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Series 800
Computers

Installing and Updating HP-UX 9.0

Installing and Updating HP-UX 9.0

HP 9000 Series 600/800



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Introduction to HP-UX 9.0 Install/Update

This document explains how to perform four different tasks. You will probably perform only one of them.

- Migrate an existing 8.x system, which is running on a hard partition, to a 9.0 system that runs on a logical volume. This task is new to the 9.0 release.
- Install the 9.0 release of HP-UX. The information applies whether you perform a new installation or perform a reinstallation that follows a system crash. A new feature of the 9.0 release lets you:
 - install the root file system on a hard partition on a physical disk, or
 - install the root file system on a logical volume.
- Update your HP-UX system from the 8.x release to the 9.0 release, staying on a hard partition.
- Update an existing 9.0 HP-UX system by adding software products to it.

Before you read later chapters in this document, you need to decide which task to perform.

You Must Function as a System Administrator

Installation The hardware/software system is shutdown when you begin an installation. Therefore, any user can perform an installation, but HP recommends that you have the expertise of a system administrator. You will be asked to perform tasks such as: connect and test devices, boot the system from install media, execute HP-UX commands, manage device files, interpret install screens, and and edit customization files.

Immediately following an installation, you utilize tools, utilities, daemons, and scripts to set up windowing, networking, printing, and so on.

Update The hardware/software system is running when you begin an update, and you must be logged in as a system administrator.

Immediately following an update, you examine various files to make sure the updated system provides the functionality you obtained while accommodating the functionality you had. You might also need to restore back-up copies of files.

If you do not have the expertise mentioned above, HP recommends that you obtain the services of a system administrator who can perform an installation or update.

New Features of the Install Program

9.0 Introduces the Logical Volume Manager

The 9.0 release contains a new subsystem called the Logical Volume Manager (LVM). The LVM sets up a virtual system for managing files. The virtual system functions above physical file systems and can encompass multiple physical disks.

If you are not familiar with the LVM and wish to use it, study its nature and features before beginning an installation or migration. A following section named “You Might Need Additional Information” points to information about the LVM.

Install Accommodates Multiple Disks

The installation program lets you use multiple disks. This document talks about the *root disk*, which you must have. It also talks about *other*, *additional*, or *non-root* disks.

During an installation, you can make decisions about the disks you want to use.

You Might Need Additional Information

<i>HP-UX 9.0 Introduces the Logical Volume Manager: (LVM)</i>	Provides a pictorial introduction to the Logical Volume Manager (LVM). You might also want to see the following document if you need more information about the LVM.
<i>How HP-UX Works: Concepts for the System Administrator</i>	Explains concepts related to system administration. It also describes the Logical Volume Manager.
<i>System Administration Tasks</i>	Explains how to function as a system administrator. You can find information about such tasks as creating device files, editing customization files, and managing the LVM.
<i>Installing Peripherals</i>	Contains information about configuring peripherals. For example, it has information about select codes, minor numbers, and device files.
<i>HP-UX Reference</i>	A series of reference documents that explain HP-UX commands. For example, you get information about commands such as <i>install</i> (1M), <i>update</i> (1M), <i>mknod</i> (1M), and <i>rmfn</i> (1M).
Readme Firsts	Your products might have readme first documents that supplement the information contained in this document.
Release Notes	If you received a printed version of the release notes, you can learn about new, changed, or removed features. After an installation or update, you can see the release notes in the file named <code>hpuxsystem</code> in the directory named <code>/etc/newconfig/90RelNotes</code> .

Identify Your Situation and Then Install or Update

Your existing situation determines if you perform an installation, perform an update from a previous release to the 9.0 release, or perform an update of the 9.0 release by adding non-core software products to it.

The following items and chart should provide insights:

- Installing HP-UX places the 9.0 release on a root disk, overwriting files that exist on that disk (or disks). If you have no existing operating system, you simply perform an installation. You can have an existing system and need to perform an installation instead of an update (for example, the system crashed or you are running a release that predates the 8.0 release).
- If your system has an 8.x release and you wish to migrate to the LVM while moving to the 9.0 release, you have a special case in which you must plan the migration and perform an installation instead of an update.
- Updating HP-UX from an 8.x release to the 9.0 release modifies files as necessary and loads new files as necessary. The process does not destroy your customized files.
- Adding non-core software to your existing 9.0 system does not destroy that system, but the update might alter some files and might configure a new kernel. You should note any special instructions in the documentation for your software. You might want to backup certain files.

If you simply want to update an existing 9.0 system by adding software to it, skip the following section and work through Chapters 2, 7, and 8. Otherwise, work through the chart in the following section. One of the situations should fit your needs and indicate how to continue. While you examine the chart, note the decisions you can make about having a root disk with logical volumes or a root disk with hard partitions.

How to Continue and Get Information

You have alternatives for installing or updating HP-UX. The chart shows them, and following sections describe them. If you cannot find your situation or if you cannot perform your update or installation, see your HP representative.

/ New System?	OR Existing System? /

(1) New System,	(1) Running 8.x,
Preinstalled	update to 9.0, root
9.0 HP-UX	on hard partition
Skip this	A normal update.
Document. See	
documents for	See Chapters:
preinstalled	2, 7, and 8
product.	

(2) New System	(2) Running 8.x,
put 9.0 root on	migrate to 9.0, root
hard partition	on logical volume
See Chapters:	Caution! This is an
2, 4, 6, 8.	install, not an
Then, use SAM	update.
for system	See Chapters:
administration	2, 3, 4, 5, 8

	Then, use SAM

(3) New System	for system
put 9.0 root on	administration
logical volume	
See Chapters:	(3) Running 9.0,
2, 3, 4, 5, 8	will add a new
Then, use SAM	product to system
for system	
administration	See Chapters:

	2, 7, and 8

New System, Preinstalled 9.0 HP-UX

Do not use this document. Instead, use the documentation that attended your preinstalled system. The documentation for the preinstalled system has information about the LVM.

New System, Put 9.0 Root on Hard Partition

1. Do the planning in Chapter 2. Perform the steps that apply.
2. Work through Chapter 4 and Chapter 6 to perform the installation.
3. Work through Chapter 8 to complete the installation.
4. If you want any logical volumes on non-root disks, use SAM to create them after the installation is complete.

New System, Put 9.0 Root On a Logical Volume

1. Work through Chapter 2 to plan the installation.
2. Work through Chapter 3. Although the focus of the chapter is on planning a migration, the chapter contains information about the LVM that can help you with an installation of a new system.
3. Work through Chapter 4 and Chapter 5 to perform the installation.
4. Work through Chapter 8 to complete the installation.
5. If you want to create additional logical volumes, use SAM after the installation to create them.

Running 8.x, Update to 9.0 with Root on Hard Partition

1. Work through Chapter 2. Perform the prerequisite tasks that apply.
2. Work through Chapter 7 to update HP-UX from an 8.x release to the 9.0 release.
3. Work through Chapter 8 to complete the update.
4. If you want any logical volumes on non-root disks, use SAM to create them after the update is completed.

Running 8.x, Migrate to 9.0 with Root on a Logical Volume

1. Backup your existing system. Make notes about this process according to your needs.
2. Get information about the LVM according to your expertise. You might want to examine the *How HP-UX Works: Concepts for the System Administrator* document to get a conceptual view of the LVM.
3. Work through Chapter 2. Perform the steps that apply. Note the step that relates to the LVM.
4. Work through Chapter 3 to accommodate the LVM migration planning.
5. Work through Chapter 4 and Chapter 5 to effect the migration and install the 9.0 release.
6. Work through Chapter 8 to complete the migration and installation.
7. If you want additional logical volumes, use SAM to create them after the update is completed.

Planning an Installation or Update

If you have already installed the 9.0 release or updated to the 9.0 release and want only to add a product to that release, go to Chapter 7. Otherwise, work through this chapter to plan your installation or update.

The chapter is laid out in steps to make your planning easier. Most steps contain *checklist items* that provide information, alert you to something you should consider, or indicate an action you should take.

The planning steps begin on the next page.

Step 1: Check Your Product (or Products) and Your Media

Checklist Item	Information and Tasks
----------------	-----------------------

Correct Product?	An HP representative helped you obtain a core HP-UX product that matches your needs. Be aware that, if your product has multiple licenses, the installation process might install the most restrictive license. Your HP representative can inform you about this.
------------------	---

Multiple Products?	Your installation or update media might consist of several products. For example, you might have a core HP-UX 9.0 product and several application products such as ME-10 and SoftBench. If you have multiple products, you will need to install or update your core HP-UX system. Then, you will update the HP-UX 9.0 system as required to add the applications.
--------------------	---

Media and Source Device Match?	HP-UX 9.0 media can reside on several types of media (listed later). Make sure your hardware system has a corresponding source device. For an update, the existing kernel must have a device driver for the source device. The <i>Installing Peripherals</i> document and the <i>System Administration Tasks</i> document have information about devices and device drivers.
--------------------------------	--

Step 2: Back up Your Existing System as Appropriate

You need to determine if a backup is required and, if one is required, you need to determine the type.

Checklist Item	Information and Tasks
You have no operating system	A backup does not apply. You perform an installation. Later, you set up a back-up procedure.
You have a system and do an installation	Backup anything that does not exist on the root file system (for example, <code>/users</code> and any data partitions). After the installation, you can restore files and data as necessary.
You have a system on a hard partition and migrate to the LVM	Chapter 3 describes how to plan the migration. Part of this planning describes the required backup.
You do an update that modifies the kernel	Some updates add files that require building a new kernel. Such updates accommodate most configuration files, placing new versions of them in <code>/etc/newconfig</code>. HP suggests you: ■ Make printouts of customized files and refer to them after an update (for example, files such as <code>.profile</code>, <code>/etc/rc</code>, <code>/etc/passwd</code>, <code>/etc/hosts.local</code>). ■ Collect customized files in a directory (for example, <code>/old</code>). Use <code>tar(1)</code> to make a tape archive of the files in <code>/old</code>. After the update, restore the files, editing them as desired. The following section names files you might want to back up.

Files You Might Want to Back Up Prior to an Update

You might want to make copies of the following customized files:

<code>/etc/group</code>	<code>/etc/inetd.conf</code>	<code>/etc/inittab</code>
<code>/etc/passwd</code>	<code>/etc/profile</code>	<code>/etc/services</code>
<code>/etc/vhe_list</code>	<code>/etc/checklist</code>	<code>/etc/conf/gen/S800</code>
<code>/etc/csh.login</code>	<code>/etc/mklp</code>	<code>/etc/netbsdsrc</code>
<code>/etc/letlinkrc</code>	<code>/etc/netnfssrc</code>	<code>/etc/powerfail</code>
<code>/etc/rc</code>		

You might also want to make copies of your dot files (for example, `.profile`, `.mailrc`). The *System Administration Tasks* document and other system administration documents (for example, administering networking) describe customized files.

After you perform an update, you can restore these files, editing them as necessary.

Step 3: Minimal System Requirements

Besides the minimums shown below, you might have additional requirements for such things as swap space, tools, utilities, facilities, environments, applications, languages, user files, data, graphics, printing, and plotting. If you expect to migrate to the LVM, Chapter 3 contains steps that help you account for disk space and conversion of physical volumes to logical volumes.

Checklist Item	Information and Tasks
----------------	-----------------------

Computer	A Series 600 or 800 computer except for the following models. (825SRX, 825CHX, 834CH, 834SRX, 834TurboSRX, 835CHX, 835SRX, 835TurboSRX)
Memory	The minimal RAM is 8 Mbytes. Your HP Representative is your best source of information about installing an adequate amount of RAM.
Disk Drive	At least one hard-disk drive (for example, a C2213A disk) with at least the following capacities: ■ 200 MBs to install HP-UX and minimal applications. ■ 400 MBs for a standalone workstation. ■ 1 GB or more for systems that run large applications.

The minimal requirements continue on the next page.

Checklist Item	Information and Tasks
Monitor	Any configurable monitor lets you to perform an update. For an installation, the system console must be HP Term0, VT100, or Wyse30 capable. Your HP Representative has information about obtaining an appropriate monitor.
Install-Update Media	Examine your product and ensure that the system has an appropriate source drive and device file. For tape drives, be sure the heads are clean. The following items show types of media and probable device files: ■ Product on a 9-track reel tape. Probable device file is <code>/dev/rmt/0h</code>). ■ Product on a DDS cartridge tape. Probable device file is <code>/dev/rmt/0m</code>. ■ Product on an HP 9144 or HP 9145 Cartridge Tape. Probable device file is <code>dev/update.scr</code>. ■ Product on CD-ROM. Probable device file is <code>/dev/dsk/c1d0s2</code>).
Codeword Device	You might need a codeword to complete an installation or update. A codeword is associated with the ID of a device. If you need a codeword, your system must have an appropriate, associated device. Your HP Representative has information about this, and the <i>CD-ROM</i> booklet that came with your media has information about this.
Other Devices	Your system can also have any supported device. If you have an unsupported device, HP assumes no role in making the device function. The <i>Installing Peripherals</i> document has information about devices.

Step 4: You Might Need a Codeword

If your installation or update media is a CD-ROM disk having an ISO 9660 format and containing files intended to be copied onto an HP-UX file system by the *update(1M)* command, you have what is called a *Core* or *Application* disk. To use a CD-ROM for other than installing a 2-User Runtime product, you *must* obtain a codeword that you enter during the installation/update process. You cannot use this type of disk as a start-up disk, and you should not expect to execute commands from such a disk.

The following items provide information about obtaining a codeword, allowing that you should also consult a CD-ROM booklet.

- It is possible for one (or more) required codewords to appear on the *CD-ROM Certificate* you received with your product. Examine *ALL* the packages that contain your products and the certificate. Keep the certificate handy because you will need to refer to the codeword (or codewords).
- Your certificate might not include a codeword. In this case, you need to obtain a codeword from Hewlett-Packard Company. The CD-ROM booklet that came with your CD-ROM disk has directions for obtaining the codeword. The process involves filling out a form, using a FAX machine to transmit the form to your HP Sales Office, and getting a returned FAX that has the codeword. If you do not have access to a FAX machine, you can make other arrangements with your HP Sales Office, but the procedure takes more time.
- If, for any reason, your CD-ROM does not have a certificate, contact your HP Representative to obtain one.
- Take the time to resolve any questions you have regarding CD-ROMs, certificates, and codewords *before* you begin an installation or update. Not completing this prerequisite step may cause a significant delay in completing the installation or update.

Continue on the next page.

Besides just getting a codeword, there are requirements for associating the codeword with hardware IDs.

- Your codeword is tied to the ID for a specific device in your hardware system. For example, your codeword might be tied to your SPU (System Processing Unit) or, perhaps, your HP-HIL ID module.
- The ID might not be the serial number. The CD-ROM booklet contains explanations, according to devices, for what you can use as the IDs for codewords.
- The device ID that is tied to your codeword might impact your use of a system. Consider the following situations:
 - If the codeword is tied to the ID of a SPU, the codeword will allow you to extract software *only* from a CD-ROM drive connected to that system (SPU).
 - If the codeword is tied to the ID of an HP-HIL module, you could move the device among systems, using the codeword to extract software on those systems.

Step 5: Decide on Having Long or Short Filenames

During an installation, you specify long or short filenames.

Checklist Item	Information and Tasks
Long Filenames	Copying files from a long-filename system to a short-filename system can result in a loss of data for filenames that become identical due to truncation. Otherwise, you get to use more descriptive filenames.
Short Filenames	Some previous releases were restricted to short filenames. You might have a situation that favors deciding to have short filenames.
Preinstalled HP-UX	If you have a <i>preinstalled</i> HP-UX and, for some reason, you need to reinstall that system, you must choose long filenames.

Step 6: Obtain Information for Time and Networking

Checklist Item	Information and Tasks
Time Zone	An installation prompts you to enter a time zone. It is a good idea to have that information available. The <i>Using HP-UX With HP VUE</i> manual explains the format for time zones.
Time and Date	An installation prompts you to enter the current time and data. See same document as above item.
Hostname and Internet Protocol Address	For a networked system, you can enter your system hostname and internet address during an installation. If you do not have this information during the installation, you can set up networking later. See your network administrator, or see the <i>Installing and Administering LAN/9000</i> document.

Step 7: Continue When Your Planning is Complete

When you have completed the planning steps that apply to your situation, continue by working through the chapters you identified in Chapter 1. Be aware that, in no situation, do you work sequentially through the remaining chapters.

Migrating the Root Disk to Logical Volumes

In this chapter, **migration** means transferring the file systems (or other forms of disk usage) on a disk from fixed sections to **logical volumes**.

Objective of Root Disk Migration

The objective of root disk migration is: To move the data currently on the root disk from disk sections to logical volumes.

To migrate the data on the root disk,

- Organize the custom files you now have in `/`.
- Back up the data currently on the root disk, if you haven't done this.
- Run the migration tool, **lvmigrate**, to organize the migration.
- Reinstall HP-UX, Release 9.0.
- Set up logical volumes on the root disk.
- Put the custom files in place on the new system.
- Restore the backed up data.

After migrating the **root** disk to HP-UX 9.0 and LVM, you can migrate file systems or raw data on other disks in your system. This phase of migration can take place after you have set up the 9.0 system with **root** in logical volumes.

The *HP 9000 Series 800 System Administration Tasks* manual describes how to migrate data other than the `/` or `/usr` file systems. SAM also can provide assistance.

Traditional Disk Sections vs. Logical Volumes

Compared with the traditional method of using multiple fixed-sized disk sections, LVM provides many benefits for disk use.

LVM allows you to:

- Replace fixed-size disk sections with more flexibly sized logical volumes.
- Combine the space from many disks into a single pool of available space.
- Create file systems that span disks.
- Create file systems as large as four GBs (and as small as one MB).
- Increase the size of an unmounted file system without rebooting.
- Set up software-based bad-block relocation.
- Create two or three mirror copies of a file system (on HP-FL or SCSI disks; LVM Mirroring is an optional product that works with LVM).
- Perform online backup (with use of optional LVM Mirroring product).
- Set up logical volumes for root and primary swap, each of which can be mirrored for higher system availability.

Also, LVM:

- Comes preconfigured on pre-installed systems.
- Provides a migration planning tool to aid in moving root disk on an HP-UX system to Release 9.0 and Logical Volumes.

Note	Where to find more information about LVM.
-------------	---

- *How HP-UX Works:*

Explains the Logical Volume Manager conceptually, indicates the benefits Logical Volume Manager can provide, and discusses more extensively the new terms you will encounter in this document.

- *The System Administration Tasks* manual:

Describes managing logical volumes and guides you in performing tasks involving file systems, swap, and raw data that reside within logical volumes.

Should You Migrate the Root Disk to Logical Volumes?

This section presents the benefits and costs of migrating / and /usr to logical volumes.

Note	Release 9.0 of HP-UX does not support clusters of HP 9000 Computers. Therefore, do <i>not</i> attempt to install Release 9.0 of HP-UX on the root disk of a cluster server.
-------------	---

- **If you intend to migrate / and /usr** to logical volumes, you can load and use the `lvmigrate` utility to assist you in migration.
- **If you decide not to migrate** the disks containing / and /usr to logical volumes, you can update to HP-UX 9.0 (rather than reinstall) and migrate non-root file systems to LVM on a disk by disk basis. Migrating non-root disks is simpler than migrating the root disk; no reinstallation is necessary.

Refer to the chapter called “Updating HP-UX”.

Benefits of Migrating the Root Disk to Logical Volumes

Migrating the **root** disk to logical volumes provides the following benefits:

- **Compatibility.**

You can make *all* disks LVM disks, including the **root** disk. If you do not migrate the **root** disk, only non-root disks can be LVM disks and you will have to manage file systems in both disk sections and in logical volumes.

- **Mirroring of Root Logical Volume.**

You can mirror the **root** logical volume using LVM Mirroring (unless the disk is HP-IB; HP-IB disks do not support mirroring with LVM Mirroring). With a mirrored root logical volume, the data in the **root** logical volume can exist in replicated form on separate disks and be protected in the event one disk fails.

Costs of Migrating HP-UX to Logical Volumes

Migration entails the following costs.

- Time.

Migration requires time to:

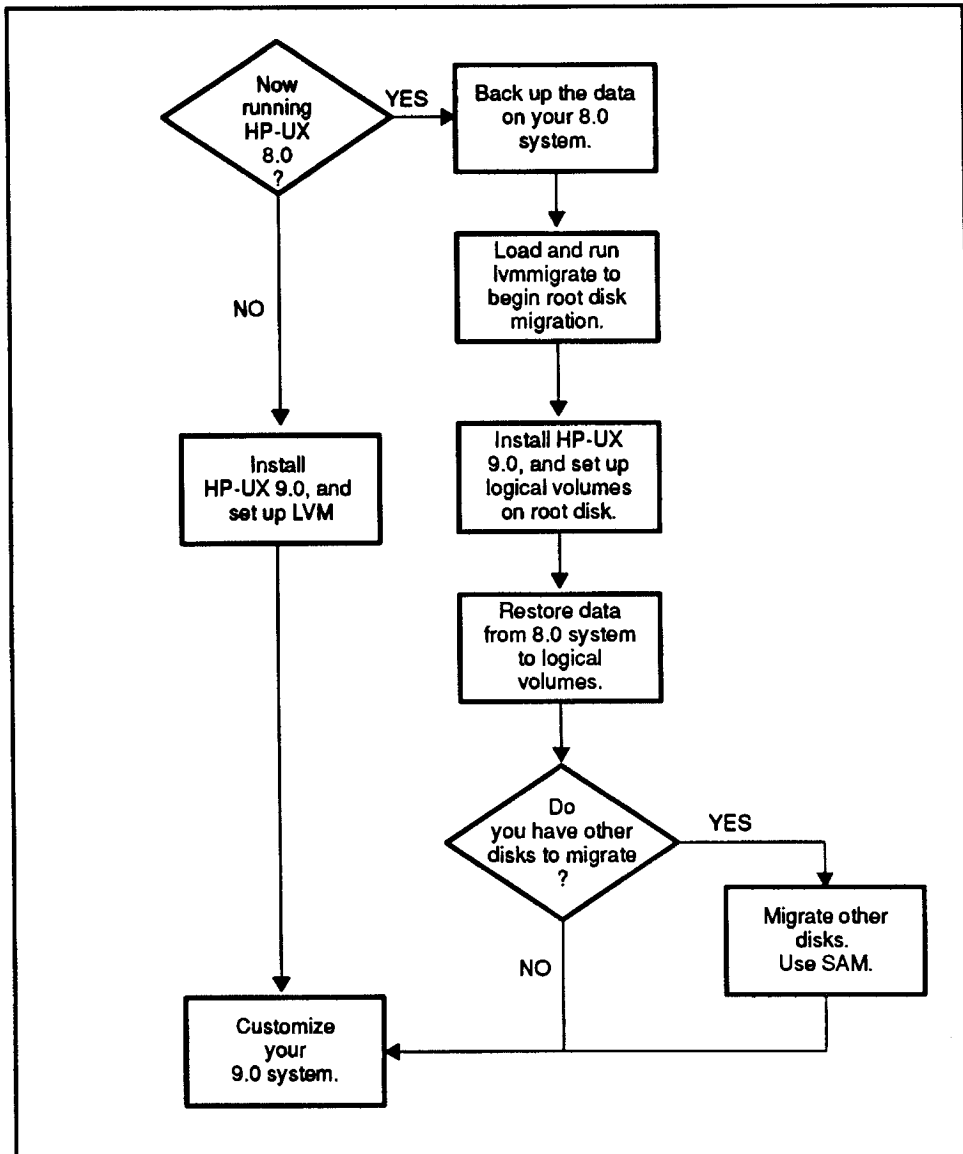
- ☐ plan how your root file system will be arranged in logical volumes
- ☐ back up your system
- ☐ reinstall HP-UX
- ☐ recover your backed up files, and
- ☐ recustomize your new system

- Possible increase in disk usage.

It is possible that the root disk on logical volumes might require *more* space after migration because of the LVM overhead (about 1 MB per disk). (But, it is likely that less space will be required because you can make logical volumes to the size you need.)

To Migrate / and /usr to Logical Volumes ...

Look at Figure 3-1:



LG200202_007

Figure 3-1.

Checklist: Migrating Root Disk to Logical Volumes

1. Save the customized files on your system in a single directory. Call the directory `/IMPORTANT` and make a tape copy of its files.
2. Back up the full file system. You might have done this already following the planning suggestions in Chapter 2.
3. Load the `lvmmigrate` tool from the HP-UX Release 9.0 update tapes.
4. Run `lvmmigrate` tool; the `lvmmigrate` tool will generate a record of the current file system configuration and provide a list of migrating file systems that you must back up.

The `lvmmigrate` tool designs the configuration of the **root volume group**, which is the LVM volume group that is to contain the root logical volume, the `/usr` logical volume, and the primary swap logical volume. Later in the migration procedure, the HP-UX installation program will use the migration information that `lvmmigrate` generates to set up your new Release 9.0 system in logical volumes.

5. Print a copy of the `lvmmigrate` output, or, if you don't have access to a printer, write down key information you will need for reference when installing HP-UX 9.0.
6. Install HP-UX 9.0 and set up logical volumes based on the `lvmmigrate` information; also refer to the printed copy of the `lvmmigrate` output or your notes based on it.
7. Copy the customized `/IMPORTANT` files from tape to the `/` directory.
8. Recustomize the system using `/IMPORTANT` files for reference.
9. Restore any `/` and `/usr` files you backed up before installation that you might need after installation.
10. Create logical volumes *and* file systems, using SAM, for the non-root file systems that were present on the root disk(s) prior to migration.
11. Restore the file systems from the backup tape to their new logical volumes.

Chapters 4 and 5 explain Step 6; Chapter 8 explains Steps 8 through 11.

After Root Disk Migration, Use SAM to Help You Migrate Other Disks

After you migrate the root disk to logical volumes, you will have completed installation to HP-UX 9.0.

You can migrate the file systems and raw data on other (that is, non-root) disks on your system to logical volumes at your pace. On one system, file systems using logical volumes can coexist with file systems that use disk sections.

To back up file systems, set up new logical volumes for them, and then to restore the data to the logical volumes, you can use SAM to assist you. The *HP 9000 Series 800 System Administration Tasks* manual contains the procedures.

1. Copy Customized System Files for Safekeeping

There are important files that reflect your system's users, peripherals, and subsystems. Because you will need to refer to these files to *recustomize* your system after installing HP-UX Release 9.0, you should organize them now into one, easy-to-find directory.

These files include:

- `/.profile` (and other customized dot files)
- `/etc/checklist`
- `/etc/conf/gen/S800`
- `/etc/csh.login`
- `/etc/group`
- `/etc/hosts`
- `/etc/host.equiv`
- `/etc/inetd.conf`
- `/etc/inittab`
- `/etc/mklp`
- `/etc/netbsdsrc`
- `/etc/netlinkrc`
- `/etc/netnfsrc`
- `/etc/passwd`
- `/etc/powerfail`
- `/etc/profile`
- `/etc/rc`
- `/etc/services`

Create /IMPORTANT Directory

1. Log in as superuser.
2. Make a special directory to hold the customized files.

```
cd /  
mkdir IMPORTANT
```

3. Copy the files to the directory `/IMPORTANT`.

```
cd IMPORTANT  
cp /.profile .profile  
cp /etc/checklist .  
:  
:
```

Save the `/IMPORTANT` Directory to a Separate Tape

Use the `tar(1M)` command to make a separate tape copy of the files in the `/IMPORTANT` directory. This makes the files easily accessible after you complete the installation of Release 9.0.

