

***Red Hat Linux 6.2***

**The Official Red Hat Linux Alpha/SPARC  
Installation Guide**

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# 1 New Features of Red Hat Linux 6.2

This chapter describes the new features of the Red Hat Linux 6.2 graphical installation process. To learn about non-installation-related new features, please refer to the *Official Red Hat Linux Reference Guide*.

## 1.1 Installation-Related Enhancements

Improvements to Red Hat Linux 6.2 which will make installation even easier include:

### Improved X Configuration

Configuration of your X Window System during the installation has never been more thorough. From choosing your monitor and its correct settings, to video card probing, to testing your desired X setup, Xconfigurator will help you set everything just right.

### Additional Graphical User Interface (GUI) Partitioning Tool

Previously available only in expert mode, Fdisk has been added to the GUI installation. You can now partition with Disk Druid or fdisk, depending on your level of skill and personal preference.

### Rescue Mode Improvements

New and improved options make using rescue mode even more powerful than before. Improvements include mtools and RAID tools. Pico is included as the new default editor in rescue mode.

### Software RAID Configuration in Kickstart Installations

Kickstart installations now include the ability to configure RAID.

### RAID Upgrades

The installation program can now perform RAID upgrades.

### ATAPI Zip Drive Recognition

ATAPI Zip drives are now recognized by the installation program and automatically configured to use SCSI emulation. If you add an ATAPI Zip drive after

the installation, the `kudzu` hardware recognition program will recognize it once you reboot your system. The installation program will also create device files for Jaz drives as well.



## 2 Getting Ready for the Installation

This chapter explains how to prepare for the installation of Red Hat Linux. Installing Red Hat Linux is a fairly straightforward process, but taking time to prepare for it will make things go much more smoothly. In this chapter, we'll discuss what you need to do prior to starting the installation.

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### Please Note

If you currently use Red Hat Linux 2.0 (or greater), you can perform an upgrade. Skim this chapter to review the basics, and read the chapter containing the pre-installation information applicable to your architecture. Then read Chapter 5, *Starting the Installation* and follow the directions. The upgrade procedure starts out identically to the installation procedure. Once you have chosen to perform an upgrade during the graphical installation process, refer to Chapter 7, *Upgrading Your Current System*.

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If you are an experienced user and do not need to review the basics, you can skip to the chapter containing the pre-installation information for your architecture.

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### Tip

Refer to the Red Hat Frequently Asked Questions for answers to questions and problems that may occur before, during or after the installation. You'll find the FAQ online at: [http://www.redhat.com/support/docs/faqs/rhl\\_general\\_faq/FAQ.html](http://www.redhat.com/support/docs/faqs/rhl_general_faq/FAQ.html).

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## 2.1 Do You Have the Right Red Hat Linux Components?

If you've purchased the Official Red Hat Linux boxed set, you're ready to go! However, mistakes occasionally happen, so now is a good time to double-check the contents of your boxed set.

A registration card is in your Red Hat Linux box. A list of the contents of your boxed set is on the back of that card. Please read over the list and check to make sure that you have all the CDs and manuals that are available with your version of Red Hat Linux.

If you've purchased the Official Red Hat Linux boxed set from Red Hat, Inc. (or one of its distributors), and you're missing one or more of the items listed, please let us know! Contact information is also available on the registration card.

*How to identify our official boxed set:* The bottom of our box has an ISBN number next to one of the bar codes. That ISBN number should be in this form:

1-58569-xx-y

(The *xx* and *y* will be replaced with numbers which uniquely identify your particular product.) If your box has an ISBN number in this form, and you're missing something, please use the contact information included on the registration card.

Keep in mind that Red Hat partners with international and domestic companies so that we can make Red Hat Linux available to you in the most convenient form. Because of this, you might find that your Red Hat Linux boxed set may not have been actually produced by Red Hat.

If your box has a different ISBN number (or none at all), you'll need to contact the company that produced your boxed set. Normally, third-party producers will include their logo and/or contact information on the outside of the box; an official Red Hat Linux boxed set lists only our name and contact information.

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### **2.1.1 No Boxed Set? No Problem!**

Of course, not everyone purchases a Red Hat Linux boxed set. You can install Red Hat Linux using a CD created by another company, or even via the File Transfer Protocol (FTP). In these cases, you may need to create one or more diskettes to get started.

For information on downloading Red Hat Linux via FTP, refer to [http://www.redhat.com/download/howto\\_download.html](http://www.redhat.com/download/howto_download.html).

## **2.2 Is Your Hardware Compatible with Red Hat Linux 6.2?**

Use Red Hat's online resources to make sure your hardware is compatible and/or supported. You'll find the hardware compatibility lists at: <http://www.redhat.com/hardware>.

## **2.3 Have You Checked for Errata?**

Although most of the time it's not necessary to check for errata before the installation, it is also not a bad idea, either.

Red Hat offers updated diskette images, documentation and other errata downloads for your convenience.

There are two ways to review the errata:

1. Online: <http://www.redhat.com/support/errata> provides errata you can read online, and you can easily download diskette images.
  2. E-mail: if you send an empty mail message to [errata@redhat.com](mailto:errata@redhat.com), you will receive an e-mail containing a text listing of the complete errata of the installation program and software itself (if errata exist at that time). URLs to each updated package and diskette image in the errata are also included. Using these URLs, you can download any necessary diskette images. Please note that you must use binary mode when transferring a diskette image.
-

Occasionally, we find that the installation may fail, and that a revised diskette image is needed for the installation to work properly. In these cases, we make special images available via the Red Hat Linux errata listing.

Since this is relatively rare, you will save time if you try to use the standard diskette images first. Review the errata only if you experience problems completing the installation.

Documentation errata are also available. When significant changes are made to the manuals, we make sure to update these online as well. Documentation updates can be found at [http://www.redhat.com/support/errata/doc\\_errata/](http://www.redhat.com/support/errata/doc_errata/).

## 2.4 Which Installation Type is Best For You?

Red Hat Linux includes four different classes, or types of installations. They are:

- `Workstation` -- A workstation-class installation is most appropriate if you are new to the world of Linux, and would like to give it a try. By answering a few installation questions, you can be up and running Red Hat Linux in no time!
  - `Server` -- A server-class installation is most appropriate for you if you'd like your system to function as a Linux-based server, and you don't want to heavily customize your system configuration.
  - `Custom` -- A custom-class installation allows you the greatest flexibility during your installation. You choose your partitioning scheme, which packages you want and more. Custom-class installations are most appropriate for users who are very familiar with Red Hat Linux installations and for those afraid of losing complete control over every aspect of the installation.
  - `Upgrade` -- If you already have a version of Red Hat Linux 2.0 (or greater) running on your system and you want to quickly update to the latest packages and kernel version, then an upgrade is most appropriate for you.
-

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**Please Note**

The custom-class installation allows you the most flexibility. The workstation- and server-class installations go through the installation process for you and omit certain steps. However, partitioning control has been added to workstation and server-class installations, so you can now partition your drives manually during these types of installations, if you so desire.

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These classes give you the option of simplifying the installation process (with some potential for loss of configuration flexibility), or retaining flexibility with a slightly more complex installation process. Let's take a detailed look at each class, so you can determine which one is right for you.

### 2.4.1 The Workstation-Class Installation

You can choose from two types of workstation-class installations:

- The **GNOME Workstation** installation is for a system that will be used primarily as a workstation. The GNOME GUI desktop environment is installed and the system is configured to start GNOME when the system boots. If you choose not to manually partition, the installation program deletes all data in all existing Linux partitions, decides how to partition the disk for the new version, and chooses which software packages to load.
  - The **KDE Workstation** installation is for a system that will be used primarily as a workstation. The KDE GUI desktop environment is installed and the system is configured to start KDE when the system boots. If you choose not to manually partition, the installation program deletes all data in all existing Linux partitions, decides how to partition the disk for the new version, and chooses which software packages to load.
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**Please Note**

Unlike previous workstation-class installations, performing a Red Hat Linux 6.2 workstation-class installation will not install the network daemon `inetd`. Not installing `inetd` results in a more secure installation; however, network-related services such as `finger`, `telnet`, `talk`, and `ftp` will not work. If you require these types of services, choose a server or a custom-class installation.

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**What Does a Workstation-Class Installation Do?**

If you choose *not* to partition manually, a workstation-class installation removes *all* Linux-related partitions on *all* installed hard drives (and uses all free unpartitioned disk space) to create the following partitions:

- A 64MB swap partition.
- A variably-sized (the exact size is dependent on your available disk space) root partition (mounted as `/`) in which all other files are stored.
- Older SPARCs and Alphas will get a 16MB partition (mounted as `/boot`) for the Linux kernel and related files. Newer SPARC and Alpha machines won't get this partition, because they don't need it.

This approach to disk partitioning results in the simplest filesystem configuration possible.

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**Please Note**

You will need at least 700MB of free disk space in order to perform a workstation-class installation.

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A workstation-class installation will remove *all* existing Linux partitions on all hard drives in your system.

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## 2.4.2 The Server-Class Installation

During the server-class installation, the X Window System is *not configured* and *no GUI desktop environment will be loaded* when the system boots. The installation program deletes *all* data in *all* existing partitions of any kind, decides how to partition the disk for the new version, and chooses which software packages to load.

### What Does a Server-Class Installation Do?

If you choose *not* to partition manually, a server-class installation removes *ALL existing partitions* on *ALL installed hard drives*, so choose this installation class only if you're sure you have nothing you want saved! When the installation is complete, you'll find the following partitions:

- A 64MB swap partition.
- A 256MB partition (mounted as `/`).
- A partition of at least 512MB (mounted as `/usr`).
- A partition of at least 512MB (mounted as `/home`).
- A 256MB partition (mounted as `/var`).
- A 16MB partition (mounted as `/boot`) in which the Linux kernel and related files are kept.

This approach to disk partitioning results in a reasonably flexible filesystem configuration for most server-class tasks.

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**Please Note**

You will need at least 1.8 GB of free disk space in order to perform a server-class installation.

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A server-class installation will remove *ALL existing partitions of ANY type on ALL existing hard drives of your system*. All drives will be erased of all information and existing operating systems, whether they are Linux partitions or not!

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### 2.4.3 The Custom-Class Installation

As you might guess from the name, a custom-class installation puts the emphasis on flexibility. During a custom-class installation, *you* can choose how disk space should be partitioned. You have complete control over which packages will be installed on your system.

If you do a custom installation and choose to install everything, you will need a minimum of 1.7 GB of free space on your system.

#### Behind the Scenes of a Custom-Class Installation

This section covers those installation steps that are *only* seen when performing a custom-class installation.

The following list may help those of you who are trying to decide which installation class will suit your needs. If you think you'll have trouble performing any of the tasks on this list, you should not perform a custom-class installation without reading through this manual and clarifying any questions you may have.

- **Creating Partitions** -- In the custom-class installation you have to specify where you want Red Hat Linux to be installed. (You also have the *option* of manually partitioning during the workstation and server-class installations.)
-



- **Formatting Partitions** -- All newly created partitions must be formatted. Any partitions that contain old data (data you no longer need or want) should be formatted. (If you chose to manually partition during your workstation or server-class installation, you will need to choose which partitions to format.)
- **Selecting and Installing Packages** -- This is performed after your partitions have been configured and selected for formatting. Here you may select groups of packages, individual packages, a combination of the two, or choose an "everything" install.

#### **2.4.4 Upgrading Your System**

Upgrading Red Hat Linux 2.0 (or greater) will not delete any existing data. The installation program updates the modular 2.2.x kernel and all currently installed software packages. See Chapter 5, *Starting the Installation* and Chapter 7, *Upgrading Your Current System* for instructions on upgrading.

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## 3 Alpha: Pre-Installation Information

### 3.1 Introduction

This chapter provides specific information needed for installing Red Hat Linux on an Alpha.

You may need more information to help you with your Red Hat Linux/Alpha configuration. Other documents, available on the Web, provide Alpha-related information:

The Alpha Miniloader HOWTO at

<ftp://gatekeeper.dec.com/pub/Digital/Linux-Alpha/Miniloader/docs/HOWTO/milo.howto.html>

contains in-depth information about the MILO miniloader.

The SRM (System Reference Manual) Firmware HOWTO at

<http://www.alphalinux.org/faq/srm.html>

describes how the SRM firmware may be used to boot Linux.

A Brief Introduction to Alpha Systems and Processors at

<http://www.alphalinux.org/faq/alpha-sys.html>

contains an overview of the Alpha architecture.

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#### Please Note

Many people will find the previous information to be very useful. However, this information is provided by sources outside of Red Hat, Inc. and it may contain descriptions of procedures that are not supported by Red Hat, Inc. For a description of Red Hat, Inc.'s installation support, please refer to Appendix B, *Getting Technical Support* or to Red Hat's website at <http://www.redhat.com/>.

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## 3.2 Installation Overview

Installing Red Hat Linux on an Alpha system is slightly more complex than installing Red Hat Linux on an Intel machine because a variety of Alpha machine architectures exist and many different models are supported. In general, the sequence of steps to a successful installation are:

1. Create a kernel disk from the image available on the Red Hat Linux/Alpha CD.
2. Create a MILO disk, if necessary.
3. Create a RAM disk diskette, if you're doing an NFS, FTP or hard drive install.
4. Load and run the Red Hat Linux/Alpha kernel, and boot into the Red Hat Linux installation program using either the SRM console or MILO.

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### Please Note

If your system supports both the SRM console and MILO, using SRM is the preferred boot method, and is the boot method supported by Red Hat.

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5. Install the bootloader on a small partition on your machine.

### 3.2.1 Disk Space Required for Alpha Installations

For both MILO and SRM installations, you'll need a floppy drive: a 3.5 inch high density "A:" drive (/dev/fd0). (Optionally, most SRM installations can use the CD-ROM drive.)

Hard Drive Space:

- For a MILO installation, you'll need a 5 MB DOS-formatted partition to hold the MILO bootloader.

If you're using SRM, you need free space at the beginning of the disk. If you do a workstation- or server-class installation and allow the installation program to partition for you, the installation program will take care of this requirement. If you're partitioning manually, however, you need to start your partitions at cylinder 2. If

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you try to start your partitions at cylinder 1, you'll see a warning message. Note that Disk Druid will not start the partitions at cylinder 1 during manual partitioning, but `fdisk` will.

- For both MILO and SRM, you'll need at least one swap partition. Optimally, the size of the swap partition is twice the RAM of your system, up to 2 GB.
- For both MILO and SRM, 900 MB is needed for a workstation-class installation.
- For both MILO and SRM, 1.8 GB is needed for a server-class installation, or for a custom-class installation (choosing everything).

### 3.3 Support for Specific Hardware

Red Hat Linux/Alpha supports a variety of hardware based on the Alpha processor and the PCI bus. This section describes the various systems known to be compatible or incompatible with Red Hat Linux/Alpha 6.2, at the time that this manual was printed. This section also explains the difference between "supported," "compatible" and "incompatible" hardware.

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#### Please Note

The most recent list of hardware supported by Red Hat Linux/Alpha can be found at Red Hat's website at <http://www.redhat.com/hardware>. You should check the website for up-to-date hardware compatibility information before you begin the installation. The website is the definitive source for hardware compatibility information.

Hardware not explicitly listed is, by definition, not supported. We make no claims of compatibility with Red Hat Linux for any hardware that is not listed.

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#### 3.3.1 Testing Non-Listed Hardware

Running Linux on an Alpha system is similar to running Linux on the more well-known Intel platform. Many Alpha systems contain an ISA and/or PCI bus similar

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to that of an Intel system. However, only a subset of the peripherals that work on Intel systems will work on an Alpha. Sometimes, peripherals won't work because of driver differences that need to be ironed out in the kernel or in XFree86. Some hardware, however, is not compatible because it expects the world to be 32-bit, like Intel machines, and not 64-bit, like Alphas.

Before you attempt to use hardware that isn't listed to work with the Alpha, you should check the Red Hat Linux/Alpha mailing list for information on the hardware. Information on how to join the Alpha mailing list, `axp-list@redhat.com`, is available from [http://www.redhat.com/community/list\\_subscribe.html](http://www.redhat.com/community/list_subscribe.html). You can also check the AlphaLinux website at <http://www.alphalinux.org> to see if an installation attempt on a particular system is feasible.

Currently, only a select few models of Alpha-based systems are being tested in the Red Hat Quality Assurance labs. However, as more testing is done, both in-house and in the field, more information will become available in order to improve the Alpha version of Red Hat Linux and allow us to upgrade the status of more types of machines.

Linux runs on a majority of the different Alpha systems that exist on the market and we are constantly working to increase the level of compatibility for all Alpha machines. If more information is made available to us about installing Red Hat Linux on a certain class of machine, it becomes easier to qualify that machine for support.

If you have successfully installed Red Hat Linux on a particular class of Alpha machine, and you have information that you think can help increase the reliability of ensuring future installations on machines of that class, please send e-mail to `faq-maintainer@redhat.com` and tell us about your experiences.

### 3.3.2 Support Terminology

The following terms are used in this chapter to describe the level of support provided for specific hardware:

#### **Certified**

Certified hardware has passed all certification tests and requires no special action on the part of the user in order to set up the system. Certified systems are

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completely supported by Red Hat technical support. A badge may be on the physical hardware indicating its Red Hat Linux certified status.

**Tier-2**

Tier-2 supported hardware has been certified by Red Hat's QA. The Linux kernel can detect and use Tier-2 hardware. Red Hat will provide support to users installing Official Red Hat Linux boxed set software on Tier-2 hardware.

**Tier-3**

Tier-3 supported hardware is not certified, but should be detected by and usable with the Linux kernel. Tier-3 hardware includes hardware that Red Hat support technicians have personal experience with and/or hardware which is known to be reliable both in-house and in the field. However, some users may have reported problems with some versions of the hardware, or with the hardware's interactions with other hardware. Therefore, while Tier-3 installations can be supported under most circumstances, they cannot be guaranteed in all cases. Official Red Hat Linux boxed set owners can expect installation support for Tier-3 hardware, but it will be limited to:

- Determining whether Red Hat Linux recognizes the hardware
- Providing information on what drivers to use, what options to give to the kernel/module/driver, and so on
- Instructing users on when to perform Alpha Firmware upgrades
- Directing users to online information sources

**Compatible but unsupported**

Hardware that is listed as compatible but unsupported should be detected by the Linux kernel and should work with the Linux kernel under certain circumstances. However, the drivers for this hardware may be experimental or the hardware's functionality may be problematic. Owners of the Official Red Hat Linux boxed set will get information on which included drivers may work with the hardware and how to determine if Linux recognizes the hardware. Drivers for compatible but unsupported hardware are not always available from Red Hat. Support for third-party drivers will not be provided.

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### **Incompatible**

Incompatible hardware is known to NOT work with Red Hat Linux. Drivers or patches for this hardware may be found on the Internet, but Red Hat will not support them. The AlphaLinux website at <http://www.alphalinux.org/> or the Compaq Digital Alpha FTP site at <ftp://ftp.digital.com/pub/linux/> may be useful for support with this hardware.

### **Not Listed**

Systems which are not listed here are not considered compatible and are not supported. However, hardware that is not listed may become compatible and supported in the future.

Hardware vendors reuse product names on different hardware. This may be confusing to the consumer, since you may purchase something that appears to be supported but has a slightly different name (e.g., an added letter or plus sign). Usually, these changes indicate that the hardware is very different, and thus will not be supported.

### **3.3.3 Alpha Systems**

Table 3–1, *Alpha System Information* provides a snapshot of various Alpha systems, the support provided by Red Hat for those systems, whether each system supports MILO and/or SRM, and the MILO image file needed for the system (if the system supports MILO).



