discharge damaging your computer's and RAM board's integrated circuits.

Please refer to your *Installation Guide* for complete details on how to install RAM boards.

Caution

A static charge of almost *40,000 volts* can be generated on a carpeted floor. This exceeds the limits of these RAM boards and can cause unsuccessful operation or damage.

Integrated circuits on printed circuit boards can be damaged by electrostatic discharge. Use the following precautions:

- Use the grounding wrist strap supplied with this upgrade. Follow the instructions printed on the strap's package.

- Do not wear clothing subject to static charge buildup, such as wool or synthetic materials.

- Do not handle integrated circuits in carpeted areas.

- Do not remove the device from its anti-static bag until you are ready to install it.

- Avoid touching circuit leads as much as possible.

Determining Existing Memory

Follow these steps to determine how much memory your computer already has:

1. If your computer is operating, shut down the operating system, following normal procedures. Refer to the "Shutting Down" sections of Chapter 3 or Chapter 5 for guidance.

2. After you have shut down, turn off your computer

3. Turn the computer back on.

4. When the power-up display lists the line:

   ```
   HP-HIL.Keyboard
   ```

   press the (Space bar).

5. Note the amount of Random Access Memory (RAM) in bytes listed in the line that reads:

   ```
   RAM xxxxxxx Bytes
   ```

```
Copyright 1991
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All Rights Reserved

BOOTROM Rev. 3.0, 10APR 91
MD 11 Rev 3.0, 1991/04/10
Bit-Mapped Video
MC68040 Processor
Configuration EEPROM
HP-HIL.Keyboard
HP-IB
DMA-C0
RAM xxxxxxx Bytes
HP98644 (RS232) at 9
HP98265 (SCSI S 32) at 14
HP98643 (LAN) at 21, THIN,  08009AAAAA
HP Parallel at 12
HP425S(or T) at SGC slot 0 (Console)



SEARCHING FOR A SYSTEM (Press RETURN To Pause)
RESET To Restart SPACE clears input
```

Figure 9-1. Power-Up Display

6. Write the amount here: RAM _____ Bytes.

   Note that the actual amount of RAM will be about 4.9% higher than the
   amount commonly stated. For example, '8,000,000' bytes (8 megabytes) is
   actually 8,388,608 bytes.

RAM Board Memory Installation Requirements

RAM boards must be installed meeting these requirements:

- Boards must be installed in pairs; each board in the pair must be the same size.

- Slots 0A and 0B must have the largest size RAM board pair.

- Slots 1A and 1B boards must be equal to, or smaller than boards in slots 0A and 0B.

- Slots 2A and 2B boards must be equal to, or smaller than boards in slots 1A and 1B.

- Each higher numbered slot pair must be equal to or smaller than RAM boards in the previous, lower numbered slot pair.

Supported Memory Configurations

Table 9-1 lists all supported RAM board configurations for HP 9000 Series 400 computers that use HP 98229B-E RAM boards.

Your computer has one of these configurations which can be upgraded to an appropriate larger configuration.

Table 9-1. Total RAM vs. Slot Numbers and Board Sizes

Total Memory	Slots 0A	0B	Slots 1A	1B	Slots 2A	2B	Slots 3A	3B
8 MBytes	4 MB	4 MB						
8 MBytes	2 MB	2 MB	2 MB	2 MB				
12 MBytes	4 MB	4 MB	2 MB	2 MB				
12 MBytes	2 MB	2 MB	2 MB	2 MB	2 MB	2 MB		
16 MBytes	8 MB	8 MB						
16 MBytes	4 MB	4 MB	4 MB	4 MB				
16 MBytes	4 MB	4 MB	2 MB	2 MB	2 MB	2 MB		
16 MBytes	2 MB	2 MB	2 MB	2 MB	2 MB	2 MB	2 MB	2 MB
20 MBytes	8 MB	8 MB	2 MB	2 MB				
20 MBytes	4 MB	4 MB	4 MB	4 MB	2 MB	2 MB		
20 MBytes	4 MB	4 MB	2 MB	2 MB	2 MB	2 MB	2 MB	2 MB
24 MBytes	8 MB	8 MB	4 MB	4 MB				
24 MBytes	4 MB	4 MB	4 MB	4 MB	4 MB	4 MB		
24 MBytes	4 MB	4 MB	4 MB	4 MB	2 MB	2 MB	2 MB	2 MB
28 MBytes	8 MB	8 MB	4 MB	4 MB	2 MB	2 MB		
28 MBytes	8 MB	8 MB	2 MB	2 MB	2 MB	2 MB	2 MB	2 MB
32 MBytes	16 MB	16 MB						
32 MBytes	8 MB	8 MB	8 MB	8 MB				

Table 9-1.
Total RAM vs. Slot Numbers and Board Sizes (continued)

Total Memory	Slots 0A	0B	Slots 1A	1B	Slots 2A	2B	Slots 3A	3B
32 MBytes	8 MB	8 MB	4 MB	4 MB	4 MB	4 MB		
32 MBytes	8 MB	8 MB	4 MB	4 MB	2 MB	2 MB	2 MB	2 MB
36 MBytes	16 MB	16 MB	2 MB	2 MB				
36 MBytes	8 MB	8 MB	8 MB	8 MB	2 MB	2 MB		
36 MBytes	8 MB	8 MB	4 MB	4 MB	4 MB	4 MB	2 MB	2 MB
40 MBytes	16 MB	16 MB	4 MB	4 MB				
40 MBytes	16 MB	16 MB	2 MB	2 MB	2 MB	2 MB		
40 MBytes	8 MB	8 MB	8 MB	8 MB	4 MB	4 MB		
40 MBytes	8 MB	8 MB	8 MB	8 MB	2 MB	2 MB	2 MB	2 MB
48 MBytes	16 MB	16 MB	8 MB	8 MB				
48 MBytes	16 MB	16 MB	4 MB	4 MB	2 MB	2 MB	2 MB	2 MB
48 MBytes	8 MB	8 MB	8 MB	8 MB	8 MB	8 MB		
64 MBytes	16 MB	16 MB	16 MB	16 MB				
64 MBytes	16 MB	16 MB	8 MB	8 MB	8 MB	8 MB		
64 MBytes	16 MB	16 MB	8 MB	8 MB	4 MB	4 MB	4 MB	4 MB
96 MBytes	16 MB	16 MB	16 MB	16 MB	16 MB	16 MB		
96 MBytes	16 MB	16 MB	16 MB	16 MB	8 MB	8 MB	8 MB	8 MB
128 MBytes	16 MB	16 MB	16 MB	16 MB	16 MB	16 MB	16 MB	16 MB

Determining How to Configure New Memory

You may refer to the sections explaining examples to help you learn about your new RAM configuration.

Follow these steps to determine your new RAM configuration:

1. Write the existing RAM board sizes in the "Existing" row for each memory slot, as shown in Table 9-2.

2. In Table 9-2, fill in the upgraded RAM board configurations as follows:

   a. RAM boards must be installed in pairs; each board in the pair must be the same size.

   b. Slots 0A and 0B must have the largest size RAM board pair.

   c. Slots 1A and 1B boards must have boards equal to, or smaller than boards in slots 0A and 0B.

   d. Slots 2A and 2B boards must have boards equal to, or smaller than boards in slots 1A and 1B.

   e. Slots 3A and 3B boards must have boards equal to, or smaller than boards in slots 2A and 2B.

3. Add up the Upgraded RAM board sizes and write the total in the "Upgraded, Total" block of Table 9-2.

4. Remove and/or replace RAM boards to match the configuration in the "Upgraded" row in Table 9-2.

Table 9-2. Existing Memory vs. Upgraded Memory

	Total	Slot 0A	Slot 0B	Slot 1A	Slot 1B	Slot 2A	Slot 2B	Slot 3A	Slot 3B
Existing									
Upgraded									

Removing and Installing RAM Boards

Please refer to your *Installation Guide* for more complete details on how to install and remove RAM boards.

Verifying the Upgrade

Follow these steps to verify your memory upgrade:

1. Turn on your computer.

2. Enter attended mode by pressing `Space Bar` when the `HP-HIL.Keyboard` line appears in the power-up display.

3. Note the amount of RAM in bytes listed in the power-up display. The amount should be what you upgraded to. If it is not, check your board installation.

10

Dealing with Problems

Chapter Contents

- Interpreting Error Messages During Boot.

- Interpreting the Computer LED Indicators.

- Dealing with VUE Problems.

- Logging in When All Else Fails.