Make the tape copy as follows:

1. Move to the `/` directory.

```
cd /
```

2. Ready the backup tape on the backup device.

3. Enter:

```
tar -cvf /dev/rmt/0m IMPORTANT
```

The device file `/dev/rmt/0m` in this example is appropriate for a DDS tape drive. If you are using a nine-track reel-to-reel tape, the correct device file is `/dev/rmt/0h`.

Keep this tape handy to use when your new system is installed.

2. Back Up Data Before Reinstallation

You need to back up the files on your system's disks to ensure that you preserve the data during the migration process. If necessary, refer to the *System Administration Tasks* manual for detailed discussions and examples of using SAM or using the *fbackup*(1M) command.

Make File Time Stamps Current

Later in this procedure—after you install Release 9.0—you will use *frecover*(1M) to recover the files you back up using *fbackup*(1M).

However, because many of the files you install could have been created months ago, it's likely that some of them will have time stamps older than files of the same name on your backup tape. This means that you could possibly overwrite needed files when you run *frecover*(1M).

So, to insure this does not happen, you can use the *touch*(1M) command to reset the access times of all files on the system before you back up the files. Later, when the new system files are installed, you can reset the access dates and times on them also, ensuring that they won't be overwritten when you run *frecover*(1m).

Note	The <i>touch</i> operation of files should be performed <i>prior</i> to a doing a full system backup. If you have already performed a full backup, consider repeating that step after “touching” the files to guard against possible data loss.
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Continue on the next page.

Do this as follows:

1. Run the *date*(1) command to verify that the system clock is correct.

date

Correct the system time if necessary.

2. Touch the files on your system:

find / -depth -print | xargs touch

This could take several minutes. When the **touch** operation is complete, all files should have a current time stamp.

Back Up Raw Data Areas

This requires you use the *dd*(1M) command, which enables you to copy an image of data from one storage device to another (SAM does not do this). The *dd*(1M) is also discussed in *HP 9000 Series 800 System Administration Tasks* manual.

Backing Up the Full File System Using SAM

Using the Release 8.x version of SAM, you can back up your system prior to doing the migration. If you choose not to use SAM to do the backup, you can skip ahead to the section “Backing Up the Full File System Using HP-UX Commands.” You might already have backed up your system following the instructions in chapter 2. If so, you can skip this step.

You can refer to chapter 7, “Backing Up and Restoring Your Data,” in the *HP 9000 Series 800 System Administration Tasks* manual published for Release 8.0.

Note Perform the backup on a quiet system because any open files won't be backed up.

1. Load backup tape on the backup device.
2. Run SAM.
3. Select:

Backup and Recovery->

Backup Files Interactively ...

4. On the data entry screen that SAM presents, make sure that the field under “Files to be included” contains / and that no files appear under “Files to be excluded.” This will back up all files on the system.
5. In the field labeled **Device file (device to store files on)**, enter:

<code>/dev/rmt/0m</code>	If you are backing up your files to DDS(DAT) tape.
<code>/dev/rmt/0h</code>	If you are backing up your files to reel-to-reel magnetic tape.
<code>/dev/rct/cnd1s2</code>	If you are backing up your files to a cartridge tape at LU <i>n</i> .

6. Press the **Perform Task** softkey (**f4**).

As the backup process proceeds, the **fbackup** utility will prompt you to put your backup tape in place and will prompt you to change tapes as necessary.

7. When your backup is complete, SAM will return you to the “Backup and Recovery” menu.

Backing Up the Full File System Using HP-UX Commands

If you aren't using SAM, you can use the *fbackup*(1M) command to perform your backups.

Note Perform the backup on a quiet system because any open files won't be backed up.

To back up your entire system,

1. Load the backup tape on the backup device.
2. Issue a command such as:

```
/etc/fbackup -f /dev/rmt/0m -oi /
```

This command backs up all files to DDS (DAT) tape drive or a 1600 bpi mode reel-to-reel tape drive using device file /dev/rmt/0m.

For a 6250 bpi mode reel-to-reel tape drive, use device file /dev/rmt/0h. You might need several reels of tape.

Backing Up to Cartridge Tape. If you are backing up the files on your system disk to cartridge tape, use the *tcio* command in conjunction with the */etc/fbackup* command. For example, enter:

```
/etc/fbackup -f - -oi / | tcio -oe /dev/rct/c2d1s2
```

Backs up all files to cartridge tape drive using device file /dev/rct/c2d1s2.

Backing up the entire system could take several hours on a system with a large amount of data. Be sure you place the tape (or tapes) that contain your full system backup in a safe place.

3. Load `lvmmigrate` Tool

The `lvmmigrate` utility comes on the same tape that contains the HP-UX Release 9.0 update software.

Load From DDS or Nine-Track Tape

1. Write protect the tape.
2. Insert the tape in its drive and wait until the tape is ready.
3. Change to the `/` directory.

`cd /`

4. Assuming the tape is in the drive whose device file is `0m`, enter the following command. If your device file for the drive having the tape differs, specify that device file.

`tar -xvf /dev/rmt/0m TOOL`

This procedure loads the `/etc/lvmmigrate` tool, which you need to run in the next step. It also loads the 9.0 version of the `/etc/update` program and some other tools, which you do not need to use now.

4. Run `/etc/lvmigrate`

Enter the command and pipe it to `more(1M)`:

```
/etc/lvmigrate -v | more
```

The `-v` option presents disk and file system information in tabular format. By piping the command to `more(1M)`, you can see the output in screenfuls; pressing the space bar advances the output one screen at a time. (See “Example `lvmigrate` Output”.) You can run the command again, if necessary, or view the text file version of the output, `/tmp/LVMIGRATE`.

What Running `/etc/lvmigrate` Does

Running `/etc/lvmigrate` will:

- Create a text file `LVMIGRATE` and copy it to the `/tmp` directory.
- Identify the disk(s) that will be part of the new root volume group.
- Identify the `/` and `/usr` file systems that will be migrated to logical volumes in the root volume group.
- Identify any non-root file systems on the root disks.
- Identify the current size of the primary swap.
- Generate a record of all other file systems currently on the system and recommend logical volume sizes for their future migration.
- Write the key information it gathers and the configuration it designs to the boot area of the disk that will be used as the Release 9.0 root disk.

Note	Using the <code>-n</code> option (no write) allows you to preview the default <code>lvmigrate</code> configuration.
-------------	---

5. Record the `/etc/lvmigrate` Output

Review the migration information carefully. Pay attention to the instructions for backing up your file systems, especially those that are on the migrating disks.

Also, the output from the `/etc/lvmigrate` command is essential for completing your migration to logical volumes and HP-UX 9.0. You must either have a printed copy of the output, or write down the important information.

Print Out the File LVMMIGRATE

You can print out the text file LVMMIGRATE (generated and stored in the `/tmp` directory) by using the `lp(1M)` command. For example, if you have a printer set up on your system, enter:

```
lp /tmp/LVMMIGRATE
```

If You Are Writing the Information on Paper

If you cannot print the information, take the time to note and write down the following:

1. Disks you must migrate to the root volume group; note their hardware paths; for example: "Disk LU 0, at path 52.6.0".
2. File systems you must migrate to the root volume group, their path names, and their sizes in MBs; for example: "/", 284 MB."
3. Non-root file systems you must migrate, their path names, and sizes in MBs; for example: "/users, 64 MB."
4. Raw disk sections you must migrate (if any); note the hardware path and disk section.
5. Other file systems on non-root disks you must back up. These are file systems for which backup is recommended ("Recom" under the heading "Backup") and that are not initially in the root volume group ("N" under the heading "In Root VG ?").

For each other file system (you can migrate them after installation is complete), you need to know:

- a. The path name used to identify the file system; this is listed under the heading "FileSystem" (for example, `/users/games`).
- b. The hardware path ("HW Path") of the disk.
- c. The disk section that contains the file system.

6. The primary swap size. The primary swap logical volume will be, by default, the same size as your current primary swap section. You can read this value by running `/etc/lvmigrate -v`. Look for the line that contains "PrimarySwap."
7. The command to boot HP-UX from tape.
Get this from the last line of the `/etc/lvmigrate` output.

Example lvmigrate Output

You can run the `lvmigrate` command with a `-v` option. This produces a table of disk and file system information that is normally not produced.

Look at the following example output of the `lvmigrate -v` command:

Disk Name	LU	HW Path	Size-MB	Model	In Root VG ?
/dev/dsk/c0d0s2	0	52.6.0	624	2213A	Y
/dev/dsk/c1d0s2	1	44.5.0	392	C2472S	Y
/dev/dsk/c6d0s2	6	44.1.0	392	C2472S	N

HW Path	Section	Section/ FS Size in K	Recom. LV Size in MB	Backup	In Root VG ?	FileSystem
52.6.0	13	597184	336	Must	Y	/
44.5.0	4	107426	68	Must	N	/users
44.5.0	5	70950	68	Must	N	/project
44.1.0	4	107426	64	Recom	N	/marketing
52.6.0	15	48560	48	No	Y	PrimarySwap
44.5.0	0	24280	12	Must	Y	/usr/spool
44.1.0	7	75350	76	-	N	RawSection
44.1.0	10	129024	128	-	N	RawSection
44.1.0	3	29298	32	-	N	RawSection
44.1.0	5	70950	72	-	N	RawSection
44.5.0	6	1998	4	Must	N	RawSection
44.5.0	1	48560	48	Must	N	RawSection
44.5.0	10	129024	128	Must	N	RawSection
44.5.0	3	29298	32	Must	N	RawSection

Note: The recommended LV size for file system is 1.4 times the present
used size. You can modify the LV size during install or subsequent
migration, if needed.

Tape Drive LU	HW Path
0	52.0.0

LVM Migrate: Present system configuration recorded successfully in boot section

The following disk(s) will be migrated to the Root Volume Group:

Disk LU 0, at path "52.6.0"
Disk LU 1, at path "44.5.0"

The following file systems will be migrated to the Root Volume Group.

/ size 584 MB
/usr/spool size 24 MB

You MUST backup the following file systems and disk areas to tape before

proceeding with reinstallation (LVM install will overwrite the disks they reside on). SAM or fbackup(1M) can be used to perform this task.

/	on section	"/dev/dsk/c0d0s13"
/users	on section	"/dev/dsk/c1d0s4"
/project	on section	"/dev/dsk/c1d0s5"
/usr/spool	on section	"/dev/dsk/c1d0s0"

Also backup the following disk areas if they contain useful data.

RawSection	"/dev/dsk/c1d0s6"
RawSection	"/dev/dsk/c1d0s1"
RawSection	"/dev/dsk/c1d0s10"
RawSection	"/dev/dsk/c1d0s3"

The following file systems and disk areas MUST be backed up IF you elect to include the disks they reside on in the Root Volume Group during the reinstallation process.

/marketing	on section	"/dev/dsk/c6d0s4"
RawSection	"/dev/dsk/c6d0s7"	
RawSection	"/dev/dsk/c6d0s10"	
RawSection	"/dev/dsk/c6d0s3"	
RawSection	"/dev/dsk/c6d0s5"	

You can ignore the raw sections mentioned above if they do not contain useful data.

Perform the following before you proceed to install:

1. Save customized files such as /etc/passwd, etc., to tape: Refer to 'Installing/Updating HP-UX' manual for the list of customized files.
2. Make sure the file systems and disk areas indicated in the above output are backed up.
3. Place the LVM-install tape in the tape drive.
4. Reboot the system using reboot(1M).
5. Stop the autoboot sequence, if enabled, within 10 seconds.
6. Enter the following at the ISL prompt:

hpux install to (52.6.0)

Overriding the `lvmigrate` Defaults

Skip this section if you find the `lvmigrate` default migration configuration satisfactory.

However, you can override the default migration by using options for the `lvmigrate` utility. These options are helpful when you want to:

- use disks in the migration process different from the current ones.
- include or exclude file systems different from the default migration configuration.

Table 3-1 below describes these options:

Table 3-1. `lvmigrate` Options

Option	Use
<code>-d disk special file</code>	Use this option to explicitly specify a certain disk other than the current root disk be used as the root disk for reinstallation. This option is needed if you prefer to use a disk for root other than the one you are currently using.
<code>-f</code>	Force the recording of the file <code>LVMIGRATE</code> in the boot section of a disk that might already contain either a file system or an LVM record. NOTE: If you are forcing the creation of an LVM boot section in the area of a disk that contains a file system, make sure you have backed up the contents of the file system. Otherwise, the file system's data will be lost.
<code>-i file system(s)</code>	Specify a list of file systems to include in the root volume group; by default, only <code>/</code> , <code>/tmp</code> , and <code>/usr</code> file systems are included.
<code>-e file system(s)</code>	Specify a list of file systems to exclude from the root volume group; the volume group <i>must</i> include <code>/</code> .

Before You Install 9.0

Before you install Release 9.0 to continue migrating your root disk to LVM, review the following checklist and make sure you are ready.

By now, you should have:

1. Organized and saved customized files.
2. Reset the access times of all files on your system so that when you restore them, they won't overwrite the newly installed files.
3. Run a complete system backup using SAM or *fbackup*(1M) (if you had not done so already).
4. Loaded the `lvmigrate` tool from the Release 9.0 software tape(s).
5. Run `/etc/lvmigrate -v`.
6. Made a copy of `lvmigrate` output, or have written down the key information you need to have on hand during the Release 9.0 Install process.

Go on to Chapter 4

If you have accomplished the above tasks, go to Chapter 4 to begin the Release 9.0 installation. Chapter 5 covers detailed installation in logical volumes.

Then, after you complete the installation, go to chapter 8 to perform those post-installation tasks, which include recustomizing your system and restoring files as needed.

Initial Steps in Installing HP-UX

Be sure to plan your installation by working through Chapter 2 before you use this chapter to begin it. If you are running the 8.0 release on a hard partition and wish to migrate 9.0 HP-UX to a logical volume, do not begin an installation until you have worked through Chapter 2 *and* Chapter 3.

The steps begin on the next page.

Step 1: System Startup

This step works best if you have the hardware system in a quiet state.

- If an HP-UX system is currently running, run `shutdown -h` to halt that system. Then, turn all devices OFF.
- If no HP-UX system exists on the hardware system, start with all devices turned OFF.

The following checklist items have cases that involve external drives. If you have HP-UX on an external drive and want to install to an internal drive, or conversely, make sure you know and specify boot paths that will NOT allow your current root drive to be overwritten. Another way to do this, if possible, is to have that drive turned OFF.

Find your case for system startup in the checklist items noting that, in every case, you will turn devices on and stop when you get the prompt:

```
Boot from primary boot path (Y or N)?>
```

Checklist Item	Information and Tasks
A computer with internal disk drive and media drive	Turn the monitor (terminal) ON. Turn the computer ON, which also turns the drives on.
A computer with external disk drive and media drive	Have all devices turned OFF. Turn the monitor (terminal) ON. Turn the external drives ON and wait until they are ready for use. Turn the computer ON.
A computer with internal and external drives	You need to decide which disk drive and media drive will be used for the installation. Turn the monitor (terminal) ON. Turn the drives you will use ON and wait until they are ready for use. Leave any drives you will not use OFF. Turn the computer ON.

Step 2: Prepare and Load the Install Media

The following items explain the write protection:

Checklist Item	Information and Tasks
9-track magnetic tape	Remove the write protection ring. The documentation for the tape drive explains this.
DDS cartridge tape	Make sure the slider bar is positioned so <i>NO white</i> shows in the hole in the bottom of the cartridge. The documentation for the DDA cartridge tape explains this.
HP 9144 or 9145 cartridge tape	Make sure the write protect ring points to <i>SAFE</i> according to the documentation for the drive.
CD-ROM disc	No write protection; disc is read-only.
Cartridge tape autochanger	Load the install tape in magazine slot 1 and load any update tapes in sequential order, starting in slot 2. Set the sequential/selective switch on the back of the tape drive to <i>sequential</i> . The documentation that came with the autochanger explains this.

Continue the step on the next page.

The following items explain loading:

Checklist Item	Information and Tasks
Load the write-protected media	Note when the loading process has completed (for example, the busy lights become <i>green</i>). The documentation for each drive explains how to load media.
How to continue	In the next step, you respond to prompts about booting the system. To specify source and destination devices during this process, you need to know the primary and alternate boot paths for your model of Series 800 computers. If you do not know these paths, Appendices A through G show them for various models. It is a convention, but not a requirement, for the primary boot path to serve the root device (the destination or target device) and for the alternate boot path to serve the source device (the drive having the media).

Step 3: Continue the Startup Process

Checklist Item	Information and Tasks
Initial system prompt	You have loaded the install media and are looking at the following prompt: Boot from primary boot path (Y or N)?> Type <u>N</u>. If you type <u>Y</u>, the system will attempt to boot HP-UX, which cannot lead to doing an installation.
Alternate boot prompt	You see the prompt: Boot from alternate boot path (Y or N)?> Type <u>Y</u>. The system provides another prompt that is described in the next step. If you typed <u>N</u>, see the following checklist item.
What if you type <u>N</u> for booting from the alternate boot path?	You get the following prompt: Enter boot path, command, or ? > At this prompt, you have two choices. 1. You can still boot from the alternate boot path by typing that path. For example, for a Model 832 with install media in a DDS cartridge tape drive, you could continue by typing an alternate boot path such as <u>52.6.0</u>. If you need information about alternate boot paths, see Appendices A through G according to your model of computer. 2. You can abort the installation by turning the system OFF and starting over. This document has no further explanation of this prompt because your task is to boot from an alternate boot path, which will eventually load a mini-kernel and other files that let you continue the installation.

Step 4: Interact With IPL

Checklist Item	Information and Tasks
The IPL prompt	To boot from the alternate boot path, you see: <pre>Interact with IPL (Y or N)?></pre> Type <u>Y</u> to get to the ISL> prompt. If you type <u>N</u>, turn the system OFF and start over. If you type <u>Y</u> and the system hangs, recheck your actions and make sure the source device is installed correctly. (See the documentation for the device and the owner's guide for your model.)
The ISL prompt	At the ISL> prompt, you have options for continuing. For simplicity, use one of the following commands: ■ The recommended command is:<pre>hpux install to (boot_path)</pre> Type this command, specifying the boot path for your model to indicate which disk will become the root disk. For many models, this is <u>hpux install to (4.0.0)</u> or <u>hpux install to (52.6.0)</u>. Appendices A through G have information according to models. ■ An alternative command is:<pre>hpux install</pre> Typing <u>hpux install</u> continues an installation and installs the root file system on the first valid destination device (the one located at the lowest device address on the lowest bus address).
The installation continues, and you see messages such as:	<pre>Tape 2(52.0.0;0xa0000):INSTALL ...</pre>

Step 5: System Specification Decisions

Checklist Item	Information and Tasks
System size	Continuing the installation, you see the following prompt: <pre>Do you wish to do a full install (y/n) [y]?</pre> The default is Y; so typing Return does a full installation. If you type N, you respond to prompts and get a minimal system for which you will need to customize the boot area after installation.
Root file system	You get the following prompt: <pre>Do you wish to install a Logical Volume system (y/n) [y]?</pre> Accepting the default, Y, installs to a logical volume. Typing N installs to a hard partition.
Root size	You get the following prompt: <pre>Enter Root size in Mega bytes, range 104-592 [104]:</pre> Specifying a larger size (for example, 180) should be adequate for the root file system). Entering a size greater than 200 will subsequently prevent the Logical Volume Manager from creating logical volumes for file systems such as /usr.
Swap size	You get the following prompt: <pre>Enter Swap size in Mega bytes, range 48-136 [48]:</pre> The 48 MB default is usually adequate. The minimum value is 4 MBs.
Type of filenames	You get the following prompt: <pre>Enter file system filename type, long or short: [s]:</pre> The default, s, specifies short filenames. Type l to specify long filenames.

At this point, the system loads several files. Move on to the next step.

Step 6: System Reboot and Initial Loading

Do NOT interrupt the loading. Several files are loaded onto the system. Then, the system does a reboot. You see several messages, and you can ignore error messages unless they cause a system hang. You also see messages about required user action.

The checklist items show the prompts.

Checklist Item	Information and Tasks
Primary boot prompt	You get the following prompt again: <pre>Boot from primary boot path (Y or N)?></pre> Type <u>N</u>.
Alternate boot prompt	You see the following prompt again: <pre>Boot from alternate boot path (Y or N)?></pre> Do NOT type <u>Y</u>. Type <u>N</u> this time.
Enter boot path	You get the following prompt: <pre>Enter boot path, command, or ? ></pre> Type the boot path specification for your destination device (for example, <u>52.6.0</u> or <u>(4.0.0)</u>).
Possible alternative	You must continue from the above prompt. If, for any reason, you start over and get to the ISL> prompt while working through the steps, typing <u>lsautofl</u> (all letters, no digits) shows the correct boot command for the above prompt. For example, you might see: <pre>lsautofl hpux -lm (;0)/hp-ux</pre> When you again get to the above prompt, type <u>hpux -lm (;0)/hp-ux</u> and the installation should continue.

The next page shows messages that appear.

Prompt to Change Media

You get messages that reflect the decisions you made earlier. Do NOT interrupt the process. In time, you get the following prompt:

```
-----  
Ensure that the install media unit has been removed and an update  
media unit is online and prepared for reading.
```

```
-- Press Return to continue --  
-----
```

Remove the install media unit. Insert your update media in the same source drive. If you have several update units, insert the first one. The documentation for your product explains this. A general guideline is to update with products for core functionality; then products for tools, utilities, and languages; then products for applications; then products for environments.

When the media unit is online and ready, press **Return** as suggested. The system takes several actions, and you have a decision as to which chapter you read next.

- If you decided to install to a logical volume, move on to Chapter 5.
- If you decided to install to a hard partition, skip Chapter 5 and move on to Chapter 6.

Logical Volume Installation Continued

This chapter assumes you worked through Chapters 1, 2, 3, and 4. The chapter continues the installation you began in Chapter 4 because you decided to install the root file system on a logical volume.

Navigating Install Screens

Item	What happens
Cursor	You see a cursor in fields that have parameters you can customize. Moving the cursor to a field does not necessarily highlight the field. To highlight a field containing the cursor, press Return .
Current item	A highlighted item is the current item. This means that the item can be edited or activated, depending on its function.
Editing	You can edit highlighted fields that let you change a specification or parameter. You most often tab to the field, backspace to remove the current specification or value, and type the new specification or value. You eventually tab to OK and press Return to activate the specification or value.

Tips for navigation continue on the next page.

The following items explain certain keys:

Tab Pressing the Tab key moves a cursor among the fields, options, and buttons. Sometimes, the key moves the cursor to field and highlights it. At other times, the key simply moves the cursor to a field, an option, or a button.

Return The Return key can have two functions:

- Press **Return** to highlight a field you tabbed to.
- Press **Return** on an option, a field, or a button to activate it.

Arrow keys When enabled, pressing an arrow key moves the cursor among options, fields, or buttons. (Duplicates the function of **Tab**.)

The following items explain the buttons:

OK Use **Tab** to highlight **OK** and press **Return**. **OK** causes the install program to take the action implied by a screen, parameter, specification, or option.

Cancel Use **Tab** to highlight **Cancel** and press **Return**. Activating **Cancel** undoes the current state, typically returning to the previous state. In the early stages of an installation, **Cancel** aborts the installation.

Help When help is available, use **Tab** to highlight **Help** and press **Return**. You get context-sensitive help.

Step 1: Create the Root Volume Group

The following screen shows the default root volume group creation.

Root Volume Group Creation

Root Volume Group /dev/vg00 will be created with the following configuration:

Logical Volume	Size (MB)	File System
/dev/vg00/lvol1	504	/
/dev/vg00/lvol2	64	swap

Root VG Disk(s)	Total Size (MB): 640
/dev/dsk/c0d0s6 640	Available (MB): 72

(Some instructions appear here)

[Modify Root Volume Group] [Restart]

[OK]

[CANCEL]

[HELP]

If the values on the screen are acceptable, activate **OK**. As shown below, the install program displays messages about what happens and indicates how to continue. If you need to use the options, the following sections explain them (Modify Root Volume Group and Restart).

UPDATE ON ROOT VOLUME GROUP

The Physical Volumes will be created

...

(Other messages appear)

...

Use OK to run Update, and continue

OK

SHELL

HELP

Option: Restart

Activating this option aborts the installation and lets you start over.

Option: Modify the Root Volume Group

The screen looks like this.

```
-----
                          Change Root Volume Group

                          [CHANGE FILESYSTEMS]

                          [CHANGE DISKS]

                          [CHANGE VG PARAMS]

                          OK                      Cancel                      Help
-----
```

Checklist Item	Information and Tasks
Related Information	Selecting an option takes you to another screen. These screens are not explained; use Help to get context-sensitive help within them.
CHANGE FILESYSTEMS	Provides a screen that lets you modify the specifications for file systems (for example, you could add <code>/usr</code> and <code>/mnt</code>). You can also modify the swap space. After you make changes, activate OK to return to the screen for Root Volume Group Creation.
CHANGE DISKS	Provides a screen that lets you add or delete disks from the specification of disks for the root volume group, but you must retain at least one disk. It is better to install the root file system to one logical volume and, if desired, use SAM to add more disks after the installation. After you make changes, activate OK to return to the screen for Root Volume Group Creation.
CHANGE VG PARAMS	Provides a screen that lets you view the current values for logical volume parameters and, if desired, modify those values. You can create or remove logical volumes in the root volume group, but you must retain logical volumes for the root file system and swap space. After you make changes, activate OK to return to the screen for Root Volume Group Creation.

Step 2: The Main Menu Continues the Installation

```
-----
INSTALL                               Main Menu

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

Source:  Tape Device      Destination: Local System
        /dev/scr_device    /

Select ALL Filesets on the Source Media ->
Select Filesets for a Minimum System ->
Select/View Partitions and Filesets ->
Enter Codeword ->

How to Use Install

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

Read This Before You Choose a Main Menu Option

Checklist Item	Information and Tasks
You must eventually load filesets	Regardless of which option you choose for loading filesets, and regardless of which subscreen you use from the Main Menu, you must eventually activate Start Loading to continue the installation.
Do not interrupt the loading	While the system loads filesets, messages appear on the screen. They are also recorded in <code>/tmp/update.log</code> so you can review them after the installation. The loading takes one to several hours.
Install runs customization scripts	When the loading completes, the install program runs customization scripts for individual filesets and builds a new kernel. Again, you should not interrupt the system during this time.

Checklist Item	Information and Tasks
Install prompts for time zone, time, and date	The customize scripts prompt you to enter a time zone, time, and date. For example, MST7MDT for Mountain Standard Time, which is 7 hours off the Prime Meridian, and <u>0412093292</u> for April 12 at 9:32 in the morning in 1992.
Install prompts about networking	The customize scripts let you specify a hostname and an internet protocol address. If you get to this point in the installation and do not know your hostname and internet protocol address, you can continue and set up networking later. The <i>System Administration Tasks</i> manual explains how to do this.
End of an installation	Getting a login prompt indicates the installation is complete. When the loading ends and you have completed the installation, remove the media and store it in a safe place. Then, go on to Chapter 8 to perform post-installation tasks.

Is Your Media on a CD-ROM?

If you install from CD-ROM and you install software other than the 2-user Runtime product, activate the Enter Codeword -> option. You get the following screen.