Table 3-1 Alpha System Information

Machine Class	Model	Alias	Support Level	SRM	MILO	MILO Image
Jensen	DECpc 150	JENSEN	Currently incompatible	X		N/A
	DEC 2000 Model 300	JENSEN		X		
	DEC 2000 Model 500	CULZEAN		X		
Alcor	AS 600	ALCOR	Compatible but unsupported	X	X	alcor.img
	AS 500 5/5xx	BRET		X	X	xlt.img
	XL-300	XLT			X	
	XL-366	XLT			X	
	XL-433	XLT			X	
Digital Alpha XL	XL-233	XL	Compatible but unsupported		X	xl.img
	XL-266	XL			X	

<b>Ma- chine Class</b>	<b>Model</b>	<b>Alias</b>	<b>Support Level</b>	<b>SRM</b>	<b>MILO</b>	<b>MILO Image</b>
Avanti	AS 200 4/*	MUS- TANG	Tier-3	X	X	avanti.img
	AS 205 4/*	LX3		X	X	
	AS 250 4/*	M3		X	X	
	AS 255 4/*	LX3+		X	X	
	AS 300 4/*	MEL- MAC		X	X	
	AS 400 4/*	AVANTI		X	X	
Digital Personal Worksta- tion	PWS 433a, 433au	MIATA	Tier-2	X	X	miata.img
	PWS 500a, 500au	MIATA		X	X	
	PWS 600a, 600au	MIATA		X	X	

<b>Ma- chine Class</b>	<b>Model</b>	<b>Alias</b>	<b>Support Level</b>	<b>SRM</b>	<b>MILO</b>	<b>MILO Image</b>
Sable	AS 2100 4/xxx	SABLE	Unsup- ported	X		N/A
	AS 2100A 4/xxx	LYNX	Currently incom- patible			
	AS 2000 4/xxx	DEMI- SABLE	Unsup- ported	X		
	AS 2100 5/xxx	GAMMA- SABLE		X		
	AS 2000 5/xxx	DEMI- GAMMA- SABLE		X		
Mikasa	AS 1000 4/xxx	MIKASA	Compat- ible but unsup- ported	X		N/A
	AS 1000 5/xxx	MIKASA- PRIMO		X		
Noritake	AS 1000A 4/xxx	NORI- TAKE	Compat- ible but unsup- ported	X		N/A
	AS 1000A 5/xxx	NORI- TAKE- PRIMO		X		
	AS 600A 5/xxx	ALCOR- PRIMO		X		
	AS 800 5/xxx	CORELLE		X		

<b>Ma- chine Class</b>	<b>Model</b>	<b>Alias</b>	<b>Support Level</b>	<b>SRM</b>	<b>MILO</b>	<b>MILO Image</b>
Rawhide	AS 4000	WRAN- GLER/DU- RANGO	Currently incom- patible	X		N/A
	AS 4100	DODGE		X		
	AS 1200	TINCUP		X		
Alpha- Book	Laptop	ALPHA- BOOK	Compat- ible but unsup- ported	X		N/A
Noname	AXP- pci33	NON- AME	Compat- ible but unsup- ported	X	X	udb- noname.img
	UDB/Mul- tia	MULTIA		X	X	
EB64+	EB64+	EB64+	Compat- ible but unsup- ported	X	X	eb64p.img
	Al- phaPC64	CABRI- OLET		X	X	cabrio.img
	Al- phaPCI-64	CABRI- OLET		X	X	
PC164	Al- phaPC164	PC164	Compat- ible but unsup- ported	X	X	pc164.img
	Al- phaPC164- LX	LX164			X	lx164.img
	Al- phaPC164- SX	SX164			X	sx164.img
EB164	EB164	EB164	Tier-3	X	X	eb164.img

<b>Ma- chine Class</b>	<b>Model</b>	<b>Alias</b>	<b>Support Level</b>	<b>SRM</b>	<b>MILO</b>	<b>MILO Image</b>
EB66+	EB66+	EB66+	Compat- ible but unsup- ported	X	X	eb66p.img
EB66	EB66	EB66	Compat- ible but unsup- ported	X	X	eb66.img
Tsunami	AlphaPC DP264	DP264	Compat- ible but unsup- ported	X		N/A
Compaq Profes- sional Worksta- tions	XP1000/ 500	MONET	Certified (pending)	X		N/A
	XP1000/ 667	BRIS- BANE		X		
	XP900	WEB- BRICK		X		
Compaq Al- phaServers	ES40	CLIP- PER	Certified (pending)	X		N/A
	DS20	GOL- DRUSH		X		
	DS20E	GOL- DRACK		X		
	DS10	WEB- BRICK		X		

Machine Class	Model	Alias	Support Level	SRM	MILO	MILO Image
Takara	(Takara?)	TAKARA	?	?	?	takara.img
Ruffian	AlphaPC 164UX	RUF-FIAN	Compatible but unsupported	No	X	ruffian.img

### 3.4 Choosing Disk Images

Previous versions of Red Hat Linux/Alpha used different boot images. Now, however, all Alpha installations use the same kernel, so only one boot image is needed (`images/generic.img`). You no longer need to insert the kernel boot disk after an installation to copy over the kernel to the installed system.

Alpha machines are divided into classes. The classes reflect the many Alpha machine designs that have been produced over the years, and differentiate between the several *boxes du jour* produced by Digital. If you're using MILO to load Red Hat Linux, you'll need the MILO image that corresponds to the class of Alpha system that you have.

Search the Machine Class column in Table 3-1, *Alpha System Information* for your system. If you know your system's code name or alias, you can search the Alias column. The appropriate MILO image (if applicable) is listed on the right. All of the MILO image files are located in the `miло/images` directory. The table will also show you whether your machine is SRM and/or MILO capable. Note that if your machine is both SRM and MILO capable, using SRM is preferred.

If you're doing an NFS, FTP or hard drive installation, you'll also need a RAM disk diskette made from `images/ramdisk.img` on CD 1.

### 3.4.1 Creating a Boot Disk

The boot disk image is `images/generic.img` on Red Hat Linux/Alpha CD 1. Refer to Appendix A, *Writing Image Files to Floppy Disks Using `rawrite` or `dd`* for instructions on writing the image file to a disk. Label the disk "Boot Disk."

### 3.4.2 Creating a MILO Disk

If you need a MILO image, you will find it in the `miilo/images` directory on the Red Hat Linux/Alpha CD 1. See Table 3–1, *Alpha System Information* to find the appropriate MILO image file for your system.

---

#### Please Note

If you have trouble with MILO, the first thing to try is a newer MILO image. If updated MILO versions are available, they can be found at:

`ftp://ftp.digital.com/pub/DEC/Linux-Alpha/Kernels/`

---

MILO file names begin with `miilo-`, which is followed by the system type and date. Refer to Appendix A, *Writing Image Files to Floppy Disks Using `rawrite` or `dd`* for instructions on how to make disks from disk images. Label the disk you make from the MILO image "MILO Disk."

### 3.4.3 Creating a RAM Disk Diskette

If you're doing an NFS, FTP or hard drive installation, you'll need to create a RAM disk diskette. All Red Hat Linux/Alpha installations use the same RAM disk image: `images/ramdisk.img` on Red Hat Linux/Alpha CD 1. Refer to Appendix A, *Writing Image Files to Floppy Disks Using `rawrite` or `dd`* for instructions on writing the image file to a disk. Label the disk "RAM Disk Image."

## 3.5 Disk Partitioning

Red Hat Linux/Alpha supports two varieties of hard drive partitioning: standard DOS-style partitioning and BSD-style partitioning.

---

The standard `fdisk`-style partitioning method has the usual oddities (such as extended partitions) and is done in the same way as on Intel platforms (using Linux `fdisk`). This is the partitioning style you must use if you are using the ARC or AlphaBIOS console.

### 3.5.1 Partitioning for SRM

When using `about` to boot Red Hat Linux from the SRM console, you must use BSD-style disk labels. `about` does not understand DOS-style partition tables as MILO does, and therefore a slightly different installation path is necessary. When you're using disk labels on an Alpha, be aware that you'll need initial unallocated space at the beginning of the hard drive.

The initial unallocated space is unallocated disk space that is not explicitly allocated to any label other than the "whole disk" label. This space should be approximately 1 MB to 10 MB (2048 to 20480 sectors), depending on exactly what configuration for `about` you will be using. Its purpose is to provide space at the very beginning of the hard drive for `about` to write the boot block and object file that allows booting to kernels located within the disk labels. For more information on the process `about` uses to boot, please see the SRM Firmware HOWTO at <http://www.alphalinux.org/faq/srm.html>.

BSD-style disk labeling is different in certain ways from the standard `fdisk` partitioning used in ARC/AlphaBIOS installations and on Intel installations:

- The partitions are identified by letters (a, b, c...) instead of numbers.
  - The partition types are different. For example, "83" and "82" no longer correspond to "Linux" and "Linux Swap," respectively. In fact, ext2 partitions are identified as "8"; the swap partition is "1".
  - You can have a maximum of eight partitions (a to h) per drive.
  - The first partition should start on cylinder 2, since the first cylinder may not be full-size.
  - Partition types must be explicitly set after creation. The BSD disk label program uses a default partition type of "unknown" which causes the Disk Setup portion of the installation program not to see the partitions.
-



You will want to create at least three partitions (or more if you chose to put `/usr` in a separate partition, etc.)

One of the partitions should be your swap partition. It should be approximately twice the size of the amount of physical RAM present in your machine. It should be set to type "1" for swap.

The rest if the partitions compose your Linux filesystem layout. They should be sized as appropriate and set to type "8" for ext2.

### 3.5.2 Partitioning for MILO

The only rule for partitioning the hard drive for MILO is that there should be a 2 MB FAT partition at the beginning of the drive from which you will load MILO.

## 3.6 SRM Installations

The installation of Red Hat Linux on different SRM-based Alphas is a similar process. However, differences exist in certain areas. Additional information on the SRM console can be found at the SRM Firmware HOWTO at

<http://www.alphalinux.org/faq/srm.html>

### 3.6.1 SRM Devices

You should be familiar with how the SRM console lists the devices present in your system. The SRM console references devices based on their type. Here is a list of common devices, and how they are referenced in the SRM console:

**Table 3–2 Common Devices and How They are Referenced in the SRM Console**

Device	Description
dkaXXX	SCSI device on the first SCSI bus. Further SCSI busses are denoted as dkbXXX...
dqaXXX	IDE device on the first IDE bus. Further IDE busses are denoted as dqbXXX...

Device	Description
dvaXXX	Floppy device
ewaXXX	Ethernet adapter
mkaXXX	SCSI tape device
pkaXXX	SCSI host adapter for the first SCSI bus. Further SCSI busses are denoted as pkbXXX...

If you have an IDE CD-ROM, you will need to know where in the IDE bus it is installed. It will be one of the following devices, based on its position on the IDE busses of your machine:

**Table 3–3 Location of an IDE CD-ROM on an IDE Bus**

Device	Location
hda	First IDE bus, master device
hdb	First IDE bus, slave device
hdc	Second IDE bus, master device
hdd	Second IDE bus, slave device

You should have the following information available before you begin:

- The SRM device of the floppy drive. In most cases, the SRM device will be dva0.
- The SRM device address of your hard drive. For example, in this document, we've used the SRM device dkb0 to refer to the hard drive.
- The SRM device address of your CD-ROM drive. In this document, we've used device dka500 to refer to the CD-ROM drive.

To see the list of devices that the SRM console can see, type in the following command:

```
>>> show dev
```

A list of the devices that the SRM console is capable of seeing will appear. You must chose one of these devices from which to boot Red Hat Linux, during the installation process and every time you wish to boot your machine.

In some cases, however, you may have a SCSI adapter, IDE drives, or networking hardware that is compatible with Red Hat Linux, but is neither OEM Digital or Compaq hardware or otherwise detectable by the SRM console. This may not impede your running Red Hat Linux on your Alpha machine, but you are always required to boot from a device that the SRM console recognizes.

### 3.6.2 SRM Variables

The SRM console has several variables which store their values in NVRAM, therefore keeping them between reboots. To see the value of SRM console variables, type in the command:

```
>>> show VAR
```

Replace VAR with the name of the SRM console variable.

To make listing variables easier, you can append an asterisk (\*) at any point at the end of a variable name to show all variables that match the text typed so far. For example, the following command will show a list of all SRM console variables that begin with the letter "b":

```
>>> show b*
```

A special case of the `show` command is the `show dev` command (as previously mentioned), which lists all the devices that the SRM console can locate.

You can explicitly list all the devices of a particular type that SRM can see on your machine using the command:

```
>>> show dev dk
```

The previous command will show all SRM devices that begin with "dk" (i.e., all SCSI disks).

To set an SRM console variable, use the command:

```
>>> set VAR VALUE
```

---

In the above command, *VAR* is the name of the SRM console variable, and *VALUE* is the value it should be set to. Integer values do not have to be in quotes; however, it is recommended that you enclose all string values in quotes. And, while single-word string values don't need to be in quotes, it's easier to ALWAYS put string variable values in quotes.

To clear a SRM console variable, use the following command:

```
>>> set VAR ""
```

In the above command, *VAR* is the name of the SRM console variable, and the empty quotes ("" ) denote a blank value. Some integer values cannot be cleared, but can be set to 0. Also note that some SRM console variables are integer in value, but boolean in nature.

Several SRM console variables are worth mentioning:

#### **boot\_file**

The `boot_file` variable is equivalent to the `-file` option of the SRM `boot` command.

#### **boot\_osflags**

The `boot_osflags` SRM console variable is equivalent to the value passed to the `boot` command by the `-flags` option. It can be set to the value that you would pass to the `-flags` parameter of an SRM `boot` command. At the very least, it is convenient to set the `root=/dev/XXX` value.

#### **bootdef\_dev**

The `bootdef_dev` SRM console variable sets the default boot device used when the `boot` command is issued.

#### **auto\_action**

The `auto_action` SRM console variable can be set to `HALT` or `BOOT`, depending upon what default power-on function you want for your Alpha, when booted into the SRM console.

These variables can be set to automatically boot your Alpha. See Section 8.1.1, *SRM Console Variables*.

---

### 3.6.3 SRM Disk Images

Some things have changed for the better since the 5.x releases of Red Hat Linux. Now there is a single, generic kernel for all Alpha machines. This simplifies Alpha installation immensely. The recommended method for booting into the Red Hat Linux installation process is to use a floppy disk to load the kernel and to load the installation program directly from the CD-ROM.

All Alpha installations will need the kernel disk, created from the image file `images/generic.img` on CD 1. If you're booting the installation program from a floppy, you'll also need the RAM disk image from `images/ramdisk.img`, also on CD 1. Instructions for creating disk images are located in Appendix A, *Writing Image Files to Floppy Disks Using rawrite or dd*.

### 3.6.4 Booting the Installation Program from a Floppy

Now that you've created the kernel disk, you will need to boot into the Red Hat Linux installation program. Put the kernel disk into your floppy drive and then use the following command:

```
>>> boot dva0 -fl 0
```

### 3.6.5 Booting the Installation Program from a CD-ROM

Many modern Alphas which use SRM can boot directly from the Red Hat Linux CD that is shipped in the boxed set, as the CD does have a valid `aboot` block. The command to boot from the CD looks like the following:

```
>>> boot dka500 -fi /kernels/generic.gz -fl root=/dev/scd0
```

Please note that in the above command, we've used `dka500` (SRM) and `/dev/scd0` (Linux) to refer to the CD-ROM device. Your system may be set up differently, so the command may need to be changed.

### 3.6.6 SRM Installation Process

Follow the instructions contained in Chapter 5, *Starting the Installation* to install Red Hat Linux.

---

## 3.7 MILO Installations

The ARC and AlphaBIOS consoles are designed to load the Windows NT operating system. Like many other things in the Linux world, they're being used to do a job that they were never intended to do. In this case, they're used to load Linux. When you power-on an ARC/AlphaBIOS console machine, you will see the firmware initialize the hardware, and you will see a boot menu. The initialization process varies greatly by machine.

The ARC and AlphaBIOS consoles operate in essentially the same way. Both use MILO and, aside from cosmetic changes, they are identical in functionality. The keystrokes described in each section have been tested against ARC and AlphaBIOS systems, and are known to work with on-site machines. However, small differences may exist for other ARC and AlphaBIOS systems.

The Windows NT ARC/AlphaBIOS firmware is an environment in which programs (for example, the Windows NT `osloader`) can run and make callbacks into the firmware to perform actions.

Linux's `linload.exe` is a much simpler program which does just enough to load and execute MILO. `linload.exe` loads the appropriate image file into memory at `0x00000000` and then makes a swap-PAL PALcall to the image file. The swap is necessary because MILO, like Linux, uses a different PALcode than Windows NT. MILO relocates itself to `0x200000` and continues on through the PALcode reset entry point as before.

### 3.7.1 Setting up ARC for Installation

If you're using MILO and ARC to boot the installation program from the CD-ROM, you'll only need a MILO image disk.

If you're using MILO and ARC, but you're not booting the installation program from the CD-ROM, you'll need to make three disks:

1. The correct MILO disk for the class of machine onto which you are installing Red Hat Linux. The MILO disk images are located in the `miло/images` directory on CD 1. See Table 3-1, *Alpha System Information* for which MILO image you need.
-

2. The generic installation kernel disk, made from `images/generic.img` on CD 1.
3. The RAM disk made from `images/ramdisk.img` on CD 1.

Please refer to Appendix A, *Writing Image Files to Floppy Disks Using `rawrite` or `dd`* for instructions on writing image files to disks.

Once you have created these disks, boot your Alpha machine into the ARC boot menu. The first step is to set up a boot menu entry to enable MILO to be loaded from floppy disk. At the boot menu, select the option **Supplementary menu**.

Next, select the command: **Set up the system**, which takes you to the **Setup Menu**. From here, select the command **Manage boot selection menu**, which takes you to the **Boot Selections Menu**.

You need to add a boot command to load MILO from the floppy disk you created. Choose the command **Add a boot selection**.

You should see several devices listed. To select the A: drive, choose **Floppy Disk 0**.

---

#### Please Note

If you do not see an entry for the floppy drive, consult your AlphaBIOS/ARC installation manual to determine the correct method for configuring your hardware in the console.

---

Next, enter the name of the OS loader to use. Enter `\linload.exe` as the OS loader directory and name. The MILO disk you created has the `linload.exe` file on it, and the correct MILO for your Alpha machine class. The MILO command is always named `mi10` on the floppy, and both files should reside in the root directory of the floppy disk.

Select the **yes** option when you are asked if the operating system is on the same partition as the OS loader (it is, both are in the root directory), and enter `\` as the operating system root directory. As the name of the boot selection, enter something descriptive like **MILO Floppy** to indicate that this entry boots MILO from the floppy drive.

---

If prompted, select **no** to indicate that you do not want to start the debugger at boot time.

You should now be back in the boot selections menu. Press [Esc] to get back to the **Boot Selections Menu**. Choose the option **Supplementary menu, and save changes** to commit the changes to NVRAM. Once you have saved your boot entry, [Esc] will get you back to the boot menu and you can now attempt to boot MILO.

You should have a boot selection that looks something like this:

```
LOADIDENTIFIER=Linux
SYSTEMPARTITION=multi(0)disk(0)fdisk(0)
OSLOADER=multi(0)disk(0)fdisk(0)\linload.exe
OSLOADPARTITION=multi(0)disk(0)fdisk(0)\
OSLOADOPTIONS=
```

This boot selection enables ARC to boot into MILO from the floppy using the `linload.exe` OS loader.

### 3.7.2 Setting up AlphaBIOS for Installation

First, you'll need to install the latest version of AlphaBIOS, which can be obtained from Compaq's Alpha Firmware update site at

```
http://ftp.digital.com/pub/DEC/Alpha/firmware/
```

As with ARC, if you can boot from the CD-ROM, you'll only need to make a MILO disk. If your machine can't boot from the CD-ROM, you will need three disks for the MILO installation process:

1. The correct MILO disk for the class of machine onto which you are installing Red Hat Linux. The MILO disk images are located in the `miilo/images` directory on CD 1. See Table 3-1, *Alpha System Information* for which MILO image you need.
2. The generic installation kernel disk, from `images/generic.img` on CD 1.
3. The RAM disk made from `images/ramdisk.img` on CD 1.

Please refer to Appendix A, *Writing Image Files to Floppy Disks Using rawrite or dd* for instructions on writing image files to disks.

---



Once your AlphaBIOS is at the latest revision level, you can start the installation process. Turn on the system and insert the floppy. At the opening screen, press [F2] to enter setup mode. You are going to add a boot selection that allows you to boot MILO from a floppy disk. Select the following command from the menu: **Utilities -> OS Selection Setup..**

Press [Insert] to add a new operating system selection. For the **Boot Name** parameter, enter something like: **MILO Floppy** to indicate that you are loading MILO from a floppy disk. Press [Tab] to get to the next field. Use the [DOWN-ARROW] key to move through the options until the selection for **Boot File** is **A:**. Then, [Tab] to the next field and enter: **linload.exe** as the name of the OS loader.