- Handling a Boot Failure.

- Recovering from a System Panic.

- Hard Disk Drive: Interpreting the Status Indicator.

- CD ROM Drive: Interpreting the Busy Light.

- Dealing with Network Failures.

Interpreting Error Messages During Boot

When you turn on your computer, an error message such as the following indicates that a hardware problem with the Boot ROM or its associated circuits probably occurred:

    Configuration EEPROM Failed

    Configure Mode Failed

Refer to Table 10-1 for possible error messages you may see when entering Configuration Mode.

Table 10-1. Configuration Mode Entry Error Messages

Error Message	Meaning and Action
(No error message)	If Configuration Mode does not start and no error message appears, a hardware failure probably occurred.
Configure Mode Failed Configuration EEPROM Failed	One or more of these situations exists: All of the interface values have been set to their default (factory) values. Some default and some changed values have been set. All the interface values have been set to their changed values. Some minor error occurred that should not affect the configurations for the interface. Check your computer's Boot Mode Selection and Interface Configuration Modes and verify they are correct for your application.
EEPROM Has Bad Information	Configuration Mode started, main menu may appear, but something failed. Try again.

Table 10-1.
Configuration Mode Entry Error Messages (continued)

Error Message	Meaning and Action
EEPROM Load Section Missing	Could not load new configuration data. Hardware failure.
EEPROM Defaults Section Missing	Default configurations could not be found. Hardware failure.
Too much data to save	Too many interfaces for EEPROM to manage. Reconfigure computer with fewer interfaces.

If the Boot ROM or EEPROM has problems after you enter one of the configuration commands (see Appendix B), the mode lines display one of the error messages shown in the following table.

Table 10-2. Configuration Mode Exit Error Messages

Command	Error Message	Meaning and Action
N or *D*	Too many configuration saves	More than 64,000 saves were tried. Unlikely to occur.
N or *D*	Cannot save new configuration	Something prevented saving the new configuration. Hardware failure. Contact your HP Service Engineer.
N or *D*	EEPROM cannot save information	EEPROM may not save any or all of the new configuration information. Hardware failure. Contact your HP Service Engineer.
A	(No message should appear)	No error messages should appear when you abort configuration mode and reset your computer.

Interpreting the LED Indicators During Boot
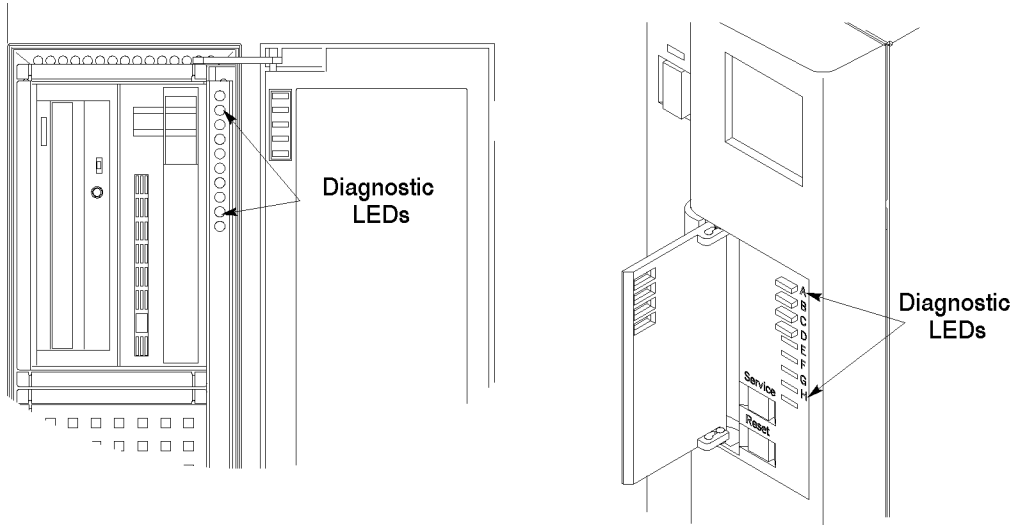
Figure 10-1. Diagnostic LEDs - Model 425s and 425t (right)

There are eight diagnostic LEDs (A through H) on the computer's front panel. The normal indications of a running system are given in Table 10-3. Some of these LEDs will always be blinking during normal operation.

Table 10-3. Normal LED Display During HP-UX Operation

LED Display (A through D Flashing)								Meaning
A	B	C	D	E	F	G	H	
o	o	o	●	o	o	o	o	Operating system running
o	o	●	o	o	o	o	o	Disk access in progress
o	●	o	o	o	o	o	o	Network receive in progress
●	o	o	o	o	o	o	o	Network transmit in progress

The indications in Table 10-4 refer to conditions which might happen during boot, including boot failures, *before* HP-UX is running:

Table 10-4. Diagnostic LED Display During Boot

LED Display (During Boot)								Status	Remedy
A	B	C	D	E	F	G	H		
o	o	o	o	o	o	o	o	No failure.	
o	o	o	o	o	o	o	●	Failed CPU register test.	Replace crystal or 68040 IC.
o	o	o	o	o	o	●	o	Testing the top 16 Kbyte of memory.	
o	o	o	o	o	o	●	●	Top 16 Kbyte of memory failed.	Check memory in slot 0A.
o	o	o	o	o	●	o	o	Top 16 Kbyte of memory missing or not found.	Check memory in slot 0A.
o	o	o	o	o	●	o	●	Searching for user-supplied extension ROM.	
o	o	o	o	o	●	●	o	Started executing extension ROM instructions	Should not happen; no ROM based systems in Series 400
o	o	o	o	o	●	●	●	Starting test vector list.	
o	o	o	o	●	o	o	o	Resetting all interfaces.	
o	o	o	o	●	o	o	●	Searching for console display.	
o	o	o	o	●	o	●	o	IODC test RAM under test.	
o	o	o	o	●	●	●	o	Failed Boot ROM checksum.	Replace Boot ROM.
o	o	o	o	●	●	●	●	Preloading RAM for main test.	
o	o	o	●	o	o	o	o	Testing RAM.	
o	o	o	●	o	o	o	●	Insufficient working RAM.	Replace RAM

Table 10-4. Diagnostic LED Display During Boot (continued)

LED Display (During Boot)	Status	Remedy
o o o o ● o ● ●	Console IODC test in progress	May need to replace display interface.
o o o o ● ● o ●	Testing console in DIO II space	May need to replace display interface.
o o o ● o o ● ●	Boot error.	Replace CPU board.
o o o ● o ● o o	Operating system tried to load at too high memory address.	Try booting again, or replace CPU or 68040 IC. Could be caused by corrupt file system.
o o o ● o ● o ●	Not enough memory to load operating system.	Add more memory. Try booting again. Could be caused by corrupt file system.
o o o ● o ● ● o	Failure during system scan.	
o o ● o o o o o	4 msec. timer problem.	Replace CPU board.
o o ● o o o o ●	EEPROM malformed.	
o o ● o o o ● o	Failure of HP-HIL circuit.	Replace CPU board.
o o ● ● o ● ● ●	Failure during Remote send.	Check terminal baud rate, handshake, modem, etc.
o o ● o ● o o o	Failure of DMA circuit.	Replace CPU board.
o o ● o o ● o o	Testing internal HP-IB.	
o ● o o o o o o	Failure of DIO-I interface at select code identified by five lowest LEDs.	Replace CPU board.
o ● ● ● o o ● ●	SGC slot # of display interface	
● ● ● ● ● ● ● ●	The entire 8 bits is the select code of a failed DIO II interface	

Problems with VUE

Checking Your Error Logs

For errors that occur prior to successfully logging in with HP VUE, you can examine `/usr/lib/X11/vue/Vuelogin/Xerrors` for clues as to what happened.

For errors that may have occurred subsequent to logging in, you can examine `.vue/errorlog`, in your home directory for error information.

Dealing with Possible Installation Problems

For general problems with VUE, first check for errors in installation:

Table 10-5. Installation Problems

Problem	Probable cause
General installation problems	■ Check `/tmp/update.log` for errors. ■ Ensure that you did *not* NFS-mount `/usr` or `/usr/softbench` prior to installation.
Upon login, VUE displays the copyright message for a long time, and then the display goes black.	■ Check the `$HOME/.vueprofile`, which should contain environment variable settings *only*. Any commands in the file that run in the foreground or require any terminal I/O will cause VUE problems. Do not copy `.login` or `.profile` to `.vueprofile`. ■ If your login shell is other than `sh`, `csh`, or `ksh`, change it to one of these.
The Home Session cannot be restored	■ The Session Startup dialog was set to "Return to Home Session," but you didn't *set* the Home Session. To do so, click on `Startup` from the Style Manager icons. Then click on `Set Home Session...` and confirm it by clicking on `OK` when the warning message comes up. Click on `Return to Home Session` if you haven't done so already. ■ The `.vue` directory in your home directory may have been removed.