```
-----
                From CD-ROM (directory) to Local System

Modify the desired fields and press "Done".

Source Directory: /UPDATE_CDROM

Destination Directory: /

Codeword Certificate:

Codeword : ____ _
          ----short form-----

Verified Hardware ID:
-----
```

Checklist Item	Information and Tasks
Hardware IDs	You can get the current hardware IDs on your system by highlighting the Verified Hardware ID and pressing Help . You are not allowed to enter anything, you only get the information.
Codeword field	Enter the appropriate codeword from your CD-ROM Certificate and continue.

Option 1: Select All Filesets on the Source Media ->

Checklist Item	Information and Tasks
What the option does	Selecting Select All Filesets on the Source Media -> automatically loads every fileset on the source media.
Start the loading	From the Select All ... screen, activate Start Loading . When it completes, go to Chapter 8.

Option 2: Select Filesets for a Minimum System->

Activating this option selects the following minimum set of filesets (plus the appropriate user license):

UX-CORE	CORE-DIAG
KERN-BLD	C-MIN
TOOL	EDITORS
CORE-SHLIBS	CMDS-MIN

Checklist Item	Information and Tasks
Related Information	The Select Filesets for a Minimum System screen appears. You can install a minimal system now and then, after the installation, you can use <i>update(1M)</i> to load other filesets.
Load the filesets	Activate Start Loading from this screen. When the loading completes, go to Chapter 8.

Options continue on the next page.

Option 3: View/Select Partitions and Filesets->

The following screen lets you tailor the functionality you load onto the system.

View or Select Individual Partitions						
Mark "y" or "n" to make a selection.						
Press "Main" to return to the partition selection screen.						
Select	Partition	Partition Description			Size in Kbytes	
n	DIAGNOSTICS	Hardware Diagnostic Programs			37663	
p	NETWORKING	Networking Products			8919	
y	NLS	Native Language Support			472	
y	OS-ADMIN	Recommended Administration Cmds			2292	
y	OS-CORE	Recommended System Core			5517	
y	OS-FEATURES	Selectable OS Features			8176	
y	PROG-LANGUAGES	Programming Languages			8542	
y	REFERENCE-DOC	Reference Manual Pages			348	
y	SHARED-LIBS	Runtime Shared Libraries			2757	
y	WINDOWS	Windowing Products			102	
Help	Shell	Start	Disk	View	Global	Main
		Loading	Space	Filesets	Select	

Checklist Item	Information and Tasks
Using Y, N, and P	Y selects and N deselects a partition. If you select or deselect filesets in a partition, a P appears to indicate a partial selection.
Update checks dependencies	The install program does not let you load (or not load) partitions without accommodating required dependencies.
You eventually start loading	After you select or deselect the partitions or filesets, activate <u>Start Loading</u> and go to Chapter 8.

Root Hard Partition Installation Continued

This chapter assumes you worked through Chapters 1, 2, and 4. The chapter continues the installation you began in Chapter 4 from the point at which you decided to install the root file system to a hard partition on a physical disk.

Tips for Navigation Screens

Checklist Item

Information and Tasks

Tab

Pressing the Tab key moves among the fields, options, and buttons on a screen.

Softkeys

Softkey labels appear along the bottom of screens. The labels correspond by position to the softkeys labeled **f1** through **f8** that appear along the top of the keyboard. For example, the softkey for **Default Sections** is **f2**.

Arrow Keys

When activated, pressing an arrow key moves among the options, fields, or buttons.

Return

The Return key can have two functions:

- Press **Return** to highlight a field you tabbed to.
- Press **Return** on an option, field, or button to activate the option, field, or button.

Step 1: Partition the Root Disk If Necessary

The screen shows the default configuration for your root disk (values for parameters such as Section, Size, Section Name, and Section layout for `boot`, directories such as `/usr`, and `swap`). Exactly what you see depends, for example, on your type of disk and its default values. In general, the screen looks like this:

```
-----
                        Root Disk Partitioning

Filename Type (long or short) |s|      Disk Type: |7935|

Section      Size      Section Names      Section
      (Mb)    (e.g. swap, /, ..., /extra)    Layout

      (Information .....)
```

Softkey labels appear along this line ...

```
-----
```

Checklist Item	Information and Tasks
Continuing now	If the screen shows the partition and information you want, continue by pressing the softkey for <u>Perform Task</u> , which is F1 . Move on to Step 2.
Not continuing now	If you elect to make changes in the root disk partitioning, the following section in this step explains what to do. However you change the partitioning, you must eventually continue and move on to Step 2.

Changing the Hard Partitions

You should read this entire section. Then make modifications as necessary by seeing *Appendix H, Root Disk Partitioning Screen*.

The following checklist items discuss changes you can make:

Checklist Item	Information and Tasks
Long/Short filenames?	The default is short filenames. To have long filenames, tab to the field and type <code>l</code> over the <code>s</code> .
Partition size?	The values you see for disk partitioning are usually adequate. Do not change them unless you have sufficient expertise to know what to specify.
Swap space?	During an installation, you can install a minimal system or more than a minimal system. For following items provide guidelines: ■ Some disks default to 16 MBs on Section 15 for swap space. This allows only a minimal system, which contains the KERN-BLD, TOOL, UX-CORE, CORE-SHLIBS, CORE-DIAG, C-MIN, EDITORS, and CMD-MIN filesets. ■ The <i>Installing Peripherals</i> document has information about the default swap space for disks. Be aware that the HP 7914, 7936, 7958, 7959, 7962B, 7963B, and 9263B disks have 16 MBs of swap space. ■ You must have at least 24 MBs to install more than the minimum system. ■ You can install a minimal system now. Then, as a system administrator, you can modify the swap space and use <code>update(1M)</code> to add other filesets to the system.

Step 2: Continue the Installation

Checklist Item	Information and Tasks
Orientation	Whatever you do in the above section and Appendix H to modify the root disk partitioning, you must eventually press the softkey for Perform Task, which is (F1). When you do this, you get the following message: OK to begin installation (y/n)?
Type (Y) to continue	Typing (N) takes you back to the <i>Root Disk Partitioning</i> screen. Having typed <u>y</u>, you see: Begin installation Making directories and mounting file systems You also see an estimate of time and a series of <i>mkfs</i>(1M) commands.
Install copies files	The install program copies files from the source media onto the target disk. You see messages such as: Downloading files to disk. ... (list of files) ...
User action required	You then see messages such as the following: User ACTION TO BE TAKEN: ... unload the install media and load the update media. Dismount the install media and load the first of the update media. It will be marked UPDATE and have a serial designation such as 1 of <i>n</i> where <i>n</i> is the number of update media entities. Put the media drive back online (that is, mount the drive again).

Checklist Item

Information and Tasks

The system keeps working

While you change the media, the system continues to display messages, for example:

Flushing buffers
Installing boot partition

Making device files
Please ignore "Failed to find" messages from insf

Super block information is being copied to /etc/super_blocks

When the loading completes, you should print a copy of the /etc/super_blocks file because, should a superblock become corrupted, you can use an alternate block to start up HP-UX.

More messages

You will see additional messages. For example:

Rebooting the system

You eventually see this message:

Ensure the install media unit has been removed and an update media is online and prepared for reading.

--Press "Return" to continue--

Finish the loading

If you have not removed the install media and inserted the first of the update media while the messages were being displayed, do so now. Then, press **Return** and go on to Step 3.

Step 3: Use the Main Menu to Continue the Installation

INSTALL

Main Menu

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

Source: Tape Device Destination: Local System
 /dev/scr_device /

Select ALL Filesets on the Source Media ->
Select Filesets for a Minimum System ->
Select/View Partitions and Filesets ->
Enter Codeword ->

How to Use Install

Help	Shell	Select Item	Exit Update
------	-------	----------------	----------------

Read This Before You Choose a Main Menu Option

Checklist Item

Information and Tasks

- | | |
|-----------------------------------|---|
| You must eventually load filesets | Regardless of which option you choose for loading filesets, and regardless of which subscreen you use off the Main Menu, you must eventually activate Start Loading to cause the install program to load your selected filesets. |
| Do not interrupt the loading | Once you choose an option for loading filesets, the system will begin loading. Messages will appear on the screen, and the messages will be recorded in /tmp/update.log so you can review them after the installation. You simply watch this process, or do something else. The loading takes one to several hours. |

Checklist Item	Information and Tasks
Install runs customization scripts	After the filesets are loaded, the install program runs customization scripts for individual filesets and builds a new kernel. Again, you should not interrupt the system during this time.
Install prompts for time zone, time, and date	When the loading completes, install prompts you to enter a time zone, time, and date. For example, <u>MST7MDT</u> for Mountain Standard Time, which is 7 hours off the Prime Meridian, and <u>0412093292</u> for April 12, 1992 at 9:32 in the morning.
Install prompts about networking	Install also prompts for a hostname and an internet protocol address. If you do not know the hostname and internet protocol address, you can continue and configure the system for networking later. The <i>System Administration Tasks</i> manual explains this.
End of an installation	Getting a login prompt indicates the installation is complete. When the loading ends and you have completed the installation, dismount the device used for the update media. Remove the media and store it in a safe place. Then, go on to Chapter 8 to perform post-installation tasks.

Is Your Media on a CD-ROM?

If you install from CD-ROM *and* you install software other than the 2-user Runtime product, activate the **Enter Codeword** option. You get the following screen.

```
-----
                From CD-ROM (directory) to Local System

Modify the desired fields and press "Done".

Source Directory: /UPDATE_CDROM

Destination Directory: /

Codeword Certificate:

Codeword :-----
          ----short form-----

Verified Hardware ID:
-----
```

Checklist Item	Information and Tasks
Hardware IDs	You can get the current hardware IDs on your system by highlighting the Verified Hardware ID and pressing Help . You are not allowed to enter anything, you only get some information.
Codeword field	Enter the appropriate codeword from your CD-ROM Certificate and continue.

Continue Here Whether You Enter a Codeword or Not

Checklist Item	Information and Tasks
Help and Escapes	You can get help about how to use the Main Menu. Also, while using the Main Menu, you can escape to a shell to execute HP-UX commands by activating Shell . (This document assumes that, if you want to escape to a shell, you know what to do and how to do it.)
You must select an option	The Main Menu has three major options (besides entering a codeword or getting help). To continue, you must highlight and activate an option. HP highly recommends that you activate Select ALL Filesets on the Source Media -> . If you activate another options, you should know what you want to accomplish. The following sections describe the options.

Sections on the following pages describe the Main Menu options.

Option 1: Select All Filesets on the Source Media ->

Checklist Item	Information and Tasks
What this option does	Selecting Select All Filesets on the Source Media -> automatically loads every fileset on the source media.
Start the loading	From the Select All ... screen, activate Start Loading . When the loading completes, go to Chapter 8.

Option 2: Select Filesets for a Minimum System->

Activating this option causes the following minimum set of filesets (plus the appropriate user license) to be selected:

UX-CORE	CORE-DIAG
KERN-BLD	C-MIN
TOOL	EDITORS
CORE-SHLIBS	CMDS-MIN

Checklist Item	Information and Tasks
Related Information	The Select Filesets for a Minimum System screen appears. You can install a minimal system now and then, after the installation, you can use <i>update(1M)</i> to load additional filesets.
Load the filesets	Activate Start Loading from this screen. When the loading completes, go to Chapter 8.

Option 3: View/Select Partitions and Filesets->

The following screen lets you tailor the functionality loaded onto your system.

View or Select Individual Partitions						
Mark "y" or "n" to make a selection.						
Press "Main" to return to the partition selection screen.						
Select	Partition	Partition Description			Size in Kbytes	
n	DIAGNOSTICS	Hardware Diagnostic Programs			37663	
p	NETWORKING	Networking Products			8919	
y	NLS	Native Language Support			472	
y	OS-ADMIN	Recommended Administration Cmds			2292	
y	OS-CORE	Recommended System Core			5517	
y	OS-FEATURES	Selectable OS Features			8176	
y	PROG-LANGUAGES	Programming Languages			8542	
y	REFERENCE-DOC	Reference Manual Pages			348	
y	SHARED-LIBS	Runtime Shared Libraries			2757	
y	WINDOWS	Windowing Products			102	
Help	Shell	Start	Disk	View	Global	Main
		Loading	Space	Filesets	Select	

Checklist Item

Information and Tasks

Using Y, N, and P

Y selects and N deselects a partition. If you select or deselect filesets in a partition, a P appears to indicate a partial selection of filesets.

Update checks
dependencies

The install program does not let you load (or not load) partitions without accommodating required dependencies.

You eventually start
loading

After you select or deselect the partitions or filesets, activate **Start Loading**. Then the loading completes, go to Chapter 8.

Updating HP-UX

This chapter assumes you worked through Chapter 1, worked through Chapter 2 if necessary, and did not work through Chapters 3, 4, 5, or 6.

Note	Be aware that to migrate HP-UX from a hard partition on the 8.0 release to a root logical volume on the 9.0 release, you <i>must</i> perform an installation, not an update. Chapters 1, 2, and 3 have information about this.
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In contrast to an installation, which overwrites files on the root disk, an update provides new functionality without destroying the existing system. You must have a functioning HP-UX system to perform an update. After performing an update, you might want to edit your customized files or remove certain filesets. Chapter 8 has information about completing an update.

You update HP-UX (as opposed to install HP-UX) when you have any of the following situations:

- You are running an 8.x release and want to move to the 9.0 release, keeping your root file system on a hard partition as it is now.
- You are running the 9.0 release and you want to add software to that release (for example, Starbase Graphics or ARPA Services).
- You want to convert an existing system to a network distribution server (a netdist server). Appendix I has information about creating, managing, and maintaining a netdist server.

Step 1: Determine Your Type of Update Before You Begin

An Interactive Update

This chapter describes an *interactive* update mode in which menus, prompts, and help screens guide you through the procedure. You perform an interactive update by executing *update*(1M) with no arguments.

Your existing system must meet the minimal requirements discussed in Chapter 2. If you reconfigure your system before you begin an update, account for all requirements for using the reconfigured system during the update (for example, you might need to change the swap space, change the mount points for file systems, or create new device files). Chapter 2 discussed this.

Besides using a supported HP terminal or monitor, you can use a VT-100 or Wyse 30 compatible terminal while performing an update. This includes Xterm windows because they run as VT-100 compatible terminals. If you use such a terminal and the screen does not behave correctly, examine the value of your *TERM* variable. The following items show appropriate values:

VT-100 Compatible Terminals

TERM=vt100
TERM=vt100-am
TERM=vt100
TERM=vt102
TERM=xterm
TERM=ansi

Wyse 30 Compatible Terminals

TERM=30
TERM=wy30
TERM=700-41

If you have a VT-100 or Wyse 30 compatible terminal, and the value is not in the above list, set the value of the *TERM* variable to one of the above values and note if the display behaves appropriately. For an update to work in the interactive mode, the display must behave appropriately.

A Non-interactive Update

You perform a *non-interactive* update by executing *update*(1M) as a shell command, specifying the options that control the update. The interface is less friendly than that of the interactive update, and you need to know which options to specify.

You might want to use a non-interactive update under the following conditions:

- You have a non-HP terminal other than a Vt100 or Wyse30 compatible terminal, and the terminal does not function in the interactive update mode.
- You are very familiar with *update*(1M), and you want to bypass the interaction.

This chapter does not discuss the *non-interactive* update. To get information, see the *update*(1M) entry in the *HP-UX Reference* manual.

If Problems Occur During an Interactive Update

Error messages appear on the display and are recorded in */tmp/update.log*. Typically, you can return to a previous step, correct the error condition, and continue. After the update, you should examine the log file.

If Problems Occur During a Non-interactive Update

Error messages are recorded in */tmp/update.log* and sent to standard error. If an error condition occurs before *update*(1M) begins to load filesets, the program aborts. Otherwise, the program completes the update and you can examine the log file to see what happened. To get more information, see *update*(1M) in the *HP-UX Reference*.

Step 2: Clean Up File Systems As Necessary

Your existing HP-UX can accumulate unnecessary files. You can recover disk space by cleaning up your file system before you begin an update.

Checklist Item	Information and Tasks
Check standard directories	Note directories under / (root) that are larger than expected (for example, use the <code>du(1)</code> command to look at <code>/bin</code> , <code>/etc</code> , <code>/usr</code> , <code>/lib</code> , and so on). You need some expertise to note discrepancies; but wherever you see some, the directory probably contains unnecessary files.
Check for miscellaneous files	Examples of things to check include: ■ Archived files for accounts under <code>/user</code> (check with the users). ■ Core dump files, which are named <code>core</code>, can be very large. Listing root with <code>ls /</code> shows if you have core dump files. You can see their size by typing <code>ll core</code>, and you can remove them by typing <code>rm core</code>. ■ Extra backups of the kernel (only <code>SYSBACKUP</code> is necessary). Check for extra copies of the kernel in <code>/</code> and <code>/etc/conf/*</code>.
Edit files	Use <code>vi(1)</code> (or preferred editor) to examine files such as <code>/etc/btmp</code> and <code>/etc/wtmp</code> . These files grow without bounds and can become very large. Delete unnecessary lines.

Step 3: Read Associated Documentation as Required

Checklist Item	Information and Tasks
Release Notes	See the 9.0 Release Notes if you have them in paper form. Note items that might relate to your particular system.
Special documents	Read any <i>README FIRST</i> documents. Read any <i>certificates</i> . Read any <i>special</i> documentation you received with your products; for example, an application note.
Windowing documents	HP VUE is the default windowing system. If you need to accommodate HP VUE, see the <i>HP Visual User Environment Configuration Guide</i> .
Networking documents	If you are installing networking products, you may need to see the following documents: ■ <i>Installing and Administering ARPA Services</i> ■ <i>Installing and Administering NFS Services</i> ■ <i>Installing and Administering LAN/9000</i>
System Administration	You might need to supplement the directions in this chapter by referring to three documents for system administration. ■ <i>System Administration Tasks</i> ■ <i>How HP-UX Works: Concepts for the System Administrator</i> ■ <i>Installing Peripherals</i>

Step 4: Reconfirm Having Enough Disk Space

Your current system might need to grow to accommodate your 9.0 products. If you do not have enough space, you have two alternatives.

1. Free up disk space on your existing system, or
2. Shut down your system, add another disk (or disks), restart the system, and perform the update.

Minimum Free Space Requirements

Checklist Item	Information and Tasks
Default free space	Each disk has 10% of its capacity reserved for minimum free space . The parameter named <i>minfree</i> determines the amount. The system administrator can reallocate space on a file system having less than the minimum free space.
Possible error messages	During an update, you might see either of these messages: <code>It is recommended you free up n Kbytes</code> <code>Loading the selected filesets results in less free disk space ...</code>
How to continue	In an interactive update, you can load files, but you should correct the problem after the update. In a non-interactive update, the program aborts.

Insufficient Disk Space

Checklist Item

Information and Tasks

Possible error messages

During an update, you might see either of the following messages:

```
You MUST free up n Kbytes
```

```
Loading the selected filesets is impossible  
due to insufficient space on one or more  
file systems....
```

How to continue

You must free up disk space before you continue to load filesets. The next section explains this.

How to Free Disk Space

1. Deselect filesets to load during an update.
2. Remove some existing files on the system.
3. Mount another file system.
4. Create symbolic links.
5. Use a combination of the above methods.

Options A through D in the following sections describe the first four methods. You can combine them as desired.

Option A: Deselect Filesets

Checklist Item	Information and Tasks
Appropriate screens	The Partition Selection, Fileset Selection, and Disk Space Analysis screens let you deselect filesets.
What to do	In any of these screens, examine the options for deseleting filesets and deselect those you omit. Update does not let you deselect a required fileset.
You can add filesets later	After the update completes, add more disk space and update your system again.

Option B: Remove Unnecessary Files

Checklist Item	Information and Tasks
Escape to a shell	This lets you execute conventional HP-UX commands.
Potential unnecessary files	The update program might have files in /tmp that you cannot remove. They include: /tmp/INDEX, /tmp/INFO, /tmp/CDFinfo, and /tmp/update.log
Other files to remove	Check the following directories for unnecessary files: /tmp, /etc/*tmp* (you might remove wtmp or btmp), /usr/adm, /usr/local, /usr/contrib, /usr/tmp, /users. Remove files as possible.
Remove unnecessary filesets	You can remove unnecessary filesets in the existing system by using <i>rmfn</i> (1M). Do not remove files or directories under /system. The system customization you do after an update might fail if you remove some filesets and, later, decide to add them or new filesets.

Option C: Mount Another File System

Checklist Item	Information and Tasks
Escape to a shell	This lets you execute conventional HP-UX commands.
Mount a file system	Using information from the <i>System Administration Tasks</i> manual, mount an file system, which should free disk space.

Option D: Create Symbolic Links

Checklist Item	Information and Tasks
Escape to a shell	This lets you execute conventional HP-UX commands.
How symbolic links help	By moving files or directories and creating <i>symbolic links</i> from the old locations to the new locations, the symbolic links can span file systems and refer to directories as well as files. Use <code>ln -s</code> to create symbolic links. See <code>ln(1)</code> in the <i>HP-UX Reference</i> .
A reminder about links	Do not create symbolic links under the root file system. In particular do not create symbolic links under <code>/bin</code> , <code>/etc</code> , <code>/lib</code> , <code>/dev</code> , or <code>/system</code> .

For example, to move `/usr/man` from `/usr` to `/extra/man` (where `/extra/man` is a file system in which more free space exists), follow the steps below:

1. Copy the subdirectory from `/usr` to `/extra`:

```
cd /usr
find man -print | cpio -pdumv /extra
```

2. Temporarily rename the original man (this is your “backup”):

```
mv /usr/man /usr/man.old
```

3. Create a symbolic link between the directory’s new location and its old location:

```
ln -s /extra/man /usr/man
```

Steps continue on the next page.

4. List the contents of the directory:

```
ls /usr/man
```

5. List the contents of your “backup”; the output should match the output of Step 4:

```
ls /usr/man.old
```

6. If the outputs match, remove your “backup”:

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

7. If the outputs *do not* match, remove the link, and start over at Step 1. To remove the link, execute the following:

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

Step 5: Gather Information About Media and Devices

Examine the checklist questions posed by the following sections, performing the tasks that relate to your update.

Update from Tape or Cartridge?

You need to know the device file name for your tape drive. The *System Administration Tasks* manual and the *Installing Peripherals* manual have information about device files for tape drives.

Update from CD-ROM?

You need the same type of information as for updating from a tape drive (previous section). You might also need a codeword. Chapter 2 describes codewords.

You might need to mount the CD-ROM. The *System Administration Tasks* manual has information about mounting devices and how `/etc/checklist` relates to mounted devices.

Update from a Netdist Server?

Appendix I explains how to use a netdist server as the source of media.

Need to Mount/unmount File Systems?

If you do not want a file system to be mounted (for example, `/users`), comment out the line in `/etc/checklist` before you start the update program. Leave NFS file systems (if any) in the checklist file so the update program does not load files under them locally.

Updating the Operating System?

Checklist Item	Information and Tasks
Have users log off	Updating the system while users are logged on can have unexpected consequences.
Use the normal kernel	If you are not running on /hp-ux (the normal kernel), reboot the system on /hp-ux .
Some updates require single-user state	If you load filesets that cause HP-UX to reboot, put the system being updated into the single-user state. The <i>System Administration Tasks</i> manual and the <i>shutdown(1M)</i> entry in the <i>HP-UX Reference</i> manual explain this.
You might want to run /etc/fsck	After you shut down the system, and before you begin an update, it is a good practice to run <i>fsck(1M)</i> if you suspect you have any file-system corruption. The <i>System Administration Tasks</i> manual and the <i>fsck(1M)</i> entry in the <i>HP-UX Reference</i> manual explain this. The <i>HP-UX Error Message Catalog</i> explains errors related to fsck .

Updating from CD-ROM after a Shutdown?

Perform this step if you run `/etc/shutdown` because the shutdown process unmounts the CD-ROM drive.

Checklist Item

Information and Tasks

The CD-ROM needs a directory

Make a directory where the CD-ROM will be mounted by executing:

```
mkdir /UPDATE_CDROM
```

Insert the CD-ROM disc

The documentation for the CD-ROM drive explains this.

Mount the CD-ROM drive

Execute a command similar to:

```
/etc/mount /dev/dsk/bsrc /UPDATE_CDROM -t cdfs
```

The command mounts the CD-ROM drive at `/UPDATE_CDROM`. The `-t cdfs` indicates the file system type on the CD-ROM disc. If an appropriate device file does not exist, use the `mknod(1M)` command to create one.

Step 6: Some Final Tips for Performing an Update

Checklist Item	Information and Tasks
Note your terminal	Users of HP 700/92 terminals might get a blank screen if the keyboard is not used frequently (for example, while you take time to read another document). If the screen goes blank, press (Shift) . The Shift key is <i>not</i> interpreted as input. <i>Do not use use any other key.</i>
Check status of console	Do not run console processed in the background. Unexpected output to the terminal can produce unreadable screens. Except when the update program is loading filesets, use (CTRL)-(L) to refresh the screen. If the program is loading filesets, do not press any key until the loading completes.
Set TERM variable correctly	To have the display behave correctly, ensure that the <i>TERM</i> environment variable accommodates the terminal. The <i>A Beginner's Guide to HP-UX</i> document explains how to set the variable.
Run correct HP-UX	To perform an update, be sure you booted the currently running HP-UX from the primary boot path. Not doing this (that is, booting from an alternate boot path) will cause customize scripts to not be run.

Step 7: Load the TOOL Fileset

If You Have DDS, HP 9114(5), or 9-track Tapes ...

1. Write protect the tape according to its documentation.
2. Insert the tape in its drive. Wait until the drive is ready according to the drive's documentation.
3. Be in the root directory. Execute `cd /` if necessary.
4. Execute the following command, which assumes a device file named `0m`. You need to specify the appropriate device file name. Wait for the extraction to complete before you type anything. After no files are extracted for a few minutes, stop the command by typing the interrupt key (probably `Break` or `Ctrl-C`). Otherwise, it can take a long time for the command to read the entire tape.

```
tar -xvf /dev/rmt/0m TOOL
```

If You Have CD-ROM ...

1. Be in the root directory. Execute `cd /` if necessary.
2. Execute the following command, which assumes the CD-ROM drive is mounted under the directory named `/UPDATE_CDRM`. If your system differs from this, specify the directory where the CD-ROM drive is mounted. You get an error message if you do not insert the CD-ROM disc or mount the CD-ROM drive (`invalid update source media`). Wait for the extraction to complete.