[Tab] past the **OS Path Load Device** option, since it's irrelevant and `linload.exe` ignores it. [Tab] to the **OS Path Load File** option. Enter: `\` for the OS Path load file. Finally, press [Enter] to add the selection to the boot menu.

At this point, AlphaBIOS will probably put up a big, unfriendly dialog box labeled something like **Warning: Operating System Selection not valid!**

Ignore this error (AlphaBIOS considers it an error whenever your OS is not Windows NT). Press [Enter] to continue. Press [F10] to save the changes you just made, and press [Enter] to confirm the changes.

Press [Esc] twice to get back to the opening screen. Use the [UP-ARROW] and [DOWN-ARROW] keys to select the boot selection you just added, and press [Enter] to boot it.

AlphaBIOS will load `linload.exe`, which will in turn load MILO.

### 3.7.3 The MILO User Interface

Once the Windows NT firmware is running and you have the correct MILO image for your system loaded, the rest of the installation details are completely generic.

Once you boot into MILO, you get a prompt that is very familiar to the standard `bash#` prompt in Linux. As mentioned earlier, MILO uses native Linux device drivers; therefore, all devices in MILO are referred to in the same manner as a running Linux system (`/dev/scd0` for a SCSI CD-ROM 0, `/dev/hda` for the first IDE device, etc.).

MILO has a very simple interface that is designed to allow you to boot a Linux kernel image, and perform some basic diagnostic functions. Typing **help** is a good idea, since it provides a useful summary of the commands, as follows:

```
MILO> help
MILO command summary: ls [-t fs] [dev:[dir]]
                        - List files in directory on device
boot [-t fs] [dev:file] [boot string]
-
Boot Linux from the specified device and file
run [-t fs] dev:file
                        - Run the standalone program dev:file
show
-
Display all known devices and file systems
set VAR VALUE
-
Set the variable VAR to the specified VALUE
unset VAR
- Delete the specified variable
reset
- Delete all variables
print
- Display current variable settings
help [var]
- Print this help text
Devices are specified as: fd0, hda1, hda2, sda1...
Use the '-t filesystem-name' option if you want
to use anything but the default filesystem ('ext2').
Use the 'show' command to show known devices and file-
systems.
Type 'help var' for a list of variables.
```

---

### Please Note

The `bootopt` command only appears on AlphaPC64 (and similar) systems. Refer to the board's documentation to find out just what it means.

---

## Devices

Until you use a command that needs to make use of a device, no device initialization will take place. The first time you issue the `show`, `ls`, or `run` command, the devices within MILO will be initialized. Devices are named exactly the same way that Linux names devices. So, the first IDE drive will be called `hda` and its first partition will be `hda1`. Use the `show` command to show what devices are available.

---

## Filesystems

MILO supports three filesystems: MSDOS, ext2 and ISO9660. If a device is available to it, MILO can `ls`, `boot` or `run` an image stored on one of these filesystems. MILO will assume ext2 as the default filesystem, and so you have to explicitly tell MILO if the filesystem is something other than ext2. All of the commands that use filenames allow you to pass the file system using the `-t [filesystem]` option. So, if you wanted to list the contents of a SCSI CD-ROM, you might type the following:

```
MILO> ls -t iso9660 scd0:
```

## Variables

MILO contains some settable variables that help the boot process. If you are loading via Windows NT ARC or AlphaBIOS firmwares, then MILO makes use of the boot option environment variables set up by that firmware. For some systems (for example, the AlphaPC64), MILO maintains its own set of environment variables that do not change from boot to boot. These variables can be displayed with the `help var` command:

```
MILO> help var
Variables that MILO cares about:
MEMORY_SIZE - System memory size in megabytes
BOOT_DEV    - Specifies the default boot device
BOOT_FILE   - Specifies the default boot file
BOOT_STRING -
Specifies the boot string to pass to the kernel
SCSIIn_HOSTID - Specifies the host id of the
n-th SCSI controller
PCI_LATENCY - Specifies the PCI master device latency
AUTOBOOT    - If set, MILO attempts to boot on powerup
and enters command loop only on failure.
AUTOBOOT_TIMEOUT - Seconds to wait before auto-
booting on powerup.
```

---

**Please Note**

If you set AUTOBOOT, you need to set the timeout. Setting AUTOBOOT without setting the timeout can result in your machine automatically booting after a timeout of 0 seconds, which will not allow for any user intervention in the case of errors.

---

### 3.7.4 Booting with MILO

The primary function of MILO is to boot the Linux kernel. To boot the installation program to use the CD-ROM (assuming the CD-ROM drive is SCSI) the command would look similar to this:

```
MILO> boot scd0:/kernels/generic.gz root=/dev/scd0
```

Note that the above command may be different for your system, because it depends upon how your system and its CD-ROM drive are set up.

To boot from the floppy, put the `generic.img` floppy into the floppy drive and type in the following command:

```
MILO> boot fd0:
```

The installation program should boot, and you should be able to proceed as normal. IDE CD-ROM devices use the standard IDE device references. You'll see output like the following:

```
available configurations: linux
(or 'halt' to return back to MILO prompt)
boot:
```

Type in **linux** and press [Enter].

If needed, you'll be prompted to place the RAM disk diskette in the floppy drive, and then the installation should begin.

---

### **3.7.5 Installation**

See to Chapter 5, *Starting the Installation* for instructions on the graphical installation process. Be aware that you'll need to install MILO to the hard drive during the installation. Instructions on how to do so are included at the appropriate point during the installation.

---

---

## 4 SPARC: Pre-Installation Information

This chapter provides information you'll need before you begin installing Red Hat Linux on a SPARC system.

If you need more information, the UltraLinux Web page at <http://www.ultralinux.org> provides a wealth of information for people using Red Hat Linux/SPARC.

### 4.1 Supported Hardware

Red Hat Linux/SPARC supports a variety of hardware based on the SPARC architecture. The most recent list of hardware supported on Red Hat Linux/SPARC can be found on Red Hat's Web site at <http://www.redhat.com/hardware>.

The following list was current at the time this manual was produced:

- sun4c architecture machines (IPC, SS1, etc)
  - sun4m architecture machines (Classic, SS5, SS10, etc)
  - sun4u (UltraSPARC-1, UltraSPARC-2, UltraSPARC-5, Ultra-SPARC-10, Enterprise UltraSparc servers)
  - bwtwo, cg3, cg6, TCX frame buffers (24 bit on the TCX)
  - Creator, Creator3D, and Elite3D frame buffers (on UltraSPARC systems)
  - Mach64/PGX24/PCI and PGX32/PCI frame buffers (on UltraSPARC systems)
  - LEO frame buffer (on sun4m systems)
  - cg14 frame buffer (in cg3 mode)
  - SCSI and Ethernet on all of the above
  - type 4, type 5 and type 6 keyboards and mice
  - external SCSI drives
  - CD-ROM drives (external and internal)
  - SCSI/Ether SBUS expansion cards
  - Any original equipment Sun monitor for the frame buffers listed
-

Unsupported Hardware -- The following list contains hardware that is currently unsupported:

- VME-based sun4m machines, such as the 4/690
- SPARC 5 Model 170 machines
- sun4d (SS1000, SS2000)
- sun4 architecture
- Eurocard sun4c machines, called the "sun4e" under Solaris2.4 and others, are not supported. These are VME-bus sun4c machines, to which the kernel has not been ported yet.
- The following types of CD-ROMs are unsupported (for more information on CD-ROM compatibility issues, please visit <http://saturn.tlug.org/suncdfaq>):
  - All NEC models
  - Some Toshiba XM-4101B revisions
  - Toshiba XM-3201B
  - AppleCD 300 Plus on older SPARC PROM
  - Apple CD600i

## 4.2 Installation Overview

Installing Red Hat Linux on a SPARC system is slightly more complex than installing Red Hat Linux on an Intel machine, mostly due to differences in machine architecture. In general, the main steps to a successful installation are:

1. Determine which console commands your SPARC system supports
  2. Determine whether you have sufficient memory to use a RAM disk-based installation
  3. Determine how you will boot the installation program
  4. Determine what installation method you will use
  5. Determine whether you will install Red Hat Linux/SPARC from a serial terminal
-



## 6. Load and run the Red Hat Linux installation program

The remainder of this chapter looks at each of these steps in more detail.

## 4.3 Console Commands

SPARC systems have two different types of boot commands available, depending on the version of the system's console PROM (Programmable Read Only Memory -- a way of storing data without a hard drive). Systems with a PROM version less than 2.0 use what is known as the "old style" boot command, while systems whose PROM is at version 2.0 or greater can use either the old or the "new style" boot commands. If your SPARC system's console prompt is `ok`, then your system is in new command mode, and can use the new style boot command.

In general, it's preferable to use the new style boot command if your system supports it. Of course, it's possible to use the old style boot command, but you'll need to know a bit more about your hardware configuration. An excellent reference on older Sun hardware in general (and the old-style boot commands in particular) can be found in *The Sun Hardware Reference FAQ*, originally by James W. Birdsall. Unfortunately, the Sun Hardware Reference FAQ is not being maintained at this time. However, if you need that type of information, search for the Sun Hardware Reference FAQ on the Web, and you'll find archived copies in various places. Within the Sun Hardware Reference FAQ, the file `part2` contains an in-depth description of the various "ROM monitors" present in older Sun Systems.

In general, the new style boot command is `boot`, followed by a descriptive device name (such as `floppy`, `cdrom`, or `net`).

The old style boot command is `b`, followed by a device specifier in the form:

```
xx(a,b,c)
```

Where `xx` is used to specify the device type (such as `sd` for SCSI disks), `a` is the controller number, `b`, is the device's unit number, and `c` is the partition number. Please refer to *The Sun Hardware Reference* if you have an older SPARC system and require additional information on its boot command syntax.

---

## 4.4 RAM Disk-Based Installation Criteria

When the Red Hat Linux/SPARC installation starts, normally a RAM disk is loaded into memory. This RAM disk contains data and programs required to perform the installation, and is approximately 4 MB in size. Since the RAM disk takes memory away from the Red Hat Linux/SPARC installation program, your SPARC system must have at least 12 MB of memory in order to successfully use a RAM disk-based installation.

---

### Please Note

Red Hat Linux/SPARC may also be installed by booting from the Red Hat Linux/SPARC CD-ROM. This method doesn't use a RAM disk, as the necessary files are already present on the Red Hat Linux/SPARC CD-ROM. We will discuss booting from CD-ROM in Section 4.5.2, *Booting From CD-ROM*.

---

## 4.5 Choosing a Boot Method

This section describes how to start (or `boot`) the installation program. Once the installation program is running, you will be able to choose from several installation methods. You can choose from the following installation methods: CD-ROM, hard drive, FTP and HTTP. (Note that if the installation program is booted directly from CD-ROM, the installation will automatically proceed from that CD-ROM.)

There are three different ways a Red Hat Linux/SPARC installation can be started:

- **Boot From Disk** -- The installation program is started from a disk.
  - **Boot From CD-ROM** -- The installation program is started directly from the Red Hat Linux/SPARC CD-ROM.
  - **Boot From the Network** -- The installation program is read from a TFTP server.
-

### 4.5.1 Booting from Disk

In most cases, if your SPARC system has a disk drive, you can boot the Red Hat Linux/SPARC installation program from a disk.

---

#### Please Note

You can't boot an SMCC manufactured UltraSPARC (made by Sun Microcomputers) from disk; you'll need to choose another boot method.

---

The boot disk image (`boot32.img` for sun4c and sun4m; and `boot64.img` for UltraSPARC) is located in the `images/` directory on your Red Hat Linux/SPARC CD-ROM. You'll need to write this file to a floppy disk.

You'll need a blank, formatted, high-density (1.44 MB), 3.5-inch disk. You'll need access to a computer with a 3.5-inch disk drive and the capability of running a DOS program or the `dd` utility program found on most Linux-like operating systems.

See Appendix A, *Writing Image Files to Floppy Disks Using `rawrite` or `dd`* for instructions on how to write image files to disks.

#### Disk Boot Commands

For SPARC systems with a PROM version of 2.0 or greater, the proper boot command (when in new command mode) is:

```
boot floppy
```

On the other hand, SPARC systems with PROM versions less than 2.0 should use the following command at the `\symgt` prompt:

```
b fd()
```

---

---

**Please Note**

There have been reports that some systems with pre-2.0 PROMs cannot boot the Red Hat Linux/SPARC installation program from disk. Also, PCI-based UltraSPARC machines cannot boot from disk. If this is the case with your SPARC system, you will need to use another boot method (from the CD-ROM or the network).

---

### 4.5.2 Booting From CD-ROM

If your SPARC system has a fully Sun-supported CD-ROM drive, you can boot directly from the Red Hat Linux/SPARC CD-ROM.

Please see the Red Hat Linux Hardware Compatibility List at <http://www.red-hat.com/support/hardware/> to see if your CD-ROM drive will work with Red Hat Linux/SPARC. Sun-supported CD-ROM drives read in 512-byte blocks, so you'll need to use a CD-ROM drive that can read in 512-byte blocks if you want to boot the installation program from a CD-ROM.

For SPARC systems with a PROM version of 2.0 or better, use the following command when in new command mode:

```
boot cdrom
```

SPARC systems with PROM versions less than 2.0 may not be able to boot from a CD-ROM at all, although we've received reports that at least some PROM 1.3 systems have been able to boot from CD-ROM. If your SPARC system has a CD-ROM at SCSI id 6, the following command should boot the Red Hat Linux/SPARC installation program:

```
b sd(0,6,0)
```

Note that using an NFS-mounted root after booting from CD-ROM is not supported, as the filesystem on the Red Hat Linux/SPARC CD-ROM performs the same function as an NFS-mounted root. Therefore, no additional boot command arguments should be given for CD-ROM boots.

---

### 4.5.3 Booting From the Network

The Red Hat Linux/SPARC can network boot with a network-loaded RAM disk. This method can be used by systems with at least 16 MB of RAM. While booting your SPARC system from the network is fairly straightforward, there are several requirements:

- Your SPARC system must have a network connection.
- Your network must be able to give your SPARC system its IP address via a RARP (Reverse Address Resolution Protocol) message.
- You must have a TFTP server that can download the Red Hat Linux/SPARC kernel and installation program to your SPARC system.

#### TFTP Server Setup

If you are going to set up a TFTP server on a Red Hat Linux system, simply install the latest `tftp` package using RPM, making sure the line in `inetd.conf` that will run `tftp` is uncommented. Don't forget to kill `-HUP inetd` if you needed to make any changes to `inetd.conf`.

Next, you'll need to make a symbolic link describing the SPARC system to be booted, and point it to the file from which it should boot. The name of the symlink contains either one or two items:

1. The IP address of the system to be booted, in hexadecimal.
2. A string describing the architecture of the system to be booted (only sun4c and sun4m machines need this part).

To convert the more common "dotted decimal" IP address into its hex equivalent, convert each of the four groups of numbers in the IP address into hex. If the resulting hex number is only one digit, add a leading zero to it. Then append all four hex numbers together. For example, take the IP address 10.0.2.254. Convert each set of four numbers into hex, and add a leading zero where necessary:

```
10 = A   or 0A
 0 = 0   or 00
 2 = 2   or 02
254 = FE or FE
```

Therefore, the IP address 10.0.2.254 in hex is: 0A0002FE.

If you have `perl` available on a system, you can use the following command (modified to include your system's IP address, of course) to have your IP address converted for you:

```
# perl -e 'printf "%02x"x4 . "\n",10,0,2,254;'
0a0002fe
#
```

In this example, `perl` converted 10.0.2.254.

The second part of the symlink name is the SPARC system's architecture. Only `sun4m` and `sun4c` machines need this part. For our example, we'll use `sun4m`. The IP address and architecture are separated by a dot, resulting in this symlink name:

```
0A0002FE.SUN4M
```

The last step is figuring out what this symlink should point to. If you're using a RAM disk, use one of these files:

```
/images/tftp32.img -- for sun4c and sun4m
/images/tftp64.img -- for UltraSparc
```

Place the appropriate file in the TFTP server's directory, and create the symlink. In this example, we're using the image that includes a RAM disk:

```
ln -s tftp32.img 0A0002FE.SUN4M or
ln -s tftp64.img 0A0002FE
```

## Network Boot Commands

You're now ready to boot. If you're going to boot `tftp32.img` or `tftp64.img`, simply use the following command (in new command mode):

```
boot net
```

If `boot net` doesn't work, try the following command, which is needed by certain older machines:

```
boot le()
```

---

## 4.6 Choosing an Installation Method

Once your SPARC system has booted, and the installation program is running, you'll be asked to choose an installation method (unless you've booted directly from CD-ROM, in which case a CD-ROM installation method is assumed). Red Hat Linux/SPARC can be installed by any of the following methods:

- Installing packages from CD-ROM.
- Installing packages from a locally-attached hard drive.
- Installing packages from an NFS server.
- Installing packages from an FTP site.
- Installing packages from an HTTP site.

### 4.6.1 CD-ROM Installation

This is the most straightforward method. It requires a Red Hat Linux/SPARC CD-ROM, and a Sun-supported CD-ROM connected to your SPARC system.

### 4.6.2 Hard Drive Installation

This installation method requires that the contents of the Red Hat Linux/SPARC CD-ROM (or equivalent files) have been copied to a hard disk directly attached to your SPARC system. It is important to note that the partition holding these files cannot be used for any other purpose during the installation (i.e., it cannot be given a mount point during the installation). In addition, the partition must be in ext2 format.

### 4.6.3 NFS Installation

Installing via NFS requires a local area network connection and access to an NFS server that can export the contents of the Red Hat Linux/SPARC CD-ROM (or equivalent files).

### 4.6.4 FTP Installation

This installation method requires a local area network connection and access to an FTP site with the Red Hat Linux/SPARC CD-ROM (or equivalent files).

---

### 4.6.5 HTTP Installation

This installation method requires a local area network connection and access to an HTTP site with the Red Hat Linux/SPARC CD-ROM (or equivalent files).

## 4.7 Installation Using a Serial Terminal

You can also install Red Hat Linux/SPARC using a serial terminal attached to your SPARC system. Any terminal which can emulate a VT100 (or a computer with terminal emulation software) will work fine. Boot as you would normally, and at the `SIL0` prompt enter:

```
boot net
```

The installation program runs on the first serial port at 9600 baud, 8 bits, no parity, 1 stop bit (often called 9600,8,N,1). The installation program can run in color, if your serial terminal supports color. Note that a computer running `kermi t` and connected to your SPARC system will display in color.

At any prompt dialog during a serial installation (any dialog with an **OK** button), you can press `[Ctrl]-[Z]` to start a subshell. To return to the installation program, enter **exit** at the shell prompt.

When the installation is complete, simply boot normally, and Red Hat Linux should appear on your serial terminal.

---

#### Please Note

If you install your system using a frame buffer and keyboard and you want to change your system to a "headless" installation, remove the keyboard and attach a serial console to the workstation. Confirm the system changes in `kudzu` during system bootup and your serial console will be configured.

---



## 4.8 Partitioning

There is one additional step required when partitioning a hard drive for Red Hat Linux/SPARC. You must create the third partition of every disk as type "Whole Disk," spanning from cylinder 0 to the end of the disk. It shouldn't be used in any way, but it must exist. You can still create other partitions as you normally would.

Note that this partition will already exist on any disk that has been used under SunOS or Solaris. If you are partitioning a new disk, you can use `fdisk's s` command to create a standard disk label (which includes the whole-disk partition). If you don't like the size of the other partitions created by `s`, you can delete those partitions and recreate them with the sizes you want.

---

### **Please Note**

In Red Hat Linux/SPARC 6.2, Disk Druid can be used to initialize disk labels on a SPARC. Disk Druid no longer uses the third partition slot for non-whole disk partitions and automatically creates the whole disk partition if the third partition slot is free.

---

---

## 5 Starting the Installation

This chapter explains how to start the Red Hat Linux installation process. We'll cover the following areas:

- Getting familiar with the installation program's user interface
- Starting the installation program
- Selecting an installation method
- Beginning the installation

By the end of this chapter, the installation program will be running on your system, and you will have begun the process of either installing or upgrading to Red Hat Linux 6.2.

### 5.1 The Installation Program User Interface

If you've used a **graphical user interface (GUI)** before, you'll be familiar with this process. If not, simply use your mouse to navigate the screens, "click" buttons or enter text fields. You can also navigate through the installation using the [Tab] and [Enter] keys.

