Red Hat Linux 7.1

The Official Red Hat Linux x86 Installation Guide

Contents

Red Hat Linux 7.1

1   Introduction

Welcome to the *Official Red Hat Linux x86 Installation Guide*.

The *Official Red Hat Linux x86 Installation Guide* contains useful information to assist you during the installation of Red Hat Linux. From fundamental concepts such as installation preparation (gathering information about your current system) to the step-by-step installation procedure, this book will be a valuable resource as you install Red Hat Linux.

This manual will walk you through a typical installation using the Red Hat Linux CD-ROMs. Once you have completed the installation as outlined in this manual, you will have a fully functioning Red Hat Linux desktop system.

1.1 Documentation Conventions

When you read this manual, you will see that certain words are represented in different fonts, type-faces, sizes and weights. This highlighting is systematic; different words are represented in the same style to indicate their inclusion in a specific category. The types of words that are represented this way include the following:

command

> Linux commands (and other operating system commands, when used) are represented this way. This style should indicate to you that you can type in the word or phrase on the command line and press [Enter] to invoke a command. Sometimes a command contains words that would be displayed in a different style on their own (like filenames). In these cases, they are considered to be part of the command, so the entire phrase will be displayed as a command. For example:

> Use the `cat testfile` command to view the contents of a file, named `testfile`, in the current working directory.

filename

> Filenames, directory names, paths and RPM package names are represented this way. This style should indicate that a particular file or directory exists by that name on your Red Hat Linux system. Examples:

> The `.bashrc` file in your home directory contains bash shell definitions and aliases for your own use.

> The `/etc/fstab` file contains information about different system devices and filesystems.

> The `/usr/share/doc` directory contains documentation for various programs.

> Install the `webalizer` RPM if you want to use a web server log file analysis program.

application

This style should indicate to you that the program named is an end-user application (as opposed to system software). For example:

Use Netscape Navigator to browse the web.

[key]

A key on the keyboard is shown in this style. For example:

To use [Tab] completion, type in a character and then press the [Tab] key. Your terminal will display the list of files in the directory that start with that letter.

Combinations of keystrokes

A combination of keystrokes is represented like this: [key]-[key]. For example:

The [Ctrl]-[Alt]-[Backspace] key combination will restart the X Window System.

Sequences of commands in Graphical User Interface (GUI) menus

If you need to type in a sequence of commands from a GUI menu, they'll be shown similar to the following example:

Click on **Programs**=>**Applications**=>**Emacs** to start the Emacs text editor.

Additionally, we use several different strategies to draw your attention to certain pieces of information. In order of how critical the information is to your system, these items will be marked as a note, a caution, or a warning. For example:

Note

Remember that Linux is case sensitive. In other words, a rose is not a ROSE is not a rOsE.

CAUTION

Do not do routine tasks as root — use a regular user account unless you need to use the root account to administer your system.

> **WARNING**
>
> **If you choose not to partition manually, a server-class installation will remove all existing partitions on all installed hard drives. Do not choose this installation class unless you are sure you have no data you need to save.**

1.2 How to Use This Manual

This manual focuses on a CD-ROM based installation, so it is ideal for users (both new and old) who want a quick and simple installation solution. It will help you prepare your system, walk you through the installation, and assist you in the configuration of Red Hat Linux.

> **Note**
>
> If you currently use Red Hat Linux 3.0.3 (or greater), you can perform an upgrade. Skim Chapter 2, *Steps to Get You Started* to review the basics, then read Chapter 4, *Installing Red Hat Linux*, following the directions as you go. Once you have chosen to perform an upgrade in the installation program, refer to Appendix A, *Upgrading Your Current System*.

If you are an experienced user who wants to perform a Red Hat Linux CD-ROM installation, and you do not need a review of the basics, you can skip ahead to Chapter 4, *Installing Red Hat Linux* to begin the installation process.

> **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 will find the FAQ online at:
>
> http://www.redhat.com/support/docs/faqs/rhl_general_faq/FAQ.html

1.2.1 We Need Feedback!

If you spot a typo in the *Official Red Hat Linux x86 Installation Guide* , or if you have thought of a way to make this manual better, we would love to hear from you! Please submit a report in Bugzilla (http://www.redhat.com/bugzilla) against the component *rhl-ig-x86* .

Be sure to mention the manual's identifier:

```
rhl-ig-x86(EN)-7.1-Print-RHI (2001-03-14T12:41-0500)
```

That way we will know exactly which version of the guide you have.

If you have a suggestion for improving the documentation, try to be as specific as possible when describing it. If you have found an error, please include the section number and some of the surrounding text so we can find it easily.

If you have a support question (for example, if you need help configuring X, or if you are not sure how to partition your hard drive[s]), please register your product at http://www.redhat.com/apps/activate/ and use the online support system for those type of requests.

2　Steps to Get You Started

Before you install Red Hat Linux, you will need to perform the following steps:

2.1　Step 1 - Do You Have the Right Red Hat Linux Components?

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

A black, red and white Registration Information card is included in your boxed set. A list of the contents of your boxed set version is on the back of the card. Please read over the list and check to make sure that you have all the CDs and manuals that are included with the version of Red Hat Linux that you purchased.

If you have purchased the Official Red Hat Linux boxed set from Red Hat, Inc. (or one of its distributors), and you are missing one or more of the items listed, please let us know! Contact information is also available on the Registration Information 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-x-y
```

(The *x* and *y* will be unique numbers.)

Red Hat partners with companies (international and domestic) so that we can make Red Hat Linux available to you in the most convenient form. Because of these partnerships, 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 will 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.

2.1.1　Where to Find Other Red Hat Linux Manuals

If your particular boxed set did not include all of the printed Red Hat Linux manuals, you can find them online or on the Red Hat Linux Documentation CD.

To find the manuals in both HTML and PDF formats online, visit http://www.redhat.com/support/manuals.

2.1.2 Why You Should Register Your Red Hat Linux Boxed Set

If you have purchased an official Red Hat Linux 7.1 boxed set, you should register your product. Registration offers many useful services, such as installation support, priority FTP access, and more.

To register your product, go to http://www.redhat.com/apps/activate/. You will find your *Product ID* on the Registration Information card in your Official Red Hat Linux boxed set. Once registered, you will have access to all the extras that Red Hat provides to its registered users.

For more information on registering and the scope of Red Hat's technical support offerings, see Appendix D, *Getting Technical Support*.

2.1.3 No Boxed Set? No Problem!

Of course, not everyone purchases a Red Hat Linux boxed set. It is entirely possible to install Red Hat Linux using a CD created by another company, or even via FTP. In these cases, you may need to create one or more diskettes to get started.

For information on downloading and installing Red Hat Linux, refer to http://www.redhat.com/download/howto_download.html.

For people installing Red Hat Linux from a CD-ROM not from Red Hat, you may need a boot disk, or if you are using a PCMCIA device during the installation (such as a laptop), a PCMCIA boot disk. It may also be possible to start the installation directly from the CD. We will discuss this in more detail when we outline the various installation methods.

For information on making diskettes, see Section 2.4.2, *Making Installation Diskettes* .

2.2 Step 2 - Is Your Hardware Compatible?

Hardware compatibility is particularly important if you have an older system or a system that you built yourself. Red Hat Linux 7.1 should be compatible with most hardware in systems that were factory built within the last two years. However, hardware specifications change almost daily, so it is hard to guarantee that your hardware will be 100% compatible.

First, gather all the system hardware information you can; Chapter 3, *Installation Options and System Requirements Tables* and Chapter 5, *Installing Red Hat Linux via Text Mode* have instructions (including instructions for Windows users) which may assist you.

2.3 Step 3 - Do You Have Enough Disk Space?

Nearly every modern-day operating system (OS) uses **disk partitions**, and Red Hat Linux is no exception. When you install Red Hat Linux, you may have to work with disk partitions. If you have not

worked with disk partitions before (or need a quick review of the basic concepts) read *An Introduction to Disk Partitions* in the appendix of the *Official Red Hat Linux Reference Guide* before proceeding.

If Red Hat Linux will share your system with another OS, you will need to make sure you have enough available disk space on your hard drive(s) for this installation.

The disk space used by Red Hat Linux must be separate from the disk space used by other OSes you may have installed on your system, such as Windows, OS/2, or even a different version of Linux. Two partitions (/ and swap) must be dedicated to Red Hat Linux.

Before you start the installation process, one of the three following conditions must be met:

- Your computer must have enough *unpartitioned* disk space for the installation of Red Hat Linux.

- You must have one or more partitions that may be deleted, thereby freeing up enough disk space to install Red Hat Linux.

- You must have a preexisting, formatted FAT (DOS) partition with sufficient disk space, and install Red Hat Linux using the partitionless installation (Appendix B, *Installing Without Partitioning*).

Note

To perform a partitionless installation, you must also choose the class of installation you want to perform. Unlike a typical installation, however, you will not have to worry about losing any information on your system. A partitionless installation will not remove existing partitions. For more information, turn to Appendix B, *Installing Without Partitioning*.

2.3.1 Installation Disk Space Requirements

Workstation-class

A workstation-class installation, choosing to install GNOME or KDE, requires at least 1.2 GB of free space. Choosing both GNOME and KDE requires at least 1.5 GB of free disk space.

Server-class

A server-class installation requires 650 MB for a minimal installation and at least 1.2 GB of free space if every package is selected.

Laptop-class

A laptop-class installation, when you choose to install GNOME or KDE, requires at least 1.2 GB of free space. If you choose both GNOME and KDE, you will need at least 1.5 GB of free disk space.

Custom-class

A custom-class installation requires 300 MB for a minimal installation and at least 2.4 GB of free space if every package is selected.

Note

To use automatic partitioning, you must have enough free disk space available (1.2 GB or more); if you do not have enough free disk space available, this option will not appear during your installation.

If you are not sure that you meet these conditions, or if you want to know how to create free disk space for your Red Hat Linux installation, please refer to the partitioning appendix in the *Official Red Hat Linux Reference Guide*.

2.4 Step 4 - Can You Install Using the Red Hat Linux CD-ROM?

There are several methods that can be used to install Red Hat Linux. This manual focuses on installing from the CD-ROM. For instructions on alternative installation methods, refer to Chapter 5, *Installing Red Hat Linux via Text Mode*.

Installing from a CD requires that you have purchased a Red Hat Linux 7.1 boxed set, or you have a Red Hat Linux CD-ROM, and you have a CD-ROM drive. Most new computers will allow booting from the CD-ROM. If your system will support booting from the CD-ROM, it is an easy way to begin a local CD-ROM installation.

Your BIOS may need to be changed to allow booting from your CD-ROM drive. For more information about editing your BIOS, see Section 4.2.1, *Booting the Installation Program*.

2.4.1 Alternative Boot Methods

If you cannot boot from the CD-ROM drive, the following alternative boot methods are also available:

Local Boot Disk

You may need a **local boot disk** or **PCMCIA boot disks**, if you cannot boot from the CD-ROM drive.

If you need a local boot disk, you must create it. The local boot disk image file, `boot.img`, is located in the `images` directory on your Red Hat Linux/x86 CD. Refer to Section 2.4.2, *Making Installation Diskettes* for more information on making a boot disk.

PCMCIA Boot Disks

You may need PCMCIA boot disks if you are using a PCMCIA device to install Red Hat Linux. If you need PCMCIA boot disks, you must create them. Refer to Section 2.4.2, *Making Installation Diskettes* for those instructions.

The following checklist can help you determine if you will need to create PCMCIA boot disks:

- You will install Red Hat Linux from a CD-ROM, and your CD-ROM drive is attached to your computer through a PCMCIA card.

- You will use a PCMCIA network adapter during the installation.

The PCMCIA boot disks image files, `pcmcia.img` and `pcmicadd.img`, are located in the `images` directory on your Red Hat Linux/x86 CD. Refer to Section 2.4.2, *Making Installation Diskettes* for more information on making a boot disk.

Note

Although it is not required to boot your installation, you may occasionally find that a driver disk is needed to continue with the installation. The *Driver Disks* appendix in the *Official Red Hat Linux Reference Guide* explains why a driver disk may be necessary for your installation, and how to obtain one if needed.

2.4.2 Making Installation Diskettes

You may need to create a diskette from an **image file**; for example, you may need to use updated diskette images obtained from the Red Hat Linux errata page or you may need to create a boot disk.

An image file contains an exact copy (or image) of a diskette's contents. Since a diskette contains filesystem information in addition to the data contained in files, the image file is not usable until it has been written to a diskette.

To start, you will need a blank, formatted, high-density (1.44MB), 3.5-inch diskette. You will need access to a computer with a 3.5-inch diskette drive. The computer must be able to run either an MS-DOS program or the `dd` utility found on most Linux-like operating systems.

The `images` directory on your Red Hat Linux CD contains the boot images for Red Hat Linux/x86. Once you have selected the proper image, transfer the image file onto a diskette.

Using the `rawrite` Utility

To make a diskette using MS-DOS, use the `rawrite` utility included on the Red Hat Linux CD in the `dosutils` directory. First, label a blank, formatted 3.5-inch diskette appropriately (such as "Boot Disk" or "Updates Disk"). Insert it into the diskette drive. Then, use the following commands (assuming your CD is drive `d:`):

```
C:\> d:
D:\> cd \dosutils
D:\dosutils> rawrite
Enter disk image source file name: ..\images\boot.img
Enter target diskette drive: a:
Please insert a formatted diskette into drive A: and
press --ENTER-- : [Enter]
D:\dosutils>
```

First, `rawrite` asks you for the filename of a diskette image; enter the directory and name of the image you wish to write (for example, `..\images\boot.img`). Then `rawrite` asks for a diskette drive to write the image to; enter `a:`. Finally, `rawrite` asks for confirmation that a formatted diskette is in the drive you have selected. After pressing [Enter] to confirm, `rawrite` copies the image file onto the diskette. If you need to make another diskette, label that diskette, and run `rawrite` again, specifying the appropriate image file.

Using the `dd` Command

To make a diskette under Linux (or any other Linux-like operating system), you must have permission to write to the device representing a 3.5-inch diskette drive (known as `/dev/fd0` under Linux).

First, label a blank, formatted diskette appropriately (such as "Boot Disk" or "Updates Disk"). Insert it into the diskette drive (but do not issue a `mount` command). After mounting the Red Hat Linux CD, change directory to the directory containing the desired image file, and use the following command (changing the name of the image file and diskette device as appropriate):