```
tar -xvf /UPDATE_CDRM/TOOL
```

Options for loading continue on the next page.

If You Use a Netdist Server . . .

1. Have the netdist server configured and have the update program available for clients. If necessary, see Appendix I to get information about this.
2. Copy the 9.0 TOOL fileset from the netdist server to the local client system. HP recommends using FTP in the anonymous mode. The *Installing and Administering ARPA Services* document has information.
 - a. Type `ftp netdist_server_name` (Use the name of the server from which you copy `/etc/update`.)
 - b. At the login prompt, type: anonymous
 - c. At the password prompt, type: ftp
 - d. You should see the `ftp>:` prompt. (If you do not, the previous steps did not succeed, and you must try again.)

To extract the fileset, type:

```
get dist/TOOL.800 /tmp/TOOL
```

- e. You should see messages like this:

```
Opening data connection for dist/ ...
```

```
nn bytes received ...
```

- f. When the `ftp>:` prompt reappears, type: bye, which returns you to the client system.

3. From the client system, type:

```
cd /
```

4. To complete the extraction, type the following command. Be aware several minutes can pass before the first TOOL file is extracted. Then, the extraction occurs rapidly.

```
tar -xvf /tmp/TOOL
```

Step 8: Load the Filesets

Having booted HP-UX from the primary boot path and having become the root user, start the loading by executing /etc/update

You get a screen like the following one.

```
-----
UPDATE                               Main Menu

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

Source: Tape Device                  Destination: Local System
      /dev/rmt/0m                      /

Change Source or Destination ->

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

How to Use Update

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

Read This Before You Choose a Main Menu Option

Checklist Item	Information and Tasks
You must eventually load filesets	Regardless of which option you choose for loading filesets, and regardless of which subscreen you use off the Main Menu, you must eventually activate <u>Start Loading</u> to continue the update.
Do not interrupt the loading	During loading, messages appear on the screen and are recorded in <code>/tmp/update.log</code> so you can review them after the update. The loading takes one to several hours.
Update might run customization scripts	When the loading completes, the update program might run customization scripts and might build a new kernel. Do NOT interrupt this process.
End of an update	Getting a login prompt indicates an update is complete. Remove the media and store it in a safe place. Go to Chapter 8 and perform appropriate post-update tasks.

Is Your Media on a CD-ROM?

If you update from CD-ROM *and* have a product other than the 2-user Runtime product, activate the **Enter Codeword** option. You get the following screen.

```
-----
                        From CD-ROM (directory) to Local System

Modify the desired fields and press "Done".

Source Directory: /UPDATE_CDROM

Destination Directory: /

Codeword Certificate:

Codeword :____ _
          ----short form-----

Verified Hardware ID:
-----
```

Checklist Item	Information and Tasks
Hardware IDs	You can get the current hardware IDs on your system by highlighting the Verified Hardware ID and pressing Help . You are not allowed to enter anything, you only get information.
Codeword field	Enter the appropriate codeword from your CD-ROM Certificate and continue.

Continue Here Whether You Enter a Codeword or Not

Checklist Item	Information and Tasks
Help and Escapes	You can get help about how to use the Main Menu. While using the Main Menu, you can escape to a shell to execute HP-UX commands by activating Shell .
You can change the destination	You can still, at this point, change the source or destination device before you choose an option for loading filesets. You get a secondary screen. If you change the source, you specify the device file for the source drive (for example, <u>/dev/rmt/0m</u>). If you change the destination, you specify the destination directory (for example, <u>/apps</u>).
You must select an option for loading	The Main Menu has options for loading filesets. The following sections describe them

Sections on the following pages describe the Main Menu options.

Option 1: Select All Filesets on the Source Media ->

Selecting **Select All Filesets on the Source Media** -> automatically loads every fileset on the source media. If you activate it, the **Select All ...** screen appears. At this point, if you wish to examine the filesets selected for loading, activate **Modify/View Partitions and Filesets**, which gives you another opportunity to load or deselect filesets. When you are ready, activate **Start Loading**. When the loading completes, go to Chapter 8.

Option 2: Select Filesets for a Minimum System->

Activating this option causes the following minimum set of filesets (plus the appropriate user license) to be selected:

UX-CORE	CORE-DIAG
KERN-BLD	C-MIN
TOOL	EDITORS
CORE-SHLIBS	CMDS-MIN

Checklist Item	Information and Tasks
Related Information	The Select Filesets for a Minimum System screen appears. You can update to a minimal system now and then, after the update, use <i>update(1M)</i> to load additional filesets.
Load the filesets	Activate Start Loading from this screen. When the loading completes, go to Chapter 8.

Option 3: View/Select Partitions and Filesets->

You can use the following screen to tailor the functionality you load onto your system.

View or Select Individual Partitions						
Mark "y" or "n" to make a selection.						
Press "Main" to return to the partition selection screen.						
Select	Partition	Partition Description			Size in Kbytes	
n	DIAGNOSTICS	Hardware Diagnostic Programs			37663	
p	NETWORKING	Networking Products			8919	
y	NLS	Native Language Support			472	
y	OS-ADMIN	Recommended Administration Cnds			2292	
y	OS-CORE	Recommended System Core			5517	
y	OS-FEATURES	Selectable OS Features			8176	
y	PROG-LANGUAGES	Programming Languages			8542	
y	REFERENCE-DOC	Reference Manual Pages			348	
y	SHARED-LIBS	Runtime Shared Libraries			2757	
y	WINDOWS	Windowing Products			102	
Help	Shell	Start	Disk	View	Global	Main
		Loading	Space	Filesets	Select	

Checklist Item	Information and Tasks
Using Y, N, and P	Y selects and N deselects a partition. If you select or deselect filesets in a partition, a P appears to indicate a partial selection filesets.
Update checks dependencies	The update program does not let you load (or not load) partitions without accommodating required dependencies.
You eventually start loading	After you select or deselect the partitions or filesets, activate Start Loading . When the loading completes, go to Chapter 8.

Post Install or Update Tasks

This chapter explains tasks you might need to perform after you complete an installation or update. You perform these tasks as a system administrator.

You do not necessarily work through this chapter sequentially. Instead, examine the section names and work through those sections that apply to your situation.

Migration to LVM, Post-Installation Tasks

If you had an 8.x HP-UX system running on a disk with hard partitions and you are migrating to a 9.0 HP-UX system running on logical volumes, you should work through this section.

Recall that to this point, the migration has consisted of backing up your existing 8.n system and performing an installation of the 9.0 system. In this section, you will complete tasks that you began during the migration.

Restore Customized Files From Previous System

After completing the 9.0 installation to logical volumes, you should restore the files that you backed up on your previous system before migrating to 9.0.

Checklist Item	Information and Tasks
Recover important custom files	Assuming you backed up the important customized files to a tape prior to migrating to 9.0, you can now restore them. Insert the tape in your tape drive and execute:

```
mkdir IMPORTANT  
cd /  
tar xv IMPORTANT
```

Relocate Customized Files as Desired

You can use the files in the directory named `/IMPORTANT` to help you customize your new system. Chapter 3 described the files that you should have placed in `IMPORTANT`.

Checklist Item	Information and Tasks
Relocate important files	For example, you can put your customized <code>/etc/passwd</code> file and <code>/etc/group</code> file in the place by executing the following commands: <pre>cd IMPORTANT cp passwd /etc/passwd cp group /etc/group</pre>
Relocate other important files as desired	Let the files in the directory named <code>/IMPORTANT</code> remind you of how you want to customize the new operating system. Copy important files to the new system as appropriate. You should not simply copy the old configuration files onto the new system as they might no longer be appropriate.
Delete unneeded files	Delete obsolete files and file sets at your leisure. Many older files and file sets are no longer needed as a result of the reinstallation procedure.

Restore Operating System Files, Using HP-UX Commands

You need to restore those few files that existed in the `/` and `/usr` directories (`/bin`, `/dev`, `/etc`, `/lib`, `/system`, `/tmp`, `/usr`) on your system before reinstallation.

Go to the next section if you want to use SAM to restore these files.

The procedure described below assumes you used *fbackup*(1M) to back up your system. The example works for a DDS device. For a 9-track magnetic tape drive, use `/dev/rmt/0h`. For a cartridge tape, you see another, following example.

Load the tape with files to recover on the backup device and enter:

```
/etc/frecovery -x -i /bin -i /dev -i /etc -i /lib -i /system -i /tmp  
-i /usr -f /dev/rmt/0m
```

Except for those files that have the same name as files loaded during installation, this command restores any of the previous system's files in the included directories from your DDS (DAT) backup tape.

For a cartridge tape, execute:

```
tcio -i /dev/rct/c2d0s2 | /etc/frecovery -x -i /bin -i /dev -i /etc -i /lib -i  
/system -i /tmp -i /usr -f -
```

To continue, go to the section named "Migrate Other File Systems on Root Disk(s)."

Restore Operating System Files, Using SAM

You need to restore those few files that existed in the / and /usr directories (/bin, /dev, /etc, /lib, /system, /tmp, /usr) on your system before reinstallation.

This procedure applies if you backed up your system from SAM.

Checklist Item	Information and Tasks
To recover other files in /, use this procedure if you used SAM to back up your system.	Load the tape with files to recover on the backup device. Then: 1. Run SAM. 2. Select and open the Backup and Recovery-> Main Menu choice. 3. Select and open the Backup Devices submenu. 4. Highlight and select the backup device. 5. Recover files from the following list of directories: /bin /dev /etc /lib /system /tmp /usr Except for those files that have the same name as files loaded during installation, this command restores any of the previous system's files in the included directories from your backup tape.

After completing this step, go to the section "Migrate Other File Systems on Root Disk(s)."

Migrate Non-Root File Systems on Root Disk(s)

Checklist Item	Information and Tasks
Background and orientation	If you had file systems other than / and /usr on the root disk(s) you migrated, now is the time to migrate them to logical volumes.
Refer to the file: LVMMIGRATE	Refer to the file LVMMIGRATE, which you might have printed out before beginning migration. If you didn't print out the file then, you can now print out the file /local/LVMMIGRATE. <u>lp /local/LVMMIGRATE</u> You can identify the non-root file systems that were formerly on the root disk. They are the file systems that are marked "Must" under the column head "Backup" and "N" under the head "In Root VG ?". Using the LVMMIGRATE file as reference, note the following information (writing it down if necessary): ■ The name(s) under FileSystem. ■ The recommended logical volume size(s), in MB.

Brief introduction to SAM

- Ensure that you have superuser capabilities.
- Run SAM, type:

/usr/bin/sam

Activating the **Help** button from a dialog or message box gives you information about the attributes and tasks you can perform from the currently displayed window.

Choosing an item from the “Help” menu within a functional area gives you information about:

- the current functional area
- keyboard navigation within SAM
- using the SAM help system
- displaying the version of SAM you are currently running

Pressing the **F1** key gives you context-sensitive information for the object field at the location of the cursor.

See chapter 1 in the *HP 9000 Series 800 System Administration Tasks* manual for additional information about using SAM.

Run **sam**

In SAM, highlight **Disks and File Systems** and activate the **Open** control button.

Then, highlight **Logical Volumes** and activate the **Open** control button.

Create logical volumes using SAM

When you are in the screen **Logical Volumes**:

1. From “Actions” on the menu bar, choose **Create...**
2. Highlight the Volume Group in which to add a logical volume; you probably have only one to choose from.

3. You can let LVM name the logical volume by leaving the field “Logical Volume Name” blank (or, if you prefer, you can assign the logical volume a name).
4. Enter **Logical Volume Size (MB)**. Enter the size recommended the file system (refer to the **LVM MIGRATE** file). Note that SAM will round up the size you enter to an even multiple of the volume group’s physical extent size (4 megabytes is the default extent size).
5. Activate **OK**. SAM will report back the name of the logical volume as it creates it; make note of the name so you can match it with the file system you will create in the next step.
6. Activate **OK** to complete the task.

SAM adds the logical volume you create on the list of logical volumes. You can go to the **Local File Systems** area to create a file system. Return to step 1 if you want to create another logical volume.

Add file systems using SAM From “List” on the menu bar, choose **Local File Systems**. Without highlighting a file system, add your file system as follows:

1. From “Actions” on the menu bar, choose **Add**, and then choose **Using the Logical Volume Manager...**
2. Enter the name for the **Mount Directory**; referring to the LVMIGRATE file, use the path name listed under the heading **FileSystem** for the file system (SAM will create it if it doesn’t exist).
3. Highlight the Logical Volume in which to add a file system. If you have named the logical volumes, select the appropriate one. Otherwise, select the logical volume with the appropriate size.
4. Activate **Create new file system**.
5. Accept the default options for user ID, mount times, and access permissions (unless you want to modify them), and activate **OK**.

SAM reports its actions as it creates the file system, mounts it, and adds it to **/etc/checklist**.

Restore data to the new logical volumes

Once you have created and mounted the new file systems, you can now restore the files from the backup tape into the new file systems. Highlight **Backup and Recovery->** and activate the **Open** control button.

1. Highlight **Backup Devices** and activate the **Open** control button.
2. Highlight the device in the object list.
3. From “Actions” on the menu bar, choose **Recover Files or Directories >** and then **Local Backup Device....**
4. Choose **Select Recovery Scope**.
5. Turn on the “Selected Files” checkbox.
6. Enter each file system name in the “Included” box and activate the **Add** control button. If you make a mistake, highlight the entry with the error and use the **Modify** or **Remove** control buttons to make the correction.
7. Load the tape with the files to recover on the tape drive you selected as the backup device.
8. Activate **OK** to recover the files to your new file systems.

Verify data is restored

1. From the SAM main menu, highlight **Disks and File Systems->** and activate the **Open** control button.
2. Highlight **Local File Systems** and activate the **Open** control button.

You should find the file systems you created listed; you should also see indications that the data has been restored by looking at the columns **Unused KBytes** and **Total KBytes**.

Restore Any Other Files to Root File System

If your former system had any non-system files in the `/` directory and the root subdirectories (`/bin`, `/dev`, `/etc`, `/lib`, `/system`, `/tmp`, `/usr`), you can restore them from the backup tape that you made before installing Release 9.0.

Caution To ensure the newly installed Release 9.0 files are not overwritten by files of the same name on the the backup tape of your old system, use the `touch(1M)` command to reset the access times of the new files.

Checklist Item

First, touch newly installed files

Information and Tasks

Touching files you install or update resets their access times to the current time so that none of them are overwritten during file restoration.

Run the `date(1M)` command to verify the right system time.

`date`

Run the `touch(1M)` command. This can take several minutes. Execute the following command:

```
find / -depth -print | xargs touch
```

Recover other files using SAM.

1. Run SAM.
2. Highlight **Backup and Recovery->** and activate the **Open** control button.
3. Highlight **Backup Devices** and activate the **Open** control button.
4. Highlight the backup device from the object list.
5. From "Actions" on the menu bar, choose **Recover Files or Directories >** and then **Local Backup Device...**
6. Choose **Select Recovery Scope**.

7. Turn on the “Selected Files” checkbox.
8. Enter each file system name in the “Included” box and activate the

control button. If you make a mistake, highlight the entry with the error and use the or control buttons to make the correction.

Recover files from the following list of directories:

```
/bin
/dev
/etc
/lib
/system
/tmp
/usr
```

9. Load the tape with the files to recover on the tape drive you selected as the backup device.
10. Activate to recover the files to your new file systems.

Except for those files that have the same name as files loaded during installation, this command restores any of the previous system’s files in the included directories from your backup tape.

Migrate Non-Root Disks to LVM

Checklist Item

Information and Tasks

Background and orientation

After you migrate all of the file systems on the **root** disk(s) to LVM, you can migrate other file systems on other disks to logical volumes by using either SAM or HP-UX commands.

You can migrate the other file systems on your system on a disk-by-disk basis. You do not need to do this immediately because the system will function satisfactorily with the **root** disk on logical volumes and other file systems in traditional disk sections.

What do you need?

To migrate other file systems on other disks, be sure to have on hand:

1. A copy of the file **LVMMIGRATE** (it's in **/local**).
2. A copy of the file **/etc/checklist** from your former system (check in the directory **/IMPORTANT** if you saved it with your custom files)
3. The *HP 9000 Series 800 System Administration Tasks* manual.

The **LVMMIGRATE** file lists all the file systems on the disks as they existed on your former system. If you have not physically moved the disks, you can match each file system to a disk and disk section, and create logical volumes for them.

The procedure for accomplishing this is described in chapter 8, "Managing Logical Volumes," in the *HP 9000 Series 800 System Administration Tasks* manual.

1. Use SAM to migrate disks on a disk by disk basis.
2. Map disks in newly installed system to a new **/etc/checklist** file.

This works because, in a new installation, the system is knowledgeable of the devices at the hardware

addresses, but the new system will probably assign new logical unit numbers and create new device files for disks in such a way that the old file system/device file combination no longer holds.

By comparing your new and old `/etc/checklist` files, you should see how to edit the new file so it add non-root disks to the LVM.

Typical Post-installation System Administration Tasks

After you complete an installation or reinstallation, the following items suggest tasks you should perform. As well, your system might need additional attention.

Checklist Item	Information and Tasks
Set a password for the superuser.	The <i>System Administration Tasks</i> manual explains how to do this.
Check out your HP-UX documentation.	The <i>Finding HP-UX Information</i> manual has a complete list of documents, their descriptions, and their part numbers.
Check out your master index.	The <i>Master Index</i> document has indexes for all the HP-UX documents. Using the index, you can find information about topics of interest.
Check log files	Log in as superuser and check for problems in <code>/tmp/update.log</code> . Follow any instructions you find in this file.
Read the release notes file	The file named <code>hpuxsystem</code> is stored in <code>/etc/newconfig/90RelNotes</code> . The file contains information about new, changed, or removed 9.0 features.
Set up system security.	See the <i>HP-UX System Security</i> document.
Add software to your system	If you have optional, non-core software, now is a good time to update your installed system by adding the software. If you do this, be sure to note any README documents that attended the software.

Suggested Tasks

You can customize an HP-UX system in many ways. How depends on your situation. The following checklist items mention things you might need to do. The *System Administration Tasks* manual has information about most of the tasks. You might also want to see special documents (for example, the *Error Message Catalog* to get information about LP Spooler error messages and the *UUCP User's Guide* to set up UUCP).

Checklist Item	Information and Tasks
Add users	See the <i>System Administration Tasks</i> document.
Add groups	Same document as above.
Migrate other disks to LVM	Same document as above.
Mount file systems	Same document as above.
Set up the LP Spooler	Same document as above.
Set up UUCP	See the section about UUCP in the <i>Remote Access User's Guide</i> .
Set up or modify the windowing system	This can require reading several documents. See the <i>Finding HP-UX Information</i> document. Look for the documents about windows that relate to your release and desired functionality (for example, using HP VUE).
Create system run levels	See the <i>System Administration Tasks</i> document.
Create an accounting system	This can require reading several documents. See the <i>Finding HP-UX Information</i> document. Look for the documents about accounting and system security that relate to your release and desired functionality.
Remove extraneous software	Use the <code>/etc/rmf</code> command. See a later section in this chapter. Also, see the <code>rmf(1M)</code> entry in the <i>HP-UX Reference</i> document.
Back up your system	See the <i>System Administration Tasks</i> document.

Remove Unwanted Software Using `rmfn(1M)`

After you finish installing HP-UX, you might have software you do not need. The `rmfn(1M)` (remove functionality) utility lets you remove unnecessary system software. The *HP-UX Reference* manual has complete information for this command.

Use `rmfn` with Caution

Although `rmfn(1M)` checks dependencies to prevent you from inadvertently removing functionality, you still need to be cautious. The command is designed to help you quickly remove major pieces of software. It is important to avoid making mistakes.

Important Points About Using `rmfn(1M)`

Checklist Item	Information and Tasks
Filesets and partitions	The filesets and partitions that the <code>rmfn</code> command displays depend on the contents of the directories named <code>/etc/filesets</code> and <code>/system</code> . Do not change the contents of these directories or the command will display an inaccurate list of filesets.
Dependencies	The <code>rmfn(1M)</code> command only lets you remove filesets that will not subsequently harm the integrity of your system. The <code>rmfn(1M)</code> command does not allow you to remove a minimum set of filesets needed by the system. For example, you cannot remove <code>UX-CORE</code> .
Remote systems	The <code>rmfn(1M)</code> command does not remove files on a remote, mounted system (NFS).
Symbolic links	As the <code>rmfn(1M)</code> command removes a symbolic link contained in a fileset, it does not remove a symbolic link's target file. A target file remains intact until <code>rmfn(1M)</code> removes the fileset containing the target file.

How to Use rmfn

To use the remove fileset command, log in a system administrator and execute:

```
/etc/rmfn
```

The example below shows a typical main screen.

```
-----
rmfn                               Partitions

Press "y" to select an entire partition for deletion. Press "n" to undo a
selection. Press the "Select Filesets" key to view the filesets within
a partition. Press the "Start Removing" key when selection is complete.


Mark Partition      Arch.  Partition Description      Size in Kbytes
p  DIAGNOSTICS      400    Hardware Diagnostic Programs  37663
n  NETWORKING      400    Networking Products          8919
n  NLS              400    Native Language Support      472
n  OS-ADMIN         400    Recommended Administration Cmds 2292
n  OS-CORE          400    Recommended System Core       5517
n  OS-FEATURES      400    Selectable OS Features        8176
y  PROG-LANGUAGES   400    Programming Languages         8542
n  REFERENCE-DOC    400    Reference Manual Pages        348
n  SHARED-LIBS     400    Runtime Shared Libraries      2757
n  WINDOWS          400    Windowing Products           102

[Help]                                [Shell]  [Start Rem]
```

The following page explains the options and use.

Checklist Item

Information and Tasks

Arrow keys

Move the highlight among the items in a screen as implied by the key.

(Y)

This key selects a highlighted item for deletion. The letter **y** appears on the screen under **Mark**.

(N)

This key undoes the effects of a selection. For example, if you select a partition with **(Y)**, pressing **(N)** deselects the partition. The letter **n** appears on the screen under **Mark**.

Help

Pressing this softkey explains how to use the **rmfn** command.

Shell

Pressing this softkey lets you escape to a shell to execute HP-UX commands. Type **exit** on a shell command line to return to the **rmfn** screen.

Exit rmfn

Pressing this softkey terminates the removal process and exits the **rmfn** command.

Select Filesets

For a highlighted partition, pressing this softkey lets you select individual filesets in that partition for deletion. If you do this, a **p** appears on the screen under **Mark** to indicate a partial selection of filesets.

View Selected

Pressing this softkey lists the names and sizes of the partitions and filesets selected for removal.

Start Removing

Pressing this softkey removes the selected partitions and filesets from your system.

A

Models 808/815

This appendix contains hardware path information for the default configurations of the 808/815.

Caution

Once the Battery Backup Unit is installed, you **must** power down the system from the front panel power switch. In particular, do not add or remove memory cards without first shutting down the system properly (`/etc/shutdown -h 0`) and powering down from the front panel power switch (even if the machine is unplugged). Failure to observe this caution might damage the hardware.

Boot Paths and Installation Commands

For the 9.0 release of HP-UX, use one of the following commands at the `ISL>` prompt to boot from the device having the source media. Chapter 4 has more information about the context for using the commands.

- The recommended command is:

```
hpux install to (boot_path)
```

Use this command, typing the exact boot path, when you want to specify which disk will subsequently contain the root file system. For the Model 808 and 815, this could be hpux install to (20.0).

- An alternative command is:

```
hpux install
```

Typing hpux install continues an installation and installs the root file system on the first valid destination device (the one located at the lowest device address on the lowest bus address).

The following sections have additional information about factory settings, modifying default paths, and hardware paths.

Factory Settings

Table A-1. Factory Setting for Boot and Console Paths

Path	Setting	Configuration
Primary boot path (system disk)	20.0	HP-IB disk drive attached to a card in Cardcage Slot 5; HP-IB address is set to 0.
Alternate boot path (tape drive)	20.3	Cartridge tape drive attached to an HP-IB card in Cardcage Slot 5 of the SPU; HP-IB address is set to 3.
Console path	1.96	Terminal for the console attached to Port A on the SPU card.

Modifying Default Paths

If the configuration of your 808/815 is different from the factory settings, you should change the boot and console paths. See the tables. Change the boot paths with the ALTPATH and PRIMPATH commands at the ISL prompt. You can change the console path with the CONSPATH command.

The following examples show how to change the boot paths held in stable storage.

- Change the primary boot path to 24.2

```
ISL>PRIMPATH 24.2
```

- Change the alternate boot path to 24.5

```
ISL>ALTPATH 24.5
```

Hardware Paths on the 808/815

Hardware paths on the 808/815 have only two components:

```

                20.0.
                |  |
Module Number  ----+  +----- Port or HP-IB
(4 x cardcage slot #)      Device Address
```

Module Number

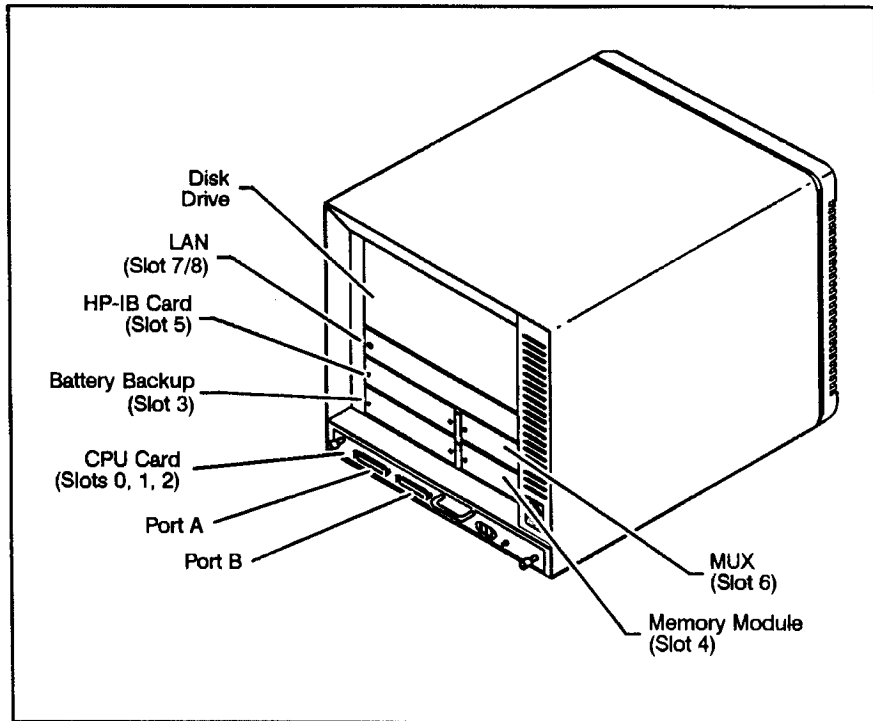
The module number for devices built into the 808/815 SPU is 1. For other devices, the module number is 4 × cardcage slot number.

Port or HP-IB Address

The second number in the hardware address is the port number (in the case of MUX cards) or the HP-IB address (in the case of HP-IB cards). Set the HP-IB address at the device. LAN cards do not require port or address numbers, since there is only one network connection per card.