---

#### Please Note

If you do not wish to use the GUI installation program, the text mode installation program is also available. To enter text mode, enter the following boot command:

```
boot: text
```

For text mode installation instructions, please refer to the *Official Red Hat Linux Reference Guide*.

---

### 5.1.1 A Note about Virtual Consoles

The Red Hat Linux installation program offers more than the dialog boxes of the installation process. Several different kinds of diagnostic messages are available to you, in addition to giving you a way to enter commands from a shell prompt. It presents this information on five **virtual consoles**, among which you can switch using a single keystroke.

These virtual consoles can be helpful if you encounter a problem while installing Red Hat Linux. Messages displayed on the installation or system consoles can help pinpoint a problem. Please see Table 5–1, *Console, Keystrokes, and Contents* for a listing of the virtual consoles, keystrokes to switch to them, and their contents.

**Table 5–1 Console, Keystrokes, and Contents**

Console	Keystrokes	Contents
1	[Ctrl]-[Alt]-[F1]	installation dialog
2	[Ctrl]-[Alt]-[F2]	shell prompt
3	[Ctrl]-[Alt]-[F3]	install log (messages from installation program)
4	[Ctrl]-[Alt]-[F4]	system-related messages
5	[Ctrl]-[Alt]-[F5]	other messages
7	[Ctrl]-[Alt]-[F7]	X graphical display

Generally, there's no reason to leave the default console (virtual console #7) unless you are attempting to diagnose installation problems. But if you get curious, feel free to look around.

## 5.2 Starting the Installation Program

Now it's time to begin installing Red Hat Linux. To start the installation, you must first boot the installation program. Please make sure you have all the resources you'll need for the installation. If you've already read through the pre-installation chapter

---

applicable to your architecture, and through Chapter 2, *Getting Ready for the Installation*, and followed the instructions, you should be ready to begin.

### **5.2.1 Booting the Installation Program**

Boot the installation program according to the instructions contained in the pre-installation chapter specific to your architecture: either Chapter 3, *Alpha: Pre-Installation Information* or Chapter 4, *SPARC: Pre-Installation Information*.

After a short delay, a screen containing the `boot :` prompt should appear. The screen contains information on a variety of boot options. Each boot option also has one or more help screens associated with it. To access a help screen, press the appropriate function key as listed in the line at the bottom of the screen.

You should keep two things in mind:

- The initial screen will automatically start the installation program if you take no action within the first minute. To disable this feature, press one of the help screen function keys.
- If you press a help screen function key, there will be a slight delay while the help screen is read from disk.

Normally, you'll only need to press [Enter] to boot. Watch the boot messages to see whether the Linux kernel detects your hardware. If it does not properly detect your hardware, you may need to restart the installation in "expert" mode. If your hardware is properly detected, please continue to the next section.

Expert mode can be entered using the following boot command:

```
boot: linux expert
```

---

**Please Note**

If you do not wish to perform a CD-ROM GUI installation, you can choose to perform a text mode installation by using the following boot command:

```
boot: text
```

For text mode installation instructions, please refer to the *Official Red Hat Linux Reference Guide*.

The command to start a **serial installation** has changed. If you need to perform the installation in serial mode, type:

```
boot: linux console=<device>
```

Where *<device>* should be the device you are using (such as ttyS0 or ttyS1).

---

---

**Please Note**

The initial boot messages will not contain any references to SCSI or network cards. This is normal, since these devices are supported by modules that are loaded during the installation process.

---

Options can also be passed to the kernel.

For example, to instruct the kernel to use all the RAM in a 128MB system, enter:

```
boot: linux mem=128M
```

After entering any options, press [Enter] to boot using those options.

## 5.3 Selecting an Installation Method

Next, you will be asked what type of installation method you wish to use. You can install Red Hat Linux via the following basic methods:

---

**CD-ROM**

If you have a CD-ROM drive and the Red Hat Linux CD-ROM.

**Hard Drive**

If you copied the Red Hat Linux files to a local hard drive. Refer to the *Official Red Hat Linux Reference Guide* for hard drive installation instructions.

**NFS Image**

If you are installing from an NFS Image server which is exporting the Red Hat Linux CD-ROM or a mirror image of Red Hat Linux. Refer to the *Official Red Hat Linux Reference Guide* for network installation instructions. Please note: NFS installations may also be performed in GUI mode.

**FTP**

If you are installing directly from an FTP server. Refer to the *Official Red Hat Linux Reference Guide* for FTP installation instructions.

**HTTP**

If you are installing directly from an HTTP Web server. Refer to the *Official Red Hat Linux Reference Guide* for HTTP installation instructions.

See Chapter 3, *Alpha: Pre-Installation Information* or Chapter 4, *SPARC: Pre-Installation Information* to determine what disks you'll require for the installation method you've chosen.

## **5.4 Beginning the Installation**

If you are planning to install via CD-ROM using the graphical interface, please read on. If not, refer to the *Official Red Hat Linux Reference Guide*

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---

**Please Note**

If you'd rather perform a text mode installation, reboot your system and at the `boot :` prompt, type **text**. Refer to the *Official Red Hat Linux Reference Guide* for further instructions.

---

### 5.4.1 Installing from CD-ROM

To install Red Hat Linux from CD-ROM, choose "CD-ROM" and select **OK**. When prompted, insert the Red Hat Linux CD into your CD-ROM drive (if you did not boot from the CD-ROM). Once done, select **OK**, and press [Enter].

The installation program will then probe your system and attempt to identify your CD-ROM drive. It will start by looking for an IDE (also known as ATAPI) CD-ROM drive. If found, you will continue to the next stage of the installation process (see Section 5.5, *Language Selection*).

If a drive is not detected, you'll be asked what type of CD-ROM drive you have. Choose from the following types:

#### **SCSI**

Select this if your CD-ROM drive is attached to a supported SCSI adapter; the installation program will then ask you to choose a SCSI driver. Choose the driver that most closely resembles your adapter. You may specify options for the driver if necessary; however, most drivers will detect your SCSI adapter automatically.

#### **Other**

If your CD-ROM drive is neither an IDE nor a SCSI, it's an "other." Sound cards with proprietary CD-ROM interfaces are good examples of this CD-ROM type. The installation program presents a list of drivers for supported CD-ROM drives -- choose a driver and, if necessary, specify any driver options.

---



---

**Tip**

A partial list of optional parameters for CD-ROM drives can be found in the *Official Red Hat Linux Reference Guide*, in the *General Parameters and Modules* appendix.

---

**What If the IDE CD-ROM Was Not Found?**

If the installation program fails to find your IDE (ATAPI) CD-ROM (it asks you what type of CD-ROM drive you have), restart the installation, and at the `boot :` prompt enter `linux hdX=cdrom`. Replace the `X` with one of the following letters, depending on the interface the unit is connected to, and whether it is configured as master or slave:

- a - First IDE controller, master
- b - First IDE controller, slave
- c - Second IDE controller, master
- d - Second IDE controller, slave

(If you have a third and/or fourth controller, simply continue assigning letters in alphabetical order, going from controller to controller, and master to slave.)

Once identified, you will be asked to insert the Red Hat Linux CD into your CD-ROM drive. Select **OK** when you have done so. After a short delay, the next dialog box will appear.

After booting, the installation program begins by displaying the language screen.

---

---

### Please Note

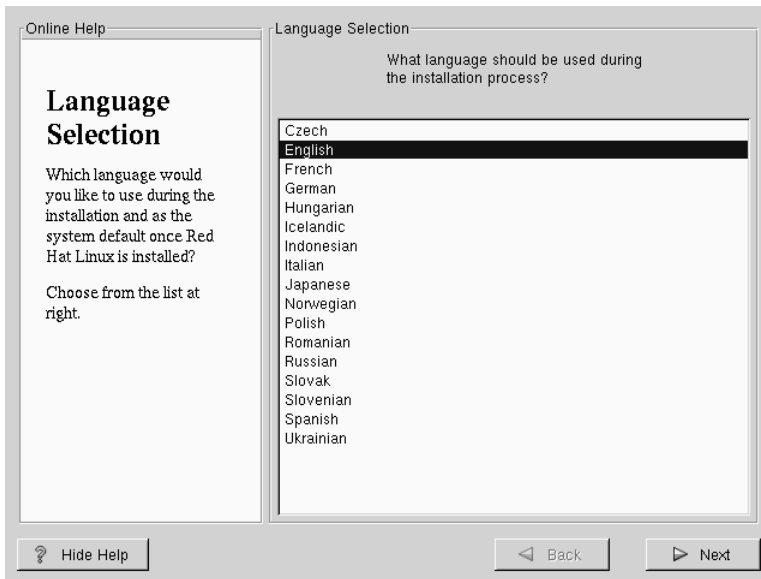
If you wish to abort the installation process at this time, simply reboot your machine and then eject the boot disk or CD-ROM. You can safely cancel the installation at any point before the **About to Install** screen, see Section 6.13, *Preparing to Install*.

---

## 5.5 Language Selection

Using your mouse, select the language you prefer to use for the installation and as the system default (see Figure 5–1, *Language Selection*).

**Figure 5–1** Language Selection



## 5.6 Keyboard Configuration

Choose the model that best fits your system (see Figure 5–2, *Keyboard Configuration*). If you cannot find an exact match, choose the best **Generic** match for your keyboard type (for example, **Generic 101-key PC**).

Next, choose the correct layout type for your keyboard (for example, U.S. English).

Creating special characters with multiple keystrokes (such as Ñ, Ô, and Ç) is done using "dead keys" (also known as compose key sequences). Dead keys are enabled by default. If you do not wish to use them, select **Disable dead keys**.

To test your configuration, use the blank text field at the bottom of the screen to enter text.

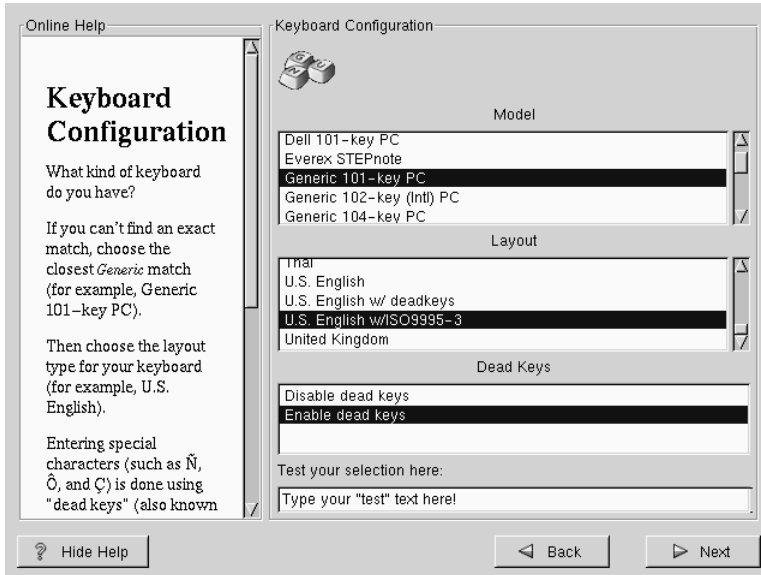
---

### Tip

To change your keyboard type post-installation, become **root** and use the `/usr/sbin/kbdconfig` command, or you can type `setup` at the root prompt.

---

Figure 5–2 Keyboard Configuration



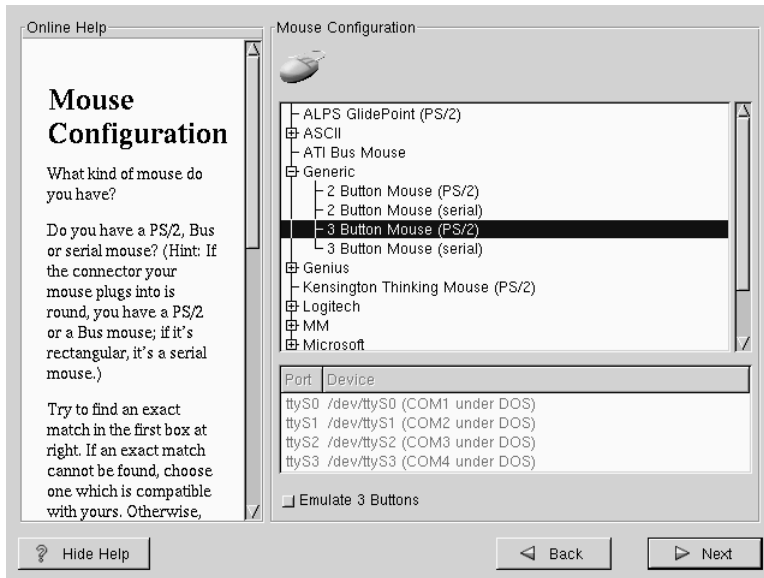
## 5.7 Mouse Configuration

Choose the correct mouse type for your system. If an exact match cannot be found, choose a mouse type that you are sure is compatible with your system (see Figure 5–3, *Mouse Configuration*).

To determine your mouse's interface, follow the mouse cable back to where it plugs into your system. If the connector at the end of the mouse cable plugs into a rectangular connector, you have a serial mouse; if the connector is round, you have a PS/2 mouse.

If you cannot find a mouse that you are sure is compatible with your system, select one of the **Generic** entries, based on your mouse's number of buttons, and its interface.

Figure 5–3 Mouse Configuration



If you have a PS/2 or a Bus mouse, you do not need to pick a port and device. If you have a serial mouse, you should choose the correct port and device that your serial mouse is on.

The **Emulate 3 Buttons** check box allows you to use a two-button mouse as if it had three buttons. In general, it's easiest to use the X Window System if you have a three-button mouse. If you select this check box, you can emulate a third, "middle" button by pressing both mouse buttons simultaneously.

---

**Tip**

To change your mouse configuration post-installation, become root. You can then use the `/usr/sbin/mouseconf` command from the shell prompt.

To configure your mouse as a left-handed mouse, you can reset the order of the mouse buttons. This can be done after you have booted your Red Hat Linux system, by typing `gpm -B 321` at the shell prompt.

---

## 5.8 Welcome to Red Hat Linux

The "Welcome" screen (see Figure 5–4, *Welcome to Red Hat Linux*) does not prompt you for any installation input. Please read over the help text in the left panel for additional instructions and information on where to register your Official Red Hat Linux product.

Figure 5–4 Welcome to Red Hat Linux



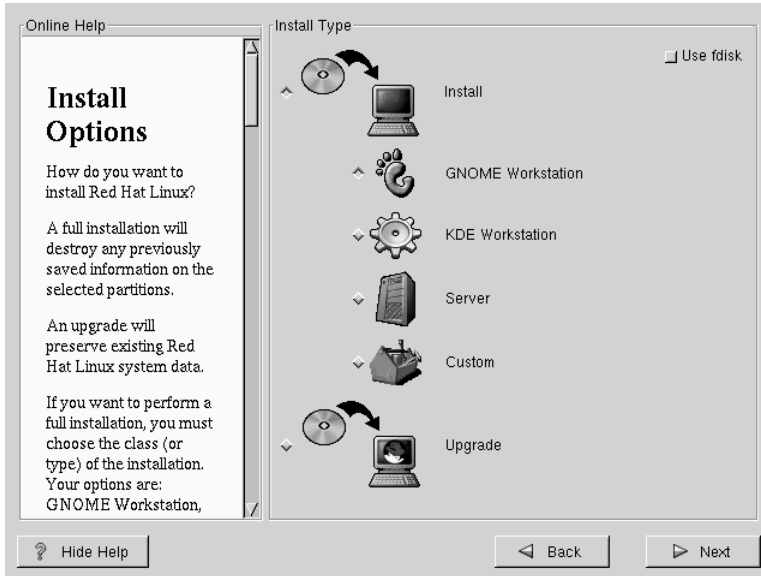
Please notice the **Hide Help** button at the bottom left corner of the screen. The help screen is open by default, but if you do not want to view the help information, click on the **Hide Help** to minimize the screen.

Click on the **Next** button to continue.

## 5.9 Install Options

Choose whether you would like to perform a full installation or an upgrade (see Figure 5–5, *Choosing Install or Upgrade*).

In the top right-hand corner of the **Install Type** screen there is a box you may select if you wish to partition using `fdisk`. Note that `fdisk` is not as intuitive to use as Disk Druid and is not selected by default. If you have not used `fdisk` before, you should read about both `fdisk` and Disk Druid to determine which will best suit your needs.

**Figure 5–5 Choosing Install or Upgrade**

To perform a full GUI installation, please refer to Chapter 6, *Installing Red Hat Linux 6.2* for those instructions.

To perform an upgrade, please refer to Chapter 7, *Upgrading Your Current System*.



## 6 Installing Red Hat Linux 6.2

Once you have finished this chapter, you will have completed a full installation of Red Hat Linux 6.2.

If you need information about performing an upgrade, please refer to Chapter 7, *Upgrading Your Current System* for those instructions.

### 6.1 Continuing the Installation

Usually, Red Hat Linux is installed on a clean disk partition or set of partitions, or over another installation of Linux.

---

**WARNING**

**Installing Red Hat Linux over another installation of Linux (including Red Hat Linux) does *not* preserve any information (files or data) from a prior installation. Make sure you save any important files! If you are worried about saving the current data on your existing system (without making a backup on your own), you should consider performing an upgrade instead (see Chapter 7, *Upgrading Your Current System*).**

---

In choosing a full installation, you must also choose the class of the installation. Your options include: **GNOME Workstation**, **KDE Workstation**, **Server** or **Custom**.

Most suitable for new users, the workstation-class installation will install your choice of a GNOME or KDE desktop environment, and the X Window System.

---

---

**WARNING**

**A workstation-class installation will erase *all information in all Linux-related partitions* from *every one of your computer's hard drive(s)*.**

---

---

---

**Please Note**

Unlike previous workstation-class installations, performing a Red Hat Linux 6.2 workstation-class installation will not install the network daemon `inetd`. Not installing `inetd` results in a more secure installation; however, network-related services such as `finger`, `telnet`, `talk`, and `FTP` will not work. If you require these types of services, please go back and choose a server- or a custom-class installation.

---

A server-class installation is most appropriate for you if you'd like your system to function as a Linux-based server, and you don't want to heavily customize your system configuration.

---

---

**WARNING**

**A server-class installation will erase *all partitions (both Linux and non-Linux)* from *every one of your computer's hard drive(s)*.**

---

The *custom-class installation* allows you the most flexibility during your installation. The workstation-class and server-class installations automatically go through the installation process for you and omit certain steps. During a custom-class installation, it is up to *you* how disk space should be partitioned. You have complete control over

---

the packages that will be installed on your system. Unless you have prior Linux experience, you should not select the custom-class installation method.

If you would like to know what steps are omitted by not performing a custom-class installation please refer to *Behind the Scenes of a Custom-Class Installation* in Section 2.4.3.

## 6.2 Partitioning with fdisk



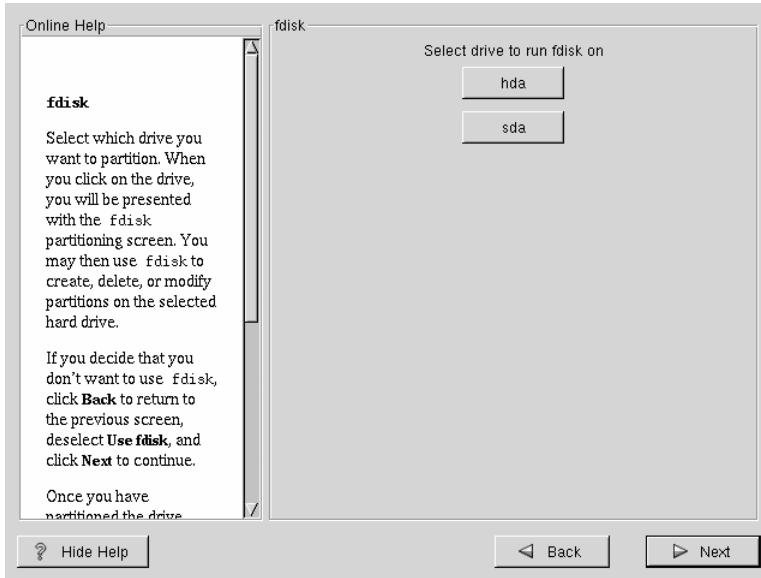
Unless you have previously used `fdisk` and understand how it works, we do not recommend that you use it. Disk Druid is an easier and friendlier partitioning tool for those new to partitioning their system. To exit `fdisk`, click **Back** to return to the previous screen, deselect `fdisk`, and then click **Next**.