Table 10-5. Installation Problems (continued)

Problem	Probable cause
`hpterm` won't work	■ An incorrect version of `hpterm` is found in `$PATH` before a correct version. Check `.vueprofile` to ensure that `$PATH` is set properly. Also make sure that `/usr/bin/X11` appears before `/usr/bin` in your `$PATH`. ■ To ensure that you have the correct `hpterm`, set the following resource in VUE, using `rdb`: `Vuecommand*Terminal: /usr/bin/X11/hpterm` Setting this in `/usr/lib/X11/app-defaults/Vuecommand` ensures that all users on the system will use the correct `hpterm`.
VUE doesn't get the right icons on the Workspace Manager panel	■ `$XBMLANGPATH` is set incorrectly. You can do one of two things: □ Unset this variable □ Set this variable correctly so that it finds the icon bitmaps.
Message is displayed: `X Toolkit Error: Can't open display`.	Set your DISPLAY variable to `local:0:0` or to *hostname*`:0:0`.
`No Windows` mode doesn't seem to work	See your *HP VUE System Administration Manual* for guidance on how to disable the console getty at the run level in which you run VUE. If your console is a local terminal, just add the gettyLine and gettySpeed resources to the `/usr/lib/X11/vue/Vuelogin/Xconfig` file to get "No Windows" to work on the bitmapped display. See your *HP VUE System Administration Manual* for specific settings.

For more information ...

To get more information on VUE customizing and administration, please see *HP Visual User Environment System Administration Manual* and the *HP Visual User Environment Configuration Guide*.

Logging in When All Else Fails

If you should have login problems which VUE `Help` won't solve, use the following procedure:

On occasion, logging in might not go as expected. For example, you may incorrectly edit `vuewmrc` so that the next time you try to log in, you return to the login screen.

To log in when all else fails:

1. Click on `[Options]` .
2. Choose `Fail-safe Session` .
3. Click on the `Login` box.
4. Type your login name.
5. Press `Return`.
6. Type your password.
7. Press `Return` or click on `[OK]` '.

When you log into a fail-safe session, a window appears with a command-line prompt in it — enough of an environment so you can fix things with system commands or by editing the faulty configuration file.

See *HP Visual User Environment User's Guide*, Chapter 8, for more information on this.

Handling a Boot Failure

Understanding the Boot Program

The boot program is located in the Boot ROM of your computer.

Here are each of the steps presented with a list of things to check if something went wrong at that point in the boot process.

Step 1: Boot Program Initializes Hardware

Problems during this first stage of the boot process are rare. At this stage problems can be caused by:

- No power to the computer (check your building's circuit breakers and the power connections to your computer equipment)

- Processor hardware failure

- Interface card hardware failure

- Incorrectly connected internal SCSI cable.

Turn off your computer's power (leave any external disks powered up and running). Wait five or ten seconds and turn the power to the computer back on.

If the problem reoccurs, record the symptoms, the status of any indicators (especially any LED displays) on your processor, and any messages that appear on your system console.

At this stage in the boot process, most of the problems that occur require your hardware to be serviced by a person trained and qualified to do so.

Step 2: Boot Program Loads a Secondary Loader Program

In this step the boot program attempts to load and run a secondary loader program that will be capable of loading and running HP-UX. The most likely problem at this stage is the boot program being unable to locate the secondary loader program.

If the boot program can't locate a secondary loader, you will see the message "Searching For a System" in the lower, left corner of your monitor's screen.

Verify that at least one device is powered on and in a ready state (it must also have a Secondary Loader Program, of course).

This symptom could also indicate that no kernel was found (see the next phase for details).

Boot Program finds the WRONG secondary loader

Another possible problem at this stage is that the boot program *does* find a secondary loader program, but the one it finds is the wrong one.

On a Series 400 computer, there is a particular sequence the boot program uses to locate a secondary loader program; it may find one before it reaches the one you want it to actually use. The boot program will use the first one it finds.

If you are booting from a LAN where more than one valid cluster server exists, the FIRST server to respond is the one that your system will boot from. It may be unpredictable which server will respond first. Moreover, the one that responds may not be the one you want! See Appendix B for information on automatic system selection.

For a server to respond to a boot request from your computer, it must have your computer configured in its `/etc/clusterconf` file. Therefore, unless your configuration requires the redundancy, you should never have more than one server on your LAN with *your* system defined in its `/etc/clusterconf` file.

Step 3: Secondary Loader Program Loads HP-UX

At this stage, the secondary loader program attempts to load and start up HP-UX itself. There are four things that can go wrong:

1. Service/Normal switch is in wrong position. It must be in "Normal".

2. The secondary loader program can't find HP-UX

3. The secondary loader program loads the wrong version of HP-UX

4. The secondary loader program is accidentally instructed to load Domain/OS

Secondary Loader Program can't find HP-UX

The secondary loader program will display a list of the valid kernels that it finds. When it begins its search for these kernels, it prints the message "Searching For a System". If it doesn't find any valid kernels, nothing further

will be displayed. (You will get a similar message if the secondary loader is accidentally instructed to load Domain O/S.)

If after a few minutes, nothing appears to happen, your system probably can't find a kernel to boot. If you're certain that a valid kernel resides on one of your devices, re-check the status of the device (see the following list "Possible Problem Areas").

If you are attempting to boot from a local device such as a disk drive and if the device is on, ready and configured properly, there is a chance that your kernel file is missing or corrupted. If you have another system you that can attach the disk drive to, you can mount the file system to that system and check for the presence of a valid kernel. If you cannot find one or if you do not have another system to mount your disk on, you might need to re-install HP-UX following the same procedures that you did when you first got your computer.

Possible Problem Areas.

■ Is the device powered on and in a ready state (for instance, if it is a disk drive, is it spun up and online)?

■ Is the device configured for the correct address (such as an HP-IB address)?

■ Is the cable connecting the device to the computer tightly connected to the correct location and is it the correct cable?

If you are attempting to boot an HP-UX client over LAN:

■ Be sure its cluster server is running.

■ Be sure that the `rbootd` daemon is running on the server.

■ Be sure the cluster server has your computer configured in its `/etc/clusterconf` file.

■ If your computer is part of an HP-UX cluster, the file `/hp-ux` is a Context Dependent File (CDF). Be sure there is an element in the CDF that corresponds to the client you're trying to boot.

Secondary Loader Program Finds Wrong HP-UX

For a variety of reasons, it is possible that the secondary loader program will load and run the wrong kernel file. If this happens, here's what you can do to override the selection of a kernel to boot.

The boot ROM program looks for valid kernel files from which to boot HP-UX. As it locates various kernel files, it creates a list of them and displays them on the screen in the order in which it found them. If you are booting in attended mode (having pressed the space bar down after the "HIL" message indicated that the keyboard was active), this list remains on the screen and you have a chance to select from the list. If you are booting in unattended mode, the system will immediately select the first kernel in the list. To be sure it is the one you want, you will need to make sure that your kernel of choice is the first one the secondary loader program will encounter.

Step 4: HP-UX Locates a Root File System

Because the kernel file nearly always comes from the same device as the file system that will become root file system for HP-UX, the device should be ready and available.

Step 5: HP-UX Begins Running

This is the point where HP-UX takes control of your system's resources and begins its startup procedure. HP-UX starts up its first process: a process called `init`. `init` processes the file `/etc/inittab` to know which processes it should run based on what run level HP-UX is in. In particular, there are processes called "gettys" which are responsible for putting login prompts on terminals. If you do not see a login prompt at a terminal where you think there should be one, check to be sure `/etc/inittab` has an entry for the getty corresponding to the run level HP-UX is currently in. For more information on this, see Chapter 9, "Problems with Terminals," in *Solving HP-UX Problems*.

The `/etc/inittab` file is also the place where `init` determines which run level to initially place HP-UX in.

As `init` processes `inittab`, it executes a shell using the script `/etc/bcheckrc` followed by a shell using the script `/etc/brc` and finally a shell using the `/etc/rc`. The functions of these shell scripts are described in Chapter 2 of the *System Administration Concepts*.