Some examples of port and serial device addresses:

- Disk on HP-IB (slot 5), device address 7: 20.7
- Printer on MUX (slot 7), port 2: 28.2



LG200148_015

Figure A-1. Standard 808 Hardware Configuration

B

Models 822S/832S/842S/852S

This appendix contains hardware path information for the default configurations of the 822S/832S/842S/852S model SPUs.

Note	The 822S/832S/842S/852S systems are delivered with the HP-UX operating system already loaded and pre-configured on the hard disk drive. You'll need the installation information in this appendix if the operating system is ever installed from tape, if the kernel must be reconfigured, or if repartition of the file systems is necessary.
-------------	--

Note	Cartridge tape drives and 9-track tapes are usually set to address 3. If you have less than four embedded disks, your cartridge tape or 9-track tape is connected to the HP-IB card in slot 11 (thus, the address 44.3). If you have four embedded disks, your cartridge tape drive or 9-track tape is connected to a second HP-IB card in slot 12 (thus, the address is 48.3)
-------------	--

Boot Path/Installation Command Tables

For the 9.0 release of HP-UX, use one of the following commands at the ISL> prompt to boot from the device having the source media.

- The recommended command is:

```
hpux install to (boot_path)
```

Use this command, typing the exact boot path, when you want to specify which disk will subsequently contain the root file system. The following items show examples:

- For an HP-IB card in slot 11 (module number 44), a system disk at address 0, and a DDS tape drive at address 7, type hpux install to (44.0).
- For an PBA-FL card in slot 8 (module number 32), a system disk at address 0 and a DDS tape drive at address 7, type hpux install to (32.0.0).
- For an HP-IB card in slot 11 (module number 44), a system disk at address 0, and a cartridge tape drive at address 3, type hpux install to (44.0).
- For an PBA-FL card in slot 8 (module number 32), a system disk at address 0, and a cartridge tape drive at address 3, type hpux install to (32.0.0).
- For an HP-IB card in slot 11 (module number 44), a system disk at address 0, and a magnetic tape drive at address 3, type hpux install to (44.0).
- For an PBA-FL card in slot 8 (module number 32), a system disk at address 0, and a magnetic tape drive at address 3, type hpux install to (32.0.0).

- An alternative command is:

```
hpux install
```

Typing hpux install continues an installation and installs the root file system on the first valid destination device (the one located at the lowest device address on the lowest bus address).

Factory Settings

Table B-1. Factory Setting for Boot and Console Paths

Path	Setting	Configuration
Primary boot path (system disk)	44.0	HP-IB disk drive attached to a card in Cardcage Slot 11; HP-IB address is set to 0.
Alternate boot path (DDS)	44.7	DDS drive attached to a card in card slot 11; HP-IB address is set to 7.
Console path	16.0	Terminal for the console attached to Port A on the SPU card.

If the configuration of your 822S/832S/842S/852S is different from the factory settings, you should change the boot and console paths. Find the correct boot paths for your configuration in the preceding command tables. Change the boot paths with the ALTPATH and PRIMPATH commands at the ISL prompt. You can change the console path with the CONSPATH command.

Modifying Default Paths

The following examples show how to change the boot paths held in stable storage.

- Change the primary boot path to 44.2

ISL>PRIMPATH 44.2

- Change the alternate boot path to 44.4

ISL>ALTPATH 44.4

Hardware Paths on the 822S/832S/842S/852S

This is an example of a hardware address on a 822S/832S/842S/852S system.

	44.0.0	----	SCSI unit number
Module Number	-----+	+-----	Port or HP-IB
(4 x cardage slot #)			Device Address

There are two basic parts to a HP-PB address (and an additional part for SCSI devices). These parts specify a path through the I/O system. In the example, the hardware address says in effect: "Go to the Device Adapter represented by module number 44 (the card in Precision Bus slot 11). Then go to the device attached to this Device Adapter which has the device address of 0."

The third part of the address is the SCSI unit number, needed for SCSI devices only. It says in effect: "Go to a particular unit within a SCSI device." For HP-UX Release 8.0, the SCSI unit number is always zero.

HP-PB Physical Module Number

The location of the I/O card determines the Physical Module Number, which is the first part of the hardware address. To calculate the Module Number, find out which Precision Bus slot the I/O card is installed in. Multiply the Precision Bus slot number by 4. If the I/O card is in Precision Bus slot 11, for example, the Module Number is 44 (4 x 11).

For a specific I/O configuration, only certain kinds of I/O cards can be installed in a given slot. For example, a system may be configured so that only a MUX card can go in Precision bus slot 4. To change the I/O configuration, use the procedure in chapter 8. However, the default I/O configuration is suitable for most systems.

Device Address or Port Number

The second part of the hardware address is the device address or port number. Since an I/O card can have several devices attached to it, this number indicates which of those devices is addressed. On disk drives and magnetic tapes, this number is the HP-IB or SCSI device address which is set on the device itself. For MUX cards, the device address is the port number.

SCSI Unit Number

The third part of the address is the SCSI unit number, needed for SCSI devices only. It indicates which SCSI unit within a particular SCSI device is being addressed. The SCSI unit number is always zero.

Addressing an HP-FL Device on an HP-PB System

HP-FL is supported on HP-PB systems through the PBA-FL adapter card. This adapter uses a CIO address as part of the hardware path. The CIO address is hardwired at 0. Therefore, the path for a peripheral device connected through a PBA-FL adapter is:

`(4 X PB slot number).CIO slot number (0).device address`

For example, if the PBA-FL adapter is installed in PB slot 8 (PB8), and the disk HP-FL address is 0, then the path for the disk device is:

`(4 X 8).0.0 = 32.0.0`

Configurations

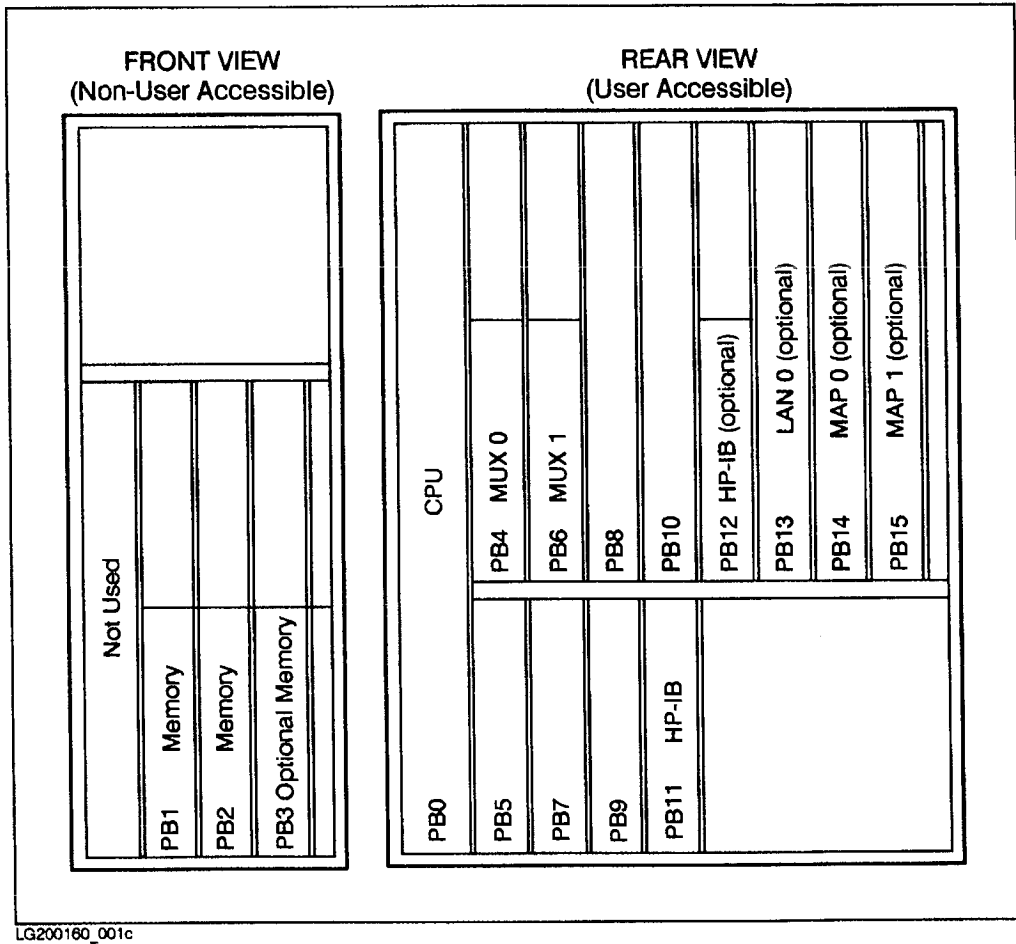


Figure B-1. Standard 822S/832S Hardware Configuration

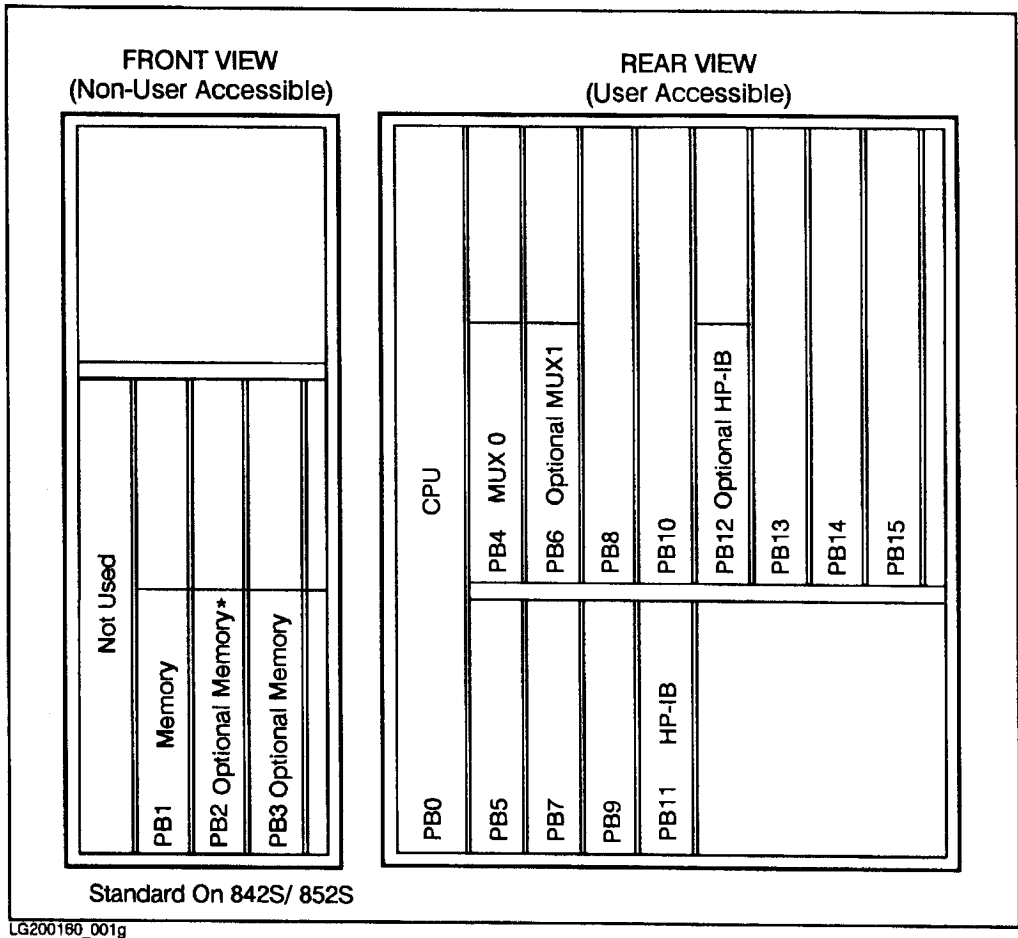


Figure B-2. Standard 842S/852S Hardware Configuration

Models 825/834/835/845/635/645

Boot Path and Installation Command Information

For the 9.0 release of HP-UX, use one of the following commands at the `ISL>` prompt to boot from the device having the source media. Chapter 4 has more information about the context for using the commands.

- The recommended command is:

```
hpux install to (boot_path)
```

Use this command, typing the exact boot path, when you want to specify which disk will subsequently contain the root file system. In most cases, you type `hpux install to (4.0.0)`. Other possibilities for addresses include:

- `(4.1.0)` (system disk at slot 1)
- `8.0.0` (model 845 or 645)
- `(8.1.0)` (model 845 or 645 with the system disk at slot 1)

Tables in the following section show typical configurations.

- An alternative command is:

```
hpux install
```

Typing `hpux install` continues an installation and installs the root file system on the first valid destination device (the one located at the lowest device address on the lowest bus address).

The following sections have additional information about factory settings, modifying default paths, and hardware paths.

Factory Settings

Table C-1. Factory Setting for 825/835 Boot and Console Paths

Path	Setting	Configuration
Primary boot path (system disk)	4.0.0	HP-IB or HP-FL disk drive attached to a device adapter in CIO Slot 0 (no AP); HP-IB address is set to 0.
Alternate boot path (tape drive)	4.2.3	Reel-to-reel tape drive attached to an HP-IB card in CIO Slot 2 of the SPU; HP-IB address is set to 3.
Console path	4.1.0	RS232-C (non-graphics) terminal for the console (no AP)

Table C-2. Factory Setting for 834 Boot and Console Paths

Path	Setting	Configuration
Primary boot path (system disk)	4.0.0	HP-IB disk drive attached to a device adapter in CIO Slot 0 (no AP); HP-IB address is set to 0.
Alternate boot path (tape drive)	4.2.3	Cartridge tape drive attached to an HP-IB card in CIO Slot 2 of the SPU; HP-IB address is set to 3.
Console path	12.0.0	RS232-C (non-graphics) terminal for the console

Table C-3. Factory Setting for 845/645 Boot and Console Paths

Path	Setting	Configuration
Primary boot path (system disk)	8.0.0	HP-IB or HP-FL disk drive attached to a device adapter in CIO Slot 0 (no AP); HP-IB address is set to 0.
Alternate boot path (tape drive)	8.2.3	Reel-to-reel or cartridge tape drive attached to an HP-IB card in CIO Slot 2 of the SPU; HP-IB address is set to 3.
Console path	8.1.0	RS232-C (non-graphics) terminal for the console

As the model 635 comes from the factory, the boot and console paths are set as in the following table:

Table C-4. Factory Setting for 635 Boot and Console Paths

Path	Setting	Configuration
Primary boot path (system disk)	4.0.0	HP-IB or HP-FL disk drive attached to a device adapter in CIO Slot 0 (no AP); HP-IB address is set to 0.
Alternate boot path (tape drive)	4.2.3	Reel-to-reel or cartridge tape drive attached to an HP-IB card in CIO Slot 2 of the SPU; HP-IB address is set to 3.
Console path	4.1.0	RS232-C (non-graphics) terminal for the console

Modifying Default Paths

The following examples show how to change the boot paths held in stable storage:

- Change the primary boot path to 4.2.0

```
ISL>PRIMPATH 4.2.0
```

- Change the alternate boot path to 4.2.5

```
ISL>ALTPATH 4.2.5
```

- Change the console boot path to 4.3.0

```
ISL>CONSPATH 4.3.0
```

825/835 Console Paths

The models 825/835 can have one of several console paths. Three possible paths are listed in the following table. You can use the CONSPATH command at the ISL prompt to change the default console path.

Table C-5. Console Paths for the 825/835

Configuration	Console Path
RS232-C (non-graphics) terminal for the console; no Access Port (AP)	4.1.0 (default)
RS232-C (non-graphics) terminal for the console; Access Port (AP)	4.3.0

Mirrored Disk Subsystem

An option for the models 825/835 is mirrored disks. For optimum safety, the disks should be connected to separate HP-FL device adapters. While the software installation steps required to install mirroring can only be done after the OS has been installed on the system disk, the hardware should be installed now.

1. Add the second HP-FL device adapter to a free CIO slot.
2. Connect the alternate disk(s) to the device adapter.
3. Record the slot numbers for the device adapter and address for the disk drive(s).

Hardware Paths on the models 825/834/835/845/635/645

Hardware paths on the models 825/834/835/845/635/645 are shown following.

```

                                4.0.0.0 ---- SCSI Unit Number
                                | | |
Module Number ----+ | +----- Port or
(4 x Mid-bus slot #) |      Device Address
                        |
                        CIO Slot Number
                        (Device Adapter)
```

Module Number

The module number for devices attached to the SPU of the models 825/834/835/635 SPU is 4; for the models 845/645 the module number is 8. For example, a system disk connected to an HP-IB card in CIO slot 0 in the SPU has a hardware address of 4.0.0. (The HP-IB address on the disk is 0.)

The module number for devices attached to the CIO Expander is 36 (on the 835) or 8 (on most Model 825s). For example, consider a tape drive with an HP-IB address of 3. If it is connected to an HP-IB card in CIO slot 2 of the CIO Expander, it has a hardware address of 36.2.3 (835) or 8.2.3 (825). This example assumes that the 825 has a Channel Adapter (CA) card in Mid-bus slot 2. If the 825, instead, has the CA card in Mid-bus slot 3, the hardware address is 12.2.3 (4 x Mid-bus slot 3 equals 12).

CIO Slot Number

The second number in the hardware address is the CIO slot number. Figures C-1 through C-7 show the recommended location for CIO cards in the models 825/834/835/845/635/645.

Port or Device Address

The third number in the hardware address is the port number (in the case of MUX cards) or the device address (in the case of HP-IB, HP-FL, or SCSI cards). The device address is set on the device itself.

SCSI Unit Number

The fourth part of the address is the SCSI unit number, needed for SCSI devices only. It indicates which SCSI unit within a particular SCSI device is being addressed. The SCSI unit number is always zero.

Model 825/835 Without Remote Support

CIO Slot	825/835 (No Access Port)		MB Slot
0	HP-IB/HP-FL (root disc)		8
1	MUX (console)		7
2	HP-IB (mt/lp/etc)		6
3	MUX		5
4	LAN		4
5	MUX, HP-IB (disc) ¹		3
6	HP-IB (disc)	Graphics or CA ²	2
n/a	System Card (825), PDH Card (835)		1
n/a	Main CPU Card (825), Processor Card (835)		0

high priority ↑
↓ low priority

FRONT ↑
↓ high priority

Model 825/835 With Remote Support

CIO Slot	825/835 (With Access Port)		MB Slot
0	Access Port (AP)		8
1	HP-IB/HP-FL (root disc)		7
2	HP-IB (mt/lp/etc)		6
3	MUX (console)		5
4	LAN		4
5	MUX, HP-IB (disc) ¹		3
6	HP-IB (disc)	Graphics or CA ²	2
n/a	System Card (825), PDH Card (835)		1
n/a	Main CPU Card (825), Processor Card (835)		0

high priority ↑
↓ low priority

FRONT ↑
↓ high priority

¹MUX on multi-user systems, HP-IB (disc) on graphics systems.

²Full-size Graphics Interface card can go here (recommended).
Full-size Channel Adapter card can go here (825 only).

LG200098_022a

Figure C-1. 825/835 Default CIO Card Locations

CIO Slots			Mid-bus Slots	Module Numbers	
0	HP-IB/HP-FL Root Disk		32 MB Memory Board	8	32
1	MUX		Open for Memory Expansion	7	28
2	Open for HP-IB		Open for Memory Expansion	6	24
3	Open for MUX		Open for Memory Expansion	5	20
4	Open for LAN		Open for Memory Expansion	4	16
5	Open for MUX		Open for Memory Expansion	3	12
PDH with internal and external channel adapter			2/10	8/40	
Open for Cooling			1	4	
Processor Board			0	0	
Power Supply					

Components of the base 845SE system

0	Available I/O Slot
1	Available I/O Slot
2	Available I/O Slot
3	Available I/O Slot
4	Available I/O Slot
5	Available I/O Slot
6	Available I/O Slot
7	Available I/O Slot
Buffer Card	
Power Supply	

LG200183_003

Figure C-2. 845SE Default CIO Card Configurations Without Access Port

CIO Slots			Mid-bus Slots	Module Numbers	
0	Access Port		32 MB Memory Board	8	32
1	HP-IB/HP-FL Root Disk		Open for Memory Expansion	7	28
2	Open for HP-IB		Open for Memory Expansion	6	24
3	MUX		Open for Memory Expansion	5	20
4	Open for LAN		Open for Memory Expansion	4	16
5	Open for MUX		Open for Memory Expansion	3	12
PDH with internal and external channel adapter				2/10	8/40
Open for Cooling				1	4
Processor Board				0	0
Power Supply					

Components of the base 845SE system with Access Port (ordered separately)

0	Available I/O Slot
1	Available I/O Slot
2	Available I/O Slot
3	Available I/O Slot
4	Available I/O Slot
5	Available I/O Slot
6	Available I/O Slot
7	Available I/O Slot
Buffer Card	
Power Supply	

LG200163_004

Figure C-3. 845SE Default CIO Card Configurations With Access Port

CIO Slot		Mid-Bus Slot	
0	HP-IB/HP-FL (root disc)	16 MB Memory Array	8
1	MUX (console)	8 MB Memory Array	7
2	HP-IB	Open for Memory Expansion	6
3		Open for Memory Expansion	5
4	LAN	Open for Memory Expansion	4
5		Open for Memory Expansion	3
6		Open for Memory Expansion	2
n/a	PDH Card (835)		1
n/a	Processor Card (835)		0

LG200181_001

Figure C-4. 635SV Default CIO Card Locations Without Access Port

CIO Slot		Mid-Bus Slot	
0	Access Port (AP)	16 MB Memory Array	8
1	HP-IB/HP-FL (root disc)	8 MB Memory Array	7
2	HP-IB	Open for Memory Expansion	6
3	MUX (Console)	Open for Memory Expansion	5
4	LAN	Open for Memory Expansion	4
5		Open for Memory Expansion	3
6		Open for Memory Expansion	2
n/a	PDH Card (835)		1
n/a	Processor Card (835)		0

LG200181_002

Figure C-5. 635SV Default CIO Card Locations With Access Port

CIO Slots			Mid-bus Slots	Module Numbers	
0	HP-IB/HP-FL Root Disk		32 MB Memory Board	8	32
1	MUX		Open for Memory Expansion	7	28
2	Open for HP-IB		Open for Memory Expansion	6	24
3			Open for Memory Expansion	5	20
4	LAN		Open for Memory Expansion	4	16
5			Open for Memory Expansion	3	12
PDH with internal channel adapter			2	8	
Open for Cooling			1	4	
Processor Board			0	0	
Power Supply					

Components of the base 645SV system

LG200163_005

Figure C-6. 645SV Default CIO Card Locations

Model 840

Boot Paths and Installation Commands

For the 9.0 release of HP-UX, use one of the following commands at the ISL> prompt to boot from the device having the source media. Chapter 4 has more information about the context for using the commands.

- The recommended command is:

```
hpux install to (boot_path)
```

Use this command, typing the exact boot path, when you want to specify which disk will subsequently contain the root file system. This is typically hpux install to (8.0.0).

- An alternative command is:

```
hpux install
```

Typing `hpux install` continues an installation and installs the root file system on the first valid destination device (the one located at the lowest device address on the lowest bus address).

The following sections have additional information about factory settings, modifying default paths, and hardware paths.

Factory Settings

Table D-1. Factory Setting for Boot and Console Paths

Path	Setting	Configuration
Primary boot path (system disk)	8.0.0	HP-IB or HP-FL disk drive attached to a card in CIO Slot 0; HP-IB address is set to 0.
Alternate boot path (tape drive)	8.2.3	Reel-to-reel tape drive attached to an HP-IB card in CIO Slot 2 of the SPU; HP-IB address is set to 3.
Console path	8.1.0	Terminal for the console attached to a MUX card in CIO Slot 1.

Modifying Default Paths

The following examples show how to change the boot paths held in stable storage.

- Change the primary boot path to 8.2.2

```
ISL>PRIMPATH 8.2.2
```

- Change the alternate boot path to 8.6.5

```
ISL>ALTPATH 8.6.5
```

- Change the console boot path to 8.2.0

```
ISL>CONSPATH 8.2.0
```

Hardware Paths on the 840

Hardware paths on the 840 follow the usual pattern:

	8	.	0	.	0	.	0		----	SCSI Unit Number
Module Number	----	+		+	-----					Port or HP-IB/HP-FL
(4 x Mid-bus slot #)										Device Address
										CIO Slot Number
										(Device Adapter)

Module Number

The module number for devices attached to the 840 SPU is 8. For example, a system disk connected to an HP-IB card in CIO slot 0 in the SPU has a hardware address of 8.0.0. (The HP-IB address on the disk is 0.)

The module number for devices attached to the Expansion Bay depends on whether it is configured as one 16-slot CIO card cage or as two 8-slot CIO card cages.

Expansion Bay Configured as One 16-Slot Card Cage

If the Expansion Bay is configured as one 16-slot card cage, then all devices attached to it will have hardware addresses in the form 16.x.x. The module number is 16, because the Channel Adapter Mid-bus card is in Mid-bus Slot 4 (4 x Mid-bus Slot 4 equals 16).

Expansion Bay Configured as Two 8-Slot Card Cages

If the Expansion Bay is configured as two 8-slot card cages, then there will be two forms for the hardware addresses: 16.x.x and 24.x.x.

Devices attached to the first of the 8-slot modules have hardware addresses in the form 16.x.x. The module number is 16 because the Channel Adapter Mid-bus card for this module is in Mid-bus Slot 4 (4 x Mid-bus Slot 4 equals 16.)

Devices attached to the second of the 8-slot modules have hardware addresses in the form 24.x.x. The module number is 24 because the the Channel Adapter

Mid-bus card for this module is in Mid-bus Slot 6 (4 x Mid-bus Slot 6 equals 24).