---

This section applies only if you chose to use `fdisk` to partition your system. If are not using `fdisk`, please skip to Section 6.3, *Automatic Partitioning* for automatic partitioning or Section 6.4, *Partitioning Your System* for partitioning with Disk Druid.

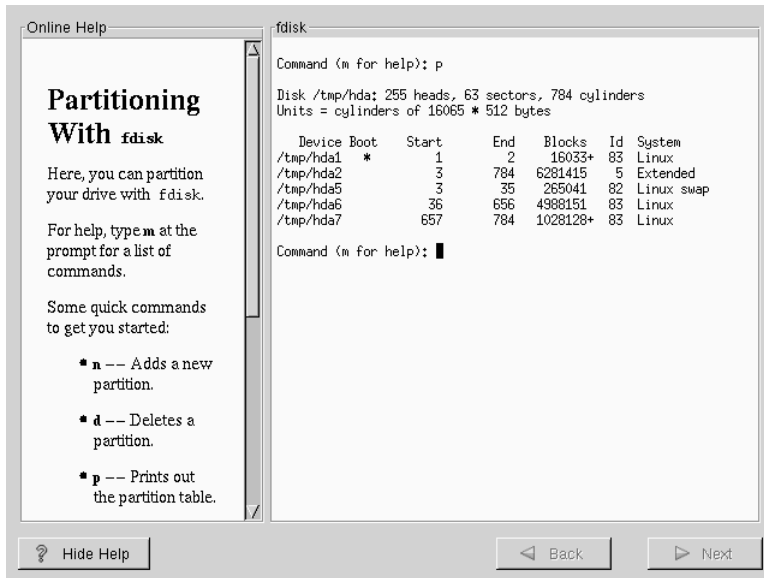
If you have chosen to use `fdisk`, the next screen (see Figure 6–1, `fdisk`) will prompt you to select a drive to partition using `fdisk`.

---

**Figure 6–1** fdisk

Once you have chosen which drive to partition, you will be presented with the `fdisk` command screen (see Figure 6–2, *Partitioning with fdisk*). If you are unsure as to what command you should use, type `[m]` at the prompt for help. Please refer to the *Official Red Hat Linux Reference Guide* for an overview of `fdisk`. When you've finished making partitions, type `w` to save your changes and quit. You will be taken back to the original `fdisk` screen where you can choose to partition another drive or continue with your installation.

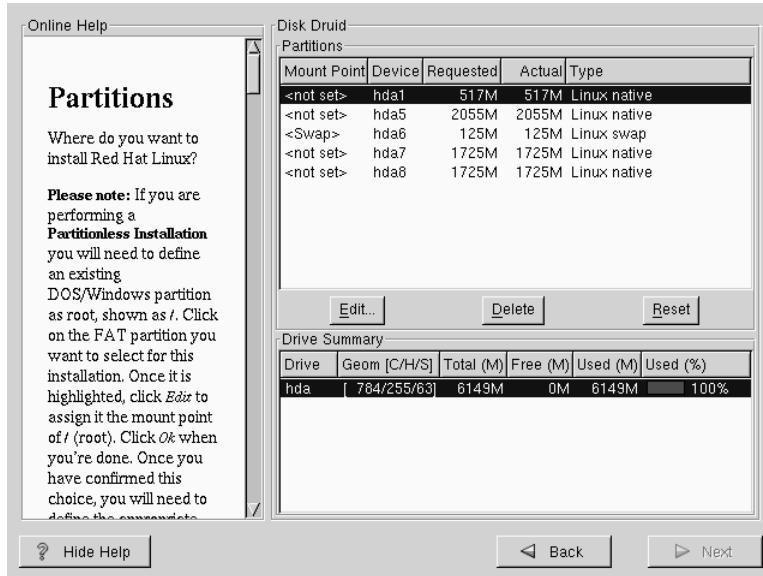
Figure 6–2 Partitioning with fdisk



After you have partitioned your drive(s), click **Next**. You will then use Disk Druid to assign **mount points** to your partitions.

You will not be able to add new partitions using Disk Druid, but you will be able to edit those you have already created.

Figure 6–3 Editing with Disk Druid



Skip to Section 6.5, *Choose Partitions to Format* for further installation instructions.

## 6.3 Automatic Partitioning

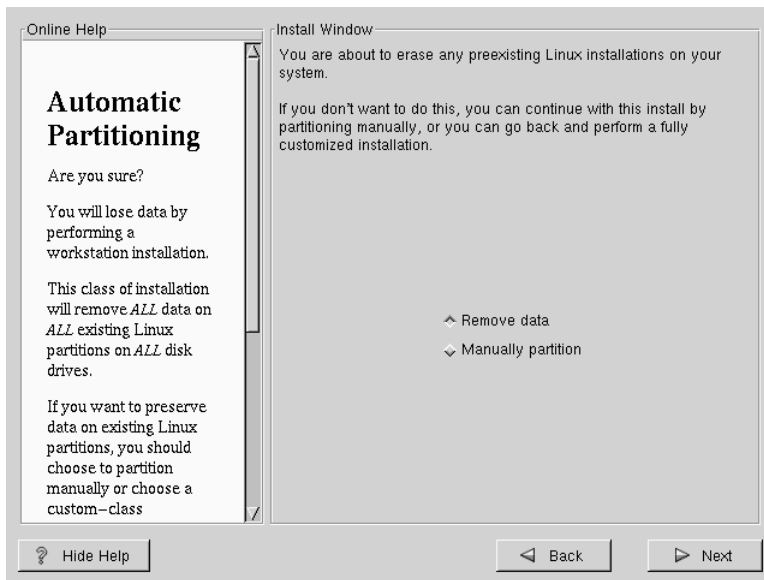
Automatic Partitioning allows you to perform an installation without having to partition your drive(s) yourself. If you do not feel comfortable with partitioning your system, it is recommended that *do not* choose to partition manually and instead let the installation program partition for you.

The Automatic Partitioning screen is only seen when performing a workstation- or server-class installation. If you are performing a custom-class installation, or choose to manually partition, please refer to Section 6.4, *Partitioning Your System*.

In this screen, you can choose to continue with this installation, to partition manually, or use the **Back** button to choose a different installation method (see Figure 6–4, *Automatic Partitioning Dialog*).

If you do *not* want to lose some or all of your data, you should either choose to partition manually or choose a different installation class.

**Figure 6–4 Automatic Partitioning Dialog**



*A workstation-class installation will remove all data on all currently existing Linux partitions.*

---



*A server-class installation will remove all data on all partitions of all hard drives.*

---

If you are unsure how you want your system to be partitioned, please refer to Chapter 3, *Alpha: Pre-Installation Information* or Chapter 4, *SPARC: Pre-Installation Information* and the chapter on partitioning in the *Official Red Hat Linux Reference Guide*.

## 6.4 Partitioning Your System

If you are performing a workstation- or server-class installation and you chose *not* to partition manually, please skip to Section 6.7, *Network Configuration*.

---

### Please Note

If you're using SRM and `aboot` to boot your Alpha, and you're using `fdisk` for partitioning, remember that you'll need to start your partitions on cylinder 2.

---

At this point, it's necessary to let the installation program know where it should install Red Hat Linux. This is done by defining mount points for one or more disk partitions in which Red Hat Linux will be installed. You may also need to create and/or delete partitions at this time (refer to Figure 6–5, *Partitioning with Disk Druid*).

---

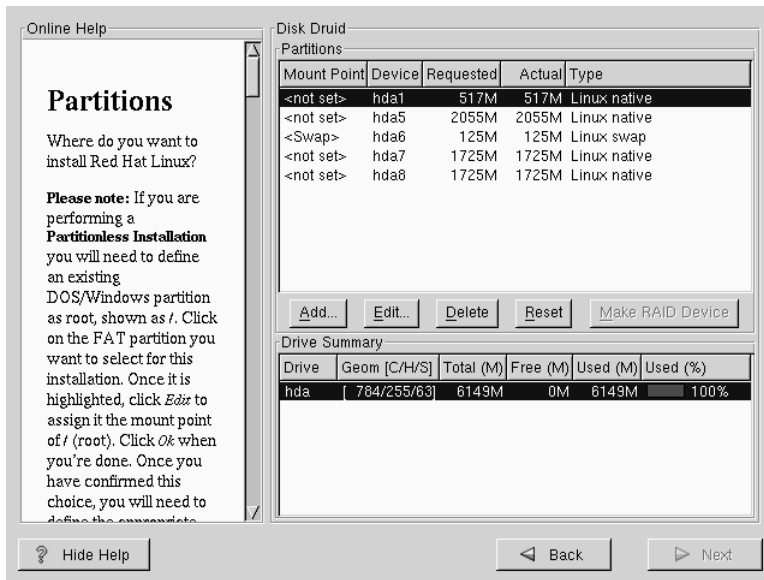
### Please Note

If you have not yet planned how you will set up your partitions, refer to the partitioning appendix in the *Official Red Hat Linux Reference Guide*. As a bare minimum, you'll need an appropriately-sized root partition, and a swap partition of at least 16 MB.

---



Figure 6–5 Partitioning with Disk Druid



The partitioning tool used in Red Hat Linux 6.2 is Disk Druid. With the exception of certain esoteric situations, Disk Druid can handle the partitioning requirements for a typical Red Hat Linux installation.

### 6.4.1 Partition Fields

Each line in the "Partitions" section represents a disk partition. Each line in this section has five different fields:

#### Mount Point:

A mount point is the location within the directory hierarchy at which a volume exists. The volume is said to be mounted at this location. This field indicates where the partition will be mounted. If a partition exists, but is "not set" you need to define its mount point. Double-click on the partition or use the **Edit** key.

Unless you have a reason for doing otherwise, we recommend that you create the following partitions:

- A swap partition (at least 16MB) -- Swap partitions are used to support virtual memory. In other words, data is written to a swap partition when there is not enough RAM to store the data your system is processing. If your computer has 16MB of RAM or less, you *must* create a swap partition. Even if you have more memory, a swap partition is still recommended. The minimum size of your swap partition should be equal to your computer's RAM, or 16MB (whichever is larger).
- A `/boot` partition (16MB, maximum) -- The partition mounted on `/boot` contains the operating system kernel (which allows your system to boot Red Hat Linux), along with files used during the bootstrap process. Due to the limitations of most PC BIOSes, creating a small partition to hold these files is a good idea. This partition should be no larger than 16MB.
- A `root` partition (700MB-1.7GB) -- This is where `" / "` (the root directory) resides. In this setup, all files (except those stored in `/boot`) reside on the root partition. A 700MB root partition will permit the equivalent of a workstation-class installation (with *very* little free space), while a 1.7GB root partition will let you install every package.

**Device:**

This field displays the partition's device name.

**Requested:**

This field shows the partition's original size. To re-define the size, you must delete the current partition and recreate it using the **Add** button.

**Actual:**

This field shows the space currently allocated to the partition.

**Type:**

This field shows the partition's type (such as Linux Native or DOS).

## 6.4.2 Problems When Adding a Partition

If you attempt to add a partition and Disk Druid can't carry out your request, you'll see a dialog box listing partitions that are currently unallocated, along with the reason

---

they could not be allocated. Unallocated partition(s) are also displayed on Disk Druid's main screen (though you may have to scroll through the "Partitions" section to see them).

As you scroll through the **Partitions** section, you might see an "Unallocated Requested Partition" message (in red text), followed by one or more partitions. A common reason for this is a lack of sufficient free space for the partition. In any case, the reason the partition remains unallocated will be displayed after the partition's requested mount point.

To fix an unallocated requested partition, you must move the partition to another drive which has the available space, resize the partition to fit on the current drive, or delete the partition entirely. Make changes using the **Edit** button or by double clicking on the partition.

### **6.4.3 Drive Summary**

Each line in the **Drive Summary** section represents a hard disk on your system. Each line has the following fields:

**Drive:**

This field shows the hard disk's device name.

**Geom [C/H/S]:**

This field shows the hard disk's **geometry**. The geometry consists of three numbers representing the number of cylinders, heads and sectors as reported by the hard disk.

**Total:**

This field shows the total available space on the hard disk.

**Free:**

This field shows how much of the hard disk's space is still unallocated.

**Used:**

These fields show how much of the hard disk's space is currently allocated to partitions, in megabytes and percentage.

---

The **Drive Summary** section is displayed only to indicate your computer's disk configuration. It is not meant to be used as a means of specifying the target hard drive for a given partition. That is done using the **Allowable Drives** field in Section 6.4.5, *Adding Partitions*.

### 6.4.4 Disk Druid's Buttons

These buttons control Disk Druid's actions. They are used to add and delete partitions, and to change partition attributes. There are also buttons that are used to accept the changes you've made, or to exit Disk Druid. Let's take a look at each button in order.

**Add:**

Used to request a new partition. When selected, a dialog box will appear containing fields (such as mount point and size) that must be filled in.

**Edit:**

Used to modify attributes of the partition currently selected in the "Partitions" section. Selecting **Edit** will open up a dialog box. Some or all of the fields can be edited, depending on whether the partition information has already been written to disk.

**Delete:**

Used to remove the partition currently highlighted in the **Current Disk Partitions** section. You'll be asked to confirm the deletion of any partition.

**Reset:**

Used to restore Disk Druid to its original state. All changes made will be lost if you **Reset** the partitions.

**Make RAID Device:**

**Make RAID Device** can be used if you want to provide redundancy to any or all disk partitions. *It should only be used if you have experience using RAID.* To read more about RAID, please refer to the *Official Red Hat Linux Reference Guide*.

---

### 6.4.5 Adding Partitions

To add a new partition, select the **Add** button. A dialog box will appear (see Figure 6–6, *Adding a Partition*).

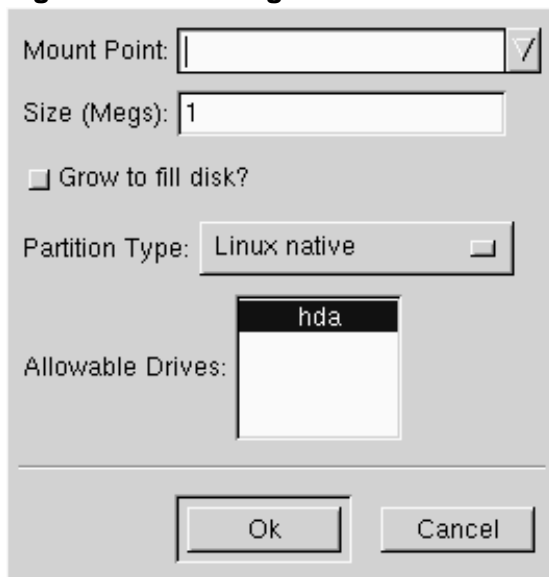
---

#### Please Note

You will need to dedicate at least one partition to Red Hat Linux, and optionally more. This is discussed more completely in Appendix C in the *Official Red Hat Linux Reference Guide*.

---

**Figure 6–6 Adding a Partition**



- **Mount Point:** Highlight and enter the partition's mount point. For example, if this partition should be the root partition, enter `/`; enter `/boot` for the `/boot` partition, and so on. You can also use the pull-down menu to choose the correct mount point for your partition.

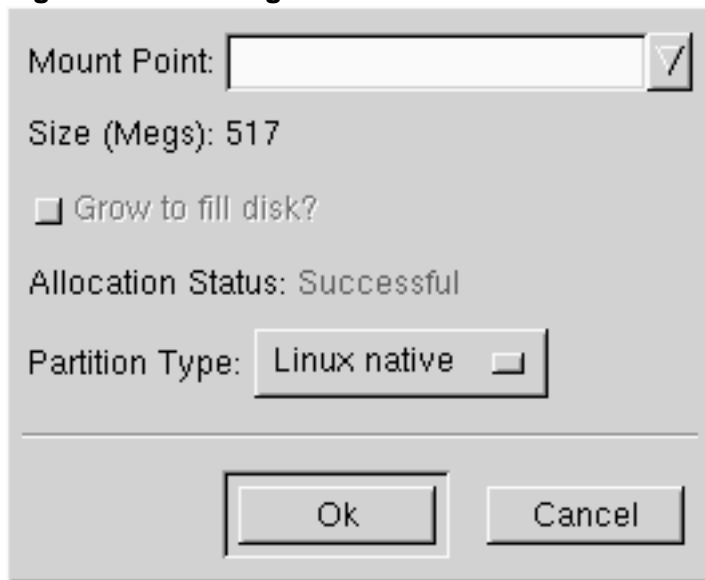
- **Size (Megs):** Enter the size (in megabytes) of the partition. Note this field starts with a "1" in it; unless changed you'll end up with a 1 MB partition.
- **Grow to fill disk:** This check box indicates if the size you entered in the previous field is to be considered the partition's exact size, or its minimum size. When selected, the partition will grow to fill all available space on the hard disk. The partition's size will expand and contract as other partitions are modified. You can make multiple partitions growable; if you do, the additional free space will be shared among all growable partitions.
- **Partition Type:** This field contains a list of different partition types (such as Linux Native or DOS). Select the appropriate partition type by using the mouse.
- **Allowable Drives:** This field contains a list of the hard disks installed on your system. If a hard disk's box is highlighted, then a desired partition can be created on that hard disk. If the box is *not* checked, then the partition will *never* be created on that hard disk. By using different check box settings, you can direct Disk Druid to place partitions as you see fit, or let Disk Druid decide where partitions should go.
- **Ok:** Select **Ok** once you're satisfied with the settings, and wish to create the partition.
- **Cancel:** Select **Cancel** if you don't want to create the partition.

### 6.4.6 Editing Partitions

To edit a partition, select the **Edit** button or double-click on the existing partition (see Figure 6-7, *Editing a Partition*).

---

Figure 6–7 Editing a Partition



---

**Please Note**

If the partition already existed on your hard disk, you will only be able to change the partition's mount point. If you want to make any other changes, you will need to delete the partition and recreate it.

---

### 6.4.7 Deleting a Partition

To delete a partition, highlight it in the "Partitions" section and double-click the **Delete** button. You will be asked to confirm the deletion.

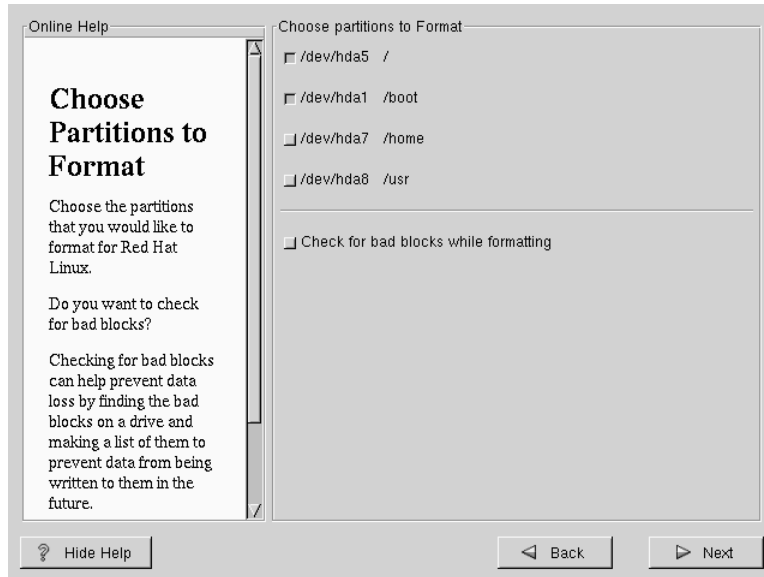
## 6.5 Choose Partitions to Format

Choose the partitions that you would like to format. All newly created partitions should be formatted. In addition, any existing partitions that contain data you no

---

longer need should be formatted. However, partitions such as `/home` or `/usr/local` must not be formatted if they contain data you wish to keep (see Figure 6–8, *Choosing Partitions to Format*).

**Figure 6–8** Choosing Partitions to Format



If you wish to check for bad blocks while formatting each filesystem, please make sure to select the **check for bad blocks** option.

Checking for bad blocks can help prevent data loss by locating the bad blocks on a drive and making a list of them to prevent using them in the future.

## 6.6 SPARC: Installing SILO

If you're performing a workstation- or server-class installation, please skip ahead to Section 6.8, *Time Zone Configuration*.

In order to be able to boot your Red Hat Linux/SPARC system, you usually need to install SILO. You can decide not to install SILO, however.