```
# dd if=boot.img of=/dev/fd0 bs=1440k
```

To make another diskette, label that diskette, and run `dd` again, specifying the appropriate image file.

2.5 Step 5 - Which Installation Class is Best For You?

Usually, Red Hat Linux is installed on its own 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 installing this way, and you want to preserve the current data on your existing system, you need to back up your data and/or consider performing an upgrade instead.**

Red Hat Linux provides five different classes, or types, of installations:

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 would like your system to function as a Linux-based server, and you do not want to heavily customize your system configuration.

Laptop

A laptop-class installation has been designed to make installing Red Hat Linux on laptops even easier. Much like a workstation-class installation, it will make sure you have the appropriate packages needed, as well as offer you an automated installation environment.

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 those users more familiar with Red Hat Linux installations and for those afraid of losing complete flexibility.

Upgrade

If you already have a version of Red Hat Linux (3.0.3 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.

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, partition flexibility has been added to workstation- and server-class installations, so you can now partition your drives manually during those classes of installations, if you choose to.

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. Next, take a detailed look at each class, so you can see which one is right for you.

Note

If you are planning to perform a partitionless installation, you will also need to choose an installation class. However, you can disregard the warnings regarding which partitions will be removed; these warnings are intended for users who are performing a typical installation. If you perform a partitionless installation, you do not have to worry about losing any information on your system. A partitionless installation will not remove existing partitions.

2.5.1 Workstation-Class Installations

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

> **WARNING**
>
> **Do not choose this method if you are sharing a disk with Windows NT; if you do, LILO will write over NT's boot loader and you will be unable to boot NT. If you are installing Red Hat Linux to share a disk with NT, you must perform a custom-class installation and configure LILO so that it is not installed on the Master Boot Record (MBR).**
>
> **To create a dual-boot environment on a system that currently has NT, you must install LILO on the first sector of the root partition, not the MBR. Please be sure to create a boot disk. You will either need to use the boot disk, or configure the NT system loader to boot LILO from the first sector of the root partition.**
>
> **Review** **http://www.linuxdoc.org/HOWTO/mini/Linux+NT-Loader.html for more information on setting up LILO and NT.**

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

Below are the minimum recommended disk space requirements for a workstation-class installation.

- Workstation choosing GNOME: 1.2 GB

- Workstation choosing KDE: 1.2 GB

- Workstation choosing both GNOME and KDE, and games: 1.5 GB

If you plan to choose all group packages (for example, GNOME is a group of packages), as well as select additional individual packages, you may want to allow yourself 1.5 GB or more of disk space. If you provide this extra space, you will have room for additional data, if needed.

Note

Unlike workstation-class installations previous to Red Hat Linux 7.0, per-
forming a Red Hat Linux 7.1 workstation-class installation will not install
the network daemon xinetd (inet services). When xinetd is not installed,
you will have a more secure installation. However,in-bound network-related
services such as finger, telnet, talk, and FTP will not work.[1] If you require
these types of services, please go back and choose a server- or a custom-class
installation.

What a Workstation-Class Installation Will Do

If you choose automatic partitioning, a workstation-class installation removes all Linux-related par-
titions on all installed hard drives (and uses all free unpartitioned disk space) to create the following
partitions:

- A 64 MB swap partition.

- A 16 MB partition (mounted as /boot) in which the Linux kernel and related files reside.

- A variable-sized root partition (mounted as /) in which all other files are stored (the exact size of
  this partition is dependent on your available disk space).

2.5.2 Server-Class Installations

A server-class installation is most appropriate for you if you would like your system to function as a
Linux-based server, and you do not want to heavily customize your system configuration.

The recommended disk space requirements for a server-class installation are as follows:

- Server (minimum): 650 MB

- Server (choosing everything): 1.2 GB

If you plan to choose all group packages, as well as select additional individual packages, you may
want to allow yourself 1.2 GB or more of disk space. This will provide space where additional data
may be written.

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[1] For example, you can telnet out to other systems, but other systems cannot telnet in to your system.

WARNING

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

What a Server-Class Installation Will Do

During the server-class installation, *the X Window System is not configured and no GUI will be loaded* when the system boots, unless you choose to install the appropriate packages during package selection. If you choose automatic partitioning, the installation program *deletes all data in all existing partitions of any kind* and decides how to partition the disk for the new version.

If you choose automatic partitioning, a server-class installation removes *ALL existing partitions on ALL installed hard drives*, so choose this installation class only if you are sure you have nothing you want saved! When the installation is complete, you will find the following partitions:

- A 256 MB swap partition.

- A 256 MB partition (mounted as /).

- A partition of at least 512 MB (mounted as /usr).

- A partition of at least 512 MB (mounted as /home).

- A 256 MB partition (mounted as /var).

- A 16 MB partition (mounted as /boot) in which the Linux kernel and related files are kept.

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

2.5.3 Laptop-Class Installations

The laptop-class installation will install your choice of the GNOME or KDE desktop environments, or both, and the X Window System.

WARNING

Do not choose this method if you are sharing a disk with Windows NT; if you do, LILO will write over NT's boot loader and you will be unable to boot NT. If you are installing Red Hat Linux to share a disk with NT, you must perform a custom-class installation and configure LILO so that it is not installed on the Master Boot Record (MBR).

To create a dual-boot environment on a system that currently has NT, you must install LILO on the first sector of the root partition, not the MBR. Please be sure to create a boot disk. You will either need to use the boot disk, or configure the NT system loader to boot LILO from the first sector of the root partition.

Review   http://www.linuxdoc.org/HOWTO/mini/Linux+NT-Loader.html for more information on setting up LILO and NT.

WARNING

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

Below are the minimum recommended disk space requirements for a laptop-class installation.

•   Laptop choosing GNOME: 1.2 GB

•   Laptop choosing KDE: 1.2 GB

•   Laptop choosing both GNOME and KDE: 1.5 GB

If you plan to choose all group packages (for example, GNOME is a group of packages), as well as select additional individual packages, you may want to allow yourself 1.7 GB or more of disk space. If you provide this extra space, you will have room for additional data, if needed.

What a Laptop-Class Installation Will Do

If you choose automatic partitioning, a laptop-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 64 MB swap partition.

- A 16 MB partition (mounted as `/boot`) in which the Linux kernel and related files reside.

- A variable-sized root partition (mounted as `/`) in which all other files are stored (the exact size of this partition is dependent on your available disk space).

This installation will remove *all* existing Linux partitions on *all* hard drives in your system; non-Linux partitions will not be removed.

A laptop-class installation will install your choice of the GNOME or KDE desktop environments (or both), and the X Window System.

Note

Performing a Red Hat Linux 7.1 laptop-class installation will not install the network daemon xinetd (inet services). Withholding xinetd results in a more secure installation[2]; 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.

2.5.4 Custom-Class Installations

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, *you* must decide how disk space should be partitioned. You have complete control over the packages that will be installed on your system. You can also determine whether you will use LILO (the LInux LOader) to boot your system. Unless you have prior Linux experience, you should not select the custom-class installation method.

The recommended disk space requirements for a custom-class installation are as follows:

- Custom (minimum): 300 MB
- Custom (choosing everything): 2.4 GB

What a Custom-Class Installation Will Do

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. You also determine whether you will use LILO (the LInux LOader) to boot your system.

The following list may help those of you who are trying to decide which installation class will better suit your needs. If you think you will have trouble performing any of the tasks on this list, you should

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[2] For example, you can `telnet` out to other systems, but other systems cannot `telnet` in to your system.

not perform a custom-class installation without reading through this manual and clarifying any questions you may have.

- Selecting and Installing Packages — This step is performed after your partitions have been configured and selected for formatting. You are allowed to select groups of packages, individual packages, a combination of the two, or choose an **Everything** install.

- LILO Configuration — In a custom-class installation, you are able to choose where you would like LILO to be installed: either on the master boot record (MBR) or on the first sector of your root partition. Alternatively, you can choose not to install LILO at all.

- Authentication Configuration — During a custom-class installation, you can set up network passwords using authentication configuration.

If you choose automatic partitioning, a custom-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 64 MB swap partition.

- A 16 MB partition (mounted as /boot) in which the Linux kernel and related files reside.

- A variable-sized root partition (mounted as /) in which all other files are stored (the exact size of this partition is dependent on your available disk space).

2.5.5 Upgrading Your System

Upgrading Red Hat Linux 3.0.3 (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 4, *Installing Red Hat Linux* and Appendix A, *Upgrading Your Current System* for those instructions.

3 Installation Options and System Requirements Tables

This chapter provides you with several reference tables to help make the installation of Red Hat Linux go more smoothly.

The first set of tables provides an overview of each installation class (workstation, server, laptop, and custom). As each screen is encountered, you can check it off in the space to the left. On the right, a listing of each screen and the corresponding installation material as found in this manual is provided.

The last table is the system requirements table, which will help you keep a record of your current system settings and requirements.

Table 3–1   Workstation-Class Cross-Reference Table

User Reference	Screen Reference
	Language Selection, Section 4.5, *Language Selection*
	Keyboard Configuration, Section 4.6, *Keyboard Configuration*
	Mouse Configuration, Section 4.7, *Mouse Configuration*
	Welcome to Red Hat Linux, Section 4.8, *Welcome to Red Hat Linux*
	Install Options, Section 4.9, *Install Options*
	Automatic Partitioning, Section 4.10, *Automatic Partitioning*
	Partitions — if you choose to manually partition using Disk Druid, Section 4.11, *Partitioning Your System*
	Choose Partitions to Format — if you choose to manually partition using Disk Druid, Section 4.13, *Formatting Partitions*
	Network Configuration — if you have a network card, Section 4.15, *Network Configuration*
	Firewall Configuration, Section 4.16, *Firewall Configuration*
	Time Zone Selection, Section 4.17, *Time Zone Configuration*
	Language Support Selection, Section 4.18, *Language Support Selection*
	Account Configuration, Section 4.19, *Account Configuration*

User Reference	Screen Reference
	Selecting Package Groups, Section 4.21, *Package Group Selection*
	Individual Package Selection — if you choose to select individual packages, Section 4.21.1, *Selecting Individual Packages*
	Unresolved Dependencies — if you selected individual packages and there were dependency problems, Section 4.21.5, *Unresolved Dependencies*
	X Configuration, Section 4.22, *GUI X Configuration Tool*
	Monitor Configuration, Section 4.22.2, *Configuring Your Monitor*
	Customize Graphics Configuration, Section 4.22.3, *Custom Configuration*
	About to Install, Section 4.23, *Preparing to Install*
	Installing Packages, Section 4.24, *Installing Packages*
	Boot Disk Creation, Section 4.25, *Boot Disk Creation*
	Installation Complete, Section 4.26, *Installation Complete*

Table 3–2   Server-Class Cross-Reference Table

User Reference	Screen Reference
	Language Selection, Section 4.5, *Language Selection*
	Keyboard Configuration, Section 4.6, *Keyboard Configuration*
	Mouse Configuration, Section 4.7, *Mouse Configuration*
	Welcome to Red Hat Linux, Section 4.8, *Welcome to Red Hat Linux*
	Install Options, Section 4.9, *Install Options*
	Automatic Partitioning, Section 4.10, *Automatic Partitioning*
	Partitions — if you choose to manually partition using Disk Druid, Section 4.11, *Partitioning Your System*
	Choose Partitions to Format — if you choose to manually partition using Disk Druid, Section 4.13, *Formatting Partitions*

User Reference	Screen Reference
	Network Configuration — if you have a network card, Section 4.15, *Network Configuration*
	Firewall Configuration, Section 4.16, *Firewall Configuration*
	Time Zone Selection, Section 4.17, *Time Zone Configuration*
	Language Support Selection, Section 4.18, *Language Support Selection*
	Account Configuration, Section 4.19, *Account Configuration*
	Selecting Package Groups, Section 4.21, *Package Group Selection*
	Individual Package Selection — if you choose to select individual packages, Section 4.21.1, *Selecting Individual Packages*
	Unresolved Dependencies — if you selected individual packages and there were dependency problems, Section 4.21.5, *Unresolved Dependencies*
	X Configuration — if you selected the X Window System during package group selection, Section 4.22, *GUI X Configuration Tool*
	Monitor Configuration — if you selected the X Window System during package group selection, Section 4.22.2, *Configuring Your Monitor*
	Customize Graphics Configuration — if you selected the X Window System during package group selection, Section 4.22.3, *Custom Configuration*
	About to Install, Section 4.23, *Preparing to Install*
	Installing Packages, Section 4.24, *Installing Packages*
	Boot Disk Creation, Section 4.25, *Boot Disk Creation*
	Installation Complete, Section 4.26, *Installation Complete*

Table 3–3   Laptop-Class Cross-Reference Table

User Reference	Screen Reference
	Language Selection, Section 4.5, *Language Selection*
	Keyboard Configuration, Section 4.6, *Keyboard Configuration*

User Reference	Screen Reference
	Mouse Configuration, Section 4.7, *Mouse Configuration*
	Welcome to Red Hat Linux, Section 4.8, *Welcome to Red Hat Linux*
	Install Options, Section 4.9, *Install Options*
	Automatic Partitioning, Section 4.10, *Automatic Partitioning*
	Partitions — if you choose to manually partition using Disk Druid, Section 4.11, *Partitioning Your System*
	Choose Partitions to Format — if you choose to manually partition using Disk Druid, Section 4.13, *Formatting Partitions*
	Network Configuration — if you have a network card, Section 4.15, *Network Configuration*
	Firewall Configuration, Section 4.16, *Firewall Configuration*
	Time Zone Selection, Section 4.17, *Time Zone Configuration*
	Language Support Selection, Section 4.18, *Language Support Selection*
	Account Configuration, Section 4.19, *Account Configuration*
	Selecting Package Groups, Section 4.21, *Package Group Selection*
	Individual Package Selection — if you choose to select individual packages, Section 4.21.1, *Selecting Individual Packages*
	Unresolved Dependencies — if you selected individual packages and there were dependency problems, Section 4.21.5, *Unresolved Dependencies*
	X Configuration, Section 4.22, *GUI X Configuration Tool*
	Monitor Configuration, Section 4.22.2, *Configuring Your Monitor*
	Customize Graphics Configuration, Section 4.22.3, *Custom Configuration*
	About to Install, Section 4.23, *Preparing to Install*
	Installing Packages, Section 4.24, *Installing Packages*

User Reference	Screen Reference
	Boot Disk Creation, Section 4.25, *Boot Disk Creation*
	Installation Complete, Section 4.26, *Installation Complete*

Table 3–4   Custom-Class Cross-Reference Table

User Reference	Screen Reference
	Language Selection, Section 4.5, *Language Selection*
	Keyboard Configuration, Section 4.6, *Keyboard Configuration*
	Mouse Configuration, Section 4.7, *Mouse Configuration*
	Welcome to Red Hat Linux, Section 4.8, *Welcome to Red Hat Linux*
	Install Options, Section 4.9, *Install Options*
	Automatic Partitioning, Section 4.10, *Automatic Partitioning*
	Partitions — if you choose to manually partition using Disk Druid, Section 4.11, *Partitioning Your System*
	Choose Partitions to Format — if you choose to manually partition using Disk Druid, Section 4.13, *Formatting Partitions*
	LILO Configuration, Section 4.14, *Installing LILO*
	Network Configuration — if you have a network card, Section 4.15, *Network Configuration*
	Firewall Configuration, Section 4.16, *Firewall Configuration*
	Time Zone Selection, Section 4.17, *Time Zone Configuration*
	Language Support Selection, Section 4.18, *Language Support Selection*
	Account Configuration, Section 4.19, *Account Configuration*
	Authentication Configuration, Section 4.20, *Authentication Configuration*
	Selecting Package Groups, Section 4.21, *Package Group Selection*
	Individual Package Selection — if you choose to select individual packages, Section 4.21.1, *Selecting Individual Packages*

User Reference	Screen Reference
	Unresolved Dependencies — if you selected individual packages and there were dependency problems, Section 4.21.5, *Unresolved Dependencies*
	X Configuration, Section 4.22, *GUI X Configuration Tool*
	Monitor Configuration, Section 4.22.2, *Configuring Your Monitor*
	Customize Graphics Configuration, Section 4.22.3, *Custom Configuration*
	About to Install, Section 4.23, *Preparing to Install*
	Installing Packages, Section 4.24, *Installing Packages*
	Boot Disk Creation, Section 4.25, *Boot Disk Creation*
	Installation Complete, Section 4.26, *Installation Complete*

Table 3–5   System Requirements Table

hard drive(s): type, label, size; ex: IDE hda=1.2 GB	
partitions: map of partitions and mount points; ex: `/dev/hda1=/home`, `/dev/hda2=/` (fill this in once you know where they will reside)	
memory: amount of RAM installed on your system; ex: 64 MB, 128 MB	
CD-ROM: interface type; ex: SCSI, IDE (ATAPI)	
SCSI adapter: if present, make and model number; ex: BusLogic SCSI Adapter, Adaptec 2940UW	

network card: if present, make and model number; ex: Tulip, 3COM 3C590	
mouse: type, protocol, and number of buttons; ex: generic 3 button PS/2 mouse, MouseMan 2 button serial mouse	
monitor: make, model, and manufacturer specifications; ex: Optiquest Q53, ViewSonic G773	
video card: make, model number and size of VRAM; ex: Creative Labs Graphics Blaster 3D, 8MB	
sound card: make, chipset and model number; ex: S3 SonicVibes, Sound Blaster 32/64 AWE	
IP, DHCP, and BOOTP addresses: four numbers, separated by dots; ex: 10.0.2.15	
netmask: four numbers, separated by dots; ex: 255.255.248.0	
gateway IP address: four numbers, separated by dots; ex: 10.0.2.245	

one or more name server IP addresses (DNS): one or more sets of dot-separated numbers; ex: 10.0.2.1	
domain name: the name given to your organization; ex: Red Hat's would be `redhat.com`	
hostname: the name of your computer; your personal choice of names; ex: `cookie`, `southpark`	

If any of these networking requirements or terms are unfamiliar to you, contact your network administrator for assistance.

4   Installing Red Hat Linux

This chapter explains how to install Red Hat Linux from the CD-ROM using the graphical, mouse-based installation program. The following topics will be discussed:

- Getting familiar with the installation program's user interface

- Starting the installation program

- Selecting an installation method

- Configuration steps during the installation (language, keyboard, mouse, etc.)

- Finishing the installation

4.1 The Installation Program User Interface

If you have used a **graphical user interface (GUI)** before, you will 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.

Note

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

```
boot: text
```

Please refer to Chapter 5, *Installing Red Hat Linux via Text Mode* for an overview of text mode installation instructions.

4.1.1 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 providing a way to enter commands from a shell prompt. The installation program displays these messages on five **virtual consoles**, among which you can switch using a single keystroke combination.

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 4–1, *Console, Keystrokes, and Contents* for a listing of the virtual consoles, keystrokes to switch to them, and their contents.

Table 4–1   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 is no reason to leave the default console (virtual console #7) unless you are attempting to diagnose installation problems.

4.2 Starting the Installation Program

To start the installation, you must first boot the installation program. Please make sure you have all the resources you will need for the installation. If you have already read through Chapter 2, *Steps to Get You Started* and followed the instructions, you should be ready to begin.

Note

Occasionally, some hardware components require a **driver disk** during the installation. A driver disk adds support for hardware that is not otherwise supported by the installation program. The driver disk could be produced by Red Hat, it could be a disk you make yourself, or it could be a disk that a hardware vendor includes with a piece of hardware.

If a screen appears prompting you to insert a driver disk, and you have a vendor-supplied driver disk, please do so. Another source for finding driver disks is http://www.redhat.com/support/errata/. For more information about driver disks, refer to *Appendix C. Driver Disks* in the *Official Red Hat Linux Reference Guide*.

4.2.1 Booting the Installation Program

Note

If you need to create a boot disk, please refer to Section 2.4.2, *Making Installation Diskettes*.

Insert the boot disk into your computer's first diskette drive and reboot (or boot using the CD-ROM, if your computer supports booting from the CD-ROM drive). Your BIOS settings may need to be changed to allow you to boot from the diskette or CD-ROM.

Tip

To change your BIOS settings, watch the instructions provided on your display when your computer first begins to boot. Often you will see a line of text telling you to press the [Del] or [F1] key to enter the BIOS settings.

Once you've entered your BIOS setup program, find the section where you can alter your boot sequence. The default is often C, A or A, C (depending on whether you boot from your hard drive [C] or a diskette drive [A]). Change this sequence so that the CD-ROM is first in your boot order and that C or A (whichever is your typical boot default) is second. This instructs the computer to first look at the CD-ROM drive for bootable media; if it does not find bootable media on the CD-ROM drive, it will then check your hard drive or diskette drive.

Save your changes before exiting the BIOS. For more information, please refer to the documentation that came with your system.

You can boot the Red Hat Linux installation program using any one of the following media (depending upon what your system can support):

- *Bootable CD-ROM* — Your machine supports a bootable CD-ROM drive and you want to perform a local CD-ROM installation.

- *Local boot disk* — Your machine will not support a bootable CD-ROM and you want to install from a local CD-ROM or a hard drive.

- *Network boot disk* — Use a network boot disk to install via NFS, FTP and HTTP.

- *PCMCIA boot disks* — Use PCMCIA boot disks when you need PCMCIA support, but your machine does not support booting from the CD-ROM drive *or* if you need PCMCIA support in

order to make use of the CD-ROM drive on your system. The PCMCIA boot disks can be used for all installation methods (CD-ROM, hard drive, NFS, FTP, and HTTP).

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.

As you boot the installation program, be aware of two issues:

- Once you see the `boot:` prompt, the installation program will automatically begin 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 diskette.

Normally, you will 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.

Additional Boot Options

Enter expert mode using the following boot command:

```
boot: linux expert
```

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

```
boot: text
```

For installation instructions, please refer to Chapter 5, *Installing Red Hat Linux via Text Mode*.

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

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

In the above command, *<device>* should be the device you are using (such as ttyS0 or ttyS1).

To explicitly request a dialog where you can configure additional devices (such as ISA devices) include the 'isa' directive:

```
boot: linux isa
```

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.

Kernel Options

Options can also be passed to the kernel. For example, to instruct the kernel to use all the RAM in a 128 MB system, enter:

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

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

If you need to specify boot options to identify your hardware, please write them down. The boot options will be needed during the LILO configuration portion of the installation (please see Section 4.14, *Installing LILO* for more information).

Booting Without Diskettes

The Red Hat Linux/x86 CD-ROM can be booted by computers that support bootable CD-ROMs. Not all computers support this feature, so if your system cannot boot from the CD-ROM, there is one other way to start the installation without using a boot disk. The following method is specific to x86-based computers only.

If you have MS-DOS installed on your system, you can boot directly from the CD-ROM drive without using a boot disk.

To do this (assuming your CD-ROM is drive d:), use the following commands:

```
C:\> d:
D:\> cd \dosutils
D:\dosutils> autoboot.bat
```

This method will not work if run in a DOS window — the autoboot.bat file must be executed with DOS as the only operating system. In other words, Windows cannot be running.

If your computer cannot boot directly from CD-ROM (and you cannot use a DOS-based autoboot), you will have to use a boot diskette to get things started.

4.3 Selecting an Installation Method

Next, you will be asked what type of installation method you wish to use. If you want to follow the instructions contained in this chapter, choose **CD-ROM**. Red Hat Linux can be installed using any of the following methods:

CD-ROM

> If you have a CD-ROM drive and the Red Hat Linux CD-ROM, you can use this method. You will need a boot disk or a bootable CD-ROM. PCMCIA boot and driver disks may also be used.

Hard Drive

If you copied the Red Hat Linux files to a local hard drive, you can use this method. Refer to Chapter 5, *Installing Red Hat Linux via Text Mode* for hard drive installation instructions. You will need a boot disk. PCMCIA boot and driver disks may also be used.

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, you can use this method. You will need a network boot disk. PCMCIA boot and driver disks may also be used. Refer to Chapter 5, *Installing Red Hat Linux via Text Mode* for network installation instructions. Please note that NFS installations may also be performed in GUI mode.

FTP

If you are installing directly from an FTP server, use this method. You will need a network boot disk. PCMCIA boot and driver disks may also be used. Refer to Chapter 5, *Installing Red Hat Linux via Text Mode* for FTP installation instructions.

HTTP

If you are installing directly from an HTTP (web) server, use this method. You will need a network boot disk. PCMCIA boot and driver disks may also be used. Refer to Chapter 5, *Installing Red Hat Linux via Text Mode* for HTTP installation instructions.

4.4 Beginning the Installation

If you are planning to install via CD-ROM using the graphical interface, please read on.

Note

If you would rather perform a text mode installation, reboot your system and at the `boot:` prompt, type `text`. Refer to Chapter 5, *Installing Red Hat Linux via Text Mode* for further instructions.

4.4.1 Installing from CD-ROM

To install Red Hat Linux from a 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 the CD is in the CD-ROM drive, 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 an ATAPI) CD-ROM drive. If found, you will continue to the next stage of the installation process (see Section 4.5, *Language Selection*).

Note

If you wish to abort the installation process at this time, simply reboot your machine and then eject the boot diskette or CD-ROM. You can safely cancel the installation at any point before the **About to Install** screen. See Section 4.23, *Preparing to Install* for more information.

If a drive is not detected, you will 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 is an "other." Sound cards with proprietary CD-ROM interfaces are good examples of this type of CD-ROM. The installation program will display 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 you have an IDE (ATAPI) CD-ROM, but the installation program fails to find your IDE (ATAPI) CD-ROM and asks you what type of CD-ROM drive you have, try the following boot command. Restart the installation, and at the `boot:` prompt enter **linux hd*X*=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.

4.5 Language Selection

Using your mouse, select the language you would prefer to use for the installation and as the system default (see Figure 4–1, *Language Selection*).

Selecting the appropriate language will also help target your time zone configuration later in the installation. The installation program will try to define the appropriate time zone based on what you specify on this screen.

Figure 4–1 Language Selection
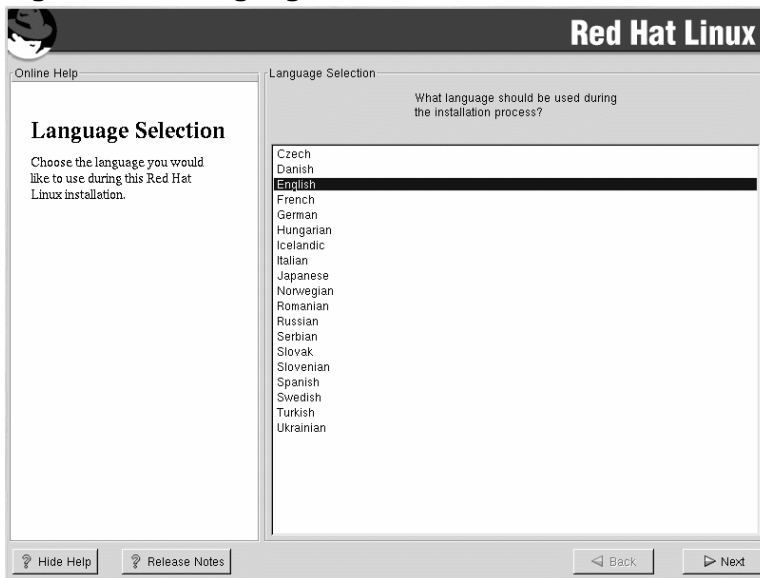
4.6 Keyboard Configuration

Choose the model of keyboard that best fits your system (see Figure 4–2, *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 keyboard configuration, use the blank text field at the bottom of the screen to enter text.

Tip

To change your keyboard type after you have installed Red Hat Linux, as root use the `/usr/sbin/kbdconfig` command. Alternatively, you can type `setup` at the `root` prompt.

To become root, type `su -` at the shell prompt in a terminal window and then press [Enter]. Then, enter the root password and press [Enter].

Figure 4–2 Keyboard Configuration
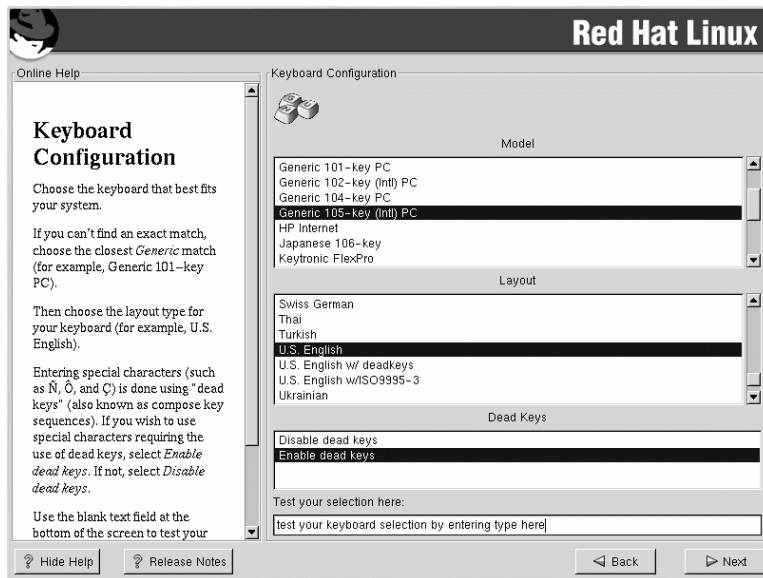
4.7 Mouse Configuration

Choose the correct mouse type for your system. If you cannot find an exact match, choose a mouse type that you are sure is compatible with your system (see Figure 4–3, *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 are installing Red Hat Linux on a laptop computer, in most cases the pointing device will be PS/2 compatible.

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 4–3   Mouse Configuration
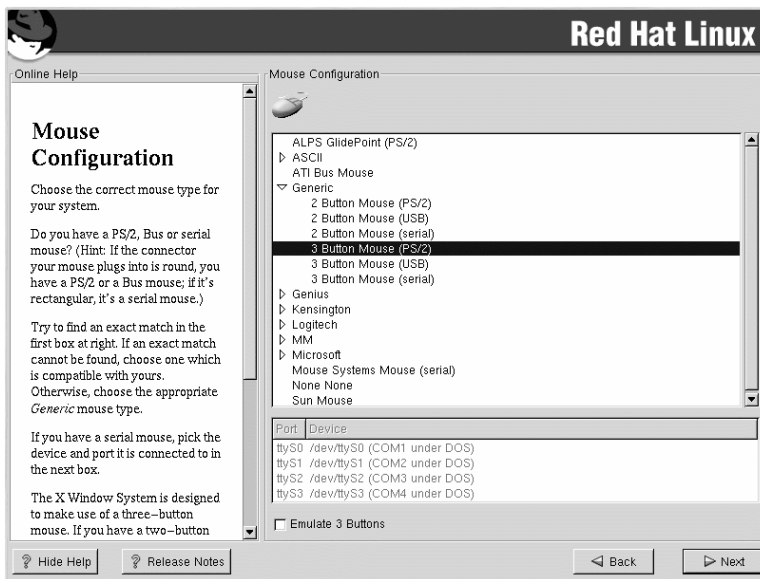
If you have a PS/2 or a bus mouse, you do not need to pick a port and device. If you have a serial mouse, you should choose the correct port and device that your serial mouse is on.

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

Tip

To change your mouse configuration after you have completed the installa-
tion of Red Hat Linux, become root. Then use the `/usr/sbin/mousec-
onfig` command from a shell prompt.

To configure your mouse to work as a left-handed mouse, reset the order of
the mouse buttons. To do this, after you have booted your Red Hat Linux
system, type `gpm -B 321` at the shell prompt.

4.8 Welcome to Red Hat Linux

The **Welcome** screen does not prompt you for any 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.

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

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

4.9 Install Options

Note

Before you choose an installation type, remember that if you would like to
try out Red Hat Linux without repartitioning your existing system, and your
system as a FAT (DOS/Windows) partition with sufficient free space, you can
perform a partitionless installation. This method is perfect for people who
are new to Linux, and who would like to try Red Hat Linux with a minimum
of disruption to their computer. To learn more about this method, refer to
Appendix B, *Installing Without Partitioning*.

Choose whether you would like to perform a full installation or an upgrade (see Figure 4–4, *Choosing
Install or Upgrade*).

Red Hat Linux allows you to choose the installation type that best fits your needs. Your options are
Workstation, **Server**, **Laptop**, **Custom**, or **Upgrade**.

Figure 4–4   Choosing Install or Upgrade
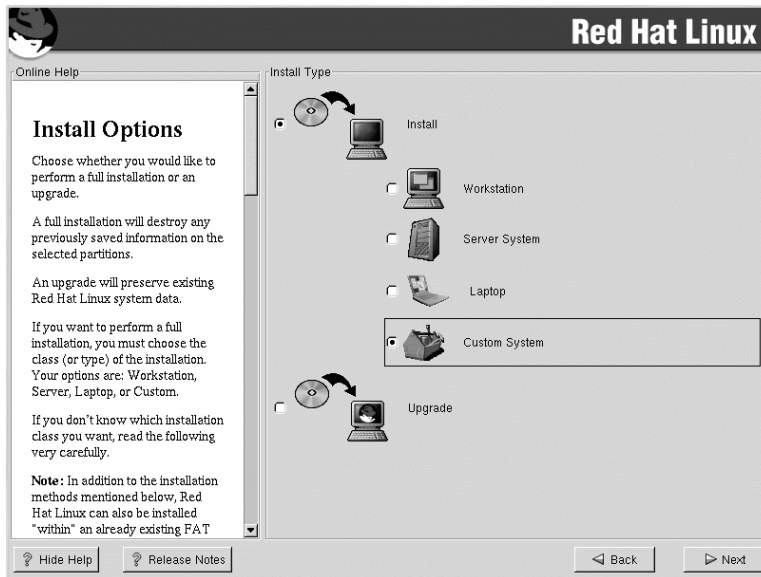
To perform an upgrade, please refer to Appendix A, *Upgrading Your Current System*.

For more information about the different installation classes, please refer to Section 2.5, *Step 5 - Which Installation Class is Best For You?*.

4.10 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.

Note

If the **Automatic Partitioning** option does not appear, then you do not have enough free space available for this installation option. You can either exit out of the installation program and make space available, or you can partition manually.

In this screen, you can choose to perform automatic partitioning, to partition manually using Disk Druid, to partition manually using fdisk, or use the **Back** button to choose a different installation method (see Figure 4–5, *Automatic Partitioning*).

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

Figure 4–5   Automatic Partitioning


```
                                              CAUTION
```
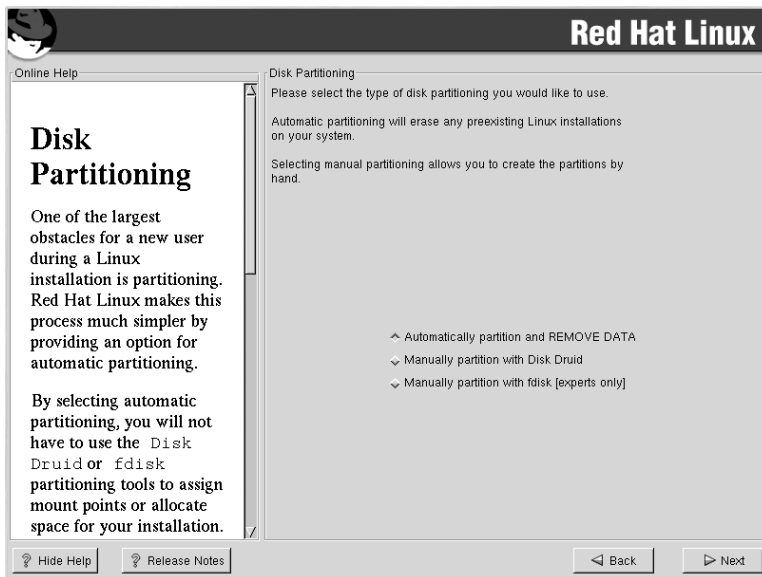
A workstation-, custom-, or laptop-class installation using automatic parti-
tioning will remove all data on all currently existing Linux partitions.

If you do not want Red Hat Linux to be installed on your MBR or if you want to use a boot manager other than LILO, do not choose this installation method.

CAUTION

A server-class installation using automatic partitioning will remove all data on all partitions of all hard drives.

If you have another OS on your system that you wish to keep installed, if you do not want Red Hat Linux to be installed on your MBR, or if you want to use a boot manager other than LILO, do not choose this installation method.

If you are not sure how you want your system to be partitioned, please read *An Introduction to Disk Partitions* in the *Official Red Hat Linux Reference Guide*.

4.11 Partitioning Your System

If you chose **Automatic Partitioning**, please skip ahead to Section 4.15, *Network Configuration*.

If you chose **Manually partition with fdisk**, please skip ahead to Section 4.12, *Partitioning with fdisk*.

At this point, you must tell the installation program where to 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 4–6, *Partitioning with Disk Druid*).

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 will need an appropriately-sized root partition, and a swap partition of at least 32 MB.

Figure 4–6   Partitioning with Disk Druid
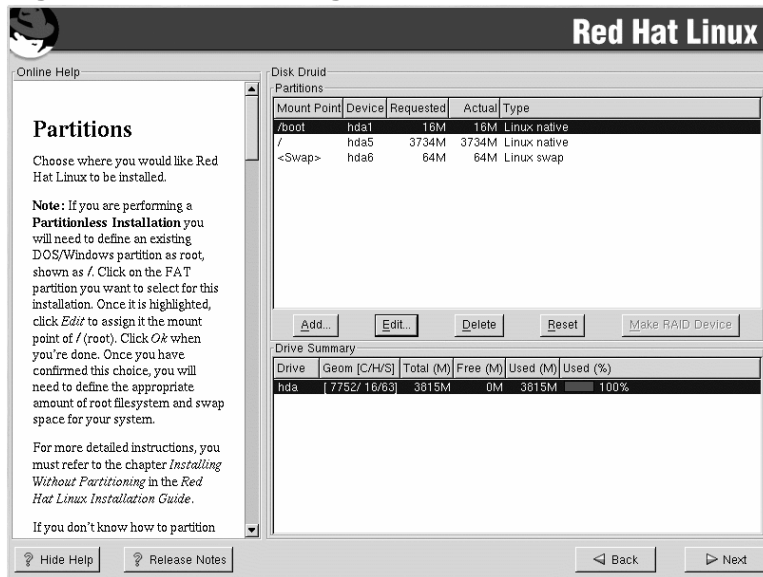
The partitioning tool used in Red Hat Linux 7.1 is Disk Druid. With the exception of certain esoteric situations, Disk Druid can handle the partitioning requirements for a typical Red Hat Linux installation.

4.11.1 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 "mounted" at this location. This field indicates where the partition will be mounted. If a partition exists, but is not set, then you need to define its mount point. Double-click on the partition or click the **Edit** button.

- **Device**: This field displays the partition's device name.

- **Requested**: This field shows the partition's original size. To redefine the size of a partition, 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 (for example, Linux Native or DOS).

4.11.2 Recommended Partitioning Scheme

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

- A swap partition (at least 32 MB) — 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 16 MB 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 twice your computer's RAM, or 32 MB, whichever amount is larger, but no more than 128 MB. In Disk Druid, the partition field for swap should look similar to the following:

  ```
  <Swap>  hda6  64M   64M  Linux swap
  ```

- A /boot partition (32 MB 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 32 MB. In Disk Druid, the partition field for /boot should look similar to:

  ```
  /boot  hda1  16M   16M  Linux native
  ```

CAUTION

If your hard drive is more than 1024 cylinders, you must create a /boot partition if you want the / (root) partition to use all of the remaining space on your hard drive.

- A root partition (1.2-2.4 GB) — this is where "/" (the root directory) will be located. In this setup, all files (except those stored in /boot) are on the root partition. An 1.2 GB root partition will permit the equivalent of a workstation-class installation (with *very* little free space), while a 2.4 GB root partition will let you install every package. In Disk Druid, the partition field for / should look similar to:

  ```
  /  hda5  3734M   3734M   Linux native
  ```

4.11.3 Problems When Adding a Partition

If you attempt to add a partition and Disk Druid cannot handle your request, you will 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.

4.11.4 Drive Summaries

Each line in the **Drive Summaries** 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 in megabytes.
- **Free**: This field shows how much of the hard disk's space is still unallocated, in megabytes.
- **Used**: These fields show how much of the hard disk's space is currently allocated to partitions, in megabytes and percentage.

The **Drive Summaries** 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; to do that, use the **Allowable Drives** field in Section 4.11.6, *Adding Partitions*.

4.11.5 Disk Druid's Buttons

These buttons control Disk Druid's actions. They are used to add and delete partitions, and to change partition attributes. Buttons on this screen are also used to accept the changes you have made, or to exit Disk Druid. For further explanation, 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 will 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 *RAID (Redundant Array of Independent Disks)* in the *Official Red Hat Linux Reference Guide*.

4.11.6 Adding Partitions

To add a new partition, select the **Add** button. A dialog box will appear.

Note

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

- **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 pulldown 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 will end up with a 1 MB partition.

- **Use remaining space**: This checkbox indicates whether 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 increase and decrease 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 checkbox

settings, you can have Disk Druid place partitions as you see fit, or let Disk Druid decide where partitions should go.

• **Ok**: Select **Ok** once you are satisfied with the settings, and wish to create the partition.

• **Cancel**: Select **Cancel** if you do not want to create the partition.

4.11.7 Editing Partitions

To edit a partition, select the **Edit** button or double-click on the existing partition.

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.

4.11.8 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.

Skip to Section 4.13, *Formatting Partitions* for further installation instructions.

4.12 Partitioning with fdisk

This section applies only if you chose to use fdisk to partition your system. If are not using fdisk, please skip to Section 4.10, *Automatic Partitioning* for automatic partitioning or Section 4.11, *Partitioning Your System* for partitioning with Disk Druid.

CAUTION

Unless you have previously used fdisk and understand how it works, we do not recommend that you use it.

Disk Druid is easier to understand than fdisk. To exit fdisk, click **Back** to return to the previous screen, deselect fdisk, and then click **Next**.

If you have chosen to use fdisk, the next screen will prompt you to select a drive to partition using fdisk.

Once you have chosen which drive to partition, you will be presented with the fdisk command screen. If you do not know what command to use, type [m] at the prompt for help.

When you are 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.

After you have partitioned your drive(s), click **Next**. Then you will need to use Disk Druid to assign mount points to the partitions you just created with fdisk.

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

For each partition you created with fdisk, click on the **Edit** button, choose the appropriate mount point for that partition from the pulldown menu, and click on **OK**.

Skip to Section 4.13, *Formatting Partitions* for further installation instructions.

4.13 Formatting Partitions

After you've created partitions, you will need to format them. 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 4–7, *Choosing Partitions to Format*).

Figure 4–7   Choosing Partitions to Format
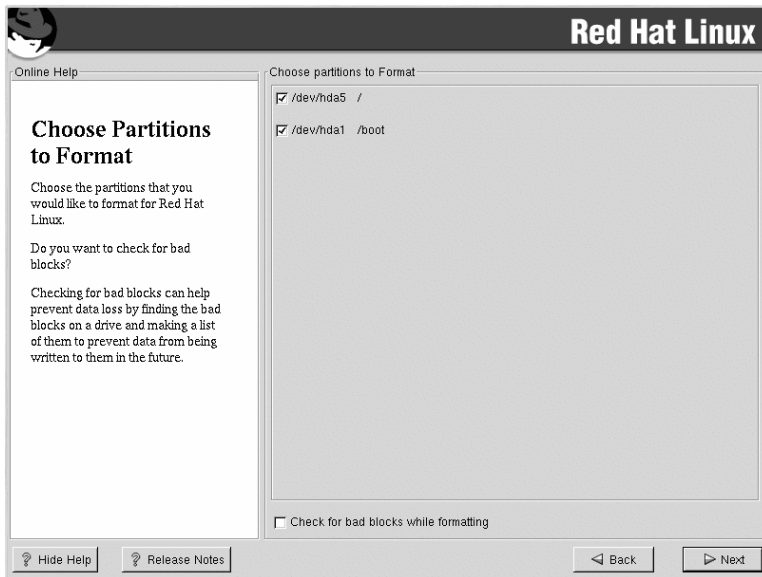
If you wish to check for bad blocks while formatting each filesystem, please make sure to select the **Check for bad blocks while formatting** checkbox. Checking for bad blocks can help prevent data loss by locating the bad blocks on a drive and making a list of them to prevent using them in the future.

Note

Selecting **Check for bad blocks while formatting** may dramatically increase your total installation time. Since most newer hard drives are quite large in size, checking for bad blocks may take a long time; the length of time depends on the size of your hard drive. If you choose to check for bad blocks, you can monitor your progress on virtual console #6.

4.14 Installing LILO

If you are performing a workstation-, server-, or laptop-class installation, please skip ahead to Section 4.15, *Network Configuration*.

In order to boot your Red Hat Linux system, you usually need to install LILO (the *LI*nux *LO*ader). You may install LILO in one of two places:

The master boot record (MBR)

> The recommended place to install LILO, unless the MBR already starts another operating system loader, such as System Commander or OS/2's Boot Manager. The MBR is a special area on your hard drive that is automatically loaded by your computer's BIOS, and is the earliest point at which LILO can take control of the boot process. If you install LILO in the MBR, when your machine boots, LILO will present a LILO: prompt. You can then boot Red Hat Linux or any other operating system that you have configured LILO to boot.

The first sector of your root partition

> Recommended if you are already using another boot loader on your system (such as OS/2's Boot Manager). In this case, your other boot loader will take control first. You can then configure that boot loader to start LILO (which will then boot Red Hat Linux).

If you choose to install LILO, please select where you would like LILO to be installed on your system (see Figure 4–8, *LILO Configuration*). If your system will use only Red Hat Linux, you should choose the MBR. For systems with Windows 95/98, you should install LILO to the MBR so that LILO can boot both operating systems.

If you have Windows NT (and you want to install LILO) you should choose to install LILO on the first sector of the root partition, and not on the MBR. Please be sure to create a boot disk. In this case, you will either need to use the boot disk, or configure the NT system loader to boot LILO from the first sector of the root partition.

Review http://www.linuxdoc.org/HOWTO/mini/Linux+NT-Loader.html for more information on setting up LILO and NT.

⬡ CAUTION ⬡

> If you choose not to install LILO for any reason, you will not be able to boot your Red Hat Linux system directly, and you will need to use another boot method (such as a boot diskette). Use this option only if you are sure you have another way of booting your Red Hat Linux system!

The **Use linear mode** checkbox is selected by default. In most cases, linear mode should be enabled; if your computer cannot use linear mode to access your hard drives, deselect this option.

Figure 4–8   LILO Configuration
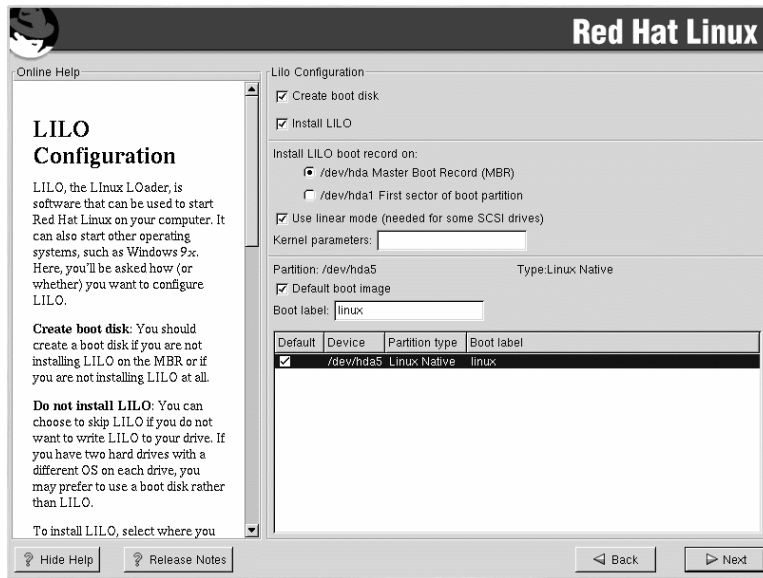
If you wish to add default options to the LILO boot command, enter them into the **Kernel parameters** field. Any options you enter will be passed to the Linux kernel every time it boots.

Every bootable partition is listed, including partitions used by other operating systems. The partition holding your Red Hat Linux system's root filesystem will have a **Boot label** of **linux**. 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.

Note

The **Boot label** column lists what you must enter at the `LILO:` 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 the `LILO:` prompt to display a list of defined boot labels.

4.14.1 Configuring LILO

You have certain options on this screen for configuring LILO, or you can choose not to install LILO at all.

Create boot disk — the **Create boot disk** option is checked by default. If you do not want to create a boot disk, you should deselect this option. However, we strongly urge you to create a boot disk. A boot disk is useful for the following reasons:

Partitionless installations — if you chose to perform a partitionless installation, you must create a boot disk. Without this diskette, you will not be able to boot into Red Hat Linux. If you lose or destroy this diskette, you will not be able to boot into Red Hat Linux.

For use instead of LILO — you can use a boot disk instead of LILO. If you are trying Red Hat Linux for the first time, and you would feel more comfortable if the boot process for your other operating system is left unchanged, you can use a boot diskette instead of LILO. With a boot disk, going back to your other operating system is as easy as removing the boot disk and rebooting. If you would rather use a boot disk instead of LILO, make sure the **Install LILO** option is not selected.

For use if another operating system overwrites LILO — 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 MBR (originally containing LILO) 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 LILO.

Do not **Install LILO** — if you have Windows NT installed on your system, *you may not want to install LILO*. If you choose not to install LILO for this 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 LILO if you do not want to write LILO to your hard drive. Make sure the **Install LILO** option is not selected unless you wish to install LILO.

Tip

If you need to use rescue mode, there are several options available to you.

- Using the CD-ROM to boot, type **`linux rescue`** at the `boot:` prompt.

- Using the network boot disk, type **`linux rescue`** at the `boot:` prompt. You will then be prompted to retrieve the rescue image from the network.

- Using the boot disk included with the Red Hat Linux boxed set, type **`linux rescue`** at the `boot:` prompt. You then pick an installation method and choose a valid installation tree to load from.

For more information regarding rescue mode, refer to *Official Red Hat Linux Customization Guide*.

4.14.2 Alternatives to LILO

If you do not wish to use LILO to boot your Red Hat Linux system, you have several alternatives:

Boot disk

> As previously stated, you can use the boot disk created by the installation program (if you elected to create one).

LOADLIN

> You can load Linux from MS-DOS. Unfortunately, it requires a copy of the Linux kernel (and an initial RAM disk, if you have a SCSI adapter) to be available on an MS-DOS partition. The only way to accomplish this is to boot your Red Hat Linux system using some other method (for example, from LILO on a diskette) and then copy the kernel to an MS-DOS partition. LOADLIN is available from ftp://metalab.unc.edu/pub/Linux/system/boot/dualboot/ and associated mirror sites.

SYSLINUX

> SYSLINUX is an MS-DOS program very similar to LOADLIN. It is also available from ftp://metalab.unc.edu/pub/Linux/system/boot/loaders/ and associated mirror sites.

Some commercial boot loaders

> You can load Linux using commercial bootloaders. For example, System Commander and Partition Magic are able to boot Linux (but still require LILO to be installed in your Linux root partition).

4.14.3 SMP Motherboards and LILO

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

The two entries in `lilo.conf` will be `linux` and `linux-up`. The `linux` 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.

4.15 Network Configuration

If you do not have a network card, you will not see this screen. Please skip ahead to the next section, Section 4.17, *Time Zone Configuration*.

If you have a network card and you have not already configured your networking, you now have the opportunity (as shown in Figure 4–9, *Network Configuration*).

If you have multiple devices, you will see a tab for each device. You may switch between devices (for example, between eth0 and eth1) and the information you provide on each tab will be specific to each device.

Choose whether you would like to configure your IP address using DHCP (Dynamic Host Configuration Protocol). If you select **Activate on boot**, your network interface will be started when you boot. If you do not have DHCP client access or you are unsure what to provide here, 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 4–9   Network Configuration

If you have a fully qualified domain name for the network device, enter it in the **Hostname** field.

Tip

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


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

4.16 Firewall Configuration

Red Hat Linux also offers you firewall protection for enhanced system security. A firewall exists between your computer and the network, and determines which resources on your computer remote users on the network can access. A properly configured firewall can greatly increase the security of your system.

Choose the appropriate security level for your system.

Figure 4–10   Firewall Configuration
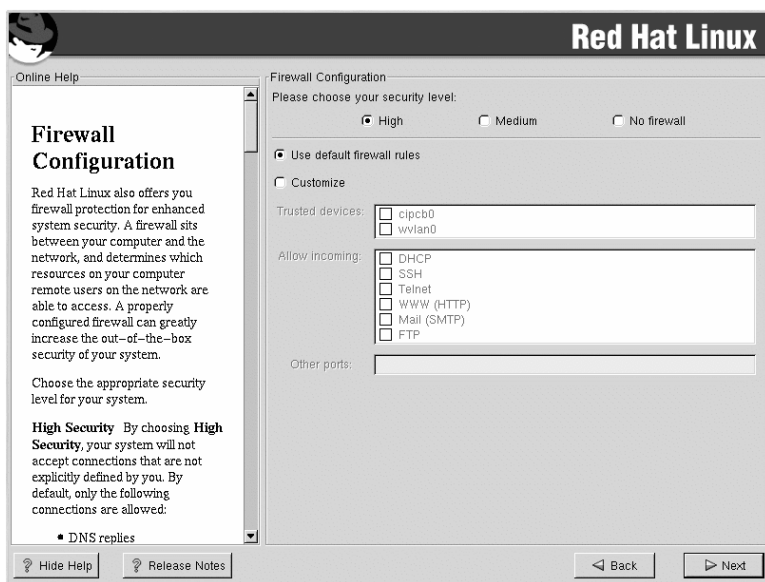
High

If you choose **High**, your system will not accept connections (other than the default settings) that are not explicitly defined by you. By default, only the following connections are allowed:

• DNS replies

• DHCP — so any network interfaces that use DHCP can be properly configured

If you choose **High**, your firewall will not allow the following:

• Active mode FTP (passive mode FTP, used by default in most clients, should still work)

• IRC DCC file transfers

• RealAudio™

• Remote X Window System clients

If you are connecting your system to the Internet, but do not plan to run a server, this is the safest choice. If additional services are needed, you can choose **Customize** to allow specific services through the firewall.

Medium

If you choose **Medium**, your firewall will not allow remote machines to have access to certain resources on your system. By default, access to the following resources are not allowed:

- Ports lower than 1023 — the standard reserved ports, used by most system services, such as FTP, SSH, telnet, and HTTP

- The NFS server port (2049)

- The local X Window System display for remote X clients

- The X Font server port (by default, xfs does not listen on the network, it is disabled in the font server)

If you want to allow resources such as RealAudio™, while still blocking access to normal system services, choose **Medium**. You can select **Customize** to allow specific services through the firewall.

No Firewall

No firewall provides complete access to your system and does no security checking. Security checking is the disabling of access to certain services. It is recommended that this only be selected if you are running on a trusted network (not the Internet), or if you plan to do more detailed firewall configuration later.

Choose **Customize** to add trusted devices or to allow additional incoming services.

Trusted Devices

Selecting any of the **Trusted Devices** allows access to your system for all traffic from that device; it is excluded from the firewall rules. For example, if you are running a local network, but are connected to the Internet via a PPP dialup, you can check **eth0** and any traffic coming from your local network will be allowed. Selecting **eth0** as trusted means all traffic over the Ethernet is allowed, put the ppp0 interface is still firewalled. If you want to restrict traffic on an interface, leave it unchecked.

It is not recommended that you make any device that is connected to public networks, such as the Internet, a **Trusted Device**.

Allow Incoming

Enabling these options allow the specified services to pass through the firewall. Note, during a workstation-class installation, the majority of these services are *not* installed on the system.

DHCP

If you allow incoming DHCP queries and replies, you allow any network interface that uses DHCP to determine its IP address. DHCP is normally enabled. If DHCP is not enabled, your computer can no longer get an IP address.

SSH

*S*ecure *SH*ell (SSH) is a suite of tools for logging into and executing commands on a remote machine. If you plan to use SSH tools to access your machine through a firewall, enable this option. You need to have the `openssh-server` package installed in order to access your machine remotely, using SSH tools.

Telnet

Telnet is a protocol for logging into remote machines. Telnet communications are unencrypted, and provide no security from network snooping. Allowing incoming Telnet access is not recommended. If you do want to allow inbound Telnet access, you will need to install the `telnet-server` package.