Note	If your computer is part of an HP-UX cluster, the file `/etc/inittab` is a context dependent file (CDF). Problems could occur if you accidentally change the wrong element of the CDF.

Most of the startup processing is done within the **/etc/rc** script, which, in turn, calls other scripts.

At this stage you are already booted. Any problems your system encounters as it executes these scripts are the same types of problems found in a running system. For instance, in the **/etc/bcheckrc** script, the **fsck** utility might encounter problems with a file system. If this is the case, refer to Chapter 6 of *Solving HP-UX Problems* for further assistance.

Recovering from a System Panic

■ System Panic:

    ☐ Record and Categorize Panic:

Problem Area	Some corrective processes:

Hardware	■ If the failure appears to be associated with the peripheral:
	
	    ☐ Check the integrity of the cable connections.
	
	    ☐ Ensure that the peripheral is online.
	
	■ If the above did not correct the problem, the failure may be associated with the System Processing Unit. In this case, call your designated service representative.

File System	■ Run the file system checker, `fsck`, to correct the problem. Follow the instructions that `fsck` may give, and use the `-n` option with any subsequent reboots required by `fsck`. See Chapter 6 "File System Problems," in *Solving HP-UX Problems* for detailed information.
LAN	■ Ensure the integrity of all LAN connections, including taps in any AUI cable. Check for proper 50 ohm terminations at both ends of the LAN.
Other	■ Reboot the system

Determining Why the System Panics

In HP-UX terms, a panic simply means that HP-UX ran into a condition that it did not know how to respond to, so it halted your computer.

System panics are rare and not always the result of a catastrophe. They sometimes occur on boot if your system was previously not shut down properly. Sometimes they occur as the result of a hardware failure. In a clustered environment, a diskless client node will panic if too much time has elapsed since its last communication with its server. This could be the result of nothing more than a LAN cable that has been disconnected for too long.

Recovering from a system panic can be as simple as rebooting your system. If you have an up-to-date set of file system backup tapes, the *worst case* scenario would involve reinstalling HP-UX and restoring any files that were lost or corrupted. If this situation was caused by a hardware failure such as a disk head crash, you will, of course, have to have the hardware fixed before you can perform the reinstallation.

Note	It is important to maintain an up-to-date backup of the files on your system so that, in the event of a disk head crash or similar situation, you can recover your data. How frequently you update these backups depends on how much data you can afford to lose. For information on how to back up data, refer to the *System Administration Tasks* manual.

Dealing with a System Panic

Step 1: Record the Message.. Record the panic message displayed on the system console.

Step 2: Categorize the panic message.. The panic message will tell you why HP-UX panicked. Sometimes panic messages refer to internal structures of HP-UX (or its file systems) and the cause might not be obvious. Generally, the problem is in one of the following areas, and wording of the message should allow you to classify it into one of them:

Category	Proceed to Step #
Hardware Failure	Step 3a
File system Problem (corrupted?)	Step 3b
LAN communication Problem	Step 3c
None of the above	Step 3d

Step 3a: Recovery from Hardware Failure. If the panic message indicated a hardware failure, the text or context of the message should indicate what piece of hardware failed.

If the hardware failure appears to be associated with a peripheral, check to be sure that its cables are tightly connected to their proper locations and that the device is powered on and in an "online" status. If there is an error indicated on the device's display:

1. record the error message or display in your log book

2. turn the device off

3. if the device is a disk drive, wait for it to stop spinning

4. turn the device back on

If the problem reappears on the device or if the hardware failure appears to be associated with an interface card or an internal component of the System Processing Unit, it might be necessary to have the problem fixed by Hewlett-Packard or whoever performs your hardware maintenance.

Proceed to Step 4 (rebooting your system).

Step 3b: File system problem recovery:. If the panic message indicates a problem with one of your file systems, you will need to run the file system checker *fsck*(1m) to check and correct the problem(s). This is normally done automatically at boot time (from the `/etc/rc` file) so you should proceed to step 4 (rebooting your system). Follow all directions that `fsck` gives you *especially if it is your root file system (the one with the "/" directory) that has the problem.* It is important to use the "`-n`" option to the *reboot*(1m) command if requested to do so by `fsck` during any subsequent reboot.

Step 3c: LAN communication problem. If the panic messages indicates a problem with LAN communication (such as when a diskless cluster client node is prevented from communication for too long), check all LAN cable connections to be sure of the following:

■ All connectors are tightly fastened to the LAN cable and the media access units (MAU's). If you are using "thick LAN," make sure all taps are tightly connected to their respective cables and that AUI cables are connected securely to the LAN interface cards (LANICs) in your computer.

■ Your LAN is properly terminated. Each END of the LAN cable MUST have a *50 ohm* terminator on it. *Do NOT* connect a computer directly to the END of a LAN cable.

Proceed to step 4 (rebooting your system).

Step 3d: Recovery from other situations. When you suspect the problem was something other than the above (or when you do not know where to classify it), proceed to step 4 "*Rebooting your system.*" In this case, it is *especially* important that you write down the *exact text* of the panic message, just in case you need it for future troubleshooting.

Step 4: Rebooting your system. Once you have checked for and corrected any problems from Step 3, you are ready to reboot your system. You can reboot your system using the reset button on the back of the computer. Otherwise, you can turn your computer off and then back on to initiate the boot sequence.

You will probably notice a few differences in boot behavior as compared with your normal boot sequence. Your computer might save a "core" file to disk. This core file is a "snapshot" of the previously running kernel at the time that it panicked. If it becomes necessary, this core file can be analyzed using special tools to determine more about what caused the panic.

Note   Core files are quite large and are saved to the directory
             `/tmp/syscore`. If you feel you need to save these files for
             future analysis (something that isn't usually required), it is
             best to save them to tape and remove them from your file
             system in order to free up space. If you *know* why your system
             panicked, you can delete the core files; it is unnecessary to keep
             them. The core files are used in rare circumstances to diagnose
             hard-to-find causes of system panics.

If the reason your system panicked was because of a corrupted file system, `fsck` will report the errors and any corrections it makes. If the problems were associated with your root file system, `fsck` will ask you to reboot your system when it's finished. When you do this, use the command:

```
reboot -n
```

The `-n` option tells reboot *not* to sync the file system before rebooting. Since `fsck` has made all the corrections on disk, you do not want to undo the changes by writing over them with the still corrupt memory buffers.

If other problems occur during the boot process, refer to chapter 5 (System Boot-up Problems).

Step 5: Monitor the system closely. If your system successfully boots, there is a good chance that you can resume normal operations. Many system panics are isolated events, unlikely to reoccur.

Check your applications to be sure that they are running properly and (for a day or so) monitor the system closely. For a short while, you might want to do backups more frequently until you are confident that the system is functioning properly.

For Further Information . . .

■ Refer to *Solving HP-UX Problems* and to *System Administration Tasks* for further information on operating-system related problems.

■ To restore a corrupted operating system, see the procedures for restoring disks in Chapter 7 of this manual.

Hard Disk Drive: Interpreting the Status Indicators

Caution

Do not operate your internal hard disk drive if your computer has been exposed to extreme temperatures, such as being left in an automobile overnight in cold weather. This could cause damage to the drive. A hard disk drive must stabilize to room temperature before you operate it. Refer to the appropriate *Installation Guide* for limits on temperature and humidity for your drive and for details of general operation.

When the hard disk drive power is switched on, the drive automatically performs a self-test. The hard disk status indicator shows the status of the drive during the self-test and during activity with the host computer. The hard disk status indicator is a light-emitting diode (LED) located on the disk drive front panel.

Status Indications During Power Up

The hard disk status indicator LED displays in the following sequence when the disk drive is turned on:

LED Sequence	Explanation
1. ON	When the power is turned on, the hard disk status indicator goes on momentarily as the controller is being tested.
2. OFF	The hard disk status indicator goes off for one second after the controller passes self-test.
3. ON	The hard disk status indicator goes on when the spindle motor starts, and stays on for about 10 seconds until the spindle reaches maximum speed.
4. OFF	The hard disk status indicator goes off when the spindle reaches maximum speed.

After the spindle reaches maximum speed, the hard disk status indicator will flash randomly during hard disk drive activity with the host computer. If the

spindle is at maximum speed and the hard disk status indicator is off, the drive is idle.