**Create boot disk** -- If you do not want to create a boot disk, don't select this option (note that SMCC manufactured UltraSPARCs can't boot from a floppy; therefore, you can't create a boot disk for a SMCC Ultra). If your SPARC will boot from a floppy, however, we strongly urge you to create a boot disk. A boot disk can be handy for a number of reasons:

You can use a boot disk instead of SILO. This is handy if you're trying Red Hat Linux for the first time, and you'd feel more comfortable if the boot process for your other operating system is left unchanged. With a boot disk, going back to your other operating system is as easy as removing the boot disk and rebooting.

You can use a boot disk if another operating system overwrites SILO. Other operating systems may not be as flexible as Red Hat Linux when it comes to supported boot methods. Quite often, installing or updating another operating system can cause the master boot record (originally containing SILO) to be overwritten, making it impossible to boot your Red Hat Linux installation. The boot disk can then be used to boot Red Hat Linux so you can reinstall SILO.

**Do not install SILO** -- If you choose not to install SILO for any reason, make sure that you have chosen to create a boot disk; otherwise you will not be able to boot Linux. You can also choose to skip SILO if you do not want to write SILO to your hard drive.

---

### Tip

If you need to use rescue mode, you can use the Red Hat Linux CD-ROM to boot. Then type `linux rescue` at the `boot :` prompt.

For more information regarding rescue mode, refer to the *System Administration* chapter of the *Official Red Hat Linux Reference Guide*.

---

If you do install SILO, you may install SILO in one of two places:

### The master boot record (MBR)

The recommended place to install SILO, unless the MBR already starts another operating system loader. The master boot record is a special area on your hard

---

drive that is automatically loaded by your computer's BIOS, and is the earliest point at which SILO can take control of the boot process. If you install SILO in the MBR, when your machine boots, SILO will present a `boot :` prompt. You can then boot Red Hat Linux or any other operating system you configure SILO to boot.

### **The first sector of your root partition**

Recommended if you are already using another boot loader on your system. In this case, your other boot loader will take control first. You can then configure that boot loader to start SILO (which will then boot Red Hat Linux).

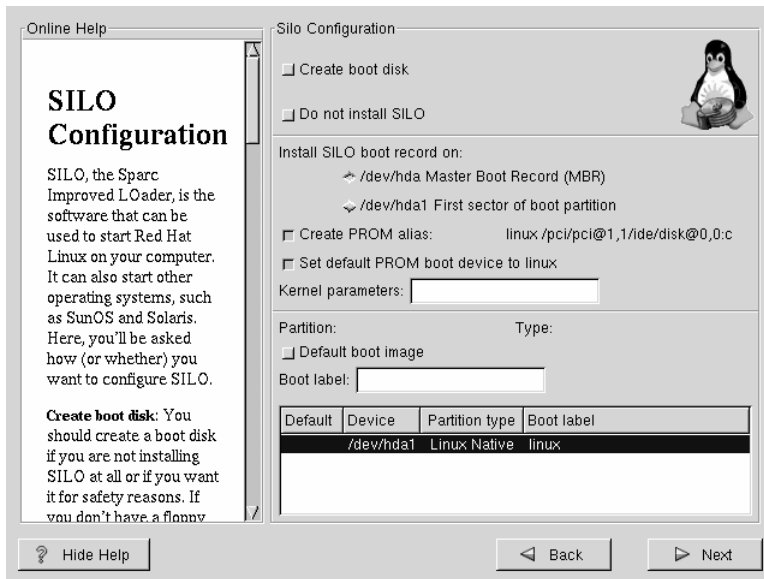
If you choose to install SILO, please select where you would like SILO to be installed on your system (see Figure 6–9, *SILO Configuration*). If your system will use only Red Hat Linux you should choose the master boot record (MBR).



If you choose not to install SILO for any reason, you will need to either use a boot diskette or you must use OpenBoot to boot to the device directly. If you don't install SILO, be sure you have another way of booting your Red Hat Linux system!

---

Figure 6–9 SILO Configuration



If the **Create PROM alias:** checkbox is checked, and if PROM supports it, the installer will create a PROM alias "linux." The "linux" PROM alias will allow you to boot into SILO from the PROM command line with `boot linux`. If the **Set default PROM boot device to linux** checkbox is checked, the installer will set the PROM option "boot-device" or "boot-from" so that PROM will boot by default into Red Hat Linux.

If you wish to add default options to the SILO boot command, enter them into the kernel parameters field. Any options you enter will be passed to the Linux kernel every time it boots.

**Bootable Partition --** Every bootable partition is listed, including partitions used by other operating systems. The **Boot label** column will be filled in with the word `linux` on the partition holding your Red Hat Linux system's root filesystem. Other partitions may also have boot labels. If you would like to add boot labels for other partitions (or change an existing boot label), click once on the partition to select it. Once selected, you can change the boot label.

---

### Please Note

The **Boot label** column lists what you must enter at SILO's `boot :` prompt in order to boot the desired operating system. However, if you forget the boot labels defined on your system, you can always press [Tab] at SILO's `boot :` prompt to display a list of defined boot labels.

---

## 6.6.1 Alternatives to SILO

If you do not wish to use SILO to boot your Red Hat Linux system, you have two choices for booting your machine: a boot disk or OpenBoot.

## 6.6.2 SMP Motherboards and SILO

This section is specific to SMP motherboards only. If the installation program detects an SMP motherboard on your system, it will automatically create two **sil.conf** entries, rather than the usual single entry.

One entry will be called **linux** and the other will be called **linux-up**. The *linux* entry will boot by default. However, if you have trouble with the SMP kernel, you can elect to boot the *linux-up* entry instead. You will retain all the functionality as before, but you will only be operating with a single processor.

## 6.7 Network Configuration

If you have a network card and have not already configured your networking information, you now have the opportunity to configure networking (as shown in Figure 6–10, *Network Configuration*).

Choose your device type and whether you would like to configure using DHCP. If you have multiple Ethernet devices, each device will keep the information you have provided. You may switch between devices, for example `eth0` and `eth1`, and the information you give will be specific to each device. If you select **Activate on boot**, your network interface will be started when you boot. If you do not have DHCP client

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access or are unsure as to what this information is, please contact your network administrator.

Next enter, where applicable, the **IP Address**, **Netmask**, **Network**, and **Broadcast** addresses. If you are unsure about any of these, please contact your network administrator.

### **Figure 6–10 Network Configuration**

---

#### **Tip**

Even if your computer is not part of a network, you can enter a hostname for your system. Take this opportunity to enter in a name, if you do not, your system will be known as `localhost`.

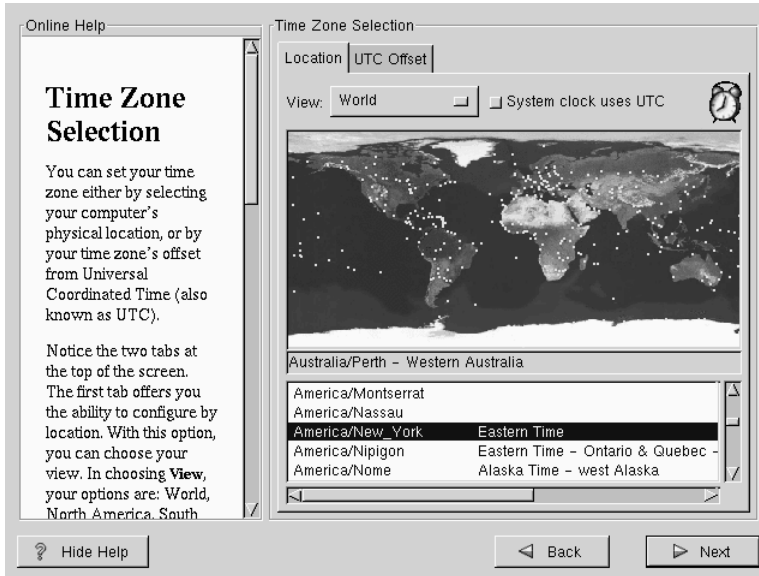
---

Finally, enter the **Gateway** and **Primary DNS** (and if applicable the **Secondary DNS** and **Tertiary DNS**) addresses.

## **6.8 Time Zone Configuration**

You can set your time zone either by selecting your computer's physical location, or by your time zone's offset from Universal Coordinated Time (also known as UTC).

**Figure 6–11** Configuring Time Zone



Notice the two tabs at the top of the screen (see Figure 6–11, *Configuring Time Zone*). The first tab offers you the ability to configure by location. With this option, you can choose your view. In choosing view, your options are: **World**, **North America**, **South America**, **Pacific Rim**, **Europe**, **Africa**, and **Asia**.

From the interactive map, you can also click on a specific city, as indicated by the yellow dots; a red **X** will appear indicating your selection. You can also scroll through a list and choose your desired time zone.

The second tab offers you the ability to use the UTC offset. UTC presents you with a list of offsets to choose from, as well as an option to set daylight saving time.

For both tabs, there is the option of selecting **System Clock uses UTC**. Please select this if you know that your system is set to UTC.

---

### Tip

If you wish to change your time zone configuration after you have booted your Red Hat Linux system, become root and use the `/usr/sbin/timeconfig` command.

---

## 6.9 Account Configuration

The **Account Configuration** screen allows you to set your root password. Additionally, you can set up user accounts for you to log into once the installation is complete (see Figure 6–12, *Account Creation*).

**Figure 6–12 Account Creation**

The screenshot shows the 'Account Configuration' window. On the left is an 'Online Help' pane with instructions for setting the root password and creating a user account. The main window contains fields for 'Root Password' and 'Confirm', both filled with asterisks. A message 'Root password accepted.' is displayed below. Below that are fields for 'Account Name' (filled with 'Bob'), 'Password' and 'Password (confirm)' (both filled with asterisks), and 'Full Name' (filled with 'Bob C. Smith'). There are four buttons: 'Add', 'Edit', 'Delete', and 'New'. At the bottom is a table with two columns: 'Account Name' and 'Full Name'. The table contains one entry: 'Bob' and 'Bob C. Smith'. At the bottom of the window are 'Hide Help', 'Back', and 'Next' buttons.

Online Help
Account Configuration

**Account Configuration**

Enter a password for the root account. The password must be at least six characters in length. Confirm the password by re-entering the password in the second entry field. The **Next** button will become enabled once both entry fields match.

Then create a user account.

Enter a user account name. Next, create a

Root Password:

Confirm:

Root password accepted.

Account Name:

Password:

Password (confirm):

Full Name:

Add
Edit
Delete
New

Account Name	Full Name
Bob	Bob C. Smith

? Hide Help
< Back
Next >

### 6.9.1 Setting the Root Password

The installation program will prompt you to set a **root password** for your system.

---

The root password must be at least six characters long; the password you type is not echoed to the screen. You must enter the password twice; if the two passwords do not match, the installation program will ask you to enter them again.

You should make the root password something you can remember, but not something that is easy for someone else to guess. Your name, your phone number, **qwerty**, **password**, **root**, **123456**, and **anteater** are all examples of poor passwords. Good passwords mix numerals with upper and lower case letters and do not contain dictionary words: **Aard387vark** or **420BmttNT**, for example. Remember that the password is case-sensitive. Write down this password and keep it in a secure place.

---

#### Please Note

The **root** user (also known as the **superuser**) has complete access to the entire system; for this reason, logging in as the root user is best done *only* to perform system maintenance or administration.

---

### 6.9.2 Setting Up User Accounts

If you choose to create a user account now, you will have an account to log in to once the installation has completed. This allows you to safely and easily log into your computer without having to be **root** to create other accounts.

Enter an account name. Then enter and confirm a password for that user account. Enter the full name of the account user and press [Enter]. Your account information will be added to the account list, clearing the user account fields so you can add another user.

You can also choose **New** to add a new user. Enter the user's information and use the **Add** button to add the user to the account list.

You can also **Edit** or **Delete** the user accounts you have created or no longer want.

---



## 6.10 Authentication Configuration

If you are performing a workstation-class installation, please skip ahead to Section 6.12, *GUI X Configuration Tool*.

If you are performing a server-class installation, please skip ahead to Section 6.13, *Preparing to Install*.

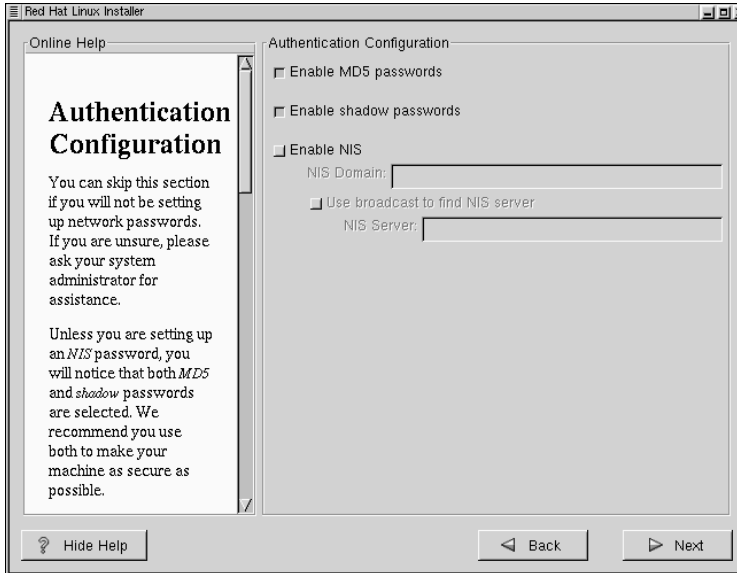
You may skip this section if you will not be setting up network passwords. If you are unsure as to whether you should do this, please ask your system administrator for assistance.

Unless you are setting up **NIS** authentication, you will notice that both **MD5** and **shadow** passwords are selected (see Figure 6–13, *Authentication Configuration*). We recommend you use both to make your machine as secure as possible.

To configure the NIS option, you must be connected to an NIS network. If you are unsure whether you are connected to an NIS network, please ask your system administrator.

---

Figure 6–13 Authentication Configuration



- **MD5 Password** -- allows a long password to be used (up to 256 characters), instead of the standard eight letters or less.
- **Shadow Password** -- provides a secure method of retaining passwords. The passwords are stored in `/etc/shadow`, which is readable only by root.
- **Enable NIS** -- allows you to run a group of computers in the same Network Information Service domain with a common password and group file. There are two options to choose from here:
  - **NIS Domain** -- this option allows you to specify which domain or group of computers your system belongs to.
  - **NIS Server** -- this option causes your computer to use a specific NIS server, rather than "broadcasting" a message to the local area network asking for any available server to host your system.

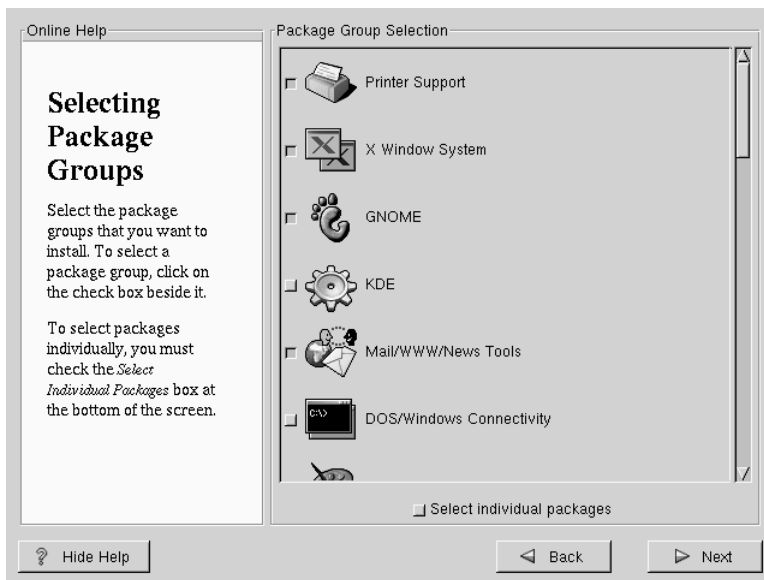
## 6.11 Package Group Selection

After your partitions have been selected and configured for formatting, you are ready to select packages for installation.

You can select **components**, which group packages together according to function (for example, C Development, Networked Workstation, or Web Server), **individual packages**, or a combination of the two.

To select a component, click on the check box beside it (see Figure 6–14, *Package Group Selection*).

**Figure 6–14** Package Group Selection



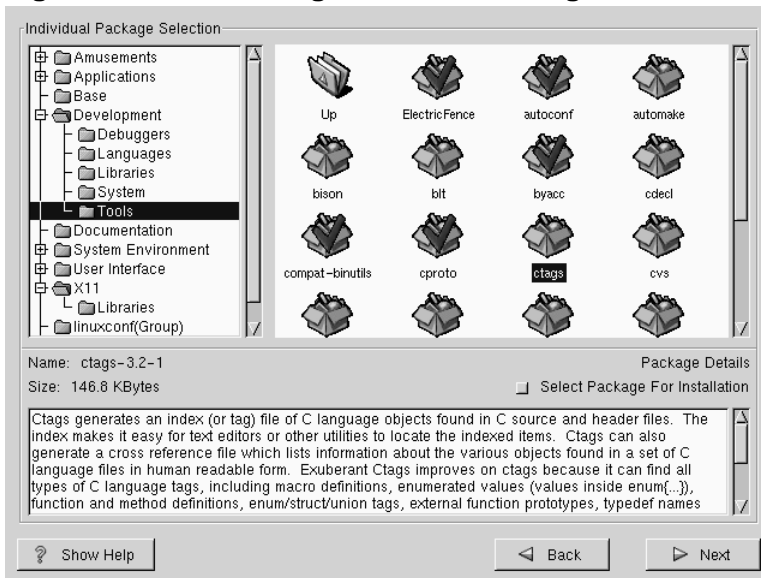
Select each component you wish to install. Selecting **Everything** (which can be found at the end of the component list) installs all packages included with Red Hat Linux. Selecting every package will require close to 1.7GB of free disk space.

To select packages individually, check the **Select Individual Packages** box at the bottom of the screen.

### 6.11.1 Selecting Individual Packages

After selecting the components you wish to install, you can select or deselect individual packages. The installation program presents a list of the packages in that group, which you can select or deselect using your mouse (see Figure 6–15, *Selecting Individual Packages*).

**Figure 6–15** Selecting Individual Packages



On the left side of the screen you will see a directory listing of various package groups. When you expand this list (double-click to select it) and double-click on a single directory, the list of packages available for installation will appear on the right.

To select an individual package, double-click on it, or click on it once to highlight it and click on the **Select Package For Installation** button below. A red check mark will appear on any of the packages you have selected for installation.

To read information about a particular package before choosing it for installation, left-click on it once to highlight it, and the information will appear in the window at the bottom of the screen along with the name and size of the package.

---

**Please Note**

Some packages (such as the kernel and certain libraries) are required for every Red Hat Linux system and are not available to select or deselect. These **base packages** are selected by default.

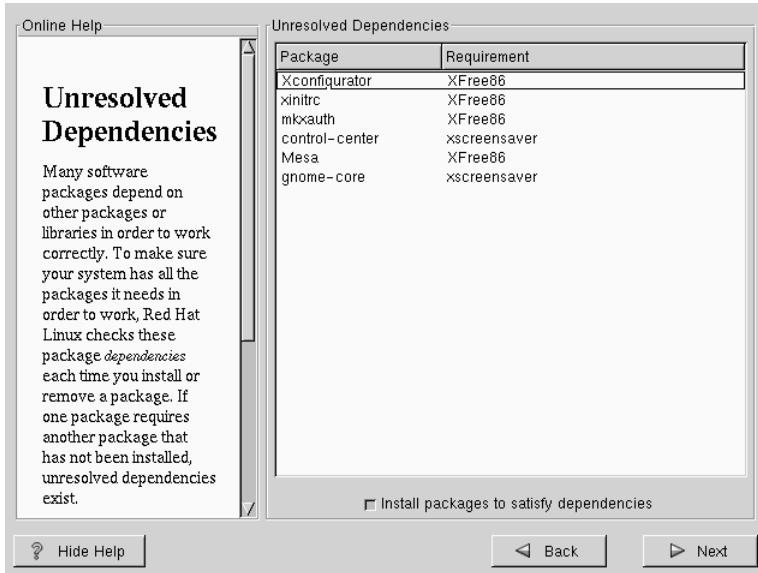
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### 6.11.2 Unresolved Dependencies

Many software packages, in order to work correctly, depend on other software packages that must be installed on your system. For example, many of the graphical Red Hat system administration tools require the `python` and `pythonlib` packages. To make sure your system has all the packages it needs in order to be fully functional, Red Hat Linux checks these package **dependencies** each time you install or remove software packages.