WWW (HTTP)

The HTTP protocol is used by Apache (and by other web servers) to serve web pages. If you plan on making your web server publicly available, enable this option. This option is not required for viewing pages locally or for developing web pages. You will need to install the `apache` package if you want to serve web pages.

Mail (SMTP)

If you want to allow incoming mail delivery through your firewall, so that remote hosts can connect directly to your machine to deliver mail, enable this option. You do not need to enable this if you collect your mail from your ISP's server using POP3 or IMAP, or if you use a tool such as fetchmail. Note that an improperly configured SMTP server can allow remote machines to use your server to send spam.

FTP

The FTP protocol is used to transfer files between machines on a network. If you plan on making your FTP server publicly available, enable this option. You need to install the `wu-ftpd` (and possibly the `anonftp`) package for this option to be useful.

Other ports

You can allow access to ports which are not listed here, by listing them in **Other ports** field. Use the following format: `port:protocol`. For example, if you want to allow IMAP access through your firewall, you can specify `imap:tcp`. You can also explicitly specify numeric ports; to allow UDP packets on port 1234 through the firewall, enter `1234:udp`. To specify multiple ports, separate them with commas.

4.17 Time Zone Configuration

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

Figure 4–11 Configuring the Time Zone
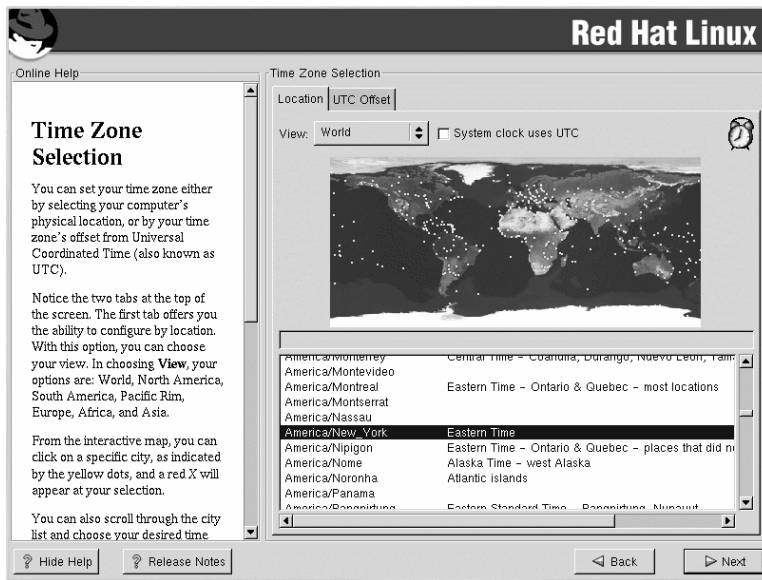
Notice the two tabs at the top of the screen (see Figure 4–11, *Configuring the Time Zone*). The first tab allows you to configure your time zone by your location. You can specify different areas to view: **World**, **North America**, **South America**, **Pacific Rim**, **Europe**, **Africa**, and **Asia**.

On the interactive map, you can also click on a specific city, which is marked by a yellow dot; a red **X** will appear indicating your selection. You can also scroll through a list and choose a time zone.

The second tab allows you to specify a UTC offset. The tab displays a list of offsets to choose from, as well as an option to set daylight saving time.

On both tabs, you can select **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/time-`
`config` command.

4.18 Language Support Selection

Red Hat Linux can install and support multiple languages for use on your system.

You must select a language to use as the default language. The default language will be used on your
Red Hat Linux system once installation is complete. If you choose to install other languages, you can
change your default language after the installation.

Figure 4–12   Language Support Selection
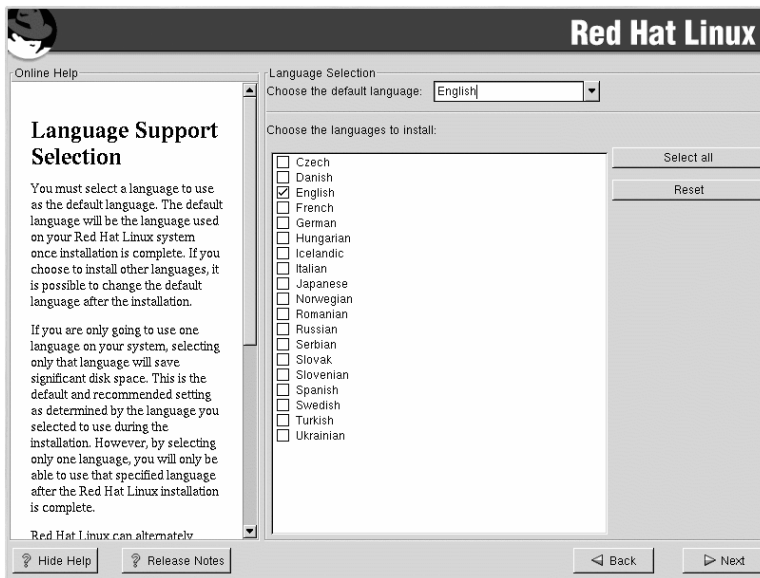
If you are only going to use one language on your system, selecting only that language will save
significant disk space. The default language is the language you selected to use during the installation.
However, if you select only one language, you will only be able to use that specified language after
the Red Hat Linux installation is complete.

To use more than one language on your system, choose specific languages to be installed or select all languages to have all available languages installed on your Red Hat Linux system.

Use the **Reset** button to cancel your selections. Resetting will revert to the default; only the language you selected for use during the installation will be installed.

4.19 Account Configuration

The **Account Configuration** screen allows you to set your root password. Additionally, you can set up user accounts for you to log in to once the installation is complete (see Figure 4–13, *Account Creation*).

Figure 4–13 Account Creation
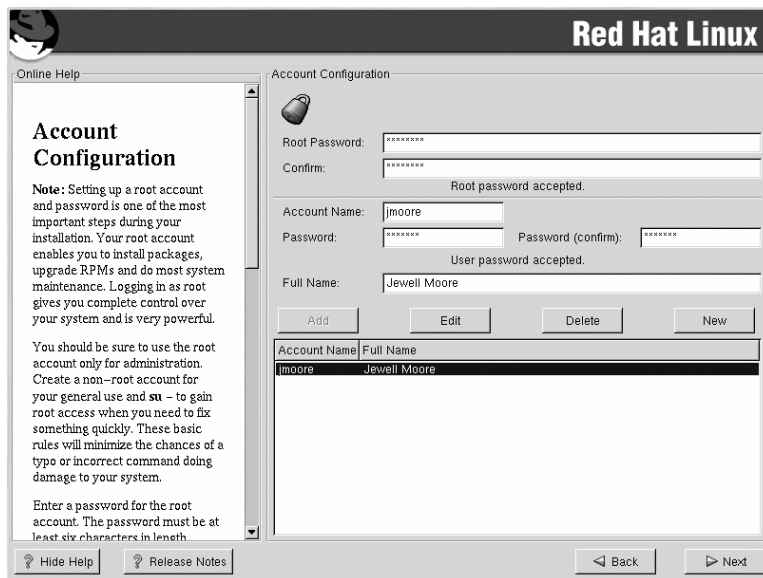
4.19.1 Setting the Root Password

Setting up a root account and password is one of the most important steps during your installation. Your root account is similar to the administrator account used on Windows NT machines. The root account is used to install packages, upgrade RPMs and perform most system maintenance. Logging in as root gives you complete control over your system.

Use the root account only for system administration. Create a non-root account for your general use and su - to root when you need to fix something quickly. These basic rules will minimize the chances of a typo or an incorrect command doing damage to your system.

The installation program will prompt you to set a root password[1] for your system. You must enter a root password. The installation program will not let you proceed to the next section without entering a root password.

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 bad 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. If you write down your password, keep it in a secure place. However, it is recommended that you do not write down this or any password you create.

Note

Do not use one of the example passwords offered in this manual. Using one of these passwords could be considered a security risk.

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.

4.19.2 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 your user account.

---

[1] A root password is the administrative password for your Red Hat Linux system. You should only log in as root when needed for system maintenance. The root account does not operate within the restrictions placed on normal user accounts, so changes made as root can have implications for your entire system.

Enter an account name. Then enter and confirm a password for that user account. Enter the full name of the account user and press **Add**. Your account information will be added to the account list, and the user account fields will be cleared so that 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 and no longer want.

4.20 Authentication Configuration

If you are performing a workstation-, server, or laptop-class installation, please skip ahead to Section 4.21, *Package Group Selection*.

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

Unless you are setting up **NIS** authentication, you will notice that only **MD5** and **shadow** passwords are selected (see Figure 4–14, *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 not sure whether you are connected to an NIS network, please ask your system administrator.

Figure 4–14   Authentication Configuration
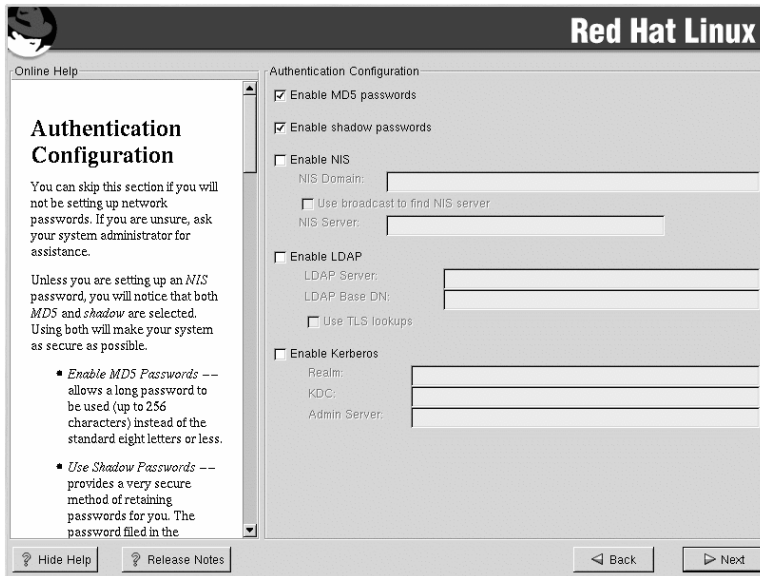
- **Enable MD5 passwords** allows a long password to be used (up to 256 characters), instead of the standard eight letters or less.

- **Enable shadow passwords** provides a secure method for retaining passwords. The passwords are stored in `/etc/shadow`, which can only be read 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. You can choose from the following two options:

  - **NIS Domain** allows you to specify the domain or group of computers your system belongs to.

  - **Use broadcast to find NIS server** allows you to broadcast a message to your local area network to find an available NIS server.

  - **NIS Server** 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.

- **Enable LDAP** tells your computer to use LDAP for some or all authentication. LDAP consolidates certain types of information within your organization. For example, all of the different lists of users within your organization can be merged into one LDAP directory. For more information about LDAP, refer to *Official Red Hat Linux Reference Guide*, *Lightweight Directory Access Protocol (LDAP)*. You can choose from the following options:

- **LDAP Server** — allows you to access a a specified server (by providing an IP address) running the LDAP protocol.

- **LDAP Base DN** — allows you to look up user information by its Distinguished Name (DN).

- **Use TLS** (*Transport Layer Security*) **lookups** — this option allows LDAP to send encrypted user names and passwords to an LDAP server before authentication.

- **Enable Kerberos** — Kerberos is a secure system for providing network authentication services. For more information about Kerberos, see *Using Kerberos 5 on Red Hat Linux* in the *Official Red Hat Linux Reference Guide*. There are three options to choose from here:

  - **Realm** — this option allows you to access a network that uses Kerberos, composed of one or a few servers (also known as KDCs) and a potentially large number of clients.

  - **KDC** — this option allows you access to the Key Distribution Center (KDC), a machine that issues Kerberos tickets (sometimes called a Ticket Granting Server or TGS).

  - **Admin Server** — this option allows you to access a server running kadmind.

4.21 Package Group Selection

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

Note

Unless you choose a custom-class installation, the installation program will automatically choose most packages for you. However, you must select either GNOME or KDE (or both) to install a graphical environment.

GNOME and KDE are both graphical desktop environments[2] that handle the overall look and feel of your system. You must choose one of these to have a default graphical setup, but you can also install both to determine for yourself which you prefer.

If you do not have unlimited space (at least 1.7 GB) to install both GNOME and KDE, Section 4.21.2, *A Brief Introduction to GNOME* and Section 4.21.3, *A Brief Introduction to KDE* should make the choice a little easier for you.

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.

---

[2] A desktop environment in Linux is similar to the environment you might see in other operating systems. However, environments differ in their look and feel and are easily customized for your individual needs.

To select a component, click on the checkbox beside it (see Figure 4–15, *Package Group Selection*).

Figure 4–15   Package Group Selection

Select each component you wish to install. Selecting **Everything** (at the end of the component list) during a custom-class installation installs all packages included with Red Hat Linux. If you select every package, you will need approximately 1.7 GB of free disk space.

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

4.21.1 Selecting Individual Packages

After selecting the components you wish to install, you can select or deselect individual packages. You can select or deselect packages using your mouse (see Figure 4–16, *Selecting Individual Packages*).

Figure 4–16 Selecting Individual Packages
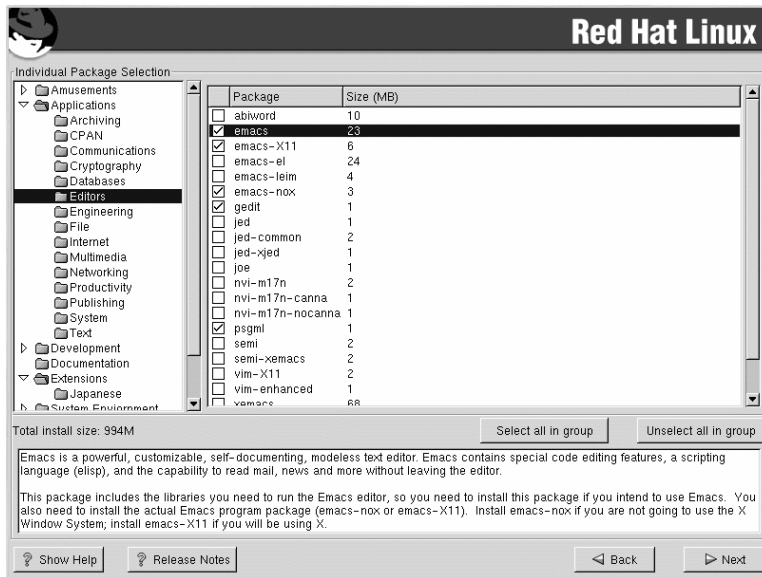
On the left side of the screen you will see a directory listing of various package groups. When you expand a directory (double-click to select it) and click on a single directory, the list of packages available for installation will appear in the panel on the right.

To select an individual package, double-click the checkbox beside the package name. A check mark in the box means that a package has been selected.

For more information about a specific package, click on the individual package name. The package information will appear at the bottom of the screen.

You can also select or deselect all packages listed within a particular group, by clicking on the **Select all in group** or **Unselect all in group** buttons.

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.

4.21.2 A Brief Introduction to GNOME

GNOME is a powerful graphics-driven desktop environment. GNOME includes a panel (for starting applications and displaying status), a desktop (where data and applications can be placed), multiple window managers (which control the look and feel of your desktop), and a standard set of desktop tools and applications.

GNOME allows you to set your desktop the way you want it to look and "feel." GNOME's session manager remembers settings and currently running programs. So, once you have set things the way you like, they will stay that way.

Figure 4–17   GNOME User Screen
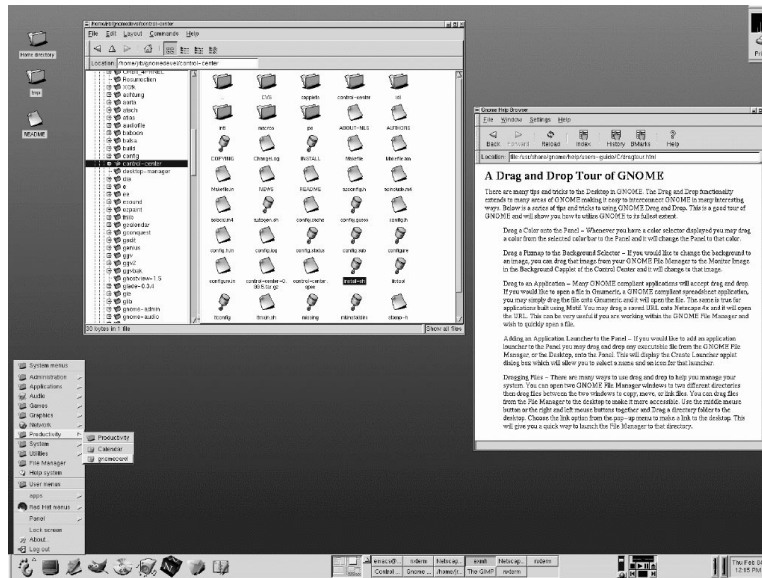
4.21.3 A Brief Introduction to KDE

KDE provides a complete desktop environment, including a file manager, a window manager, an integrated help system, a configuration system, numerous tools and utilities, and an ever increasing number of applications.

KDE offers a contemporary desktop, a searchable help system with convenient access to help on the use of the KDE desktop and its applications, standardized menu and toolbars, keybindings, color schemes, and more.

Figure 4–18   KDE User Screen
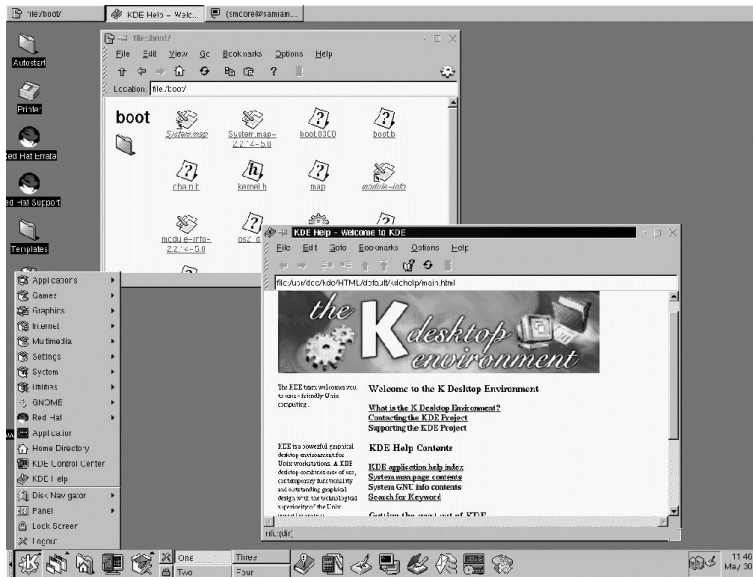
4.21.4 Selected Features Chart

The Table 4–2, *Available Features of GNOME and KDE* offers you an opportunity to compare GNOME and KDE for yourself. Key features of both desktop environments have been highlighted and a broad range of applications and tools is covered.

Table 4–2   Available Features of GNOME and KDE

Features	GNOME	KDE
highly configurable	yes	yes
multiple window managers	yes	no
Internet applications	yes	yes
changeable desktop themes	yes	yes
panel applications	yes	yes
ability to add/edit panel applications	yes	yes

Features	GNOME	KDE
file manager	yes	yes
drag and drop functionality	yes	yes
online help	yes	yes
multiple desktops	yes	yes
font manager	yes	yes
multimedia applications	yes	yes
text editors	yes	yes
graphics applications	yes	yes
games	yes	yes
network applications	yes	yes
utility applications	yes	yes
spreadsheet	yes	yes
"trashcan" for temporary file removal	yes	yes

4.21.5 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 4–19, *Unresolved Dependencies*).

The **Unresolved Dependencies** screen will only appear if you are missing packages that are needed by the packages you have selected. At the bottom of the screen, under the list of missing packages, an **Install packages to satisfy dependencies** checkbox 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 4–19   Unresolved Dependencies
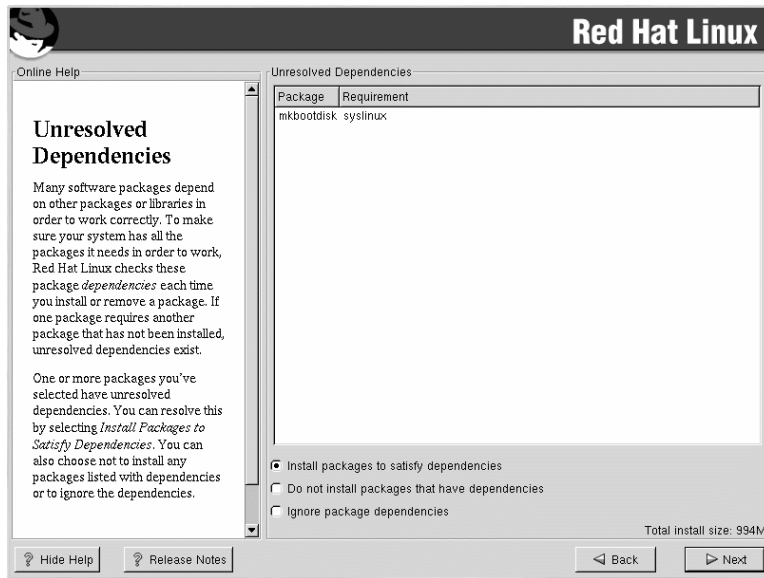
4.22 GUI X Configuration Tool

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 4.24, *Installing Packages*.

4.22.1 Video Card Configuration

Xconfigurator will now present a list of video cards for you to choose from.

If your video card does not appear on the list (see Figure 4–20, *Video Card Setup*), X 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.

Figure 4–20   Video Card Setup
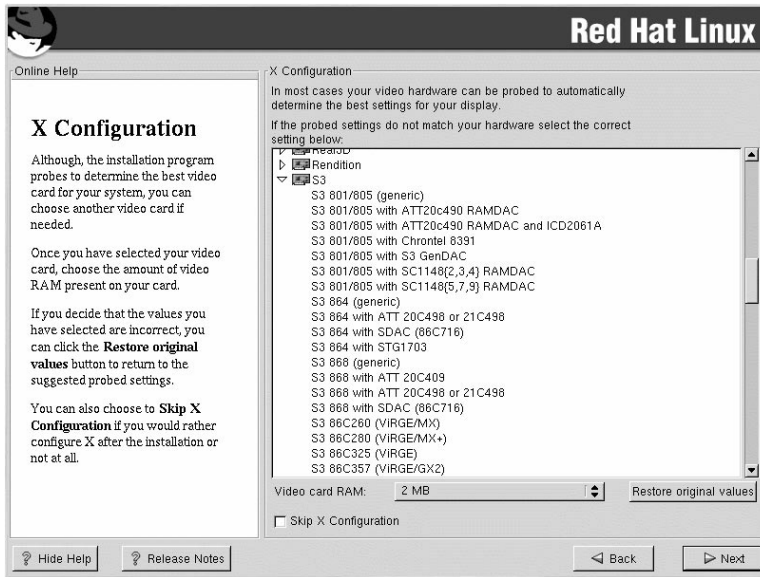
Next, enter the amount of video memory installed on your video card. If you are not sure, please consult the documentation accompanying your video card. You will not damage your video card by choosing more memory than is available, but the X server may not start correctly if you do.

If you decide that the values you have selected are incorrect, you can click the **Restore original values** button to return to the suggested settings.

You can also select **Skip X Configuration** if you would rather configure X after the installation or not at all.

4.22.2 Configuring Your Monitor

Xconfigurator, the X Window System configuration tool, 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 4–21   Monitor Selection
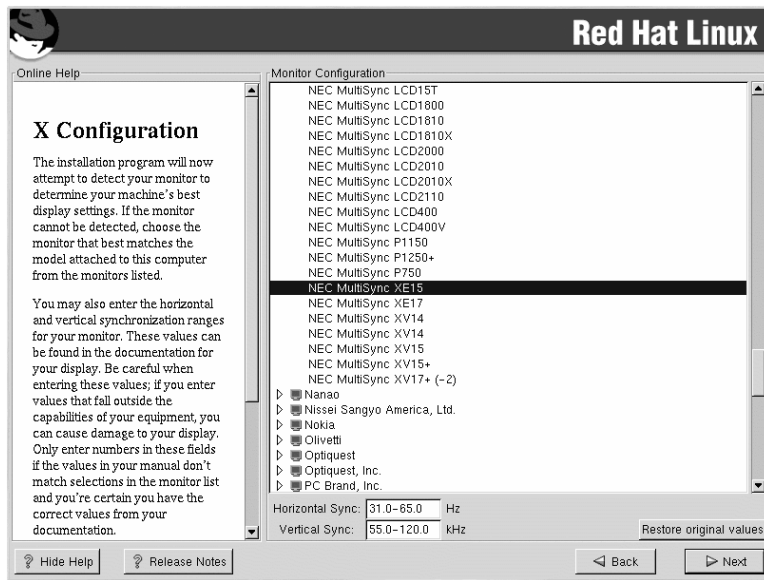
If your monitor does not appear on the list, select the most appropriate **Generic** model available. If you do select a **Generic** monitor, Xconfigurator will suggest horizontal and vertical sync ranges. These values are generally available in the documentation which accompanies your monitor, or from your monitor's vendor or manufacturer; please check your documentation to make sure these values are set correctly.

<div align="center">CAUTION</div>

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 overclock your monitor and damage or destroy it.

The horizontal and vertical ranges that Xconfigurator suggests for your monitor are also displayed on this screen.

If you decide that the values you have selected are incorrect, you can click the **Restore original values** button to return to the suggested settings.

Click **Next** when you have finished configuring your monitor.

4.22.3 Custom Configuration

Choose the correct color depth and resolution for your X configuration. Click **Test Setting** to try out this configuration. If you do not like what you see during the test, click **No** to choose another resolution.

We recommend that you test your configuration, to make sure the resolution and color settings are usable.

If you installed both GNOME and KDE, you can choose which one to use as your default desktop environment. If you installed one or the other, it will only show GNOME or KDE as the desktop default.