CIO Slot Number

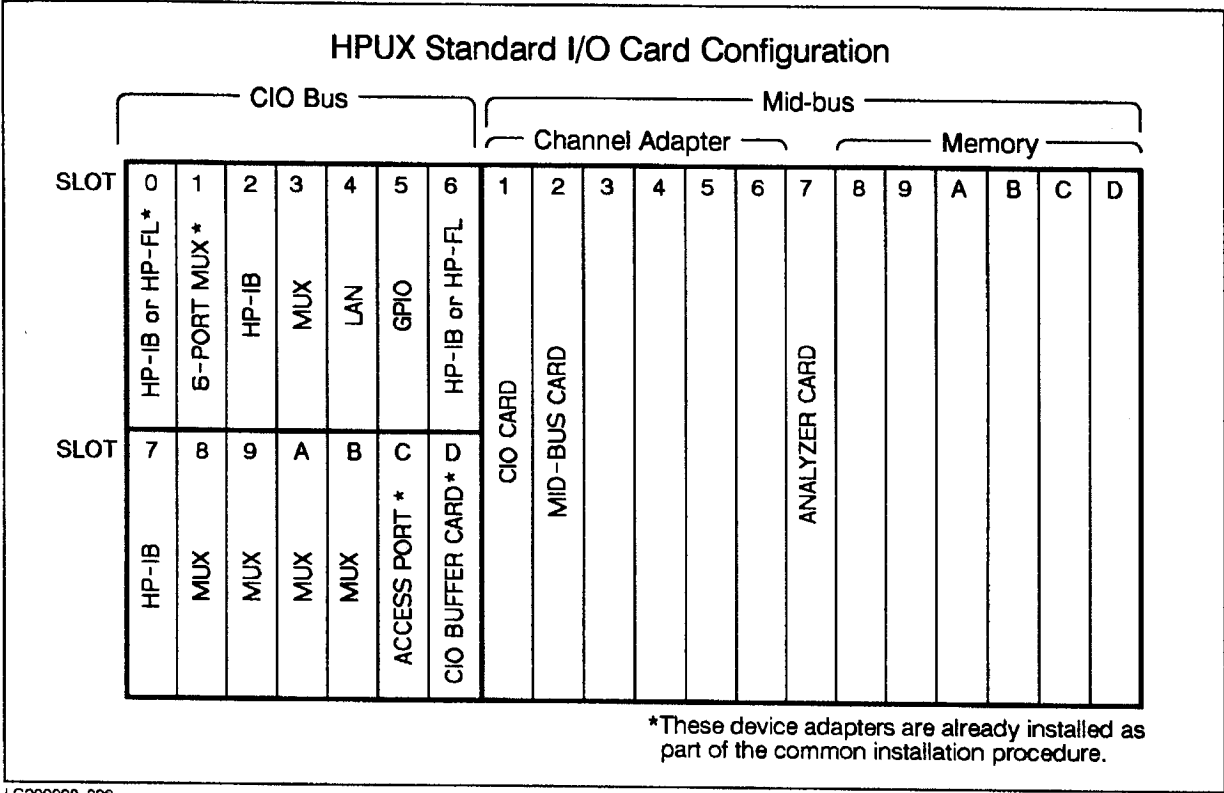
The second number in the hardware address is the CIO slot number. Figure D-1 shows the recommended location for CIO cards in the 840 with no Expansion Bay. Figure D-2 and Figure D-3 show the recommended location for CIO cards in the 840 with an Expansion Bay.

Port or Device Address

The third number in the hardware address is the port number (in the case of MUX cards) or the device address (in the case of HP-IB, HP-FL, or SCSI cards). The device address is set on the device itself.

SCSI Unit Number

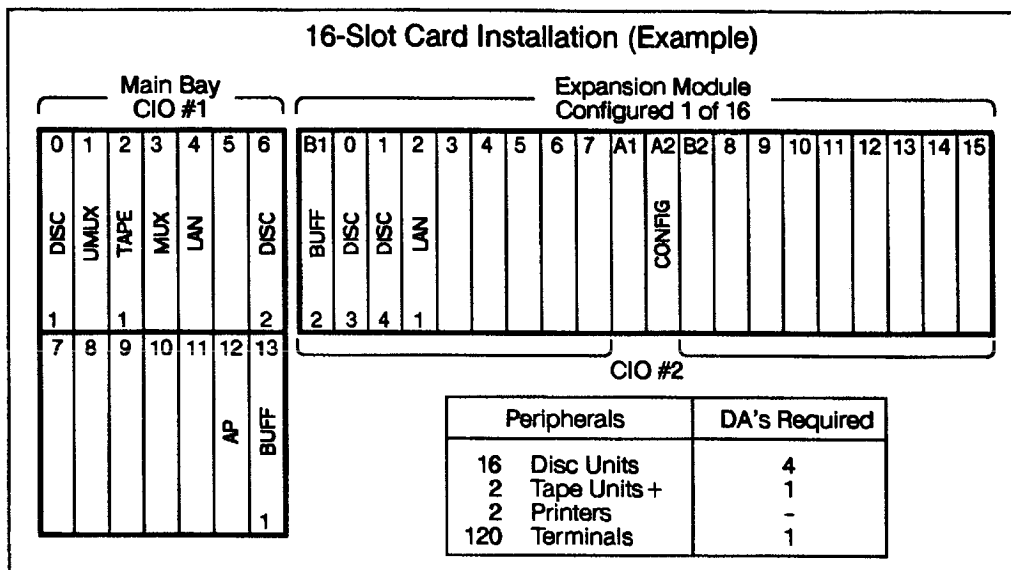
The fourth part of the address is the SCSI unit number, needed for SCSI devices only. It indicates which SCSI unit within a particular SCSI device is being addressed. For HP-UX Release 8.0, the SCSI unit number is always zero.



LG200098_026

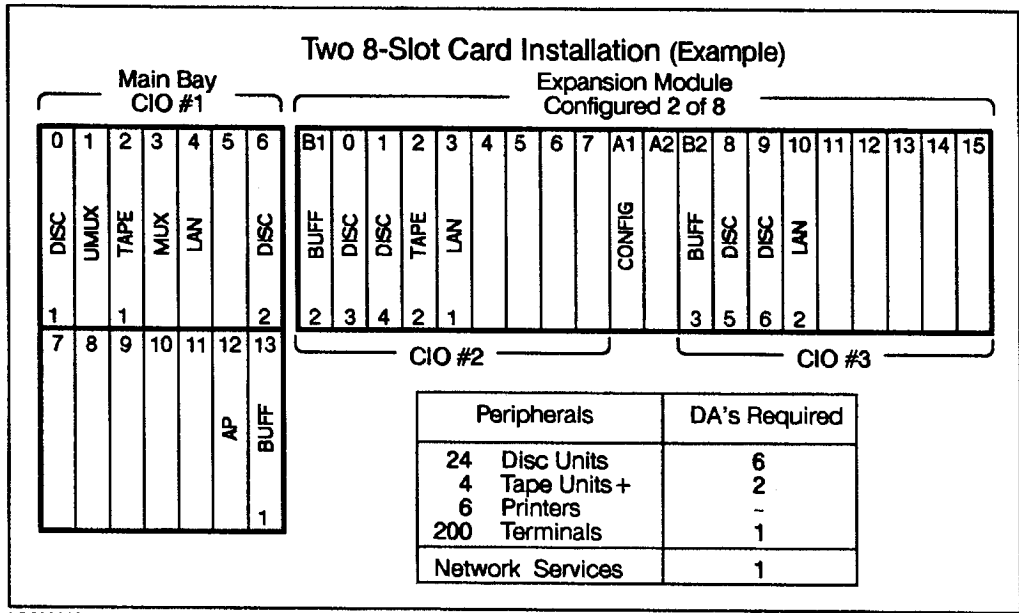
Figure D-1. 840 Default CIO Card Locations (No Expansion Bay)

Note To install HP-UX from Cartridge Tape Drive (CTD), install an HP-IB card into CIO slot 6.



LQ200088_027

Figure D-2.
840 Default CIO Card Locations with Expansion Bay (16-Slot Card Cage)



LG200098_028

Figure D-3.
840 Default CIO Card Locations with Expansion Bay (Two 8-Slot Card Cage)

Mirrored Disk Subsystem

An option for the 840 is mirrored disks. For optimum safety, the disks should be connected to separate HP-FL device adapters. While the software installation steps required to install mirroring can only be done after the OS has been installed on the system disk, the hardware should be installed now.

1. Add the second HP-FL device adapter to a free CIO slot, such as slot 7.
2. Connect the alternate disk(s) to the device adapter.
3. Record the slot numbers for the device adapter and address for the disk drive(s).

Models 850/855/860S/865/870S

Boot Paths and Installation Commands

For the 9.0 release of HP-UX, use one of the following commands at the `ISL>` prompt to boot from the device having the source media. Chapter 4 has more information about the context for using the commands.

- The recommended command is:

```
hpux install to (boot_path)
```

Use this command, typing the exact boot path, when you want to specify which disk will subsequently contain the root file system. This is typically `hpux install to (2/4.0.0)`.

- An alternative command is:

```
hpux install
```

Typing `hpux install` continues an installation and installs the root file system on the first valid destination device (the one located at the lowest device address on the lowest bus address).

The following sections have additional information about factory settings, modifying default paths, and hardware paths.

Configuring a Cartridge Tape Drive on the 860S and 870S

The cartridge tape drive must be installed at a different address, and requires a different configuration file, in order to use it for system installation/updating on 860S/870S models. If the drive is to be used for any other function, it must be moved back to its original address, and its original configuration file must be restored.

Installing/Updating from a Cartridge Tape Drive on the 860S/870S

Complete the following steps to allow installation or updating of the operating system from cartridge tape:

1. Set the address on the cartridge tape drive to **3**.
2. Install the cartridge tape drive at address **2/4.2.3**.
3. Load the install tape and complete the install or update process as described in earlier chapters.
4. The last cartridge tape is not removed automatically from the drive. If you want to remove it, press the *unload* button on the cartridge tape drive.

Using the Cartridge Tape Drive for Other Functions

The cartridge tape has been configured for system installation only. You may leave it configured for installation as long as you don't need the **lp**, **magtape**, or **instrument** drivers. If you need any of these drivers, you must return your system to the standard configuration. To restore your system to the standard configuration, follow these steps:

1. Disconnect the cartridge tape drive from address **2/4.2.3** and connect it to another address.
2. Regen the kernel by typing:
`regen`
3. Prepare to reboot the kernel by typing:
`sync;sync`
4. Reboot the system by typing:
`/etc/reboot`

Factory Settings

Table E-1. Factory Setting for Boot and Console Paths

Path	Setting	Configuration
Primary boot path (system disk)	2/4.0.0	HP-IB or HP-FL disk drive attached to a card in CIO Slot 0 (CIO Cardcage 0_1); HP-IB address is set to 0.
Alternate boot path (tape drive)	2/4.2.3	Reel-to-reel tape drive attached to an HP-IB card in CIO Slot 2 (CIO Cardcage 0_1); HP-IB address is set to 3.
Console path	2/4.1.0	Terminal for the console attached to a MUX card in CIO Slot 1 (CIO Cardcage 0_1).

If the paths in Stable Storage are different from the proper paths, change them with the ALTPATH and PRIMPATH commands at the ISL prompt. You can change the console path with the CONSPATH command.

Modifying Default Paths

The following examples show how to change the boot paths held in stable storage.

- Change the primary boot path to 2/8.0.0

```
ISL>PRIMPATH 2/8.0.0
```

- Change the alternate boot path to 2/8.2.3

```
ISL>ALTPATH 2/8.2.3
```

Hardware Paths on the 850/855/860S/865/870S

Hardware paths on the 850/855/860/865/870S models follow the usual CIO pattern, but have an initial number to specify the Bus Converter (BC):

Bus Converter (BC)	-----+		+-----	SCSI Device Unit Number
Module Number				
		2/4.0.0.0		
Module Number	-----+		+-----	Port or
(4 x MB slot #)				Device Address
		CIO Slot Number		
		(Device Adapter)		

Bus Converter (BC) Module Number

The 850/855/860S/865/870S models have two Bus Converters: Bus Converter 0 and Bus Converter 1. Bus Converter 0 services Mid-bus 0 which is on the right as you look at the SPU from the rear. Bus Converter 1 services Mid-bus 1 which is on the left of the SPU (See Figure E-1).

To specify a Bus Converter, you add a bus address to the front of the hardware address (separated with the “/” symbol). Always use 2 for Bus Converter 0, but use 6 for Bus Converter 1 when Bus Converter 0 exists, and 4 for Bus Converter 1 when Bus Converter 0 does not exist. For example, the above hardware address (**2/4.0.0**) specifies a device which is serviced by Bus Converter 0.

Module Number

The Module Number identifies the location of a device on the Mid-bus. To determine the Module number, use this formula:

Module number = MB x 4 *where MB is the Mid-bus slot in which the Channel Adapter card is located.*

Example with Bus Converter 0

For example, assume that a device is serviced by a Channel Adapter card located in Mid-bus slot 1, and by Bus Converter 0. The Module Number is 4:

$$\begin{aligned}\text{Module number} &= 1 \times 4 \\ &= 4\end{aligned}$$

The full hardware address is in the format 2/4.x.x (2/4.x for a mux), and the CIO card for this device is located in the lower right CIO card cage.

Example with Bus Converter 1

As a second example, assume that a device is serviced by a Channel Adapter card located in Mid-bus slot 2, and by Bus Converter 1. The Module Number is 8:

$$\begin{aligned}\text{Module number} &= 2 \times 4 \\ &= 8\end{aligned}$$

The full hardware address is in the format 6/8.x.x (or 6/8.x, depending upon the device), and the CIO card for this device is located in the upper left CIO card cage.

CIO Slot Number

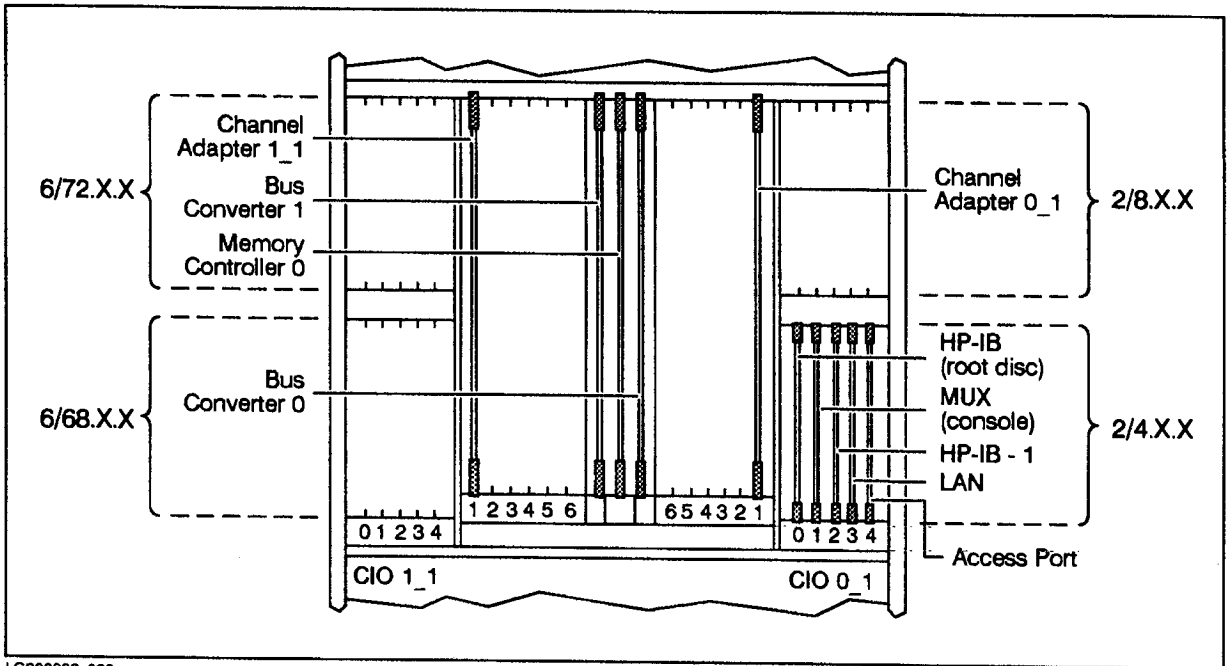
The second number in the hardware address is the CIO slot number. Figure E-1 shows the recommended location for CIO cards in the SPU.

Port or Device Address

The third number in the hardware address is the port number (in the case of MUX cards) or the device address (in the case of HP-IB, HP-FL, or SCSI cards). The device address is set on the device itself.

SCSI Unit Number

The last part of the address is the SCSI unit number (also known as a **lun** number), which is needed for SCSI devices only. It indicates which SCSI unit within a particular SCSI device is being addressed. For HP-UX Release 8.0, the SCSI unit number is always zero.



LG200098_030

Figure E-1. 850/855/860S/865/870S Default CIO Card Locations

Mirrored Disk Subsystem

An option for the 850/855/860S/865/870S models is mirrored disks. For optimum safety, the disks should be connected to separate HP-FL device adapters. While the software installation steps required to install mirroring can only be done after the OS has been installed on the system disk, the hardware should be installed now.

1. Add the second HP-FL device adapter to a free CIO slot, such as CIO Slot 0 in Cardcage 1_1.
2. Connect the alternate disk(s) to the device adapter.
3. Record the slot numbers for the device adapter and address for the disk drive(s).

Hardware Paths for a CIO Terminal Expander Bay (850/855/860S/865/870S)

The Expander Bay contains two sets of 8 slots into which MUX cards can be inserted. Each set of 8 slots is connected to a separate Channel Adapter card. HP recommends installing these Channel Adapter cards in Mid-bus slot 3 and higher on the SPU; slots 1 and 2 are usually occupied by Channel Adapter cards for CIO slots in the SPU.

Models 8x7

Boot Paths and Installation Commands

For the 9.0 release of HP-UX, use one of the following commands at the ISL> prompt to boot from the device having the source media. Chapter 4 has more information about the context for using the commands.

- The recommended command is:

```
hpux install to (boot_path)
```

Use this command, typing the exact boot path, when you want to specify which disk will subsequently contain the root file system. This is typically hpux install to (52.6.0).

- An alternative command is:

```
hpux install
```

Typing hpux install continues an installation and installs the root file system on the first valid destination device (the one located at the lowest device address on the lowest bus address).

The following sections have additional information about factory settings, modifying default paths, and hardware paths.

Factory Settings

As the system is typically configured, the following items indicate the boot paths:

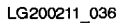
- Primary boot path is 52.6.0
- Alternate boot path is 52.0.0
- Console path is 56.0.0

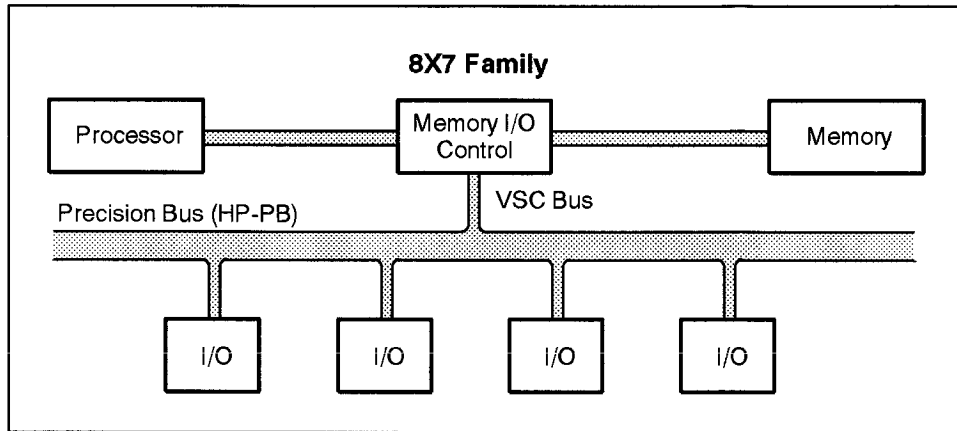
Modifying Default Paths

If the configuration of your 8x7 is different from the factory settings, you can change the boot and console paths. At the **ISL>** prompt:

- Change the boot paths with the **ALTPATH** and **PRIMPATH** commands.
- Change the console path with the **CONSPATH** command.
- If necessary, type **?** at the **ISL>** prompt to get online help.

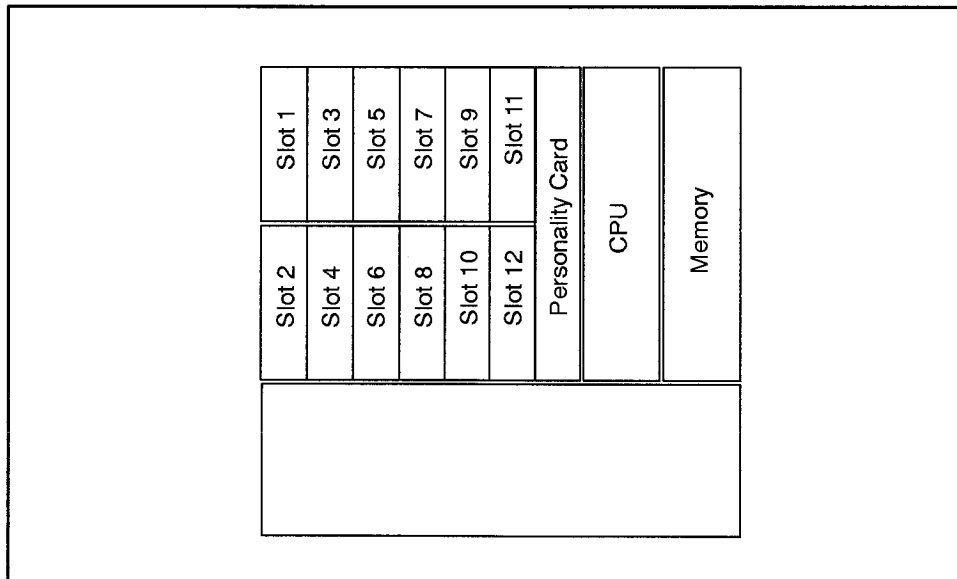
The following figures give hardware information for the model 8x7 bus and backplane. The first two drawings show the bus. The third shows the backplane.

**Models 8x7 F-3**



LG200211_014

Figure F-2. Model 8x7 Bus Drawing



LG200211_037

Figure F-3. Model 8x7 Backplane Drawing

Model 890

Boot Paths and Installation Commands

For the 9.0 release of HP-UX, use one of the following commands at the ISL> prompt to boot from the device having the source media. Chapter 4 has more information about the context for using the commands.

- The recommended command is:

```
hpux install to (boot_path)
```

Use this command, typing the exact boot path, when you want to specify which disk will subsequently contain the root file system. This is typically hpux install to (0/52.0) or hpux install to (0/52.0.0).

- An alternative command is:

```
hpux install
```

Typing hpux install continues an installation and installs the root file system on the first valid destination device (the one located at the lowest device address on the lowest bus address).

The following sections have additional information about factory settings, modifying default paths, and hardware paths.

Factory Settings

As the system is typically configured, the following items indicate the boot paths:

- For a standard FL or SCSI disk, the primary boot path is 0/52.0
For a FL disk array, the primary boot path is 0/52.0.0 where the second “0” identifies the physical disk module in the array.
- Assuming an HP C1512A SCSI tape device at address 3 in the default slot (9), the alternate boot path is 0/36.3
For a DDS device on the same SCSI card as the boot disk, the alternate boot path is 0/52.3
- Console path is 0/44.0

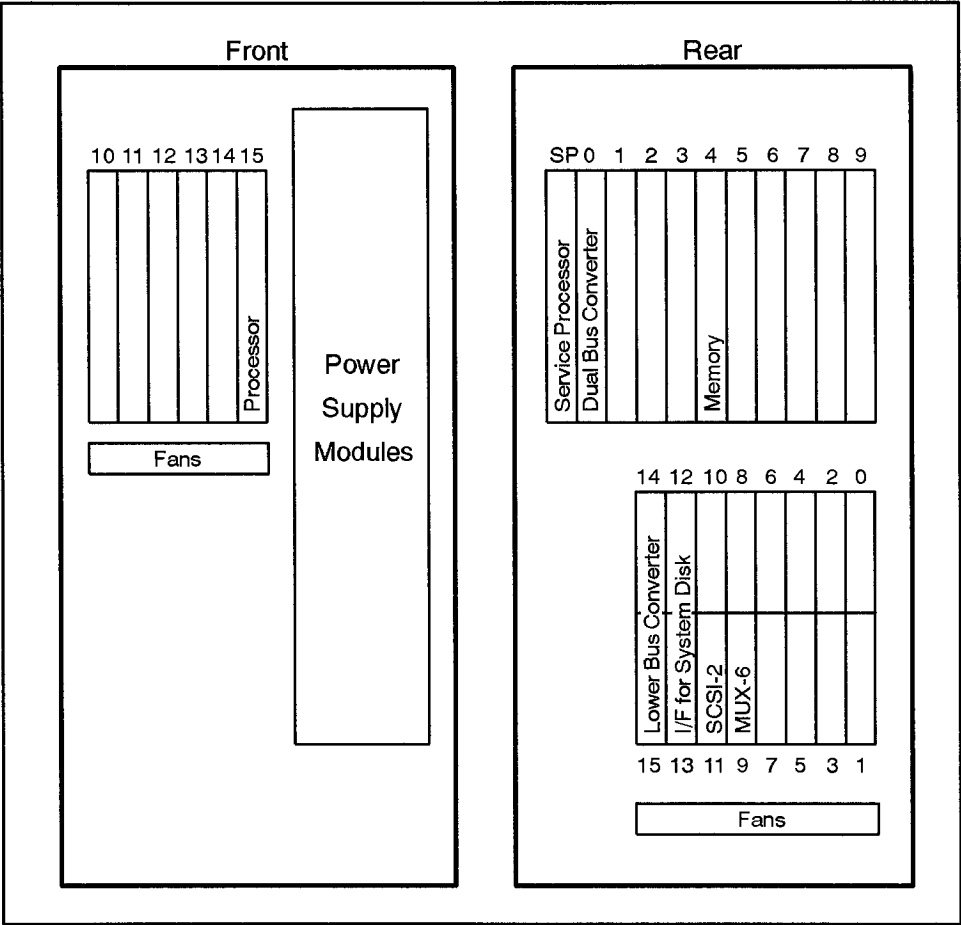
Modifying Default Paths

If the configuration of your 890 is different from the factory settings, you can change the boot and console paths. At the **ISL>** prompt:

- Change the boot paths with the **ALTPATH** and **PRIMPATH** commands.
- Change the console path with the **CONSPATH** command.
- If necessary, type **?** at the **ISL>** prompt to get online help.

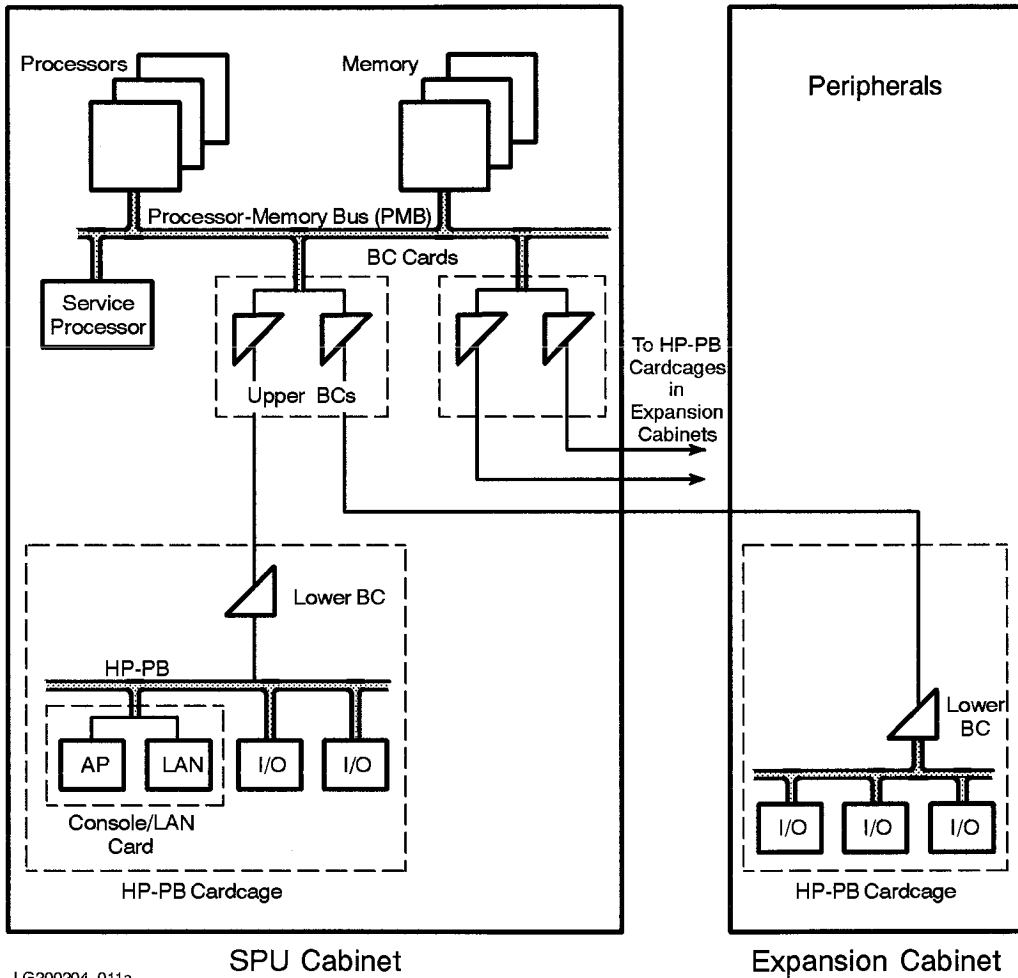
Hardware Information for the 890

The following figures give hardware information for the model 890 backplane and bus.