If any package requires another package which you have not selected to install, the program presents a list of these **unresolved dependencies** and gives you the opportunity to resolve them (see Figure 6–16, *Unresolved Dependencies*).

The **Unresolved Dependencies** screen will only appear if you are missing certain packages that are needed by your selected packages. Under the list of missing packages, there is an **Install packages to satisfy dependencies** check box at the bottom of the screen which is selected by default. If you leave this checked, the installation program will resolve package dependencies automatically by adding all required packages to the list of selected packages.

**Figure 6–16 Unresolved Dependencies**

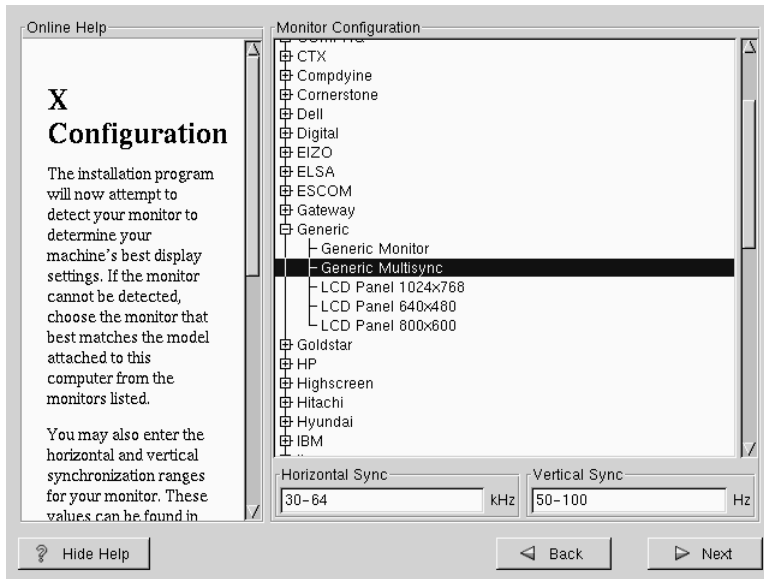
## 6.12 GUI X Configuration Tool

If you decided to install the X Window System packages, you now have the opportunity to configure an X server for your system. If you did not choose to install the X Window System packages, skip ahead to Section 6.14, *Installing Packages*.

### 6.12.1 Configuring Your Monitor

Xconfigurator, the X Window System configuration tool, first presents a list of monitors for you to choose from. In the list, you can either use the monitor that is autodetected for you, or choose another monitor.

Figure 6–17 Monitor Selection



If your monitor does not appear on the list, select the most appropriate **Generic** model available. If you do select a **Generic** monitor, Xconfigurator will suggest horizontal and vertical sync ranges. These values are generally available in the documentation which accompanies your monitor, or from your monitor's vendor or manufacturer; please check your documentation to make sure these values are set correctly.



Do not select a monitor *similar* to your monitor unless you are certain that the monitor you are selecting does not exceed the capabilities of your monitor. Doing so may over-clock your monitor and damage or destroy it.

---

Also presented are the horizontal and vertical ranges that Xconfigurator suggests.

---

Click **Next** when you have finished configuration of your monitor.

## 6.12.2 Video Hardware Configuration

Next, Xconfigurator will probe for any video hardware you have (see Figure 6–18, *Videocard Setup*). Failing that, Xconfigurator will present a list of video cards and monitors for you to select from.

If your video card does not appear on the list, **XFree86** may not support it. However, if you have technical knowledge about your card, you may choose **Unlisted Card** and attempt to configure it by matching your card's video chipset with one of the available X servers.

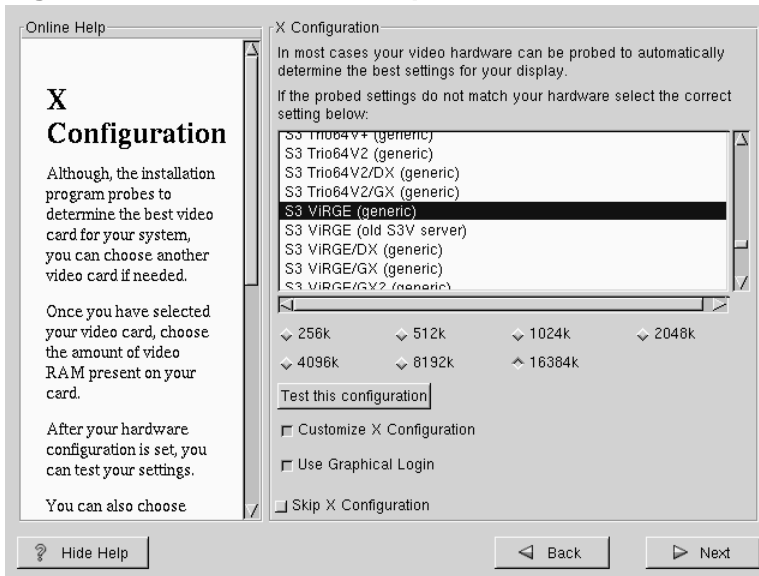
---

### Please Note

If you're installing Red Hat Linux on a SPARC, the installer will not allow you to change your video card settings.

---

**Figure 6–18 Videocard Setup**



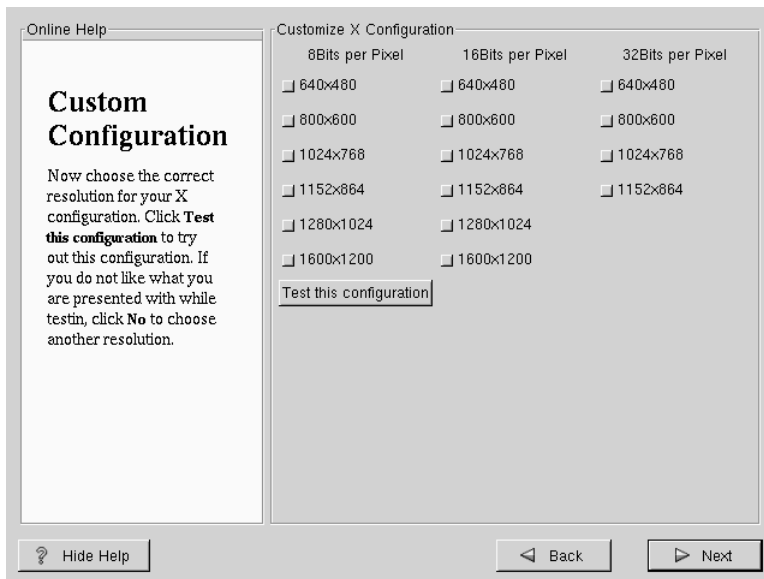


Next, Xconfigurator prompts you for the amount of video memory installed on your video card. If you are not sure, please consult the documentation accompanying your video card. You will not damage your video card by choosing more memory than is available, but the XFree86 server may not start correctly if you do.

Once your hardware has been determined, you can test the configuration settings. We recommend that you do test your configuration to make sure that the resolution and color is what you want to work with.

If you would like to customize the X configuration, please make sure the **Customize X Configuration** button is selected. If you choose to customize, you will be presented with another screen that lets you select what your resolution should be (see Figure 6–19, *X Customization*). Again, you will have the option of testing the configuration.

**Figure 6–19 X Customization**



You may also choose to **Skip X Configuration** if you would rather configure X after the installation or not at all.

## 6.13 Preparing to Install

You will now see a screen preparing you for the installation of Red Hat Linux (see Figure 6–20, *Ready to Install*).

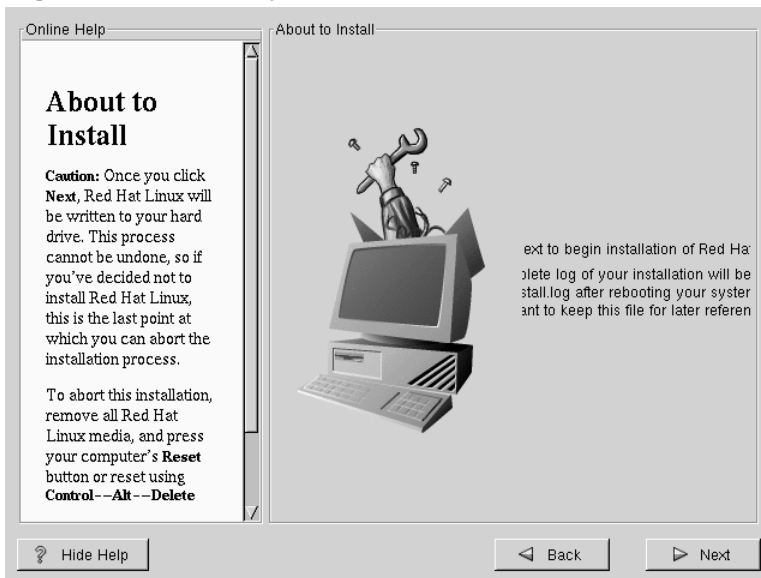
---

**WARNING**

**If, for some reason, you would rather not continue with the installation process, this is your last opportunity to safely cancel the process and reboot your machine. Once you press the Next button, partitions will be written and packages will be installed. If you wish to abort the installation, you should reboot now before your hard drive(s) are rewritten.**

---

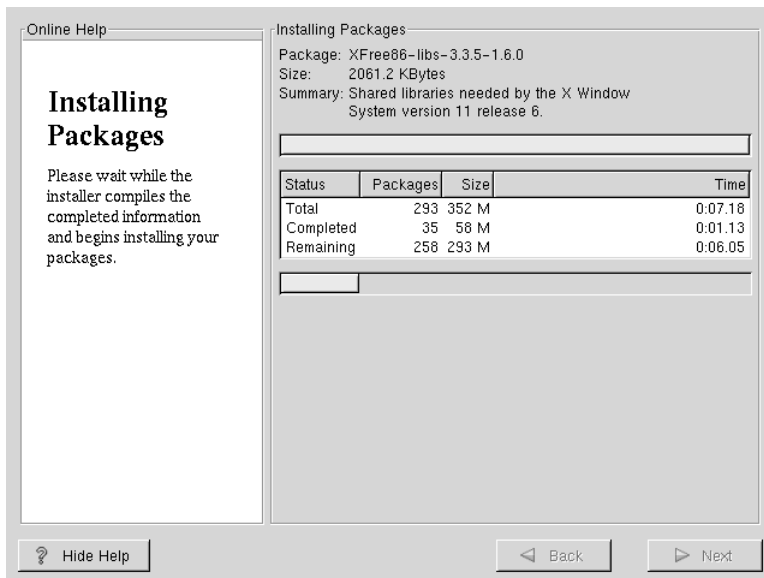
**Figure 6–20** Ready to Install



## 6.14 Installing Packages

At this point there's nothing left for you to do until all the packages have been installed (see Figure 6–21, *Installing Packages*). How quickly this happens depends on the number of packages you've selected, and your computer's speed.

**Figure 6–21** Installing Packages



## 6.15 Alpha and MILO: Installing MILO to the Hard Drive

If you're installing Red Hat Linux on an Alpha, and you are using MILO instead of SRM to boot the machine, stop when the packages you've selected are finished being transferred to the hard drive. At this point, you are prompted to install the correct X server for your machine or select your pointing device, if you didn't install X. Do *NOT* press the **OK** button yet. Instead, use the following instructions to install MILO to your hard drive.

The installation process puts all the necessary components of the Red Hat Linux Operating System on your machine, but MILO must be installed manually. Switch to the command prompt on the TTY2 console by pressing [Alt]-[F2].

Move to the `/mnt/sysimage` directory and temporarily make `/mnt/sysimage` the root directory with these commands:

```
# cd /mnt/sysimage
# /usr/sbin/chroot .
```

Now, all you need to do is actually install MILO. First, insert your MILO disk into the floppy drive. Then you'll need to issue a command which will vary slightly in syntax, depending on your boot device. For example, if you plan to boot your Alpha from the first SCSI hard disk, issue the following command:

```
bash# dd if=/dev/fd0 of=/dev/sda1
```

If you plan to boot your Alpha from the second IDE device, the `dd` command should be executed like this:

```
bash# dd if=/dev/fd0 of=/dev/hdb1
```

The command will copy MILO (along with `linload.exe`) to the small MILO partition you created. Once MILO has been installed, type the following command to exit the temporary root device set using the `chroot` command:

```
bash# exit
```

Now switch back to TTY1 using [Alt]-[F1] and select the **ok** button to continue the installation process.

## 6.16 SPARC: Boot Disk Creation

If you chose to create a boot disk, you should now insert a blank, formatted disk into your floppy drive (see Figure 6-22, *Creating Your Boot Disk*). Note that SMCC manufactured UltraSPARCs do not support booting from a floppy, so you can't make a boot floppy for a SMCC UltraSPARC.

---

After a short delay, your boot disk will be created; remove it from your floppy drive and label it clearly. Note that if you would like to create a boot disk after the installation, you'll be able to do so. For more information, please see the `mkbootdisk` man page, by typing `man mkbootdisk` at the shell prompt.

If you boot your system with the boot disk, make sure you create a new boot disk if you make any changes to your kernel.

**Figure 6–22 Creating Your Boot Disk**



## 6.17 Alpha and SRM: Note the Kernel Filename and Partition Number

If you're using SRM to boot your Alpha, you should take a moment to write down the kernel filename and partition number. This is necessary because `about` doesn't include an `ls` command, and if you encounter problems (for example, if `/etc/about.conf` isn't found on the root filesystem on the booted disk or if it contains incorrect information), you'd have to guess at the kernel name to boot your machine.

Switch to the 2nd virtual console using [Alt]-[F2] in text-mode, or using [Ctrl]-[Alt]-[F2] in X. Type in the following command:

```
bash# cat /mnt/sysimage/etc/about.conf
```

You should see output similar to the following:

```
# about default configurations
# NOTICE: You have a /boot partition. This means that
#           all kernel paths are relative to /boot/
0:1/vmlinuz-2.2.13-0.9 root=/dev/sda3
```

Write down the kernel filename and where the root filesystem is. Hopefully, you won't need to use it, but you'll be prepared. Switch back to the installation program and reboot.

## 6.18 Installation Complete

Congratulations! Your Red Hat Linux 6.2 installation is now complete!

The installation program will prompt you to prepare your system for reboot (see Figure 6–23, *Installation Complete*). Don't forget to remove any diskette in the floppy drive or CD in the CD-ROM drive.

---

Figure 6–23 Installation Complete







## 7 Upgrading Your Current System

This chapter explains those steps you'll see while you are performing an upgrade of Red Hat Linux 6.2.

### 7.1 What it Means to Upgrade

The installation process for Red Hat Linux 6.2 includes the ability to upgrade from prior versions of Red Hat Linux (version 2.0 and later) which are based on RPM technology.

Upgrading your system installs the modular 2.2.x kernel as well as updated versions of the packages which are currently installed on your machine. The upgrade process preserves existing configuration files by renaming them using an `.rpmsave` extension (e.g., `sendmail.cf.rpmsave`) and leaves a log of the actions it took in `/tmp/upgrade.log`. As software evolves, configuration file formats can change, so you should carefully compare your original configuration files to the new files before integrating your changes.

---

#### Please Note

Some upgraded packages may require that other packages are also installed for proper operation. If you choose to customize your packages to upgrade, you may be required to resolve any *dependency* problems. Otherwise, the upgrade procedure takes care of these dependencies, but it may need to install additional packages which are not on your existing system.

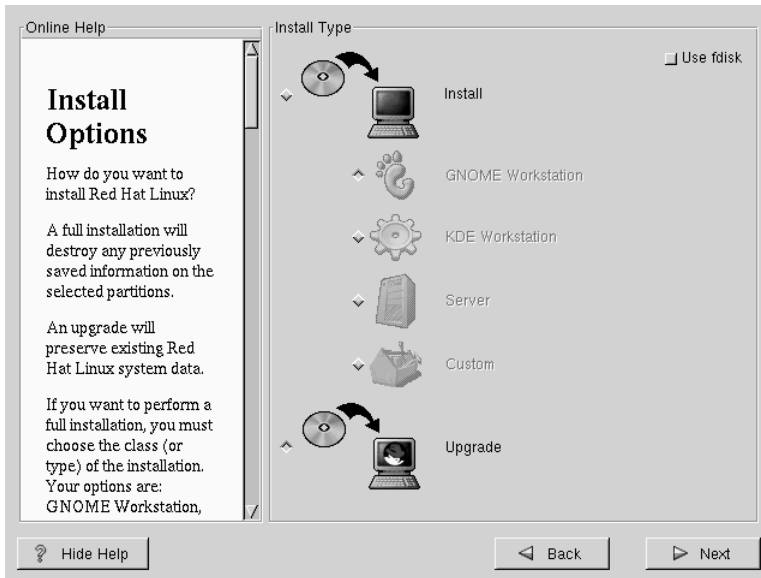
---

### 7.2 Upgrading Your System

At this point, you should have chosen **Upgrade** as your preferred installation type (see Figure 7-1, *Choosing to Upgrade*).

---

Figure 7–1 Choosing to Upgrade



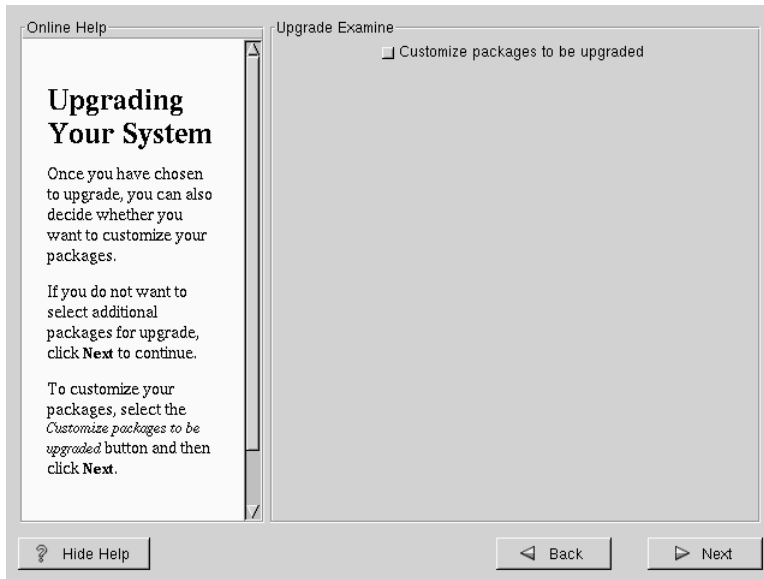
## 7.3 Customizing Your Upgrade

Next, you must choose whether to let the installation program upgrade your system for you or if you would like to customize your packages to be upgraded (see Figure 7–2, *Upgrade Customization Option*).

If you click **Next** and the **Customize packages to upgrade** button is not selected, your system will automatically begin the upgrade process (see Section 7.5, *Upgrading Packages*).

If you want to customize your upgrade packages, select this option and then click **Next**.

Figure 7–2 Upgrade Customization Option



## 7.4 Selecting Packages to Upgrade

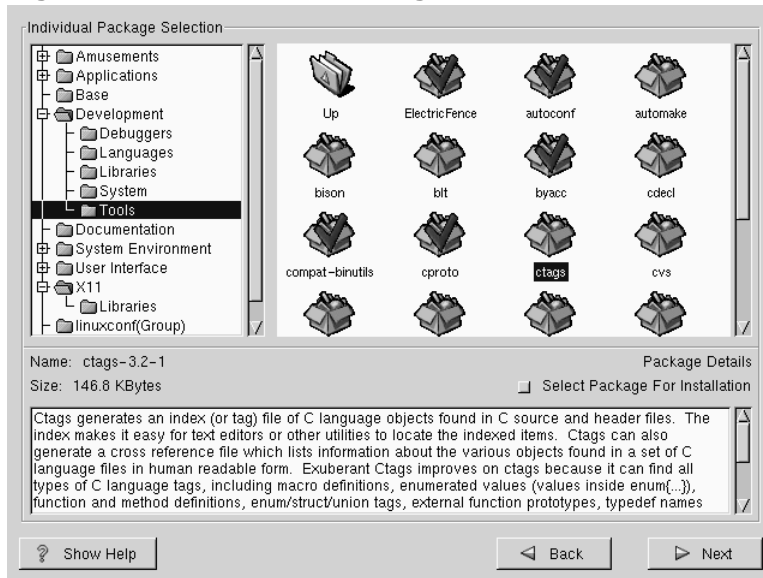
Here, you are given the opportunity to choose which packages you would like to upgrade (see Figure 7–3, *Individual Package Selection*).