Status Indications During Operation

The following table explains the operation of the status indicator during operation:

Table 10-6. Hard Disk Drive Status Indicators

Status	Explanation
OFF	No power, or hard disk drive is idle on SCSI bus
ON	Self-test has failed if the indicator stays on 20 seconds after the power is switched on. The probable cause is the hard disk drive controller.
FLASHING (*One flash per second*)	The self-test has failed if the indicator is flashing at one flash per second, 20 seconds after the power is turned on. The probable cause is the hard disk drive controller.
FLASHING (*Ten flashes per second*)	The hard disk drive controller is performing diagnostic tests.
FLASHING (*Random*)	This indicates normal SCSI bus activity.

Interpreting the DDS-Format Busy Light Indicators

Your DDS-Format drive has two busy light indicators that display either green or yellow colors:

■ Cassette Busy Light.

■ Drive Busy Light.

When your computer is turned on, the DDS-Format drive automatically performs a self-test. The cassette busy light (the left-most or upper light on the drive), indicates the status of the cassette during the self test. It also indicates activity with your computer.

The drive busy light (the right-most or lower light on the drive), indicates the drive status during self-test. It also indicates activity with your computer.

Note   If your DDS-Format drives fails the self-test, contact your local Hewlett-Packard d Sales and Service Office.

Table 10-7 lists the DDS-Format busy light indications for normal operation.

Table 10-7. DDS-Format Indicators for Normal Operation

Busy Lights		Meaning
Cassette (Left)	Drive (Right)	
Off	Off	No cassette loaded or computer power off.
Off	Green (flashing randomly)	No cassette loaded and activity with computer.
Green (flashing)	Green (flashing)	Loading or unloading a write-enabled cassette.
Green	Off	Write-enabled cassette loaded and drive off-line.
Green	Green (flashing)	Write-enabled cassette loaded and activity with computer.
Green	Green	Write-enabled cassette loaded and drive on-line.
Yellow	Off	Write-protected cassette loaded and drive off-line.
Yellow	Yellow (flashing)	Write-protected cassette loaded and activity with computer.
Yellow	Green	Write-protected cassette loaded and drive on-line.

DDS-Format Fault Conditions

Table 10-8 lists the DDS-Format busy light indications for fault conditions.

Table 10-8. DDS-Format Indicators for Fault Conditions

Busy Lights		Meaning
Cassette (Left)	Drive (Right)	
Off	Off	Drive power failure.
Green On 4.5 sec. Off .5 sec.	Green or Yellow	*Media warning.* Use cleaning cassette or replace cassette.
Yellow	Yellow	High humidity.
One Yellow Flash	Yellow	Drive failed.
Two Yellow Flashes	Yellow	Drive controller failed.
Three Yellow Flashes	Yellow	Drive controller failed.

Interpreting the CD ROM Busy Light Indicators

The CD ROM busy light shows the status of the drive during the self-test phase and during activity with the system.

The self-test is performed at the following times:

■ When you insert a disk with the power on.

■ When you turn on the drive with a disk loaded.

Normal Operation: Self-Test

Light ON	When a disk loads into the drive.
Light FLASHES (six times)	While a read test is performed on the disk.
Light OFF	When the self-test is complete and during subsequent idle periods.
Light FLASHES (continuously)	Normal activity with system, or the drive is set to continuous audio mode.

Abnormal Operation:

Light is OFF	Power failure.
Light stays ON	Indicates:

  ■ A defective disk.

  ■ Disk insertion error.

  ■ No disk inserted.

Dealing with Network Failures

If the program you have been running uses resources from a local area network and it stops unexpectedly, the following may help locate the source of the problem:

Table 10-9. Problems with the Network

Problem	Action
No systems respond to the /etc/ping *hostname* 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 /etc/ping 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 /etc/rc.
Some systems respond to /etc/ping, but others do not.	Contact your network administrator, if you have one . This condition either indicates that some systems are down, or that there is a fault with the network.

A

Hardware Configuration for Internal Drives

Appendix Contents

- CD ROM Drive Configuration Switches
- Hard Disk Drive Configuration Switches

CD ROM Drive Configuration Switches

Caution

The HP A2074A Drive's disk caddy *is not* interchangeable with the HP C1707A CD ROM Drive's disk caddy. You can exchange the CD ROMs between these caddies.

Although the CD ROM drive is well-protected from physical shock when installed in the computer, it is very easily damaged when separate. Avoid dropping or striking the CD ROM drive. Handle it gently at all times.

Your *Installation Guide* shows you the configuration switch locations. Switches and their settings are explained in Table A-1. Note the switch positions that represent a '0' and '1.'

Table A-1. CD ROM Drive Configuration Switch Functions

Switch Number	Switch Label	Function
1, 2, 3	1, 2, 4	SCSI ID Address; Switch 1 is least significant bit. Shipped with address 2 set (default).
4	PRTY	Parity checking; 0 =Disabled, 1 = Enabled.
5	ARBT	Arbitration; 0 = Disabled, 1 = Enabled.
6	TEST	Test; for service and audio only use only. 0 = Normal, 1 = Test.

Setting the SCSI Bus Address Switches

Your CD ROM drive's SCSI ID switches must be set to the bus address it will use. Follow these steps to set the SCSI bus address switches:

1. Refer to the 'Existing SCSI Bus Address Form' and note the CD ROM SCSI bus address you will use.

2. Your CD ROM has bus address 2 factory set.

Set your CD ROM's SCSI ID configuration switches for SCSI bus address you will use in the range of 0 through 7. Refer to Table A-2 for bus addresses and their switch settings.

For example, if you want to set your CD ROM drive's address switches to address 4, you would set:

a. Switch 1 (labeled 1) to 0.

b. Switch 2 (labeled 2) to 0.

c. Switch 3 (labeled 4) to 1. (labeled 4) to 1.

Table A-2. SCSI ID Addresses and Switch Settings

SCSI Address	SCSI ID 1 Switch 1	SCSI ID 2 Switch 2	SCSI ID 4 Switch 3
0	0	0	0
1	1	0	0
2	0	1	0
3	1	1	0
4	0	0	1
5	1	0	1
6	0	1	1
7	1	1	1

Setting the PRTY, ARBT and TEST Switches

Computer Data Mode

Set these switches as follows for your CD ROM drive to operate in the computer data mode in your computer:

Note If you set these switches for the computer data mode with the computer operating, you must shut down the operating system, then reboot the operating system for the drive to recognize the new switch settings.

- Switch 4 (labeled PRTY) to 1.
- Switch 5 (labeled ARBT) to 1.
- Switch 6 (labeled TEST) to 0.

Setting the Hard Disk Drive Configuration Jumpers

Caution

Although the device is well-protected from physical shock when installed in the computer, it is very easily damaged when separate. Avoid dropping or striking the device. Handle it gently at all times.

Your *Installation Guide* will show you the configuration jumper locations. Table A-3 explains the jumper positions.

Note the jumpers in the back of the drive are installed as follows:

- Jumpers installed on pins = "in."
- Jumpers removed from pins = "out."

Table A-3. Hard Disk Drive Configuration Jumper Functions

Jumper Label	Function
SS	Self-Seek; In = disabled. Out = enabled. (Default) Drive self-tests at turn-on. LED is ON during test, OFF after self-test passes. Flashes if an error is detected.
EP	Enable Parity In = enabled. Out = disabled. (Default) Controls parity checking of data on SCSI bus.
WS	Wait/Spin In = enabled. Requires a stop/start unit command to spin drive motor. Out = disabled. (Default) Drive motor starts automatically at turn-on and is ready within 20 seconds.
A0, A1, A2	SCSI Bus Address; A0 is least significant bit. Shipped with address 5 set for upgrade (jumpers on A0 and A2).

Setting the Self-Seek, Parity and Wait/Spin Jumpers

Your drive has jumpers SS, EP, and WS factory set to the 'Out' condition; no jumpers installed.

If you want to change these functions, use a pair of needlenose pliers to remove and/or install jumpers as required.

Setting the SCSI Bus Address Jumpers

Your hard disk drive must be set to a bus address that is different from other SCSI device bus addresses already used. Follow these steps to set the SCSI bus address jumpers:

1. Refer to Chapter 8 if you need help in determining which SCSI bus addresses are currently available.

2. Use a pair of needle-nose pliers to remove and install the configuration jumpers.

   Set your drive's SCSI configuration jumpers for the SCSI bus address it will use. Refer to Table A-4 for bus addresses and their jumper settings.

   For example, if you want to set your hard disk drive's address jumpers to address 6, you would set:

■ Jumper A0 out.

■ Jumper A1 in.

■ Jumper A2 in.