LG200211_039

Figure G-1. Model 890 Backplane Drawing



LG200204_011a

Figure G-2. Model 890 Bus Drawing

Root Disk Partitioning Screen

This appendix extends the installation step, if necessary, in which you partition the root disk. If you branched from the step to this appendix for the purpose of altering any default values in the screen for partitioning the root disk, perform the operations you want and then return to the step.

The appendix explains how to use the *Root Disk Partitioning* screen to change the names and section locations of the *mount points* for directories such as */*, */usr*, and */bin* into which files are loaded during an installation.

Again, be aware that you should accept the defaults you see displayed unless you have the expertise to change them and know why you should change them. While you work through the directions that follow, examine the screen as necessary to see what happens.

Sections and Directories

HP-UX divides the physical space on the disk into logical sections for the purpose of managing the space efficiently and flexibly.

Directories have certain sections by default. The *Root Disk Partitioning* screen lets you change the default assignments.

The section to which a directory is assigned determines the size of that directory. You can change the size of a directory by moving it to another section. The root directory is typically assigned to Section 13, which covers the entire disk except for **boot** and **swap**. This assignment causes *update(1M)* to load all files into the root directory.

Things to Consider If You Change the Default Configuration

- Looking at the screen, you see that some sections are formed by merging smaller sections, which means the same physical space is defined twice. (For example, section 11 encompasses sections 10, 3, 4 and 5 (or 10, 3 and 9). If you use any of these smaller sections, you cannot also use section 11 (and conversely) because the update program prevents you from using a space twice. You get a warning if you have not used all the sections available (for example, if you use 3 and 4, but not 5). Make sure all the space on the disk is allocated.
- Do not leave holes. If you use sections 0 and 14, or 0 and 13, you waste disk space (24 MBs on an HP 7935). You get a warning if your choice of sections leaves wasted space.
- The **swap** section is not a directory. It is an area of raw storage used by the HP-UX memory manager. You *must* assign at least one section to **swap**, and you *can* assign multiple sections to **swap**.

If you install more than a minimal system at HP-UX Release 9.0, you *must* have at least 24 MBs of swap space. If you have a disk with a default swap section of 16 MBs and want to install more than a minimum system, assign a swap section of at least 24 MBs.

- Having multiple sections for file systems has advantages:
 - Logically related files are stored in contiguous physical space. This reduces disk access time.
 - You can tune block/fragment sizes according to the types of file in a particular file system. The *System Administration Tasks* document has information about this.
 - Making the root directory self-contained reduces risk of having activity on other disks corrupt the root directory.
 - You are better protected against root overflow. When the root directory is full, the operating system will not work correctly. If the root is in a separate section from such directories as **/tmp**, the root is unaffected if one of these other directories fills up its section.

- Having multiple sections for file systems has a disadvantage; namely, you might run out of space in a particular section when there is ample space elsewhere on the disk. Merging everything into one large section eliminates this problem but loses the advantages listed above.
- Creating *symbolic links* can help if you run out of space in a particular section. The *System Administration Tasks* document has information about creating symbolic links.

Tips for Using the Function Keys

Perform Task

Continues the installation, using the values specified in the fields in the root disk partitioning screen.

Default Sections

Restores the default values that appeared when the screen first came up. If you change the default values for the screen and then want to start over, use this key to get the defaults back.

The key does not restore the default file name option.

Refresh

Repaints the screen, clearing out any “noise” characters caused by datacom transmission errors. Does not restore default data to the input fields.

Help

Brings up a Help screen that explains the options for using the screen.

Using the Root Disk Partitioning Screen

The following steps explain how to change the default configuration.

1. Use **Tab** to move from line to line on the screen.
2. Space through a default name you want to change, move or delete. The **boot**, **/** (root) and **swap** entities must remain in the list. You can have more than one swap area.
3. Type in a new name where you want it to appear. There are some restrictions:

- a. Do not enter duplicate names. Doing so leads to the following error:

ERROR: File system names in Section [number] and Section [number] cannot be identical.

If you have a duplication, tab to the duplicate, delete it, reenter an appropriate entry, tab back to where you were, and continue.

- b. Do not use a section that is overlapped by another already in use.

The line for a given section remains protected (you cannot tab to it) when there is an entry for an overlapping section. Clean out overlapping sections by spacing through them.

- c. Except for **swap**, enter section names that begin with **/**.

Do not name sections **/dev**, **/bin**, **/lib**, or **/etc**. These directories must be under the **/** (root) section.

If you do, press the space bar and make the indicated correction.

- d. Do not enter section names with embedded spaces.

If you do, press the space bar and retype the name without spaces.

- e. If you specified short filenames, do not enter section names longer than 14 characters.

If you do, press the spacebar and type a shorter name; or enter 1 in the **Filename Type** field and use long filenames. Chapter 2 discussed short and long filenames.

When you have made desired changes and you think the values on the screen are appropriate, you need to continue. Continue by pressing **Perform Task**, which is **(f1)**. At this point, you return to Chapter 6 and continue the installation, allowing that the following section contains information about possible error conditions.

Possible Error Conditions

- If the *install*(1M) program detects an unworkable configuration, you see a highlighted error message at the bottom of the screen. For example, you could see:

ERROR: Root disk must have a / file system

If this happens, press the space bar to acknowledge the message and correct the error as the message indicates. In this case, you would need to add an entry for / (root).

Press **Perform Task** to try again.

- You also get an error message when you do not use all the available sections. For example, you could see:

Not all sections were used! Continue installation?(y/n)

It is bad practice to leave unused sections. Respond n and fill in the vacant sections.

Also, if you attempt to allocate sections 0 and 13 or sections 0 and 14, you receive a warning that the configuration wastes space. Although you can override this warning, you should select another configuration.

- When you press the function key for **Perform Tasks** and do not get any error messages, return to Chapter 6 and continue the installation where you left your mark.

Creating and Managing a Netdist Server

This appendix explains how to use a network distribution server (called a **netdist server**). A netdist server has the capability to be a source of update media for *update*(1M). The media is distributed to a remote system (called a **client system** or a **local system**) over a network.

The *netdistd*(1M) entry in the *HP-UX Reference* document supplements the information in this appendix.

To use a netdist server during an update, run the */etc/update* program on the client system as usual and specify a netdist server as the source of media (filesets) instead of specifying a tape or CD-ROM disk. You need to know the networking address or hostname for the netdist server. Otherwise, you use the update program according to the steps described in Chapter 4: Updating HP-UX.

This appendix does *not* explain how to use a netdist server. Instead, it describes server requirements and how to perform the following tasks:

- Create (set up) a network distribution server (*netdist server*).
- Add filesets to the netdist server. This includes isolating a netdist server from processes related to ongoing updates. Isolating the server lets you add new or modified filesets to it without affecting the filesets being distributed by the server to client (remote) systems.
- Identify the filesets that are available for a network installation or update.
- Examine the log file created during an installation or update to identify possible problems.

Overview of a Network Distribution Server

The following items indicate why you might want to use a netdist server to obtain filesets for an update:

- You have a group of networked systems, and you want to update all of them to a new release of HP-UX.
- You have a group of networked systems, and you must add software to all of them.
- You need to perform an update across architectures, making a Series 300/400, 700, or 600/800 computer into a netdist server.

You cannot use a netdist server to perform an update until the server exists on a network that client systems can access. You create a server, if necessary, by running `/etc/updist` (a variant of `/etc/update`) on the desired system.

When you create a netdist server, the `/etc/updist` program transfers filesets from conventional media (tapes or CD-ROM disks) to a directory that is typically named `/netdist`. These filesets subsequently are accessed by a client system as the source media for its update.

After you create the netdist server (that is, the `/etc/updist` program adds the distribution filesets to the server and completes its work), you start up a `netdistd` daemon on the server. Client systems on the network can then obtain filesets during their update from the `/netdist` directory on the server because the `netdistd` daemon delivers the filesets as if they were on conventional media.

Requirements for a Network Distribution Server

The system you make into a netdist server must meet the following requirements.

Hardware and Disk Space Requirements

- Have the necessary networking hardware installed and configured.

See the *LAN Interface Controller (LANIC) Installation and Reference Manual* and the *LAN Cable and Accessories Manual* if you need information.

- Ensure that the server has adequate disk space. The following items offer guidelines for minimum amounts of space:
 - 100 MBs for the Series 300 runtime product.
 - 120 MBs for the Series 700 runtime product.
 - 140 MBs for Series 800 multi-user runtime product.
 - 200 MBs for the Series 800 server runtime product.
- Also, you might need additional space for applications. You might want to mount a separate disk on the `/netdist` directory and let the netdist server distribute files from that disk (directory). The *System Administration Tasks* manual has information about mounting disks on file systems.

For example, to distribute software for Series 300, 400, 700, and 800 systems, you might mount a disk of 660 MBs (or more) on the `/netdist` directory.

Software Requirements

- To distribute the 9.0 release to client systems, the netdist server must be running an appropriate release (at least 8.x unless the 8.x/9.0 versions of **updist** and **netdistd** are obtained from an 8.0 system). Regardless of the release, the netdist server should have the LANLINK and ARPA filesets.
- If necessary, configure the LANLINK software according to directions given in the following documents:

Installing and Administering ARPA Services.

Installing and Administering LAN/9000 Series 800.

- To transfer the TOOL Fileset Archive files between the netdist server and client systems, set up FTP (File Transfer Protocol) in the *anonymous* mode on the netdist server. For the 9.0 release, the netdist server must have *anonymous ftp*. You can use *sam(1M)* to set up *anonymous ftp*, or you can use the document named *Installing and Administering ARPA Services* to set it up manually.

Create and Use a Network Distribution Server

This section attempts to be complete. If you need additional information, the final section (in this appendix) named "If You Need More Information ..." contains pointers to other documentation.

You cannot perform an update over a network to a client system unless some system on the network is a netdist server.

If your network does not already have a netdist server, create one by working through the steps in this section. If your network does have an accessible netdist server, you can ignore this section.

Working through the following steps assumes the system you make into a netdist server is not already one. (In a later section, you will see the need to isolate a netdist server before you add filesets that the server can subsequently distribute to client systems. The procedure for isolating and then updating an existing netdist server is separate from the one for creating a server.)

Step 1: Create the Netdist Server

1. Be sure the system you make into a netdist server meets the minimal hardware and software requirements described in the previous section.
2. The system that will become the server must be running at least an 8.x release of HP-UX, and you must be logged in as the superuser.
3. On the system that will become the server, make a directory named `/netdist` (if it does not already exist). You can specify a different path if you do not like `/netdist`. If you use a different path, know why using a different path is important and account for it when you perform other tasks.
4. Examine the file named `/etc/services` to see if it contains an entry for the netdist server. The entry should look something like this:

```
netdist          2106/tcp          # network file distribution
```

The 2106 is the default port number on the server.

If the entry does not exist, edit `/etc/services`, adding the line as shown above. Enter the appropriate port number if you do not use the default.

5. Insert the media for the 9.0 release in the drive you intend to specify as the source device (for example, a DDS cartridge tape drive or CD-ROM disk drive). You can, when you run the `/etc/updist` program, specify another netdist server as the source device. If you intend to do this, you must know the network name of the server before you run `updist`.
6. Run the `/etc/updist` program to load filesets from the source-device media to a hierarchical structure beneath the `/netdist` directory.

The filesets you load during this step are the *only* ones the netdist server can subsequently distribute to a client system when that system requests filesets during an update.

To distribute software for Series 300, 400, 700, *and* 800 systems, run the **updist** program for each set of update media. The filesets are loaded into separate directories under the **/netdist** directory according to the series.

7. When the filesets have been loaded and the **updist** program completes its work, you should start up the system as a netdist server by executing:

/etc/netdistd -l *The option is a lowercase L*

You may need to specify other options if you do not use the defaults or if you specified a directory other than **/netdist**.

When you execute the command shown in the example, the netdist server functions as follows:

- a. The **netdistd** program is a daemon that monitors the network for distribution requests.
- b. The **-l** option causes the **netdistd** daemon to log activity and error information, saving the information in a file named **/usr/adm/netdist.log**.

If you need information about other options to the **/etc/netdistd** program, see *netdistd(1M)* in the *HP-UX Reference*.

Step 2: Make /etc/update Available to Clients

The `/etc/update` program on the netdist server must be available for network distribution of filesets requested by client systems.

1. On the newly created netdist server, build the TOOL archive from the `/netdist` directory by executing the following commands as appropriate.

Series 300/400 Execute the following commands to distribute software to Series 300/400 clients:

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

Series 700 Execute the following commands to distribute software to Series 700 clients:

```
cd /netdist/700/TOOL/product
tar -cvf /tmp/TOOL.700 etc system
```

Series 800 Execute the following commands to set up the server distribute software to Series 800 clients:

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

2. This step assumes you set up *anonymous ftp* on the netdist server.

Make the TOOL archive available to client systems by putting the archives in a directory where other systems can get them. Execute the following commands as appropriate.

Series 300/400 `mkdir /users/ftp/dist`
 `mv /tmp/TOOL.300 /users/ftp/dist/TOOL.300`
 `chmod 444 /users/ftp/dist/TOOL.300`

Series 700 `mkdir /users/ftp/dist`
 `mv /tmp/TOOL.700 /users/ftp/dist/TOOL.700`
 `chmod 444 /users/ftp/dist/TOOL.700`

Series 800 `mkdir /users/ftp/dist`
 `mv /tmp/TOOL.800 /users/ftp/dist/TOOL.800`
 `chmod 444 /users/ftp/dist/TOOL.800`

Step 3: Set Appropriate Permissions

The client systems must have permission to access the netdist server. You set permissions in the `/usr/adm/inetd.sec` file on the netdist server. It is not possible to anticipate every situation, but the following two examples show some entries.

The following example denies host 192.23.4.3 access to the NFS server named `rpc.mountd`.

```
mountd    deny    192.23.4.3
```

The example following the list allows the use of `rlogin` to:

- Hosts in subnets 3 through 5 in network 10.
- The host with internet address of 192.34.56.5.
- The host with the name `ahost`.
- All the hosts in the network named `anetwork`.

```
login     allow    10.3-5 192.34.56.5 ahost anetwork
```

At this point, set the permissions for your netdist server. If you need some help, the `inetd.sec(5)` entry in the *HP-UX Reference* has information about creating permissions. When you complete this step, the netdist server should be ready to accept requests from client systems for distribution of filesets.

If You Need More Information . . .

If you need more information about creating and using a netdist server, read the following documents:

- For information on the netdistd daemon, see the *netdistd(1M)* entry in the *HP-UX Reference*.
- For information on creating or using *anonymous ftp*, see the *Installing and Maintaining NS-ARPA Services* document or the *sam(1M)* entry in the *HP-UX Reference* manual.
- For information on disk space, see the *How HP-UX Works: Concepts for the System Administrator* manual.
- For information on networking hardware, see available hardware configuration manuals and data sheets (for example, the *HP9000 Series 300 Hardware Configuration Guide*).

Isolate Processes on a Server Before Updating It

After you create a netdist server, you will probably update the server's `/netdist` directories periodically to make new or updated filesets available to clients.

Before you update a netdist server so it can distribute new software, you need to isolate the server from any child processes that are accommodating current updates of clients via the server's parent process for the netdistd daemon.

Isolating a netdist server relates to killing certain processes and not killing other processes. It also relates to letting some processes terminate.

You need to isolate the netdist server *before* you update it.

This section explains how to isolate the server. The next section explains how to add filesets to an existing server (this includes updating the server to a new release of HP-UX). Be sure to coordinate your actions across the two sections.

Isolating the Server

1. The daemon named `netdistd` spawns child processes to handle incoming requests for updates, one child process for each request. For example, if three requests are being serviced, four copies of the netdistd daemon are running (one parent process and three child processes).
2. Before you isolate the server so as to *not* disturb any updates being performed by clients, you need to identify the parent process for the server's netdistd daemon. To do this, examine the log file named `/usr/adm/netdist.log`. The line showing the parent process in the log file should look something like this:

```
netdistd.560 14:59:46...Started on port 2106
```

A line in the log file that begins with `netdistd` indicates a *parent* daemon. The value immediately after `netdistd` (which is 560 in the line above) is the PID. Lines for *child* processes begin with a digit (for example, 1 or 2).

3. Having determined the PID of the parent process of the `netdistd` daemon, kill the process. Do *not* kill any of the child processes, wait for them to terminate normally. In reference to the above example, you could execute:

```
kill 560
```

If you need more information about killing a process, see the *kill(1)* entry in the *HP-UX Reference*).

Having isolated the `netdist` server from updates it is providing for client systems, you can update the server without disturbing the updates of clients. You need to wait for the server to *drain* itself. In the state you just created for the server, no new distributions are allowed. The server waits for existing distributions to finish.

Add Filesets to a Netdist Server as Appropriate

This section explains how to update an existing server, adding filesets or updating to a new release.

Do *not* update an existing server unless you have isolated it from updates it might be providing for client systems. Not isolating the server might cause a core dump or cause the filesets being distributed to a client system to become corrupted. The previous section explained how to isolate the server. Once you have isolated the server, work through the following steps to update it:

1. Insert the media for the filesets to be added in the device you intend to specify as the source device (probably a tape drive or CD-ROM disk drive). You can, when you run the `/etc/updist` program, specify another, existing netdist server as the source device. If you intend to do this, you must know the name and port number of the server before you run `updist`.
2. Run the `updist` program to load filesets from a tape, CD-ROM disk, or another netdist server to a hierarchical structure beneath the `/netdist` directory.

The filesets you load during this step (plus the filesets that are already on the server) are the *only* ones the netdist server can subsequently deliver to a client system when the client system requests filesets during its update.

To distribute software for Series 300, 400, 700, *and* 800 systems, run the `updist` program for each set of update media. The filesets are loaded into separate directories under the `/netdist` directory according to the series.

3. When the filesets have been loaded and the `updist` program completes its work, start up the system as a `netdist` server by executing:

`/etc/netdistd -l` *Option is a lowercase L*

You may need to specify other options if you do not use the defaults or if you specified a directory other than `/netdist`.

When you execute the command shown in the example, the `netdist` server functions as follows:

- a. The `netdistd` program is a daemon that monitors the network for network distribution requests.
- b. The `-l` option causes the `netdistd` daemon to log activity and error information, saving the information in a file named `/usr/adm/netdist.log`. The next section in this appendix describes the `netdist` log entries.

If you need information about other options to the `/etc/netdistd` program, see the `netdistd(1M)` entry in the *HP-UX Reference*.

Use the netdist.log File to Get Information

The netdistd daemon records events in a file named `usr/adm/netdist.log` if you specify the `-l` option when you execute `/etc/netdistd -l`.

The log file contains the following information:

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

Here is an example of a log file (The example is explained on the following page. The series numbers will vary according to your systems.):

```
Version @(#)$Revision: 64.7 $
```

```
Startup
```

```
Building database 14:56:42
```

```
Database ready 14:59:46
```

```
netdistd.560 14:59:46...Started on port 2106
```

```
Parent daemon
```

```
netdistd.560 14:59:46...Connection limit is 20
```

```
1.562 15:09:22...Begin service for hptest on port 2106
```

```
First child daemon
```

```
1.562 15:09:22 update @(#) $Revision: 64.492 $
```

```
1.562 15:09:22 HP-UX hptest A.B7.00 B 9000/800 15453
```

```
2.570 15:10:36...Begin service for hpclient on port 2106
```

```
Second child daemon
```

```
2.570 15:10:36 update @(#) $Revision: 64.492 $
```

2.570 15:10:36 HP-UX hpclient 7.0 B 9000/300

1.562 15:13:02...End service for hptest

2.570 15:27:17...End service for hpclient

Startup: The first three lines in the preceding example indicate when the **netdistd** program started. The first line shows the version of the **netdistd** program; the second and third lines indicate that the database was initialized successfully.

Parent daemon: Entries beginning with **netdist** indicate a *parent* daemon. The parent daemon's process ID (PID) is the number immediately following **netdist** (560 in the example). When isolating the **netdist** server, use this PID to kill the parent daemon process.

Child daemons: Entries beginning with a digit indicate "child" daemons. The first number (for example, the 1 in 1.562) is a counter that increments by one each time a child daemon is spawned. This counter lets you determine the number of update sessions that have used this **netdist** server since the server was started. In the opposite example, two child daemons (1.562 and 2.570) have been spawned from the parent daemon (560).

The number following the counter (for example, the 562 in 1.562) is the child daemon's process ID (PID). Killing a child process will interrupt an update of a client system that is in progress.

Manage Fileset Availability on a Server as Necessary

The purpose of a netdist server is to make filesets available to client systems for an update. This means you might, at times, want to know which filesets are available and control the access to those filesets.

Examining the MAIN.pkg File

The updist program automatically creates a file named `/netdist/MAIN.pkg`. The lines in the file look something like this:

```
source "/netdist/300/ACCOUNTING/netdist.pkg";
source "/netdist/300/ALLBASE1/netdist.pkg";
```

Statements that begin with `source` identify filesets that are available for network distribution.

Restricting Access to Filesets

You can make a fileset unavailable for distribution to clients by editing `MAIN.pkg` in either of the following ways, noting that the file is in `/netdist` (the default) or the directory you specified when you created the netdist server:

1. insert a pound sign (`#`) at the beginning of each line naming a fileset you do not want to distribute, *or*
2. delete each statement having a fileset you do not want to distribute.

Exercise care in restricting access to a fileset because some filesets have dependencies on other filesets. Looking at lines in `MAIN.pkg`, you will see comments under lines that begin with `source`. The comments indicate dependencies on other filesets. The following lines show examples:

```
...
source "/netdist/800/NS-SERV/netdist.pkg";
#NOTE:  NS-SERV depends on LANLINK
...
source "/netdist/800/NFS-RUN/netdist.pkg";
#NOTE:  NFS-RUN depends on LANLINK
...
source "/netdist/800/LANLINK/netdist.pkg";
...
```

Looking at the example, you see that the **NS-SERV** and **NFS-RUN** filesets depend on the **LANLINK** fileset. Therefore, do *not* comment out the source statement for a fileset (**LANLINK**) that contains files required by other filesets (**NS-SERV** and **NFS-RUN** unless you also comment out those filesets.

To restrict access by editing **MAIN.pkg**, work through the following procedure:

1. Isolate the netdist server according the directions given earlier in the section named "Isolate Processes on a Server Before Updating It".
2. Determine which filesets you do not want to distribute over the network. Do this by inspecting **MAIN.pkg** and any other documents you may have that relate to network distribution of HP products.
3. Edit the **MAIN.pkg** file as explained above (comment out or delete lines). This does *not* remove the filesets from the netdist server. You are only making them unavailable to client systems. If you update an existing netdist server, it is possible to have duplicate entries in the **MAIN.pkg** file. You must comment out or delete all related entries to make filesets unavailable to clients.
4. If you need to remove any filesets from the server, you can use the following command, which removes the specified directory.

```
rm -rf /netdist/300/ACCOUNTING
```

Specify a series number and fileset name as appropriate.

5. Restart the netdist server by executing the following command:

```
/etc/netdistd -l    The option is a lowercase L
```

Product and Fileset Information

A feature of the install and update programs is that you can decide to load or not load certain filesets. The programs do not let you deselect a fileset that is required for other filesets you decide to load.

The following sections contain information about certain, core HP-UX products. You might want to consider the information while making decisions about loading partitions and filesets for a core HP-UX product. For a product you add to the system, the documentation for that product might have information about their partitions and filesets. This information typically appears in a *README FIRST* or *Release Notes* document.

Filesets in the HP-UX S800 Runtime MF (65482 Kbytes)

The following product provides a minimum-function version of HP-UX. The size is in KBs.

Fileset Name	Size		Fileset Name	Size

08-USER	64		ACCOUNTNG	311
ACCOUNTNG-MAN	3		AMERICAN	20
ARABIC	20		ARABICW	11
AUDIT	195		AUDIT-MAN	20
BULGARIAN	10		C-INC	2278
C-MAN	89		C-MIN	6369
CFRENCH	20		CHINESES	9
CHINESET	16		CMDS-AUX	1850
CMDS-AUX-MAN	176		CMDS-MIN	2253
CMDS-MIN-MAN	229		CORE-DIAG	5851

Filesets continue on the next page.

Fileset Name	Size		Fileset Name	Size
CORE-SHLIBS	3956		CZECH	10
DANISH	20		DOS-UTILS	80
DOS-UTILS-MAN	14		DQUOTA	121
DQUOTA-MAN	16		DUTCH	20
EDITORS	313		EDITORS-MAN	41
ENGLISH	20		FINNISH	20
FRENCH	20		GERMAN	20
GREEK	20		HEBREW	20
HUNGARIAN	11		ICELANDIC	20
ITALIAN	20		JAPANESE	30
KATAKANA	9		KERN-BLD	8000
KERN-BLD-MAN	37		KEYSHELL-MAN	20
KEYSHELL-RUN	504		KOREAN	9
LANG-MIN	2713		LANG-SHLIBS	26
LP-SPOOL	953		LP-SPOOL-MAN	39
LVM	1174		LVM-MAN	65
MAILERS	678		MAILERS-MAN	52
NLS-CORE	687		NLS-CORE-MAN	56
NONHPTERM	339		NORWEGIAN	20
POLISH	10		PORTUGUES	20
RUMANIAN	10		RUSSIAN	10
SAM	6253		SAM-MAN	9
SCSI-CARD-DIAG	422		SCSI-DISK-DIAG	743
SCSI-TAPE-DIAG	1454		SDF-CMDS	395
SDF-CMDS-MAN	23		SERBOCROATIAN	10
SLOVENE	10		SPANISH	20
SPELL	214		SPELL-MAN	6
SWEDISH	20		SYS-ADMIN	1159
SYS-ADMIN-MAN	401		SYS-ADMIN	501
SYS-ADMIN-MAN	36		TERM-MNGR-MAN	9
TERM-MNGR-MAN	1353		TERM-MNGR-MAN	302
TEXT-FMT	1297		TEXT-FMT-MAN	38
THAI	8		TOOL	3124
TOOL-MAN	48		TURKISH	20
UUCP	846		UUCP-MAN	44
UX-CORE	6085		UX-CORE-MAN	585

Filesets in the HP-UX S800 Runtime SV (102572 Kbytes)

The following product provides a full-function version of HP-UX. The size is in KBs.