Figure 4–22   X Customization
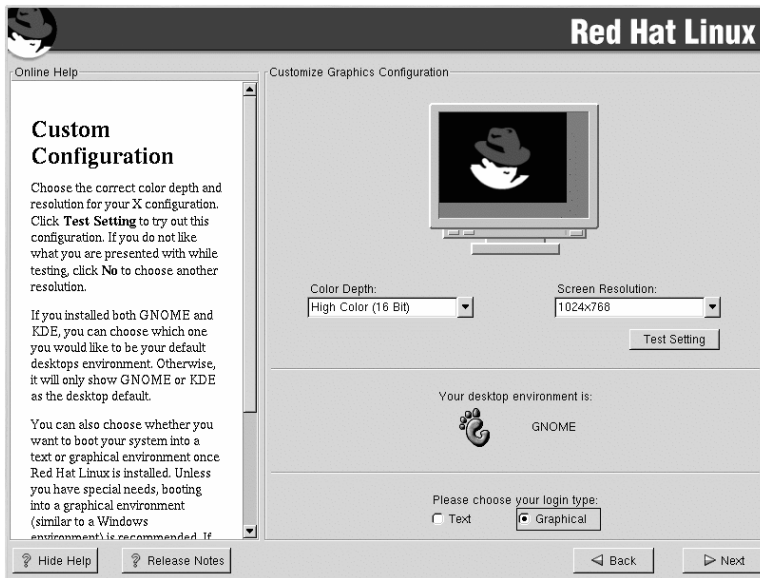
You can also choose whether you want to boot your system into a text or graphical environment once Red Hat Linux is installed. Unless you have special needs, booting into a graphical environment (similar to a Windows environment) is recommended. If you choose to boot into a text environment, you will be presented with a command prompt (similar to a DOS environment).

4.23 Preparing to Install

You will now see a screen preparing you for the installation of Red Hat Linux.

> **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.**

To cancel this installation process, press your computer's Reset button or use the [Control]-[Alt]-[Delete] key combination to restart your machine.

For your reference, a complete log of your installation can be found in `/tmp/install.log` once you reboot your system.

4.24 Installing Packages

At this point there is nothing left for you to do until all the packages have been installed (see Figure 4–23, *Installing Packages*). How quickly this happens depends on the number of packages you have selected and your computer's speed.

Figure 4–23   Installing Packages

4.25 Boot Disk Creation

> **WARNING**
>
> **If you chose to perform a partitionless installation, you must create a boot disk. Without this diskette, you will not be able to boot into Red Hat Linux. If you lose or destroy this diskette, you will not be able to boot into Red Hat Linux.**

If you chose to create a boot disk, you should now insert a blank, formatted diskette into your diskette drive (see Figure 4–24, *Creating Your Boot Disk*).

A boot disk can be useful. For more information, see Section 4.14.1, *Configuring LILO*.

After a short delay, your boot disk will be created; remove it from your diskette drive and label it clearly. Note that if you would like to create a boot disk after the installation, you will 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 (instead of LILO), make sure you create a new boot disk if you make any changes to your kernel.

Figure 4–24 Creating Your Boot Disk
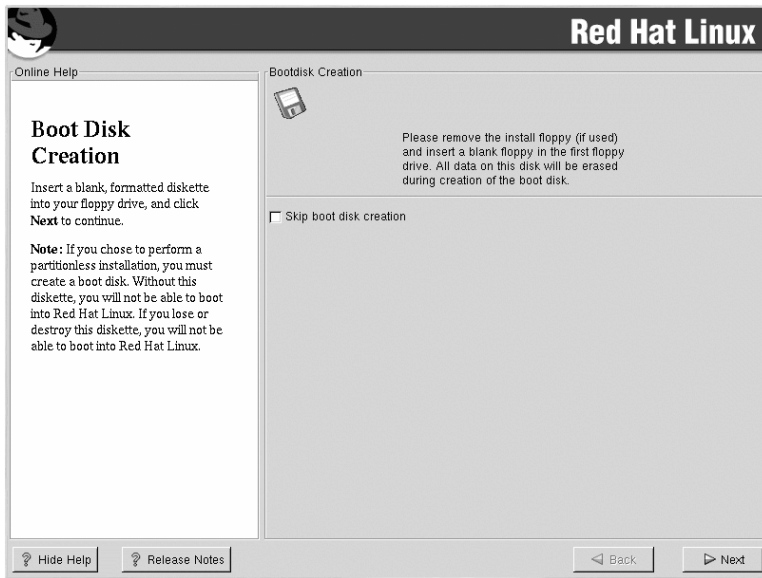
4.26 Installation Complete

Congratulations! Your Red Hat Linux 7.1 installation is now complete!

The installation program will prompt you to prepare your system for reboot. Do not forget to remove any diskette in the diskette drive or CD in the CD-ROM drive. If you did not install LILO, you will need to use your boot disk now.

After your computer's normal power-up sequence has completed, you should see LILO's GUI prompt, at which you can do any of the following things:

- Press [Enter] — causes LILO's default boot entry to be booted.

- Select a boot label, followed by [Enter] — causes LILO to boot the operating system corresponding to the boot label. (Press [?] at the `LILO:` for a list of valid boot labels.)

• Do nothing — after LILO's timeout period, (by default, five seconds) LILO will automatically boot the default boot entry.

Do whatever is appropriate 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 for some reason you need to disable the graphical boot screen, you can do so by editing the lilo.conf file and then rerunning LILO.

To do this, become root and then comment out (or delete) the line which reads message=/boot/message in the lilo.conf file. To comment a line out, insert the # character at the beginning of the line. Once you have done this, rerun LILO. To rerun LILO, type /sbin/lilo -v. The next time you boot, you will see the text LILO: prompt, as is seen in previous Red Hat Linux releases.

You can re-enable the graphical boot screen by adding the above line back into the lilo.conf file and rerunning LILO.

Tip

If you are not sure what to do next, we suggest you begin with the *Official Red Hat Linux Getting Started Guide* (available online at http://www.red-hat.com/support/manuals if not included as part of your boxed set), which covers topics relating to the basics of your system and is an introduction to using Red Hat Linux.

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

If you are looking for information on system configuration, you may find the *Official Red Hat Linux Customization Guide* to be helpful.

---

5   Installing Red Hat Linux via Text Mode

This release of Red Hat Linux features a graphical, mouse-based installation program, but you can also install Red Hat Linux using a text mode, keyboard-based installation program. This chapter briefly explains how to use the text mode installation program. Here are some recommendations:

- If you are new to Linux installations, read Chapter 4, *Installing Red Hat Linux* first. The main focus of the chapter is the graphical installation process, but most of the concepts apply to the text mode installation as well. After reading that chapter, Section 5.1, *Things You Should Know* will give you more in-depth information regarding the aspects of installing Red Hat Linux that do not apply to the graphical installation process.

  Additionally, the *An Introduction to Disk Partitions* appendix in the *Official Red Hat Linux Reference Guide* may be helpful to you, since it discusses disk partition resizing. If you plan to install Red Hat Linux on a disk where another operating system is currently installed, this knowledge will be crucial.

- If you will need PCMCIA support to perform the installation (for example, you are installing on a laptop equipped with a PCMCIA card), you must make PCMCIA boot disks. Chapter 2, *Steps to Get You Started* explains how to do this.

- If you plan to install over a network (via NFS, FTP, or HTTP), you must make a network boot disk. Chapter 2, *Steps to Get You Started* explains how to do this.

- If you have never used the text mode installation program, or need a refresher on its user interface, read the next sections.

- To begin installation without further delay, turn to Section 5.3, *Starting the Installation Program*.

5.1 Things You Should Know

Before attempting to install Red Hat Linux, you should collect information about your system. This information will help prevent any surprises during the installation. You can find most of this information in the documentation that came with your system, or from the system's vendor or manufacturer.

At the end of Chapter 3, *Installation Options and System Requirements Tables* is a table for you to fill out with your specific system requirements, which helps you keep up with any information needed during your installation. Please review the hardware table at Table 3–5, *System Requirements Table*.

The most recent list of supported hardware can be found at http://hardware.redhat.com. You should check your hardware against this list before proceeding.

Note

You can perform a text mode installation of Red Hat Linux 7.1 by follow-
ing the instructions in this chapter. However, if you are installing from a
CD-ROM, you might prefer to use the graphical installation mode, which is
easy to use and provides a flexible, custom-class installation mode. For more
information on graphical installations, turn to Chapter 4, *Installing Red Hat
Linux*.

5.1.1 Basic Hardware Configuration

You should have a basic understanding of the hardware installed in your computer, including the fol-
lowing:

- Hard drive(s) — specifically, the number, size, and type. If you have more than one, it is helpful
  to know which one is first, second, and so on. It is also good to know if your drives are IDE or
  SCSI. If you have IDE drives, you should check your computer's BIOS to see if you are accessing
  them in linear mode. Please refer to your computer's documentation for the proper key sequence to
  access the BIOS. Note that your computer's BIOS may refer to linear mode by other names, such
  as "large disk mode." Again, your computer's documentation should be consulted for clarification.

- Memory — the amount of RAM installed in your computer.

- CD-ROM — most importantly, the unit's interface type (IDE, SCSI, or other interface) and, for
  non-IDE, non-SCSI CD-ROMs, the make and model number. IDE CD-ROMs (also known as AT-
  API) are the most common type of CD-ROM in recently manufactured, PC-compatible computers.

- SCSI adapter (if one is present) — the adapter's make and model number.

- Network card (if one is present) — the card's make and model number.

- Mouse — the mouse's type (serial, PS/2, or bus mouse), protocol (Microsoft, Logitech, Mouse-
  Man, etc.), and number of buttons; also, for serial mice, the serial port it is connected to.

On many newer systems, the installation program is able to automatically identify most hardware.
However, it is a good idea to collect this information anyway, just to be sure.

Learning About Your Hardware with Windows

If your computer is already running Windows 9*x*, you can use the following steps to get additional
configuration information:

Figure 5–1   Windows System Properties

- In Windows, click on the **My Computer** icon using the secondary (normally the right) mouse button. A pop-up menu should appear.

- Select **Properties**. The **System Properties** window should appear. Note the information listed under **Computer** — in particular the amount of RAM listed.

- Click on the **Device Manager** tab. You will then see a graphical representation of your computer's hardware configuration. Make sure the **View devices by type** radio button is selected.

At this point, you can either double-click on the icons (or single-click on the plus sign **+**) to look at each entry in more detail. Look under the following icons for more information:

Figure 5–2   Device Manager Under Windows 95
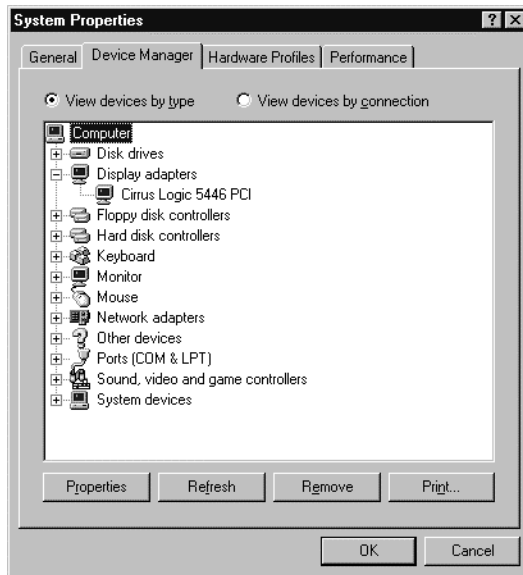
- **Disk drives** — the type (IDE or SCSI) of hard drive will be found here. (IDE drives will normally include the word "IDE," while SCSI drives will not.)

- **Hard disk controllers** — information about your hard drive controller.

- **CDROM** — information about any CD-ROM drives connected to your computer.

Note

In some cases, there may be no CD-ROM icon, yet your computer has a functioning CD-ROM drive. This is normal, depending on how Windows was originally installed. In this case, you may be able to learn additional information by looking at the CD-ROM driver loaded in your computer's `config.sys` file.

- **Mouse** — the type of mouse present on your computer.

- **Display adapters** — if you are interested in running the X Window System, you should write down the information you find here.

- **Sound, video and game controllers** — if your computer has sound capabilities, you will find more information about them here.

- **Network adapters** — information on your computer's network card (if you have one).

- **SCSI controllers** — if your computer uses SCSI peripherals, you will find additional information on the SCSI controller here.

This method is not a complete substitute for opening your computer's case and physically examining each component. However, in many cases it can provide sufficient information to continue with the installation.

Note

This information can also be printed by clicking on the **Print** button. A second window will appear, allowing you to choose the printer, as well as the type of report. The **All Devices and System Summary** report type is the most complete.

5.1.2 Video Configuration

If you will be installing the X Window System, you should also be familiar with the following:

- Your video card — the card's make and model number (or the video chipset it uses) and the amount of video RAM it has. (Most PCI-based cards are auto-detected by the installation program.)

- Your monitor — the unit's make and model number, along with allowable ranges for horizontal and vertical refresh rates. (Newer models may be auto-detected by the installation program.)

5.1.3 Network-related Information

If you are connected to a network, be sure you know the following:

- IP address — usually represented as a set of four numbers separated by dots, such as `10.0.2.15`.

- Netmask — another set of four numbers separated by dots; an example netmask would be `255.255.248.0`.

- Gateway IP address — another set of four dot-separated numbers; for example, `10.0.2.254`.

- One or more name server IP addresses — one or more sets of dot-separated numbers; for example, `10.0.2.1` might be the address of a name server.

- Domain name — the name your organization uses; for example, Red Hat has a domain name of `redhat.com`.

• Hostname — the name assigned to your individual system; for example, a computer might be named pooh.

Note

The information provided here is as an example only! Do *not* use it when you install Red Hat Linux! If you do not know the proper values for your network, ask your network administrator.

5.2 The Installation Program User Interface

The Red Hat Linux text mode installation program uses a screen-based interface that includes most of the on-screen "widgets" commonly found on graphical user interfaces. Figure 5–3, *Installation Program Widgets as seen in* **Configure TCP/IP** and Figure 5–4, *Installation Program Widgets as seen in Disk Druid* illustrate the screens you will see.

Figure 5–3   Installation Program Widgets as seen in Configure TCP/IP
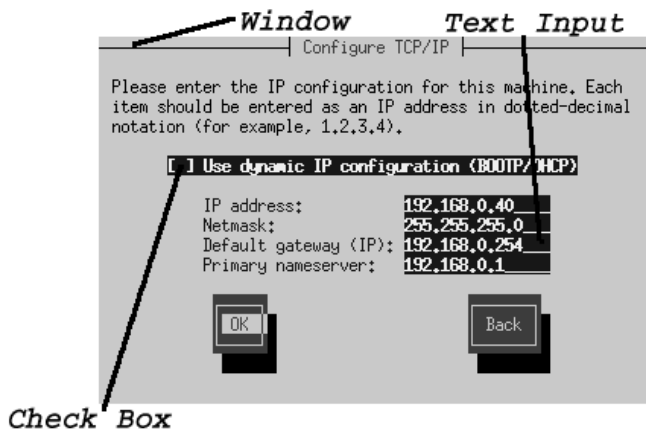
Figure 5–4   Installation Program Widgets as seen in Disk Druid
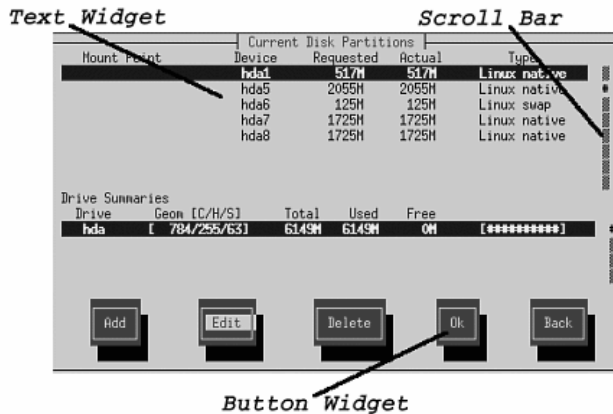
Here is a list of the most important widgets shown in Figure 5–3, *Installation Program Widgets as seen in* **Configure TCP/IP** and Figure 5–4, *Installation Program Widgets as seen in* Disk Druid :

- Window — windows (usually referred to as **dialogs** in this manual) will appear on your screen throughout the installation process. At times, one window may overlay another; in these cases, you can only interact with the window on top. When you are finished in that window, it will disappear, allowing you to continue working in the window underneath.

- Text Input — text input lines are regions where you can enter information required by the installation program. When the cursor rests on a text input line, you may enter and/or edit information on that line.

- Checkbox — checkboxes allow you to select or deselect a feature. The box displays either an asterisk (selected) or a space (unselected). When the cursor is within a checkbox, press [Space] to select an unselected feature or to deselect a selected feature.

- Text widget — text widgets are regions of the screen for the display of text. At times, text widgets may also contain other widgets, such as checkboxes. If a text widget contains more information than can be displayed in the space reserved for it, a scroll bar appears; if you position the cursor within the text widget, you can then use the [Up] and [Down] arrow keys to scroll through all the information available. Your current position is shown on the scroll bar by a **#** character, which moves up and down the scroll bar as you scroll.

- Button widget — button widgets are the primary method of interacting with the installation program. You progress through the windows of the installation program by navigating these buttons, using the [Tab] and [Enter] keys. Buttons can be selected when they are highlighted.

- Cursor — although not a widget, the cursor is used to select (and interact) with a particular widget. As the cursor is moved from widget to widget, it may cause the widget to change color, or you may only see the cursor itself positioned in or next to the widget. In Figure 5–3, *Installation Program Widgets as seen in* **Configure TCP/IP**, the cursor is positioned on the **OK** button. Figure 5–4, *Installation Program Widgets as seen in Disk Druid* shows the cursor on the **Edit** button.

5.2.1 Using the Keyboard to Navigate

Navigation through the installation dialogs is performed through a simple set of keystrokes. To move the cursor, use [Left], [Right], [Up], and [Down] arrow keys. Use [Tab], and [Alt]-[Tab] to cycle forward or backward through each widget on the screen. Along the bottom, most screens display a summary of available cursor positioning keys.

To "press" a button, position the cursor over the button (using [Tab], for example) and press [Space] or [Enter]. To select an item from a list of items, move the cursor to the item you wish to select and press [Enter]. To select an item with a checkbox, move the cursor to the checkbox and press [Space] to select an item. To deselect, press [Space] a second time.

Pressing [F12] accepts the current values and proceeds to the next dialog; it is equivalent to pressing the **OK** button.