On the left side of the screen you will see a directory listing of various package groups. When you expand this list (double-click to select it) and double-click on a single directory, the list of packages available for installation will appear on the right. You can click on the **+** to expand the list.

To select an individual package, double-click on it, or click on it once to highlight it and click on the **Select Package For Installation** button below. A red check mark will appear on any of the packages you have selected for installation.

To read information about a particular package before choosing it for installation, left-click on it once to highlight it, and the information will appear in the window at the bottom of the screen along with the name and size of the package.

Figure 7-3 Individual Package Selection




---

### Please Note

Some packages (such as the kernel and certain libraries) are required for every Red Hat Linux system and are not available to select or deselect. These **base packages** are selected by default.

---

## 7.4.1 Unresolved Dependencies

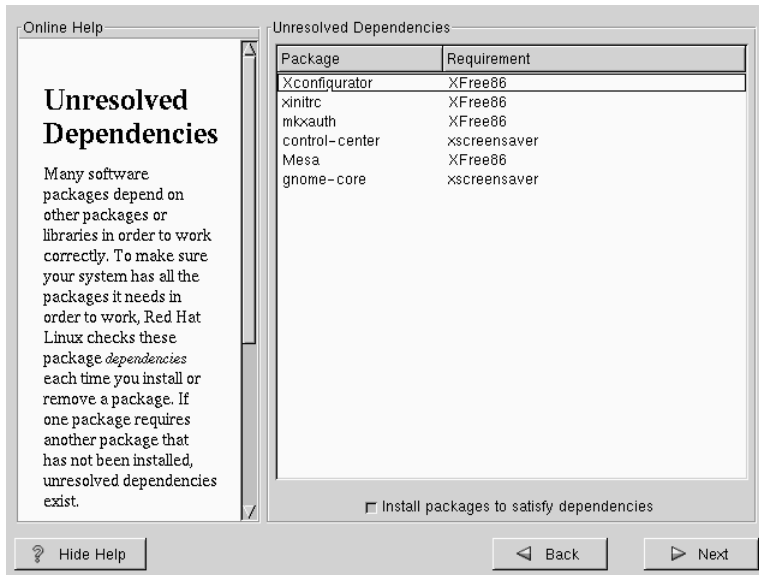
If any package requires another package which you have not selected to install, the program presents a list of these **unresolved dependencies** and gives you the opportunity to resolve them (see Figure 7-4, *Unresolved Dependencies*).

The **Unresolved Dependencies** screen will only appear if you are missing certain packages that are needed by your customized package selection. Under the list of missing packages, there is an **Install packages to satisfy dependencies** check box at the bottom

---

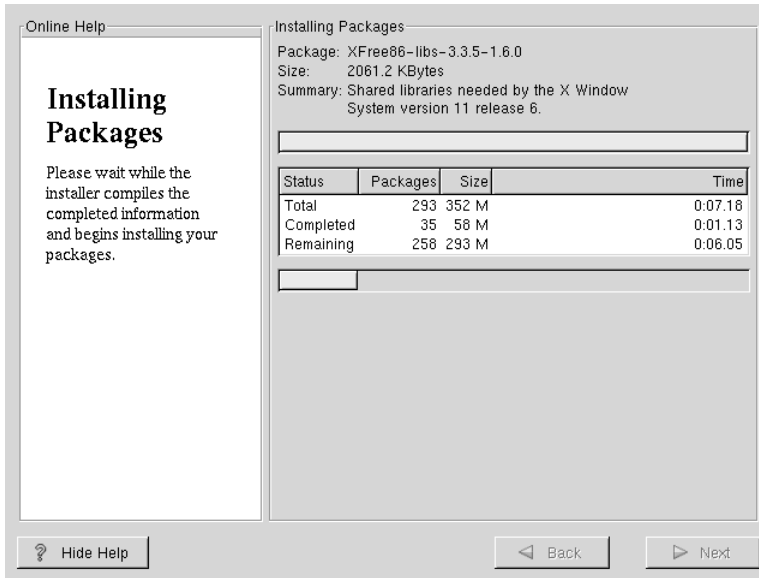
of the screen which is selected by default. If you leave this checked, the installation program will resolve package dependencies automatically by adding all required packages to the list of selected packages.

**Figure 7–4 Unresolved Dependencies**



## 7.5 Upgrading Packages

At this point there's nothing left for you to do until all the packages have been upgraded or installed (see Figure 7–5, *Installing Packages*).

**Figure 7–5 Installing Packages**

## 7.6 Upgrade Complete

Congratulations! Your Red Hat Linux 6.2 upgrade is now complete!

If you're using an Alpha and booting from the SRM console, take the time to note the kernel filename using the instructions in Section 6.17, *Alpha and SRM: Note the Kernel Filename and Partition Number*, before you reboot your machine.

You will now be prompted to prepare your system for reboot. Don't forget to remove any diskette in the floppy drive or CD in the CD-ROM drive.

---

**Tip**

If you need a quick review of some of the basic concepts of Red Hat Linux refer to the *Official Red Hat Linux Getting Started Guide*.

For information dealing with system configuration and administration, refer to the *Official Red Hat Linux Reference Guide*.

---

**Figure 7–6 Upgrade Complete**





## 8 Booting Your Machine and Post-Installation Setup

### 8.1 Alpha and SRM: Post-Installation Boot Setup

Once the installation has been completed, your machine should be capable of booting in SRM directly from the hard drive, using a command like the following:

```
>>> boot dka0 -fl 0
```

In this example, `dka0` is the device on which the root partition, `/` (or the `/boot` partition if it exists) resides (the SRM device on which you installed the `aboot` secondary boot loader).

If the previous command is problematic for your machine, the format of the command for booting from SRM is as follows:

```
>>> boot <device> -file <boot file> -flags "<boot flags>"
```

In the above command, `<boot device>` is the SRM device on which the `aboot` secondary boot loader is installed. `<boot file>` is the uncompressed kernel file that you installed. You should have noted these values during the installation process, as described in Section 6.17, *Alpha and SRM: Note the Kernel Filename and Partition Number*. You'll need to preface the kernel filename with the number of the partition where the kernel resides, and include the full path to the kernel.

Also in the above command, `<boot flags>` are the root device (the device mounted as `/`) and any other kernel flags that you need to pass.

For example, if you installed `aboot` on the first SCSI device on the second SCSI bus (`dkb0`), the root of your Linux filesystem is the third partition of your first SCSI drive (`/dev/sda3`), and you installed version 2.2.13-0.9 of the Linux kernel on a uni-processor machine, then the boot command to boot your Alpha is:

```
>>> boot dkb0 -file 3/boot/vmlinuz-2.2.13-0.9  
-flags "root=/dev/sda3"
```

### 8.1.1 SRM Console Variables

You should set the `bootdef_dev` and `boot_osflags` console variables with the following commands:

```
>>> set bootdef_dev dka0
>>> set boot_osflags 0
>>> unset boot_file
```

You can also set the SRM console to autoboot with the value of the `auto_action` SRM console variable. `auto_action` can be set to `HALT` or `BOOT` to reflect the default power-on function of the Alpha machine when booted into the SRM console.

---

#### Please Note

When setting the value of the `auto_action` SRM console variable, note that your machine will not be able to return to the SRM console unless you press the `HALT` button on the machine. Most desktop Alpha machines do not have a `HALT` button, so you should only set the `auto_action` value to `BOOT` if the Alpha machine is a high-availability server that has a `HALT` button on the front panel.

---

If you want to set your SRM console variables to automatically boot, use the following commands:

```
>>> set auto_action BOOT
```

## 8.2 Alpha: Post-Installation MILO Setup

If you dedicated the first partition of your first hard drive to a small FAT partition for booting (as the installation procedure advises you to) you can modify the **Boot Menu** to have a selection to load MILO from this partition.

Add another boot selection, as described in Section 3.7.1, *Setting up ARC for Installation* for ARC and in Section 3.7.2, *Setting up AlphaBIOS for Installation* for AlphaBIOS. However, this time you should select the appropriate hard drive device. If you installed Linux to the first hard drive, the device should be:

---

```
scsi(0)disk(0)rdisk(0)partition(1)
```

If you are using an ARC console or the AlphaBIOS console, select the following device:

```
Disk 0 Partition 1
```

If you wish to autoboot into Linux, set the `OSLOADOPTIONS` variable. In the ARC and AlphaBIOS consoles, the contents of the `OSLOADOPTIONS` parameter are passed to MILO as a command. In order to boot Linux automatically in MILO, enter a value for `OSLOADOPTIONS` similar to this one:

```
boot sda2:/boot/vmlinuz root=/dev/sda2
```

Once you have done this, booting and running Linux on an Alpha system should be very similar to doing so on an x86 system.

## 8.3 SPARC: Booting Your Machine

If you didn't install SILO, you'll have to use your boot disk now.

If you did install SILO, after your computer's normal power-up sequence has completed, you should see SILO's standard prompt, which is `boot:.` At the `boot:.` prompt, you can do any of the following things:

- Press [Enter] -- Causes SILO's default boot entry to be booted.
- Enter a Boot Label, followed by [Enter] -- Causes SILO to boot the operating system corresponding to the boot label.
- Do Nothing -- After SILO's timeout period, (which, by default, is five seconds) SILO will automatically boot the default boot entry.

## 8.4 Where To Go From Here?

Based on your own knowledge of your system, or on the advice in this chapter, do whatever you need to do to boot Red Hat Linux. You should see one or more screens of messages scroll by. Eventually, you should see a `login:` prompt or a GUI login screen (if you installed the X Window System and chose to start X automatically).

---

---

**Tip**

If you're not sure what to do next, we suggest you begin with the *Official Red Hat Linux Getting Started Guide* as an introduction to using Red Hat Linux. The *Official Red Hat Linux Getting Started Guide* covers topics relating to the basics of your system.

If you are a more experienced user looking for information on system configuration or administration topics, you may find the *Official Red Hat Linux Reference Guide* to be more helpful.

---

## A Writing Image Files to Floppy Disks Using `rawrite` or `dd`

You must write each of the image files you need to a floppy disk. The easiest methods of writing an image file to a disk are using `dd` or `rawrite`.

### A.1 Using the `dd` Command

The `dd` command in a Linux/UNIX OS is used to do direct dumps from one device (or file) to another. It is an excellent tool to create a disk image or to make a disk from an image. In Linux, the command is invoked as follows:

```
bash# dd if=<image file> of=/dev/fd0
```

You should see something like the following to indicate that the image transfer was successful:

```
2880+0 records in
2880+0 records out
```

If you see a smaller block count, your image did not transfer correctly. If this is the case, it will usually be accompanied by a disk error.

After you make a disk, make sure to label it according to its contents.

### A.2 Using the `rawrite` Utility

Under MS-DOS, you can use the `rawrite` utility to write an image file to a disk.

If you need to obtain `rawrite`, it is available on the Red Hat FTP site at:

```
ftp://ftp.redhat.com/pub/redhat/current/i386/dosutils/
```

The Red Hat FTP site is usually very busy, so you may want to try a mirror site. The list of mirror sites is available at <http://www.redhat.com/download/mirror.html>.

The `rawrite` command looks like the following (assuming your CD is drive D:):

```
C:\> d:
D:\> cd \dosutils
D:\> dosutils> rawrite
```

`Rawrite` first asks you for the filename of a disk image; enter the directory and name of the image you wish to write.

```
Enter disk image source file name:D:\images\<image file>
```

Then `rawrite` asks for a disk drive to write the image to:

```
Enter target diskette drive:a:
```

Finally, `rawrite` asks for confirmation that a formatted disk is in the drive you've selected. After pressing [Enter] to confirm, `rawrite` copies the image file onto the disk.

```
Please insert a formatted diskette into drive A: and press  
--ENTER-- : [Enter]  
D:\ dosutils>
```

The `rawrite` utility will return a message indicating whether your disk was created successfully, or it will inform you if your image failed to transfer correctly.

Make sure that you label the disk according to its contents.



## B Getting Technical Support

### B.1 Remember to Sign Up

If you have an official edition of Red Hat Linux 6.2, please remember to sign up for the benefits you're entitled to as a Red Hat customer.

You'll be entitled to any or all of the following benefits, depending upon the Official Red Hat Linux product you purchased:

- Official Red Hat support -- Get help with your installation questions from Red Hat, Inc.'s support team.
- Priority FTP access -- No more late-night visits to congested mirror sites. Owners of Red Hat Linux 6.2 receive free access to [priority.redhat.com](http://priority.redhat.com), Red Hat's preferred customer FTP service, offering high bandwidth connections day and night.
- Red Hat Update Agent -- Receive e-mail directly from Red Hat as soon as updated RPMs are available. Use Update Agent filters to receive notification about only those subjects that interest you.
- Under the Brim: The Official Red Hat E-Newsletter -- Every month, get the latest news and product information directly from Red Hat.

To sign up, go to <http://www.redhat.com/now>. You'll find your **Personal Product ID** on a red and white card in your Official Red Hat Linux box.

### B.2 An Overview of Red Hat Support

Red Hat provides installation assistance for Official Red Hat Linux boxed set products and covers installation on a single computer. This assistance is intended to help customers successfully install Red Hat Linux. Assistance with installation is offered via telephone and the Web.

Red Hat Support will attempt to answer any questions you may have before the installation process is initiated. This includes the following:

- Hardware compatibility questions
-

- Basic hard drive partitioning strategies

Red Hat, Inc. Support can also provide assistance during the installation process:

- Getting any supported hardware recognized by the Red Hat Linux operating system
- Assistance with drive partitioning

We can also help you with basic post-installation tasks, such as:

- Successfully configuring the X Window System using XF86Setup or Xconfigurator
- Configuring a local parallel port printer to print text
- Configuring a mouse

Our installation assistance service is designed to get you up and running with Red Hat Linux as quickly and as easily as possible. However, there are many other things that you may want to do with your Red Hat Linux system (from compiling a custom kernel to setting up a Web server) which are not covered.

For assistance with these tasks, there is a wealth of on-line information available in the form of HOWTO documents, Linux-related websites, and commercial publications. The Red Hat Linux operating system includes the various Linux HOWTO documents on the installation CD in the `/doc/HOWTO` directory as plain text files that can easily be read from within Red Hat Linux and other operating systems.

A large number of Linux-related websites are available. The best starting point for finding information on Red Hat Linux is the Red Hat, Inc. website at:

<http://www.redhat.com/>

Many Linux-related books are available. If you're new to Linux, a book that covers Linux basics will be invaluable. We can recommend several titles: *Using Linux*, by Bill Ball; *Linux Clearly Explained*, by Bryan Pfaffenberger; *Linux for Dummies*, by Jon "maddog" Hall; and *A Practical Guide to Linux*, by Mark G. Sobell.

Red Hat also offers various incident-based support plans to assist with configuration issues and tasks that are not covered by installation assistance. Please see the Red

---



Hat Support website for more information. The Red Hat technical support website is located at the following URL:

<http://www.redhat.com/support/>

## **B.3 Scope of Red Hat Support**

Red Hat, Inc. can only provide installation assistance to customers who have purchased an Official Red Hat Linux boxed set. If you have obtained Linux from any other company, you must contact that company for support. Examples of such companies are as follows:

- Macmillan
- Sams/Que
- Linux Systems Labs (LSL)
- Mandrake
- CheapBytes

Additionally, Red Hat Linux obtained via any of the following methods does not qualify for support from Red Hat:

- Red Hat Linux PowerTools Archive
- Downloaded via FTP on the Internet
- Included in a package such as Motif or Applixware
- Copied or installed from another user's CD

## **B.4 The Red Hat Support System**

As of October 1999, Red Hat, Inc. has implemented a new technical support system. If you signed up for technical support in the past with Red Hat, it may be necessary for you to sign up again. The new system will implement a unified login and password that will work across the entire Red Hat website. The support system will also automatically route and track service requests.

If you haven't signed up yet, then you should. Instructions for how to sign up are provided next, in Section B.5, *How to Get Technical Support*.

---

## B.5 How to Get Technical Support

In order to receive technical support for your Official Red Hat product, you first have to sign up.

Every Official Red Hat product comes with a Personal Product Identification code: a 16-character alphanumeric string. The Personal Product ID for Red Hat Linux 6.2 is located on a red and white card that can be found inside the box. Your Personal Product ID is on a perforated card that you can punch out and keep in a safe place. You need this code, so don't lose the card!

---

### Please Note

Do not throw away the card with your Personal Product ID. You need the Personal Product ID to get technical support. If you lose the certificate, you may not be able to receive support.

---

The Personal Product ID is the code that will enable your technical support and any other benefits or services that you purchased from Red Hat, depending upon which Red Hat product you purchased. The Personal Product ID may also enable priority FTP access, depending on the product that you purchased, for a limited amount of time.

### B.5.1 Signing up for Technical Support

You'll need to:

1. Create a customer profile at <http://www.redhat.com/now>. You may have already completed this step; if you have, continue to the next step. If you do not already have a customer profile on the Red Hat website, please create a new one.
  2. With your login name and password, please login at the Red Hat Support website at <http://www.redhat.com/support>.
  3. Update your contact information if necessary.
-

---

**Please Note**

If your e-mail address is not correct, communications regarding your technical support requests CANNOT be delivered to you, and you will not be able to retrieve your login and password by e-mail. Be sure that you give us your correct e-mail address.

---

If you're worried about your privacy, please see Red Hat's privacy statement at [http://www.redhat.com/legal/privacy\\_statement.html](http://www.redhat.com/legal/privacy_statement.html).

4. Add a product to your profile. Please enter the following information:
  - The Personal Product ID for the boxed set product
  - A description of the hardware on which the Red Hat Linux product will be installed
  - The Support Certificate Number or Entitlement Number if the product is a contract
5. Set your customer preferences.
6. Answer the optional customer questionnaire.
7. Submit the form.

If the previous steps were completed successfully, you can now login at <http://www.redhat.com/support> and open a new technical service request. However, you must still use your Personal Product ID in order to obtain technical support via telephone (if the product you purchased came with phone support). Please do not lose your Personal Product ID, or you might not be able to receive support.

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## B.6 Questions for Technical Support

Technical support is both a science and a mystical art form. In most cases, support technicians must rely on customer observations and communications with the customer in order to diagnose and solve the problem. Therefore, it is extremely important that you are as detailed and clear as possible when you state your questions and report your problems. Examples of what you should include are:

- Symptoms of the problem (for example: "Linux is not able to access my CD-ROM drive. When it tries, I get timeout errors.")
- When the problem began (for example: "My system was working fine until yesterday, when a lightning storm hit my area.")
- Any changes you made to your system (for example: "I added a new hard drive and used Partition Wizzo to add Linux partitions.")
- Other information that may be relevant to your situation, such as the installation method (CD-ROM, NFS, HTTP)

### B.6.1 How to Send Support Questions

Please login at <http://www.redhat.com/support> and open a new service request, or call the phone number for support. If your product came with phone support, or you've purchased a phone support contract, the phone number you'll need to call will be provided to you during the sign up process.

### B.6.2 Problems When Contacting Support

If you ever need to contact Red Hat technical support, make sure you follow the instructions provided at the support website. If you used Red Hat technical support in the past, you may have contacted technical support representatives in different ways. Those old ways of contacting technical support probably won't work now.

For example, you may have used the `support@redhat.com` e-mail address in the past. At this time, however, the `support@redhat.com` e-mail address is not functional. Please use the Web or your telephone, depending upon your support plan, to contact Red Hat technical support.

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Additionally, you should be careful when you're logging into the Red Hat support system. Make sure that you're using the Personal Product ID and the Customer ID corresponding to this Red Hat product. Older logins and passwords will probably not work.

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## C How to Provide Feedback on This Document

If you spot any mistakes in this manual, or if you've thought of a way to make this manual better, please send e-mail to:

`docs@redhat.com`

Be sure to mention the manual's identifier:

Alpha/SPARCInst(EN)-6.2-Print-RHI (02/00)

If you include the manual's identifier, we'll know exactly which version of this manual you have. If you have a suggestion, try to be as specific as possible when describing it. If you've found an error, please include the section number and some of the surrounding text so we can find it easily. We may not be able to respond to every message sent to us, but you can be sure that we read them all.

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