Table A-4.
HP A2071A SCSI Bus Addresses and Jumper Settings

SCSI Address	Jumper A2	Jumper A1	Jumper A0
0	Out	Out	Out
1	Out	Out	In
2	Out	In	Out
3	Out	In	In
4	In	Out	Out
5	In	Out	In
6	In	In	Out

B

Configuring the Boot ROM

Appendix Contents

- Using the Boot ROM Configuration Mode
- Configuring for Operating System Selection

Using the Boot ROM Configuration Mode

After you have turned on your computer and, if an operating system is installed, stopped the automatic boot process, you can enter Configuration Mode to change your computer's Boot ROM behavior or internal interface configurations.

B

Configure Mode is run and controlled by your computer's Boot ROM. You do not need to have an operating system installed to use Configure Mode.

If the operating system is installed and you want to enter Configure Mode, you must prevent the operating system from booting. Instructions are provided in this chapter.

Follow these instructions to enter and use Configuration Mode.

---

1 If your HP-UX operating system is not installed, continue with this step.

Otherwise, skip to step 2.

After turning on your monitor, turn ON your computer. The power-up display will appear. Skip now to step 3.

---

2 If your HP-UX operating system has been installed, you must prevent the operating system from booting shortly after turning your computer on.

a. After turning on your monitor, turn ON your computer. The power-up display will appear.

b. As soon as `HP-HIL.Keyboard` appears or you hear the double "beep", press:

[Space Bar]

and the power-up display will continue to appear but HP-UX will not boot.

---

3 With the power-up display shown on your monitor, press these keys to enter Configuration Mode:

[C] [Return]

---

4 You should see this menu appear in the power-up display's upper right-hand corner:

```
     Configuration Control
Keys   Control Class
------------------------------
1     I/O Configuration
2     Auto System Selection
3     Boot Mode Selection


A     Abort without changes
------------------------------
Type [key] RETURN ?
```

The **?** prompt below the menu indicates your computer is waiting for an input. To respond, press an appropriate number or letter key, followed by Return .

If you now want to change the I/O configuration of your controller, go on to the next section.

If you want to leave Configuration Control without making any changes, enter "A" followed by Return .

If you want to reconfigure your computer's internal interfaces, go on to the next section.

If you want to change computer's boot mode selection or auto system select, skip to the section, "Configuring for Operating System Selection."

Modifying I/O Configuration Information

Configuration settings are stored in part of your computer's memory called an Electrically Erasable Programmable Read Only Memory, or EEPROM. Information stored in the EEPROM remains intact even if your computer is turned off.

Table B-1 lists the factory-set default configurations for your EEPROM.

Table B-1. Built-In Interface Default Values

Built-In Interface	Function	Default Configuration	Options
SCSI	Select Code	14	0 to 31
	Interrupt Level	4	3 to 6
	Bus Address	7	0 to 7
	Parity	Yes	Yes/No
LAN	Select Code	21	0 to 31
	Interrupt Level	5	3 to 6
HP Parallel	Select Code	12	0 to 31
	Interrupt Level	3	3 to 6
HP-IB	System-Controller option	yes	yes/no
RS232	Select Code	9	0 to 31
	interrupt level	5	3 to 6
	Remote/Local	L	R or L
	Modem Enable	yes	yes/no

Follow these instructions to enter and use the I/O Configuration Menu.

Enter the following:

1 `Return`

This Configurable Interfaces menu replaces the Configuration Control menu:

```
    Configurable Interfaces
  Keys  Interface Select Code
  ------------------------------
    1   LAN             21
    2   HP-IB
    3   SCSI            14
    4   HP Parallel     12
    5   RS-232           9

    N store New values
    D store Default values
    (then cycle SPU power)
    A Abort without changes
  ----------------------------
    Type [key] RETURN ?
```

Each of the three commands is explained below.

Possible Response	Function and Meaning
Ⓝ	Stores all the listed new values you entered in the EEPROM. You can turn OFF your controller (or System Processing Unit - SPU), then turn it back ON and the new values will be used. Then the self-test will run.
Ⓓ	Exits the Configuration Mode and stores the factory default values in the EEPROM. You must cycle controller power to reconfigure the interfaces to these default values.
Ⓐ	Causes the Boot ROM to reset and run the power-up self-test without saving any changes you may have made to the interface values. The pre-existing values will be used.

Enter your response followed by (Return) after the ? prompt.

If you decide to use the default configurations, exit the menu by pressing D followed by (Return).

Configuring for Operating System Selection

Your computer can boot either HP-UX or Domain/OS operating systems. If your computer was shipped with and HP-UX operating system, the boot mode has been set to "HP-UX Compatible." You may change the boot mode by using Configure Mode and setting the mode for the type of operating system you want to use.

If two or more HP-UX operating systems are available on your computer, you can identify the one to automatically boot at turn-on by using Auto System Selection Mode.

Setting the Operating System Mode Directly

You can set the computer's operating system mode without entering Configure Mode. Follow these steps to set the Boot Mode Selection directly:

---

1 After resetting your computer or turning it ON, when the power-up display shows the line:

    HP-HIL.Keyboard

and you hear two beeps, type one of these commands to set the Boot Mode for the operating systems you want to use:

For HP-UX mode, type HP ⌷Return⌷.

For Domain/OS mode, type DOM ⌷Return⌷.

The Boot Mode Selection status is now set for the operating systems you selected.

---

2 Your computer will reset and restart.

If you have selected HP-UX compatible mode, the power-up display will appear.

If you have selected Domain/OS compatible mode, the power-up display will not appear. The Domain/OS will boot and its normal screen messages will appear.

Using Boot Mode Selection

Follow these steps to enter and use Boot Mode Selection:

1 With this Configuration Control menu in the screen's upper right-hand corner:

```
    Configuration Control
Keys Control Class
-----------------------------
  1  I/O Configuration
  2  Auto System Selection
  3  Boot Mode Selection

  A  Abort without changes
-----------------------------
Type [key] RETURN ?
```

press:

`3` `Return`

2 This Boot Mode Selection menu is now displayed in the upper right-hand corner:

```
    Boot Mode Selection
Keys Mode                Status
-----------------------------
  1  Domain Compatible
  2  HP-UX Compatible      P
  3  Undefined

  C  Clear Entry
  E  Execute
  A  Abort without changes
-----------------------------
Type [key] RETURN ?
```

The following table will help you enter this information:

Key	Mode	Status
Indicates the mode you want to select. To clear an incorrect entry, press: C Return. To execute the Boot Mode Selection menu, press: E Return. To abort the Boot Mode Selection menu without making any changes, press: A Return.	Lists the operating system modes. **Domain Compatible** is for Domain/OS systems. **HP-UX Compatible** is for HP-UX compatible systems. Includes BASIC and Pascal. **Undefined** is a neutral mode. If the computer is in this mode, at power- up, the main Configuration Control menu will appear.	Either **P** for permanent or **T** for temporary for the operating system mode. If your computer is in permanent mode for one operating system, you can temporarily change it to the other. When the computer is turned off, then back on, the permanent mode will be used.

3 The boot mode should already be selected as "HP-UX Compatible." If it is otherwise, you can select the boot mode for your operating system by doing the following:

- If HP-UX, press ② Return
- If Domain/OS, press ① Return

4 This prompt will appear below the Boot Mode Selection menu if you selected HP-UX compatible mode:

```
    2  HP-UX Compatible
Temporary or Permanent
Type T or P RETURN ?
```

To make the Boot Mode permanent so you won't have to do this each time you turn on your computer, press:

P Return

B-8   Configuring the Boot ROM

5 When the Boot Mode Selection menu looks like this:

```
    Boot Mode Selection
Keys Mode               Status
------------------------------
    1   Domain Compatible
    2   HP-UX Compatible    P
    3   Undefined

    C   Clear Entry
    E   Execute
    A   Abort without changes
------------------------------
Type [key] RETURN ?
```

press:

[E] [Return]

to execute the selected boot mode and make it permanent.

Using Auto System Selection

Follow these steps to enter and use Auto System Select:

B

1 With Configuration Control menu in the upper-right corner of the screen, enter
2 (Return).

```
    Configuration Control
   Keys    Control Class
   -----------------------------
       1  I/O Configuration
       2  Auto System Selection
       3  Boot Mode Selection

       A  Abort without changes
   ----------------------------
   Type [key] RETURN ?
```

2 This menu appears:

```
       Auto System Selection
       Keys Option            Status
       -----------------------------
          1  Scan for System      Y
          2  Selected System      N
          3  Store Selected Sys. N

          E  Execute
          A  Abort without changes
          ------------------------------
          Type [key] RETURN ?
```

3 The prompt `?` indicates that your controller is waiting for a letter or number input.

The Auto System Selection menu indicates the way your system is currently set. Toggling the "Status" options by entering one of the numbers under "Keys" on the left will result in a new configuration which will be executed as soon as you press `E`.