```
CAUTION
```

Unless a dialog box is waiting for your input, do not press any keys during the installation process (doing so may result in unpredictable behavior).

5.3 Starting the Installation Program

The following methods can be used to start the installation:

- Insert the diskette included in your boxed set (or a network boot disk, or PCMCIA boot disks, that you have created) into the primary diskette drive and reboot your computer.

- Insert the Red Hat Linux CD 1 into the drive and reboot, if your computer can boot from the CD-ROM drive.

- Boot MS-DOS, and start a program in the `dosutils` directory of the Red Hat Linux CD-ROM named `autoboot.bat` (this will work from DOS only; it will not work in a DOS window started from within Windows).

While the installation program loads, messages will scroll on your screen. When the installation program has loaded, this prompt appears:

```
boot:
```

5.3.1 Text Mode Boot Options

If you press [Enter] at the `boot:` prompt, or if you take no action within the first minute after the `boot:` prompt appears, the graphical installation program will start. Pressing one of the help screen function keys as described above disables this autostart feature.

To start the text mode installation program, before pressing [Enter], type:

```
boot: text
```

If the installation program does not properly detect your hardware, you may need to restart the installation in "expert" mode. To start an expert mode installation, type:

```
boot: text expert
```

Expert mode disables most hardware probing, and gives you the option of entering options for the drivers loaded during the installation.

Note

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

Note that the command to start a serial installation has changed. If you must perform the installation in serial mode, use the following command:

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

In this command, *<device>* should be the device you are using (such as ttyS0 or ttyS1).

You can also pass options to the kernel as you are booting the installation program. For example, to instruct the kernel to use all the RAM in a 128 MB system, enter:

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

To explicitly request a dialog where you can configure additional devices (such as ISA devices) include the **isa** directive:

```
boot: linux text isa
```

5.3.2 Displaying Online Help

Once the installation program is loaded into memory, you can obtain information about the installation process and options by pressing [F1] through [F6]. For example, press [F2] to see general information about the online help screens.

5.4 Installation Cross-reference Table

Most text mode installation screens can be cross-referenced with their GUI screen counterparts. This table lists the installation screens in order and where you can go to get the necessary information for each part of the installation.

For those screens which do not have adequate GUI counterparts, installation-related instructions and screenshots will be provided in this chapter.

Table 5–1   Installation Cross-reference Table

Text Mode Screen	Text Mode Reference Point
Language Screen	Section 4.5, *Language Selection*
Keyboard Screen	Section 4.6, *Keyboard Configuration* — Layout
Installation Method	Section 4.3, *Selecting an Installation Method*
Identify Disk Partition to Install From	Section 5.5, *Identify Disk Partition to Install From*
Installing over a Network	Section 5.6, *Installing over a Network*
Welcome Screen	Section 4.8, *Welcome to Red Hat Linux*
Installation Type	Section 4.9, *Install Options*
Upgrade Only — Customize Packages to Upgrade	Section A.3, *Customizing Your Upgrade*
Automatic Partitioning	Section 4.10, *Automatic Partitioning*
Disk Druid	Section 4.11, *Partitioning Your System*
fdisk	Section 4.12, *Partitioning with fdisk*
Installing LILO	Section 4.14, *Installing LILO*

Text Mode Screen	Text Mode Reference Point
Hostname Configuration	Section 4.15, *Network Configuration*
Firewall Configuration	Section 4.16, *Firewall Configuration*
Network Configuration	Section 4.15, *Network Configuration*
Mouse Selection	Section 4.7, *Mouse Configuration*
Language Support and Default Language	Section 4.18, *Language Support Selection*
Time Zone Selection	Section 4.17, *Time Zone Configuration*
Root Password	Section 4.19, *Account Configuration*
Add User/User Account Setup	Section 4.19, *Account Configuration*
Authentication Configuration	Section 4.20, *Authentication Configuration*
Package Installation (Group, Individual, Dependencies)	Section 4.21, *Package Group Selection*
X Configuration — Video Adapter	Section 5.7, *Configuring Your Video Adapter*
Package Installation	Section 4.23, *Preparing to Install* and Section 4.24, *Installing Packages*
Boot Disk Creation	Section 4.25, *Boot Disk Creation*
Configuring the X Window System	Section 5.8, *Configuring the X Window System*
Video Card — Manual Selection	Section 4.22.1, *Video Card Configuration*
Installation Complete	Section 4.26, *Installation Complete*

5.5 Identify Disk Partition to Install From

Note

Hard drive installations now require the use of the ISO (or CD-ROM) images instead of just copying an entire installation tree. After placing the required ISO images in a directory, choose to install from the hard drive. You will then point the installation program at that directory to perform the installation.

If you verify that the ISO images are intact before you attempt an installation, you will help to avoid problems that are often encountered during a hard drive installation. To verify the ISO images are intact before performing an installation, use an md5sum program (many md5sum programs are available for various operating systems). An md5sum program should be available on the same server as the ISO images.

The **Select Partition** screen (Figure 5–5, *Selecting Partition Dialog for Hard Drive Installation*) applies only if you are installing from a disk partition (that is, if you selected **Hard Drive** in the **Installation Method** dialog). This dialog allows you to name the disk partition and directory from which you are installing Red Hat Linux.

Figure 5–5   Selecting Partition Dialog for Hard Drive Installation

Enter the device name of the partition containing the Red Hat ISO images. There is also a field labeled **Directory holding images**. If the ISO images are not in the root directory of that partition, enter the path to the ISO images (for example, if the ISO images are in /test/new/RedHat, you would enter /test/new).

After you have identified the disk partition, you will next see the **Welcome** dialog. See Table 5–1, *Installation Cross-reference Table* for more information.

5.6 Installing over a Network

If you are performing a network installation, the **Configure TCP/IP** dialog appears; for an explanation of this dialog, go to Section 4.15, *Network Configuration* and then return here.

5.6.1 NFS Setup

The NFS setup dialog (Figure 5–6, *NFS Setup Dialog*) applies only if you are installing from an NFS server (that is, if you booted from a network or PCMCIA boot disks and selected **NFS Image** in the **Installation Method** dialog).

Figure 5–6 NFS Setup Dialog
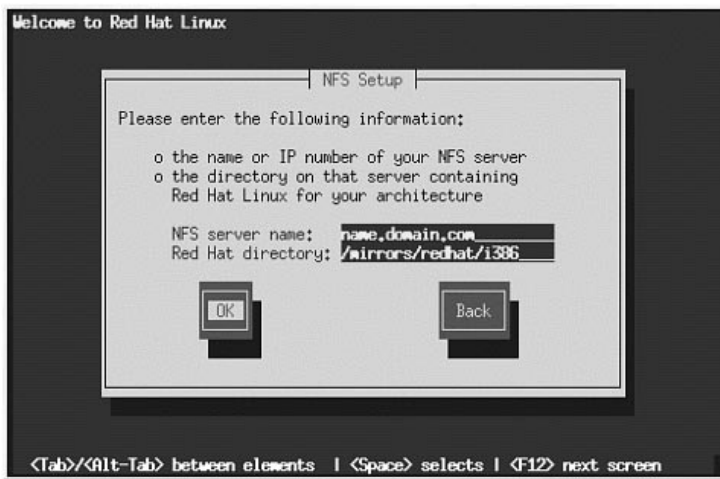
Enter the fully-qualified domain name or IP address of your NFS server, and the name of the exported directory that contains the Red Hat Linux installation files or CD. For example, if you are installing from a host named eastcoast in the domain redhat.com, enter eastcoast.redhat.com in the **NFS Server** field.

If the NFS server has the Red Hat Linux CD mounted on `/mnt/cdrom`, enter `/mnt/cdrom` in the **Red Hat directory** field. If the NFS server is exporting a mirror of the Red Hat Linux installation tree instead of a CD, enter the directory which contains the `RedHat` directory. For example, if your NFS server contains the directory `/mirrors/redhat/i386/RedHat`, enter `/mirrors/red-hat/i386`.

Note

If you are performing an NFS installation and are copying the files from the Red Hat Linux CD-ROM, be sure to check the file permissions to make sure they are set correctly for your installation. If you do not, the files that you copy will not be executable and you will have to change the permissions before you are able to install.

Next you will see the **Welcome** dialog. See Table 5–1, *Installation Cross-reference Table* for more information.

5.6.2 FTP Setup

The **FTP Setup** screen (Figure 5–7, *FTP Setup Dialog*) applies only if you are installing from an FTP server (that is, if you selected **FTP** in the **Installation Method** dialog). This dialog allows you to identify the FTP server from which you are installing Red Hat Linux.

Figure 5–7   FTP Setup Dialog

Enter the fully-qualified domain name or IP address of the FTP site you are installing from, and the name of the directory on that FTP site which contains the RedHat installation files for your architecture. For example, if the FTP site contains the directory /pub/mirrors/redhat/i386/Red-Hat, enter **/pub/mirrors/redhat/i386**.

If everything has been specified properly, a message box appears indicating that base/hdlist is being retrieved.

Next you will see the **Welcome** dialog. See Table 5–1, *Installation Cross-reference Table* for more information.

5.6.3 HTTP Setup

The **HTTP Setup** screen (Figure 5–8, *HTTP Setup Dialog*) applies only if you are installing from an HTTP server (that is, if you selected **HTTP** in the **Installation Method** dialog). This dialog prompts you for information about the HTTP server from which you are installing Red Hat Linux.

Figure 5–8   HTTP Setup Dialog

Enter the name or IP address of the HTTP site from which you are installing Red Hat Linux, and the name of the directory there which contains the RedHat installation files for your architecture. For example, if the HTTP site contains the directory /pub/mirrors/redhat/i386/RedHat, enter **/pub/mirrors/redhat/i386**.

If everything has been specified properly, a message box appears indicating that base/hdlist is being retrieved.

Next you will see the **Welcome** dialog. See Table 5–1, *Installation Cross-reference Table* for more information.

5.7 Configuring Your Video Adapter

The installation program then probes for your video card. If your card is detected, click **OK**.

Figure 5–9   Video Card Confirmation

If the installation program cannot detect your video adapter, you will need to select your video card from the available list. See Section 4.22.1, *Video Card Configuration* for more information.

5.8 Configuring the X Window System

The Xconfigurator utility gives you the opportunity to configure the X server for your system.

First, Xconfigurator displays a list of monitors (see Figure 5–10, *Monitor Setup Dialog*). If your monitor is listed, select it and press [Enter]. Otherwise, select **Custom**.

If you select a monitor from the list, you will need to enter your video memory. See Figure 5–15, *Video Memory*.

Figure 5–10   Monitor Setup Dialog
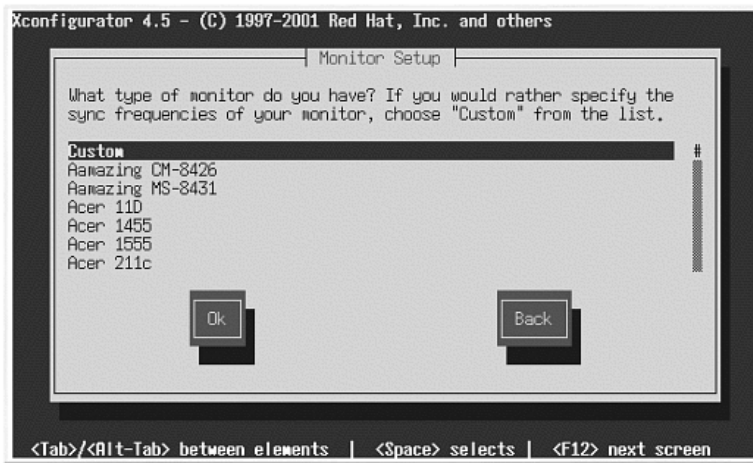
If you select **Custom**, Xconfigurator prompts you to select the horizontal sync range and vertical sync range of your monitor (these values are usually available in the documentation which accompanies your monitor, or from your monitor's vendor or manufacturer).

Figure 5–11   Custom Monitor Setup