Fileset Name	Size	Fileset Name	Size
08-USER	64	ACCOUNTNG	311
ACCOUNTNG-MAN	33	AMERICAN	20
ARABIC	20	ARABICW	11
ARPA-AUX	124	ARPA-AUX-MAN	27
ARPA-INC	13	ARPA-MAN	211
ARPA-RUN	1382	AUDIO-MAN	152
AUDIT	195	AUDIT-MAN	20
BMS	454	BSDIPC-SOCKET	279
BULGARIAN	10	C-INC	2278
C-MAN	89	C-MIN	6369
CFRENCH	20	CHINESES	9
CHINESET	16	CMDS-AUX	1850
CMDS-AUX-MAN	176	CMDS-MIN	2253
CMDS-MIN-MAN	229	CORE-DIAG	5851
CORE-SHLIBS	3956	CZECH	10
DANISH	20	DISKLESS-MAN	10
DOS-UTILS	80	DOS-UTILS-MAN	14
U2ODQUOTA	121	DQUOTA-MAN	16
DUTCH	20	EDITORS	313
EDITORS-MAN	41	ENGLISH	20
FDDI-MAN	12	FINNISH	20
FRENCH	20	GERMAN	20
GREEK	20	HEBREW	20
HPFL-DIAG	684	HPIB-CARD-DIAG	254
HPIB-DISK-DIAG	760	HPIB-PRNT-DIAG	201
HPIB-TAPE-DIAG	1176	HUNGARIAN	11
ICELANDIC	20	IMAGING-RUN	280
IMAGING-SHLIBS	477	IMAGNG-RUN-MAN	4
INSTRUMT-DIAG	240	ITALIAN	20
JAPANESE	30	KATAKANA	9
KERN-BLD	8000	KERN-BLD-MAN	37
KEYSHELL-MAN	20	KEYSHELL-RUN	504
KOREAN	9	LAN	391
LAN-MAN	268	LANG-MIN	2713

Filesets continue on the next page.

Fileset Name	Size		Fileset Name	Size
LANG-SHLIBS	26		LP-SPOOL	953
LP-SPOOL-MAN	39		LSSERVER-ADMIN	1303
LSSERVER-MAN	18		LSSERVER-RUN	671
LVM	1174		LVM-MAN	65
MAILERS	678		MAILERS-MAN	52
MKFONTDIR	123		NCSNCK-MAN	59
NCSNCK-RUN	1957		NET	286
NET-PERIPH	390		NETINET	908
NETIPC	273		NETTRACELOG	712
NETWORK-DIAG	856		NFS-INC	103
NFS-MAN	141		NFS-RUN	1785
NLS-CORE	687		NLS-CORE-MAN	56
NONHPTERM	339		NORWEGIAN	20
PMUX-PBUS-DIAG	100		POLISH	10
PORTUGUES	20		RBOOTD	49
RBOOTD-MAN	4		RUMANIAN	10
RUSSIAN	10		SAM	6253
SAM-MAN	9		SCSI-CARD-DIAG	422
SCSI-DISK-DIAG	743		SCSI-PRNT-DIAG	194
SCSI-TAPE-DIAG	1454		SDF-CMDS	395
SDF-CMDS-MAN	23		SERBOCROATIAN	10
SLIP-RUN	97		SLOVENE	10
SOE	165		SOE-MAN	1
SPANISH	20		SPELL	214
SPELL-MAN	6		SWEDISH	20
SYS-ADMIN	1159		SYS-ADMIN-MAN	401
SYSKOM	501		SYSKOM-MAN	36
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J-4 Product and Fileset Information

Troubleshooting an Update

This appendix has information that crosses architectures. Note your system as appropriate.

Situation	Possible Problem	What to Do
Updating from a local tape drive.	Cannot verify the specified source. Change the source specified, or ensure the media is loaded and ready to read.	Take the following actions: 1. Have the media inserted in the drive and wait until the drive finishes the initialization process (the indicator says the drive is ready). 2. Ensure your source is correct: ■ For Series 300/400/700, the default source is <code>/dev/update.src</code>. ■ For Series 800, the default source is <code>/dev/rmt/0m</code>. If your system does not have the default device file, if you are updating from a different source, or if you are updating a Series 800 from cartridge tape, you must specify the correct name of the source device's device file.

Situation	Possible Problem	What to Do
Updating from a local source.	Cannot open source <i>name</i> :	Ensure your source is correct: ■ For Series 300/400/700, the default source is /dev/update.src. ■ For Series 800, the default source is /dev/rmt/0m. If your system has no default device file, if you update from a different source, or if you update from cartridge tape, you must specify the name of the source device's device file.
Updating from CD-ROM.	Not all the software you purchased is displayed.	You did not enter a codeword, or you entered an incorrect codeword. Return to the Main Menu and select the menu item Enter Codeword. Check your CD-ROM Certificate (shipped with your software purchase) for your codeword. Re-enter it correctly.

Situation	Possible Problem	What to Do
While updating from CD-ROM, you entered an incorrect codeword.	The codeword you entered cannot be verified ...	Examine the following situations: ■ Make sure you typed the codeword correctly. ■ Highlight the Verified Hardware ID field and activate Help. The hardware ID listed on the CD-ROM Certificate must match one of the displayed legal IDs. If the hardware ID is not present, connect the hardware device represented by that ID (for example, an HP-HIL module). ■ Also, make sure you inserted the correct CD-ROM disc.

Situation	Possible Problem	What to Do
The CD-ROM disc is not mounted.	Cannot update from source directory <i>dir_name</i> .	Take the following steps: 1. Do a shell escape (activate Shell). 2. Mount the CD-ROM drive as described in the update chapter. 3. Type exit to return to the update program. 4. Activate the Change Source or Destination. Then, activate From CD-ROM (directory) to Local System. Fill in the CD-ROM information and proceed with the update.

Situation	Possible Problem	What to Do
While updating from CD-ROM, you inserted the HP-UX Install disc instead of the HP-UX Core Operating System disc or HP-UX Application Software disc.	Cannot copy <i>file_name</i> to <i>file_name</i> .	Take the following steps: 1. Exit the update program. 2. Execute: umount /UPDATE_CDROM 3. Remove the HP-UX Install disc. 4. Insert the correct disc and then mount the disc. 5. Executing ll /UPDATE_CDROM should show a date that indicates the disc is mounted. 6. Restart the update program and work through the program again as required.
A customize script has failed.	Type exit to return to update.	Check /tmp/update.log and re-run the customize script as indicated.
Garbled display or odd behavior after the update.	No error message appears.	The TERM variable is probably set incorrectly. Chapter 2 discussed this, and typing (CTRL)-(L) refreshes the screen.

Situation	Possible Problem	What to Do
Updating from a netdist server.	The following items indicate a problem: 1. Netdist server host <i>name</i> is not in the hosts database. 2. Cannot connect to netdist server running on host <i>x</i> at port <i>y</i>: Server not running or connection refused. 3. Connection closed by netdist server on host <i>name</i>: Access to this server is restricted. 4. Server has no filesets for this architecture.	For each messages, make sure the host name and port number are correct. If you do not know the correct name or number, see the network or system administrator. 1. Either add an entry for the server host to the hosts database, or use the server host's internet address instead of its host name. 2. The netdist server probably is not running on the specified host. Contact the network administrator. 3. The network administrator must modify the server's security file so your system can use the netdist service. 4. Either locate a server that can distribute software for your system type, or configure the specified server so it can distribute software.

Situation	Possible Problem	What to Do
You neglected to load the 9.0 version of the update program on your system.	This update media requires <i>req_version</i> or greater of update. This is <i>existing_version</i> of update.	Take the following actions: 1. Exit the update program. 2. Return to the update chapter and work as required, being sure to work through the step that has you extract the TOOL fileset.
You inserted the first update tape, and you cannot continue.	The following items indicate possible problems: 1. The media type appears to be Logical Interchange Format (LIF) ... 2. The media is an unrecognized (invalid) type, or it might be corrupt. 3. The information files on the media did not exist or could not be read ... 4. You might get other messages that indicate the media is not appropriate.	You possibly took any of the following actions: 1. You inserted a tape for a previous version that is not supported. 2. You inserted a tape that, itself, has a defect. 3. You inserted a tape that has an incorrect format. For any of these problems, contact your HP representative.

Situation	Possible Problem	What to Do
Destination disk is almost full.	The following items show this problem. ■ It is recommended you free up <i>n</i> kbytes.... ■ Loading the selected filesets would result in less free disk space ...	See freeing up disk space in the update chapter. Also, see “Managing the File System” in the <i>System Administration Tasks</i> document.
Not enough disk space to complete the update.	The following items show the problem: ■ You MUST free up <i>n</i> kbytes. ■ Loading the selected filesets is impossible due to insufficient space on one or more file systems ...	See freeing up disk space in the update chapter. Also, see “Managing the File System” in the <i>System Administration Tasks</i> document.

Situation	Possible Problem	What to Do
Selected filesets caused a system reboot, but unexpected processes run.	A non-essential process (other than ones expected at the time of system reboot) ...	Take any of the following actions: ■ Continue, and the processes will terminate when update reboots the system; users may lose work in progress. ■ Do a shell escape and run cat or more on /tmp/update.procs to get PIDs of nonessential processes. Kill those processes using /tmp/update.killall. ■ Do a shell escape and run ps to inspect all processes running on the system. ■ Exit update and run shutdown; then restart the update program. You will lose partition/fileset selections already made. ■ Do a shell escape and run /tmp/update.killall, a script built by update to terminate non-essential processes.

Situation	Possible Problem	What to Do
<i>Series 800</i> The update program quit without successfully building a kernel.	The screen will not have messages, but they are logged to /tmp/update.log.	Probably a mismatch between your hardware configuration and the /etc/conf/gen/S800 file. Fix S800. See “Reconfiguring the Kernel” in the <i>System Administration Tasks</i> manual. Type exit to return to the update facility, and that program will attempt to rebuild the kernel.
<i>Series 800</i> You are given a shell and instructed to fix a gen file.	Messages will vary.	Perhaps due to a mismatch between your hardware configuration file and the configuration file (/etc/conf/gen/S800). See “Reconfiguring the Kernel” in the <i>Series 800 System Administration Tasks</i> manual, and perhaps the hardware installation and configuration guide. Before you re-execute /etc/update, ensure that the running kernel (/hp-ux) and the kernel-generation file agree.

Situation	Possible Problem	What to Do
<i>Series 800</i> Messages are overwriting the update screen (update media: 9-track tape).	Any variety of kernel messages.	Use CTRL-L to refresh the screen if update is not loading filesets (do not touch keyboard during loading).
<i>Series 800</i> The process quits at boot-up, either during or after an update.	Utility requires more memory than is configured.	Reset the ISL <i>fastsize</i> parameter: 1. Turn the processor off and then on. 2. When you see the following prompt, interrupt the autoboot process by pressing any key: To override, press any key within 10 seconds. 3. Press y at this prompt: Boot from primary boot path 4. Press y at this prompt: Interact with IPL 5. When you see the ISL> prompt, type: fastsize f 6. Again, turn the processor off and then on. The autoboot should now succeed.

Glossary

The intent here is to provide a glossary that can help you during an installation or update. There is no intent to provide a comprehensive glossary for HP products. Most terms are defined in a general context, a few are defined in relation to an installation or update.

access port (AP)

A CIO card that permits remote access to a system, primarily for diagnostic purposes.

allocation policy

Refers to how mirrored copies of data are distributed to physical volumes. Strict allocation does not allow mirrored copies to exist on the same physical volume. Non-strict allocation does allow mirrored copies to exist on the same physical volume. As well, the allocation can be contiguous, which means there can be no gaps in the set of physical extents used to mirror data. The allocation can be non-contiguous, which does allow gaps.

alternate boot path

The hardware address of the tape drive used for installation.

application

Software that performs an integrated set of functionalities. For example, word processing, spreadsheet management, and database management.

autoboot

Occurs when the boot ROM automatically boots the operating system from the device at the primary boot path defined in stable storage.

auto mode

A mode that automatically selects a default version of HP-UX during start

up. To select a version of HP-UX, you must disable *auto mode*, which enables *manual mode*.

autosearch

When enabled, autosearch scans the the slots in the busses for a console (console autosearch) or a boot device (boot autosearch).

backplane

The circuit board, connectors, and circuitry that implement HP-PB (Hewlett-Packard Precision Bus) I/O subsystem; the physical medium to which I/O cards connect for communications with system processors and memory.

bad block relocation

An LVM feature, used by the system administrator, that transparently detects bad disk sectors and relocates the data in them to good disk sectors. This feature can work in conjunction with disk controllers that can perform bad sector relocation at the hardware level.

battery back-up unit (BBU)

A separate unit that provides power to main memory in the SPU when a power failure occurs.

block

The smallest unit of relocatable space on a disk. One block is 1024 bytes. The LVM, among other subsystems, defines and allocates data storage in numbers of blocks.

boot from disk

Loading files from the system disk into memory and starting HP-UX.

bus

A communications path that carries data and signals among hardware subsystems such as memory, I/O, and CPU.

bus converter

Allows two separate busses to be physically connected, permits an increase in the number of modules in a system, or connects a high speed processor/memory bus to a lower speed I/O bus.

cartridge tape drive (CTD)

Uses cartridge tapes instead of reel-to-reel tapes.

central bus (CTB)

See mid bus.

central processing unit (CPU)

The hardware subsystem that performs arithmetic and logical operations.

On Series 800 computers, the CPU is implemented as processor cards located in the SPU.

channel adapter (CA)

Performs conversions between the mid bus and the lower-speed CIO bus. It can consist of a chip on a card with other components. It can consist one or several mid-bus cards.

channel I/O bus (CIB)

Same as the CIO bus. This document uses the term CIO bus instead of CIB.

channel I/O bus (CIO)

The I/O bus on some Series 800 computers that connects the channel adapter to the device adapters (CIO cards).

CIO cards

Such as HP-IB cards or MUX cards installed in CIO slots so the SPU can communicate with peripherals (terminals, printers, disk drives, etc.). Also known as device adapters.

CIO expander

Provides CIO slots in addition to those in the SPU. Also known as an expander, expansion bay, or expansion module.

CIO slot number

The CIO slot number of the device adapter card connected to a peripheral device. In 4.2.3, 2 is the CIO slot number.

computer

The basic hardware entity in a computer system that contains the system

processor unit (CPU) and clock. It also contains associated circuitry for the cards, ports, and connectors that accommodate peripherals (devices).

computer system

The hardware and software that provides computing. The hardware consists of such entities as the computer, its cards, its ports, and its devices. The software consists of such entities as a release of HP-UX and the tools, utilities, applications, languages, subsystems, shells, facilities, and environments that run on HP-UX.

configuration file

The file named `s800` that configures the kernel. For example, it determines active device drivers and sets values for system parameters.

console

The terminal used to display activity that occurs while HP-UX starts up.

console path

The hardware address of the system console.

device (peripheral)

A physical entity that is attached to a computer to accommodate:

- Input operations (for example, a monitor).
- Output operations (for example, a keyboard).
- Input and output operations (for example, a disk drive).

device adapter (DA)

Cards installed in I/O slots to enable the SPU to communicate with devices (terminals, printers, disk drives). Also known as CIO cards.

device address

Since several devices can be attached to a device adapter, device addresses direct I/O operations to associated devices. See documentation about peripherals (devices) for information about device addresses.

device driver

The kernel contains compiled modules known as device drivers. Each driver processes I/O for a related device or a related set of devices. The configuration file named `s800` determines the enabled device drivers.

device file (special file)

Device files link devices and device drivers. Each device must be mapped to some device file and device driver. Device drivers exist in the kernel. Device files reside in the `/dev` directory.

display controller interface card

A mid-bus card required for graphics systems. Also known as a graphics interface card.

environment

A collection of types of software that provide a collective and related functionality. For example, an environment might provide the software required to process e-mail, do word processing, develop software, and publish documents.

expander (expansion bay or expansion module)

Provides CIO slots in addition to those in the SPU.

extent

See physical extent and logical extent.

facility

Software that performs an integrated set of related tasks. For example, the *fsck*(1M) facility checks the integrity of and makes repairs in a filesystem.

fileset

A set of files stored on installation or update media. Files are stored in **filesets**, and filesets are stored in **partitions**. Installation and update programs load filesets into the system and then place them in the directories in an HP-UX file system.

file system

Several meanings, depending on the context:

- An organization of files on a storage device.
- An entire file system tree (for example, the file system for HP-UX, which contains file systems such as `/dev`, `/bin`, `/usr`, and so on).
- An entity that contains files of a certain type. For example, the `/dev` file system contains device files for devices.

- A subentity of a file system that is contained in a disk section or logical volume, for example, and that can be mounted or unmounted from the file system.

form screen

A screen that appears during an installation that presents fields. The fields contain parameters for which you specify values. The values subsequently affect the installation.

graphics interface card (GI)

A mid-bus card that is required for graphics systems. Also known as a display controller card.

hardware address

Specifies the location of a peripheral device on the system. The hardware address for mid-bus/CIO bus computers has three parts. For example, the address *4.0.1* means go to the:

1. channel adapter represented by module number 4 (the card in mid-bus slot 1),
2. device adapter in CIO slot 0, and
3. device attached to the device adapter whose device address is 1.

HP Fiber-optic Link (HP-FL)

Provides for connecting HP-FL devices to HP-PA computers (for example, an HP-FL disk drive).

HP-FL card

CIO cards for HP-FL devices.

HP Interface Bus (HP-IB)

Hewlett-Packard's implementation of the IEEE standard 488-1975 interface. Devices such as tape drives and HP-IB printers connect to HP-PA computers via HP-IB channels.

HP-IB cards

I/O cards for HP-IB devices. CIO and HP-PB computers support HP-IB cards.

HP Precision Architecture (HP-PA)

The reduced complexity architecture used by some Hewlett-Packard computer systems (including Series 800 computers). HP-PA embodies and extends Reduced Instruction Set Computer (RISC) architectural principles.

HP-PB (Hewlett-Packard Precision Bus)

An I/O bus standard that is optimized for operation on HP Precision Architecture computer systems. It also refers to cards and backplanes that conform to HP-PB specifications.

HP-PB cards

Interface with connectors on an HP-PB I/O bus to enable the SPU to communicate with peripheral devices such as disk drives and printers.

HP-UX

Hewlett-Packard Company's implementation of the UNIX; operating system.

I/O

The input/output functions of a computer system.

I/O configuration

The location of I/O cards in slots. Also, the device drivers assigned to slots and the device files associated with device drivers.

I/O subsystem

Provides an interface between I/O devices, main memory, and the CPU. An I/O subsystem has software and hardware components. Series 800 computers use two I/O architectures: CIO and HP-PB. For example, the CIO I/O subsystem consists of the channel adapter, CIO Bus, CIO buffer circuitry, device adapters, and I/O software.

initial program load (IPL)

The first executable program brought into memory. On Series 800 computers, the IPL program is named ISL, the initial system loader.

Initial System Loader (ISL)

Boots a system and starts up HP-UX. ISL has executable commands. For example, you can change the default boot path).

installation of HP-UX

Given an operational hardware system, an installation transfers filesets from installation media to an HP-UX filesystem, destroys any existing software based operating system, and creates a functional kernel that uses the new file system.

installation device

A device (for example, a tape drive) used as the source of media for installing HP-UX.

kernel

The fundamental module of HP-UX that:

- Manages the programs, functions, libraries, and routines required to run HP-UX.
- Insulates the user from dealing directly with the hardware system.
- Supports the shells, programs, scripts, tools, utilities, applications, and environments that people use.

language

Software that, collectively, lets a person develop software in that language. For example, the C language is a collection of software that lets a person develop software written in the C language.

local area network (LAN)

Computers that are connected over a local area by LANIC cards and coaxial cable.

local area network interface controller (LANIC) card

A card used in a LAN to connect computers to coaxial cable.

logical extent

A virtual block of data that exists, together with other logical extents, within a logical volume. A logical extent maps to one physical extent unless disk mirroring is used. Then, a logical extent maps to one physical extent or to two or three physical extents, depending on whether the stored data is unmapped, mapped once, or mapped twice.

logical unit number (lu)

Associates a device driver with multiple devices by using numbers to map devices to the device driver. You specify the *lu* in a device file's minor number. The **s800** files shows the current *lu* numbers.

logical volume

A *logical* rather than *physical* construct that is a map of data that is stored on physical volumes. Think of a logical volume as a storage device of manageable size. A logical volume is not constrained to existing on one physical disk (physical volume).

LVM (Logical Volume Manager)

A subsystem that manages volume groups and logical volumes.

main memory

Contained in the memory cards connected to the:

- Mid-bus in CIO computers.
- Backplane in HP-PB computers.

manual mode

Lets you select a boot device from all the available boot devices. You are in *manual mode* when *auto mode* is disabled.

menu screen

A screen that contains options. Selecting an option shapes how an installation occurs.

mid bus

A synchronous high-speed bus used for communication by the I/O, memory, and CPU subsystems in CIO computers.

mid-bus cards

Cards that insert into mid-bus slots, which themselves connect to the mid bus.

mirrored data

The copies of data stored in physical extents that map to a unique logical extent. For singly mirrored data, two physical extents map to one logical

extent. For doubly mirrored data, three physical extents map to one logical extent.

mirror write cache (MWC)

An optionally used mirroring mechanism of the LVM that tracks outstanding mirror write requests and provides a basis for resynchronizing data blocks after a power failure or system crash.

modifying HP-UX (also customizing HP-UX)

Modifying the `s800` file so that HP-UX operates according to the modifications. The modifying requires two actions; editing the `s800` file and recompiling the kernel.

module number

The first part of a hardware address. For example, if the channel adapter is in mid-bus slot 2, the module number is 8 (4×2).

multiplexor card (MUX)

CIO or HP-PB cards used to connect serial devices such as terminals, modems, and printers.

multiple disk install

An installation in which you load filesets across more than one disk.

netdist server (network distribution server)

A client system (local system or your system) can use a netdist server, via a network, as a source of media for an installation or update.

peripheral

- As a noun, the term has the same meaning as **device**. For example, a printer could be called a peripheral or a device.
- As an adjective, the term indicates that something is external to an entity. For example, a printer could be called a peripheral device.

physical extent

A specific and contiguous set of blocks of data in a region of a physical volume. The size of a physical extent can range, in Mbyte increments by powers of two, from 1 Mbyte to 256 Mbytes (1, 2, 4, 8, 16, ... , 256 Mbytes).

physical volume

The physical device where data is stored. Typically, a physical volume is an entire physical disk. A physical volume can be a partition on a physical disk. The appropriate device file for a physical volume is a character device file (for example, `/dev/rdisk/c0d0s2`).

physical volume group

Can be organized within a volume group, usually on the basis of the I/O channel or interface adapter. A physical volume group can also be organized for the purpose of achieving higher availability of mirrored data.

prerequisite task

Any task you should perform before beginning an update or installation.

operating system

A collection of software lying between the user and the hardware system that manages the operation of the total system (hardware and software). HP-UX is an operating system.

partition

Two meanings:

- A section of physical space on the media of a disk drive. HP-UX typically assigns certain directories to certain partitions (for example, it assigns the root file system to the root disk partition). You can manage some aspects of using partitions.
- A collection of one or more filesets in installation or update media. For example, an installation tape can contain several partitions, which themselves contain filesets, which themselves contain files, which are loaded onto an HP-UX disk (moved from the installation media to the media in a disk drive used to hold the HP-UX file system).

This document differentiates the meanings as necessary.

path

The specification of the location of a device on the system. Also known as a hardware address.

primary boot path

The hardware address for the HP-UX system disk.

printed circuit assembly (PCA)

A card typically installed in a slot in a computer system. Also known as a card or a board.

processor dependent code (PDC)

Firmware that provides architected functions for a specific processor. For example, the code used to boot and reset the system or to conduct the power-on selftest.

reset

An action taken to restart a device that is already running.

RS232 console

A serial, non-graphics terminal used as the system console during an installation or update.

scheduling policy

In mirroring, determines whether data is written to mirrors in a *parallel* or *sequential* manner.

shell

A program that provides a user interface to the operating system. A shell lets a person execute commands, run scripts, and otherwise utilize types of software.

slot

Built into the backplane or a board. Used to connect an inserted printed circuit card to the mid bus, CIO bus, or HP-PB bus.

special file

Each I/O device has at least one special file in the `/dev` directory. A special file, in concert with a device driver in the kernel, lets HP-UX communicate with a device. A special file is also known as a *device file*.

stable storage (SS)

A non-volatile memory that retains data stored even when power is lost. For example, stable storage contains the primary boot path.

strict allocation

In strict allocation under mirroring, mirrored copies of data cannot reside on the same disk. This is possible only when more than one physical volume is available in a volume group.

subsystem (software)

A product or a well-defined software function.

superblock

Contains information about the size of each file system, maximum number of files it can contain, and so on. An alternate superblock can be used to attempt to start up HP-UX when the main superblock is corrupted. Backup copies of the superblocks are stored as addresses that are recorded in the `/etc/super_blocks` file.

symbolic link

Give two (or more) names to the same file. Use the `ln(1)` command. Symbolic links, created with `ln -s`, can span file systems and refer to directories as well as files. You can use symbolic links during an update to free up space on the system disk.

synchronization

In mirroring, the process of updating stale copies of mirrored physical extents.

System Administration Manager (SAM)

A menu-driven utility that lets you perform common system administration tasks. See the *HP 9000 Series 800 HP-UX System Administration Tasks* manual.

system disk

The disk that contains the root file system for HP-UX.

system processing unit (SPU)

The main processing unit in a computer system. An HP-PA SPU typically contains CPU cards, memory cards, I/O cards, a motherboard, and a power supply.

tool

Software that performs a specific task. For example, compiling a program, debugging a program, or performing diagnostics on kernel operations.

update device (see also installation device)

A device (for example, a tape drive) used as the source of media for updating HP-UX. An update device need not be the same device as the one used to install HP-UX. It is possible to use one device to install HP-UX and subsequently use another device to update HP-UX.

updating HP-UX

Given a functioning HP-UX system (hardware and software), updating HP-UX has two meanings:

- Replacing the previous version of HP-UX with the current version.
- Adding software to an existing and running version of HP-UX.

If necessary, an update creates a new kernel.

utility

Software that consists of a set of tools. For example, a system diagnostics utility contains programs for performing diagnostic tests on a system.

uxgen

Compiles (or recompiles) the kernel using I/O and parameter information in the `s800` file.

volume group

The set of virtual logical volumes and the physical volumes on which they reside. A volume group encompasses the associated mappings and subentities such as logical extents and physical extents. Only the logical volumes and physical volumes that are part of a volume group can be mapped. A physical volume can belong to only one volume group.

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