For example, if your disks contain more than one operating system, you could choose one as the Selected System by pressing `2`, followed by (Return).

B

4 The Auto System Selection menu changes to indicate `Selected System`, `Scan for System`, and `Store Selected Sys.` are all `Y` ("yes").

```
        Auto System Selection
        Keys Option            Status
        ------------------------------
          1  Scan for System     Y
          2  Selected System     Y
          3  Store Selected Sys. Y

          E  Execute
          A  Abort without changes
        ------------------------------
        Type [key] RETURN ?
```

5 To execute the menu as it appears in the previous step, press `E`, followed by (Return). The system will give you the opportunity to identify the "Selected System" in the next step.

If you decide *not* to change the Auto System Selection configuration, press `A` to leave the configuration unchanged.

6 If you pressed `E`, your power-up display would change, and the available operating systems would be listed in the upper right-hand corner like this:

```
Copyright 1991                        :(device, select code/address, unit)
Hewlett-Packard Company                1H  SYSTEM_HPUX
All Rights Reserved                    (other systems)

BOOTROM Rev. 3.01 2 MAY 91
MC68040 Processor
Configuration EEPROM
HP-HIL.Keyboard
```

7 The number-letter designation for the operating system you will select is `1H`.

Enter that prefix by typing `1H` (Return). That operating system will boot.

If you do not enter this information, the boot ROM will designate the first system it scans as the "Selected System".

If you previously set the `Store Selected Sys.` option to "yes," the operating system selected will be the one to automatically boot each time you turn on your controller.

This completes the selection process, and the system will now proceed with booting the selected system for this and future sessions.

For More Information

See "Interpreting Error Messages During Boot" Chapter 10 for additional guidance if you experience problems during this process.

C

Keyboard Configurations

Appendix Contents

- Key Label Differences Between the ITF and the PC-101 Keyboards
- ITF and PC-101 Key Label Comparisons and Conversions

C
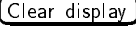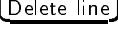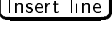
Using the ITF or PC101 Keyboard

Key overlays are provided with the PC101 keyboard for use with the HP-UX operating system. These overlays are in the keyboard shipping carton. This Appendix describes the key differences between the ITF and PC101 keyboards.

Key Label Differences Between the ITF and the PC-101

Five keys on the HP 46021A/B ITF (Integrated Terminal Format) Keyboard are not duplicated on the PC-101 Keyboard. These ITF keys are:

- (Enter/Print)
- (Clear line)
- (Clear display)
- (Delete line)
- (Insert line)

One new key was added to the PC-101 keyboard: the right-hand (Ctrl) key. The right-hand (Ctrl) key may not be functional when running some revisions of Hewlett-Packard software designed for use with the ITF keyboard.

Key Label Comparisons and Conversions

Table C-1 shows a use-comparison between PC-101 key labels and their
equivalent ITF key labels.

Table C-1. PC-101 to ITF Key Comparisons

PC-101 Key Row	This ITF Key or Key Combination	Functions Like This PC-101 Key or Key Combination
Row 1	ESC DEL	Esc
	Shift — ESC DEL	Shift — Esc
	1st non-label softkey	f9
	2nd non-label softkey	f10
	3rd non-label softkey	f11
	4th non-label softkey	f12
	Menu	Print Screen/SysRq
	Stop	Scroll Lock
	Break/Reset	Pause/Break
	Shift — Break/Reset	Shift — Pause/Break
Row 2	Insert Char	Insert
	▼	Home
	Prev	Page Up
	System/User	Num Lock
	Shift — System/User	Shift — Num Lock

C

Table C-1. PC-101 to ITF Key Comparisons (continued)

PC-101 Key Row	This ITF Key or Key Combination	Functions Like This PC-101 Key or Key Combination
Row 3	[Del char]	[Delete]
	[Select]	[End]
	[Next]	[Page Down]
	[7]	[7/Home]
	[8]	[8/▲]
	[9]	[9/Pg Up]
Row 4	[Caps]	[Caps Lock]
	[Return]	[Enter]
	[4]	[4/◀]
	[6]	[6/▶]
Row 5	[1]	[1/End]
	[2]	[2/▼]
	[3]	[3/Pg Dn]
Row 6	[CTRL]	Left [Ctrl]
	Left [Extend char]	Left [Alt]
	Right [Extend char]	Right [Alt]
	(none available)	Right [Ctrl]
	[0]	[0/Ins]
	[.]	[./Del]

C

Notice that, unlike the Vectra Personal Computer, the (Num Lock) key is NOT treated as a mode key such as (Caps Lock). This may change in the future and you should consult the documentation which comes with your Operating System. With some limits, X-windows or window environments based on X-windows allow the function of each key to be changed by the user.

A keyboard overlay, A2205-80000, is supplied with the HP 9000 Series 400 workstation to help map five of the PC-101 keys which have labels completely different from their ITF functions. This key mapping is shown in Table C-1 and is listed below:

- (Print Screen/SysRq) → (Menu)
- (Scroll Lock) → (Stop)
- (Pause/Break) → (Break/Reset)
- (Num Lock) → (System/User)
- (End) → (Select)

Glossary

absolute path name
   The name of a file which lists all the directories leading to it, starting with root ("/") and ending with the filename itself.

access permissions
   See **file access permissions**.

active window
   The VUE window where what you type appears. If there is no active window, what you type is lost. Only one window can be active at a time. The active window is said to have the "keyboard focus."

application
   A program used to perform a particular task, usually interactively, such as computer-aided design, text editing, or accounting.

argument
   The part of a command line which identifies what (file, directory, etc.) is to be acted upon.

ARPA
   Advanced Research Projects Agency, which developed ARPANET in the 60's.

ASCII
   American Symbolic Code for Information Interchange.

backup
   A backup is a copy of all or part of the file system.

back up

To "back up the file system" refers to the process of copying the file system to a separate disk or to a tape.

bitmap

Generally speaking, an array of data bits used for graphic images. Strictly speaking, a pixmap of depth one (capable of representing 2-color images).

boot

To start up your system, loading it into the computer memory.

boot ROM

A read-only memory which is incorporated into a terminal for the purpose of starting the operating system, testing the terminal, and producing a standard display.

buffer

An area used for temporary storage.

button

A graphic control that simulates a real-life push button. Use the pointer and mouse to "push" the button and immediately start an action. Radio buttons come in sets of two or more. Each button represents a mutually exclusive selection. Radio buttons are typically used for setting states or modes.

byte

A fundamental character-code unit, usually consisting of 8 or 16 bits.

CD ROM

Compact Disc Read-Only Memory.

character

An element used for the organization, control, or representation of text. Characters include graphic characters and control characters.

click

To press *and release* a mouse button. The term comes from the fact that pressing and releasing the buttons of most mice makes a clicking sound.

cluster node

A member of a group of workstations connected via a LAN. One computer, the **cluster server**, performs as a server to the cluster.

cluster server

A computer which provides file access, login access, file transfer, printing and other services across a network to a defined cluster of systems (**cluster nodes**) connected via a LAN.

command

A set of instructions you enter into the system to cause it to perform a task.

command interpreter

A program which reads lines of text from standard input (typed at the keyboard or read from a file), and interprets them as requests to execute other programs. An HP-UX command interpreter is called a shell.

current session

The session to which you are logged in at a particular time.

current working directory

This is the directory in which relative path name searches begin. It is also called the current directory or working directory.

default search path

The sequence of directory prefixes that *sh(1)*, *time(1)*, and other HP-UX commands apply in searching for a file known by a relative path name (that is, a path name not beginning with a slash (/)). It is defined by the environment variable PATH.

dialog box

The dialog box is called by the user from the main window. A dialog box contains controls and settings. To display an example of a dialog box, click the style manager button on the workspace, then click Color.

directory

A table of identifiers and references (such as file names) that refer to corresponding files and items of data. Used in a typical HP-UX organizational structure to provide an organizational and logical identity for

a given group of files and directories. In HP VUE, a directory is sometimes called a "folder".

DOS

Disk operating system.

double click

Pressing and releasing a mouse button twice in rapid succession.

drag

Pressing and holding down a mouse button while moving the mouse on your desktop (and the pointer on the screen).

drop

Releasing an icon that has been "dragged" to a new position. To drop the icon, release the mouse button.

environment

The set of defined shell variables (some of which are PATH, TERM, SHELL, EXINIT, HOME) that define the conditions under which your commands run. These conditions can include your terminal characteristics, home directory, and default search paths.

environment variables

Shell variables that determine your terminal's behavior in general, including default search paths, type of prompt, type of editor, and terminal type.

file

A named storage location in which you can store text or other data.. Files are the basic means which HP-UX uses to organize information.

file access permissions

Every file in the file hierarchy has a set of access permissions. These permissions are used in determining whether a process can perform a requested operation on the file (such as opening a file for writing). Access permissions can be changed subsequently through the *chmod(2)* call.

file manager

The HP VUE application that allows you to manage your files and directories, and set viewing preferences.

file server

A computer whose primary task is to control the storage and retrieval of data from hard disks. Any number of other workstations can be linked to the file server in order to use it to access data. This means that less storage space is required on each individual workstation.

fileset

Describes a logical, defined set of files on an update or installation tape

file system

The organization of files and directories on a hard disk.

help manager

The HP VUE application that provides online help.

$HOME

The environment variable representing the home directory. This is the directory in which you are placed after you log in. Typically, this is `/users/`*login*, where *login* is your login name. The home directory is where you keep all "your" files.

home directory

This is the directory where the user starts after logging in. It is the directory name given by the value of the shell variable HOME.

home session

A session stored explicitly using the style manager Startup dialog box, to which you can always return.

host name

Refers to a string which uniquely identifies a machine in a network. There are generally different host names associated with different networks.

HP-UX cluster

A group of workstations connected via a LAN. One computer, the **cluster server**, performs as a server for the **cluster nodes**.

icon

A small, graphic representation of an object on the workspace (typically an application window). Objects can be "iconified" (turned into icons) to clear

a cluttered workspace and restored (returned to their original appearance)
as needed. Processes executing in an object continue to execute when the
object is iconified.

iconify

The act of turning a window into an icon.

invisible file name

A file name in which the first character is a dot (.) and which is not
displayed by `ls` or by `ll` without added options, such as `-a`.

input device

Any of several pieces of equipment used to give information to a system.
Examples are the keyboard, a mouse, or a digitizer tablet.

kernel

The part of the HP-UX operating system that is an executable piece of
code responsible for managing the computer's resources.

keyboard binding

Association of a special key press with a workspace manager function. For
example, pressing the special keys (Shift) + (Esc) displays the system menu of
the active window.

keysh

The command for invoking the Key Shell.

Key Shell

An HP-UX shell which, as an extension of the Korn Shell, uses hierarchical
softkey menus and context-sensitive help to aid users in building command
lines.

LAN

Local Area Network.

LP

Line Printer.

login

Your login name, or simply "login", is the name by which you are known to

the workstation. This may be any group of characters, so long as it meets system rules.

login manager
The program that controls the initial startup of HP VUE, accepts the user's login and password, and then starts the session manager.

login screen
The screen that accepts your login and password.

login script
The shell script, run at each login, which sets the login environment for your terminal.

menu bar
An area at the top of a window that contains the titles of the pull down menus for that application.

minimize
To turn a window into an icon. The terms minimize and iconify are interchangeable. The minimize button is a push button on the window frame that is used to minimize the window.

node name
The unique identifying name given to a system in a cluster, such as `xyzleslie`.

operating system
This is the contents of `/hp-ux`, including the kernel, input-output control, system accounting, storage assignment, and other services.
Also see **kernel**.

option
The part of a command line that changes the behavior of a command in certain ways. An **option** is usually preceded by a `-`.

output device
A piece of hardware used for receiving messages from the workstation. The display screen of your workstation is an output device. The printer you use is another.

owner

The owner of a file is usually the creator of that file. However, the ownership of a file can be changed by the super-user or the current owner with the *chown(1)* command or the *chown(2)* system call.

parent directory

A directory which contains other directories, each of which is then called a **subdirectory**.

password

An encrypted sequence of characters used by HP-UX to identify an authorized user and to permit authorized login on a system.

path name

A sequence of directory names separated by slashes and ending with a file name.

PID

Process Identification. *Also see* **process ID**.

pointer

Sometimes called the "mouse pointer," the pointer shows the mouse location on the screen. The pointer's shape depends on its location. In the workspace, the pointer is an ×. On a window frame, the pointer is an arrowhead.

process

An program running in machine memory.

process ID

A unique identification number assigned to all processes by the operating system. *Also see* PID.

program (n.)

A unit of executable code, in binary or "source" form. Most HP-UX commands and routines consist of programs.

push button

A graphic control that simulates a real-life push button. Use the pointer and mouse to push the button and immediately start an action. Radio

buttons come in sets of two or more. Each button represents a mutually exclusive selection. Radio buttons are typically used for setting states or modes.

RAM

random-access memory.

relative path name

The name of a file, listing all the directories leading to that file in relation to the current working directory.

remote host

A system which is named in your `/etc/hosts`. To log in and perform file transfer tasks on a **remote host** you will need to have login and a `.rhosts` file on that system which contains your system name or system node name, such as `xyzleslie`.

ROM

read-only memory.

root directory

The highest level directory of the hierarchical file system, from which all other files branch. In HP-UX, the slash (/) character refers to the "root directory".

session

The time between when you log in and when you log out. Also called a *work session* or a *login session*.

session manager

The program that provides the ability to restore the previous or home session the next time the user logs in. When a user logs in, the session manager starts the workspace manager and other programs that were running during a previous session.

server

A program that controls all access to input devices (typically a mouse and a keyboard) and all access to output devices (typically a display screen).

shell

An HP-UX command interpreter (Bourne, Korn, Key or C).

shell script

A file that contains commands that a shell can interpret and run.

slider

One of the components of a scroll bar or slider bar. The slider is the object that is dragged along the scroll area to cause a change.

special character

A character that has special meaning to the HP-UX shell, as well as to commands such as *find(1)*, and *grep*. The set of metacharacters includes: *, ?, !, [,], <, >, ;, |, ', ', ", and &. Also called "metacharacters".

standalone

A computer which is not part of a cluster.

style manager

The HP VUE application that provides the ability to customize various aspects of your system, including colors, fonts, the keyboard and mouse, session startup and termination behavior, and access to other machines.

subdirectory

A directory which is located in, or anywhere on a path below, another directory, which is then called its **parent directory**. Sometimes called **child directory**.

subshell

A shell created by another shell to run a program.

superuser

A user with "root permission", usually a system operator or administrator.

system administrator

The person in a group who is assigned to look after the system installation, maintenance, updating, and installing new software for a system or cluster of systems.

system operator

Same as **system administrator**.

terminal window

A terminal window is a window that emulates a complete display terminal. Terminal windows are typically used to "fool" non-client programs into believing they are running in their favorite terminal. When not running programs or executing operating system commands, terminal windows display the command-line prompt.

title bar

The title bar is the rectangular area between the top of the window and the window frame. The title bar contains the title of the window object; for example, "Terminal Window", "File Manager", or "Rename Workspace".

user

Any person who interacts directly with a computer system.

username

The name which identifies your account to the `login` program and to the mail systems and other software requiring secure entry.

window

A rectangular area of the screen used by HP VUE to contain a particular application. Client applications can have multiple windows, but one window is always the "main" window. The workspace manager provides the ability to move, resize, and shuffle windows, and also provides the window decorations such as the frame and title bar. Windows, which are also called "primary windows" or "main windows", can usually be iconified, and usually have a menu bar.

window manager

The program that controls the size, placement, and operation of windows on the root window. The window manager includes the functional window frames that surround each window object as well as a window and workspace menus. If the window manager supports workspaces, it is called a workspace manager.

working directory
See **current working directory**.

workspace manager
The program that controls the size, placement, and operation of windows on the workspace. The workspace manager includes the workspace manager itself (sometimes called the "front panel") and the functional window frames that surround each window, program (`Vuewm`), as well as window and workspace menus.

workspace menu
The menu associated with the workspace. The workspace menu enables you to control the behavior of your environment. Also called the "root" menu.

workstation
A compact, graphics-oriented computer having high speed and memory capacity.

write protect
To use the protective device on your tape cartridge to prevent it from being accidentally overwritten.

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