```
XXXXXX
CAUTION
XXXXX
```
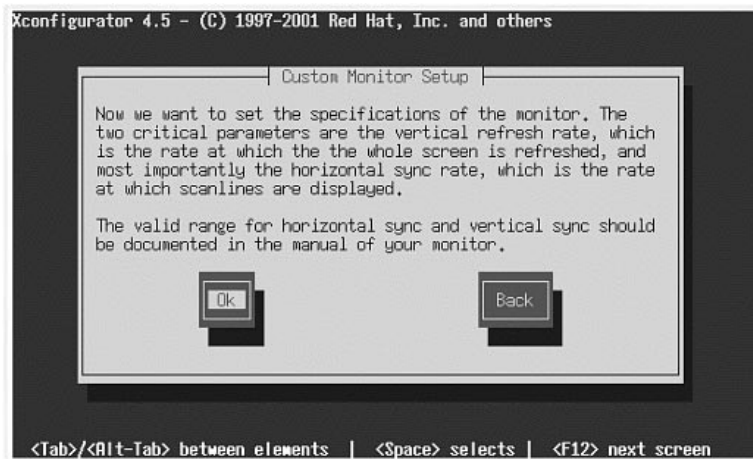
Do not select any range that exceeds the capacity of your monitor. If you do
this, it is possible you may overclock your monitor and damage or destroy it.

Choose a horizontal sync range for your monitor (see Figure 5–12, *Custom Monitor Setup - Horizontal
Sync*). Be sure *not* to choose a range outside of your monitor's capacity. For custom settings, refer to
Figure 5–14, *Custom Monitor Information*.

Figure 5–12   Custom Monitor Setup - Horizontal Sync
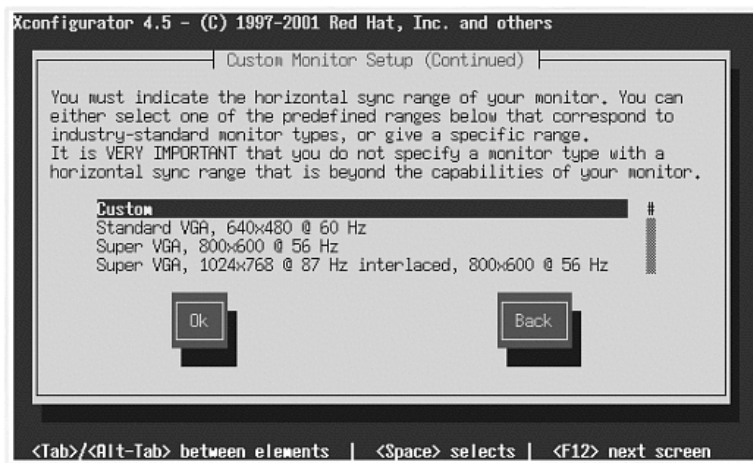
Next, choose a vertical sync range.

Figure 5–13   Custom Monitor Setup — Vertical Sync
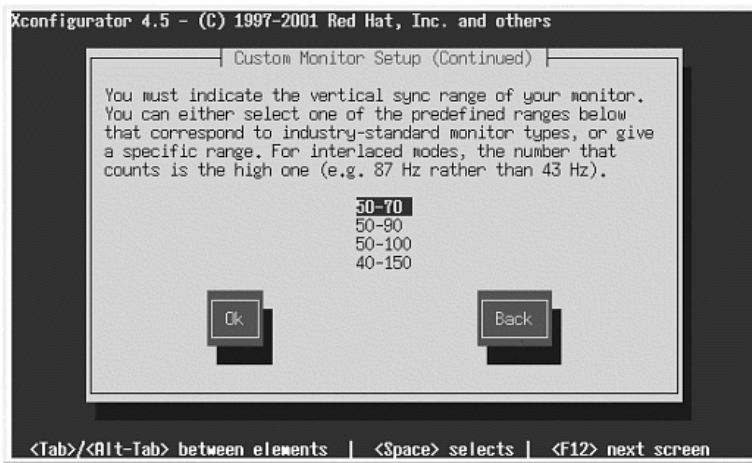
If you chose to enter custom monitor settings, please enter both the horizontal and vertical sync rages for your monitor (see Figure 5–14, *Custom Monitor Information*).

Figure 5–14   Custom Monitor Information
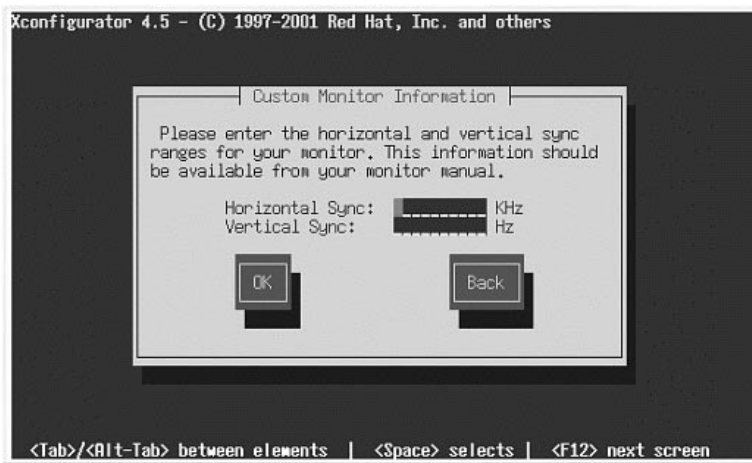
After you have selected your monitor (and its settings), you must choose the amount of memory provided by your video card (see Figure 5–15, *Video Memory*).

Figure 5–15   Video Memory

If you are not sure how much memory your card has, consult the documentation accompanying your video card. Choosing more memory than is present in your card will not damage it, but may cause the XFree86 server to start incorrectly.

Next, choose a clockchip setting if your video card supports it (if it has one). The recommended choice is **No Clockchip Setting**, since XFree86 can automatically detect the proper clockchip in most cases.

Figure 5–16   Clockchip Configuration Dialog
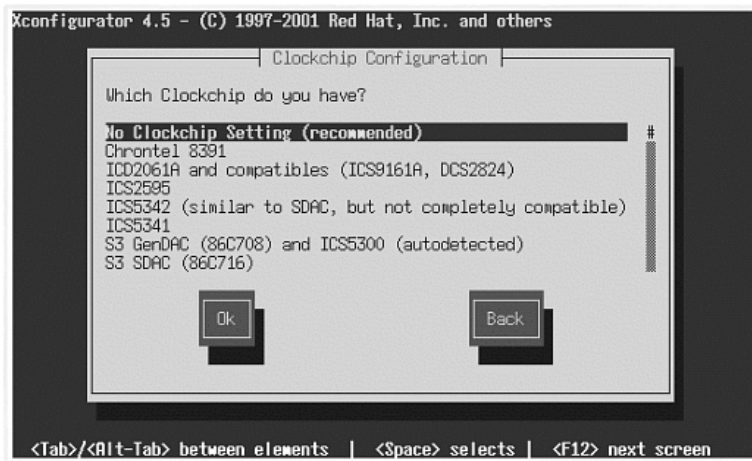
To choose your preferred display mode (see Figure 5–17, *Select Video Modes*), select one or more modes by pressing [Space].

Figure 5–17   Select Video Modes
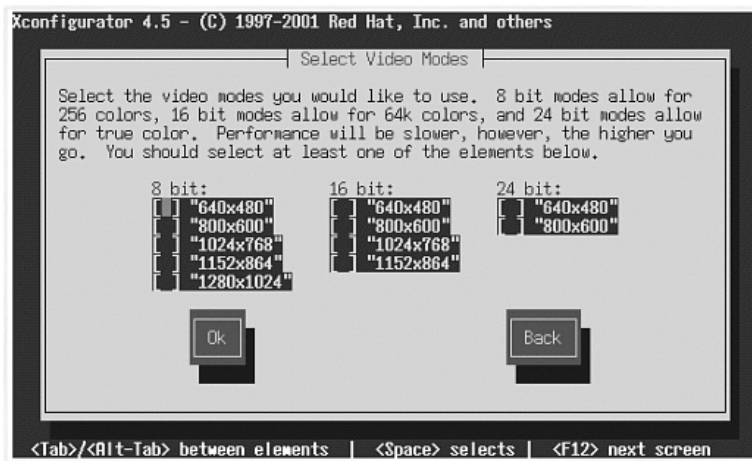
Tip

The minimum recommended settings for video modes are 16 bit for most applications in 1024 x 768. Video modes set higher than 16 bit can run more slowly.

Do not select a mode that exceeds the capacity of your monitor.

Once you have either selected the default video mode or specified a different mode, the **Starting X** dialog lets you test your X configuration.

Figure 5–18   Test Your X Configuration

If you select **OK**, you will have the opportunity to go back and enter different configuration values, if an error occurs. If no error occurs, X will start and a small display window will ask you if you can read its contents clearly; using the mouse, click **Yes** within ten seconds. Then you will be asked whether you want X to start when the system boots.

In most cases, X configuration is complete at this point, and you will see the completion screen.

Xconfigurator then saves all of your choices to the configuration file /etc/X11/XF86Config or /etc/X11/XF86Config-4. To modify your X configuration after installation, issue the Xconfigurator command as root.

A   Upgrading Your Current System

This appendix walks you through a typical Red Hat Linux 7.1 upgrade.

A.1 What it Means to Upgrade

The installation process for Red Hat Linux 7.1 includes the ability to upgrade from prior versions of Red Hat Linux (version 3.0.3 and later) which are based on RPM technology.

Upgrading your system installs the modular 2.4.*x* kernel as well as updated versions of the packages which are currently installed on your system.

The upgrade process preserves existing configuration files by renaming them with an `.rpmsave` extension (for example, `sendmail.cf.rpmsave`). The upgrade process also creates a log of its actions 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.

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 dependency problems. Otherwise, the upgrade procedure takes care of these dependencies, but it may need to install additional packages which are not on your system.

A.2 Upgrading Your System

At this point, you should have chosen **Upgrade** as your preferred installation type (see Figure A–1, *Choosing Install or Upgrade*).

Figure A–1   Choosing Install or Upgrade
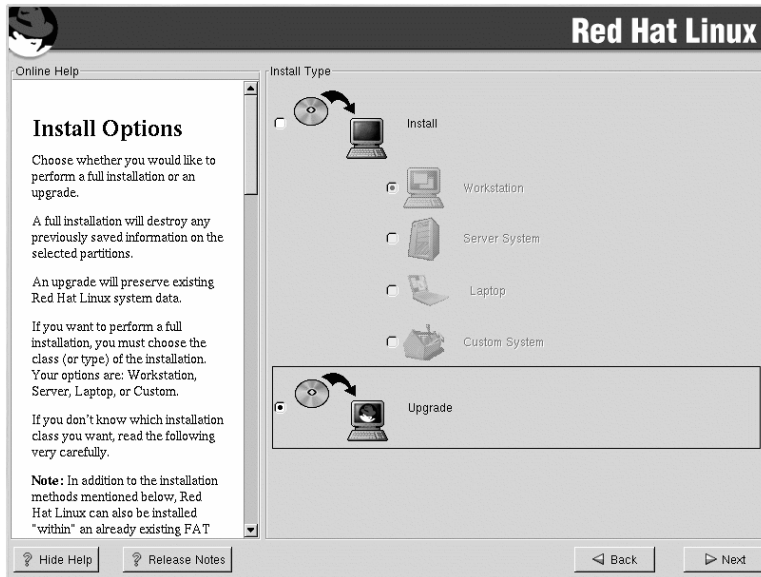
A.3 Customizing Your Upgrade

Do you want to choose the packages to be upgraded or let the installation program perform an automated installation (see Figure A–2, *Upgrade Customization*)?

To let the installation program begin the upgrade process for you, make sure **Customize packages to be upgraded** is *not* selected and click **Next** (see Section A.6, *Upgrading Packages*).

To customize your upgrade packages, select this option and then click **Next**.

Figure A–2   Upgrade Customization
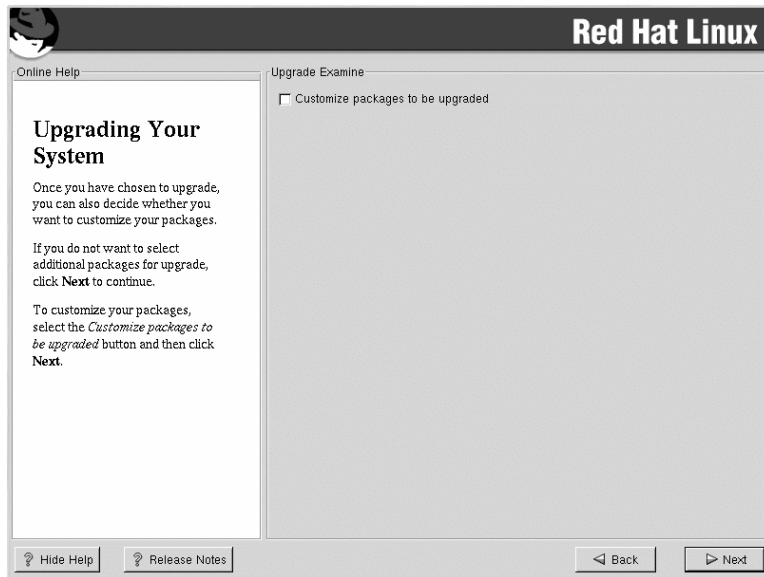
A.4 Selecting Packages to Upgrade

On this screen, you can choose which packages you would like to upgrade (see Figure A–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 on a package group, such as **Applications**, 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 the checkbox beside the package name. A check mark in the box means that a package has been selected.

For more information about a specific package, click on the individual package name. The package information will appear at the bottom of the screen.

You can also select or deselect all packages listed within a particular group, by clicking on the **Select all in group** or **Unselect all in group** buttons.

Certain packages (for example, 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.

Figure A–3   Individual Package Selection
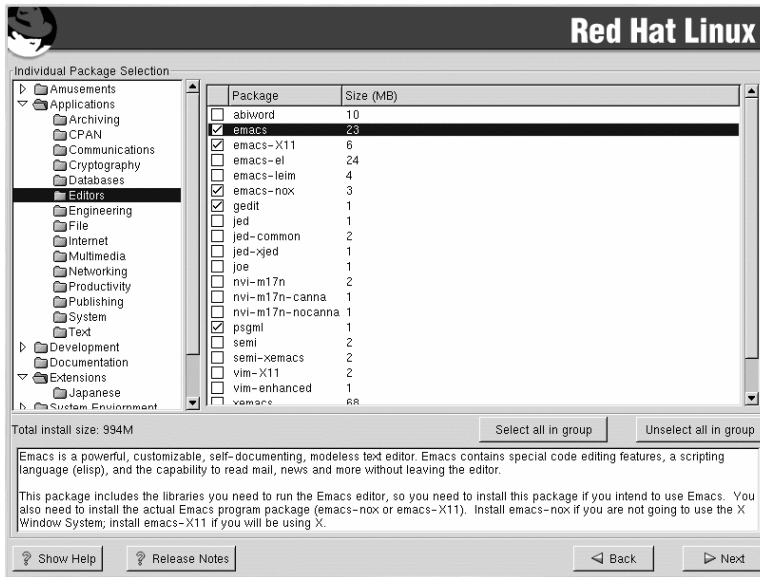
A.4.1 Unresolved Dependencies

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 A–4, *Unresolved Dependencies*).

The **Unresolved Dependencies** screen will only appear if you are missing packages that are needed by your customized package selection. At the bottom of the screen, under the list of missing packages, an **Install packages to satisfy dependencies** checkbox 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 A–4   Unresolved Dependencies
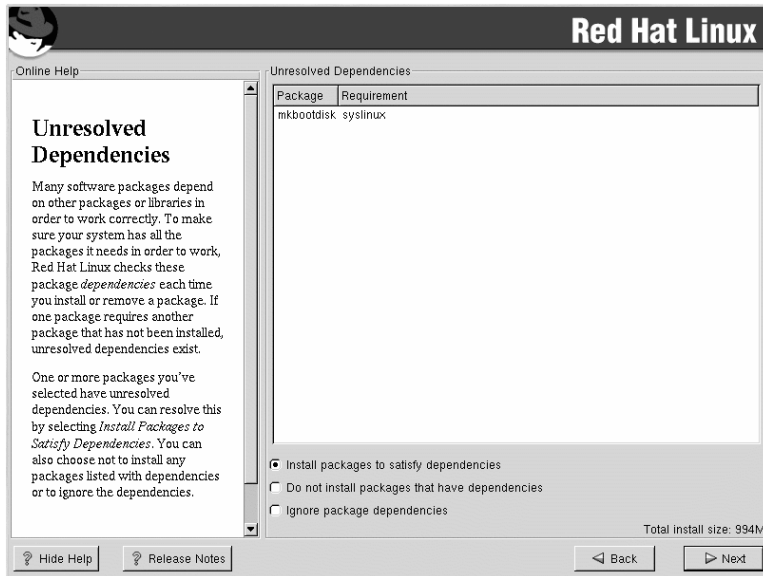
A.5 Installing LILO

In order to be able to boot your Red Hat Linux system, you usually need to install LILO (the *LI*nux *LO*ader). You may install LILO in one of two places:

The master boot record (MBR)

> The recommended place to install LILO, unless the MBR already starts another operating system loader, such as System Commander or OS/2's Boot Manager. The MBR is a special area on your hard drive that is automatically loaded by your computer's BIOS, and is the earliest point at which LILO can take control of the boot process. If you install LILO in the MBR, when your machine boots, LILO will display a `LILO:` prompt. You can then boot Red Hat Linux or any other operating system that you configure LILO to boot.

The first sector of your root partition

> Recommended if you are already using another boot loader on your system (such as OS/2's Boot Manager). In this case, your other boot loader will take control first. You can then configure that boot loader to start LILO (which will then boot Red Hat Linux).

Figure A–5   LILO Configuration
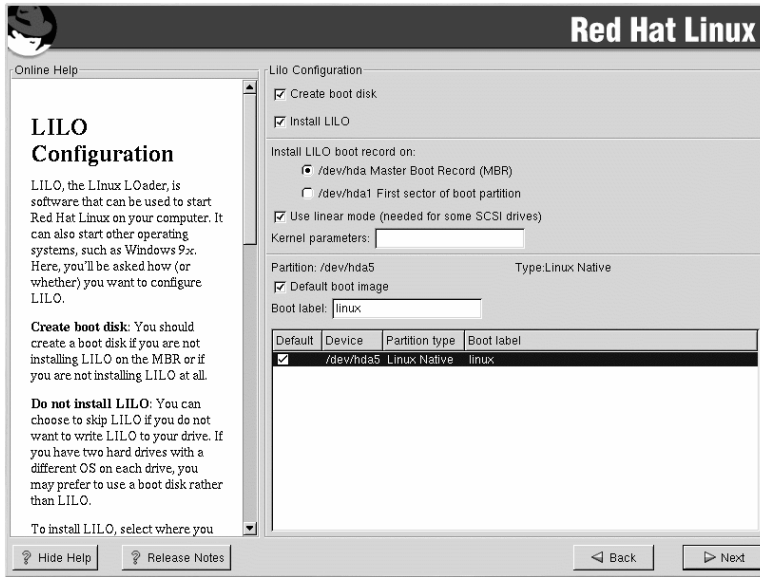
If you choose to install LILO, please select where you would like LILO to be installed on your system (see Figure A–5, *LILO Configuration*). If your system will use only Red Hat Linux you should choose the MBR. For systems which will dual boot Red Hat Linux and Windows 95 or Windows 98, you should install LILO to the MBR so that LILO can boot both operating systems.

If you have Windows NT and you want to install LILO, you should choose to install LILO on the first sector of the root partition, and not in the MBR. Please be sure to create a boot disk. In this case, you will either need to use the boot disk, or configure the NT system loader to boot LILO from the first sector of the root partition.

Review http://www.linuxdoc.org/HOWTO/mini/Linux+NT-Loader.html for more information on how to set up LILO and NT.

CAUTION

If you choose not to install LILO for any reason, you will not be able to boot your Red Hat Linux system directly, and you will need to use another boot method (such as a boot diskette). Use this option only if you are sure you have another way of booting your Red Hat Linux system!

The **Use linear mode** checkbox is selected by default. In most cases, linear mode should be enabled; if your computer cannot use linear mode to access your hard drives, deselect this option.

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

Every bootable partition is listed on this screen, including partitions used by other operating systems. The **Boot label** column will be filled in with the word **linux** for 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.

Note

The **Boot label** column lists what you must enter at the LILO: 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 the LILO: to display a list of defined boot labels.

A.5.1 Configuring LILO

You have certain options on this screen for configuring LILO, or you can choose not to install LILO.

Create boot disk — the **Create boot disk** option is checked by default. If you do not want to create a boot disk, you should deselect this option. However, we strongly urge you to create a boot disk. A boot disk is useful for the following reasons:

Partitionless installations — if you chose to perform a partitionless installation, you must create a boot disk. Without this diskette, you will not be able to boot into Red Hat Linux. If you lose or destroy this diskette, you will not be able to boot into Red Hat Linux.

For use instead of LILO — you can use a boot disk instead of LILO. If you are trying Red Hat Linux for the first time, and you would feel more comfortable if the boot process for your other operating system is left unchanged, you can use a boot diskette instead of LILO. With a boot disk, going back to

your other operating system is as easy as removing the boot disk and rebooting. If you would rather use a boot disk instead of LILO, make sure the **Install LILO** option is not selected.

Tip

If you need to use rescue mode, there are several options available to you.

•   Using the CD-ROM to boot, type **linux rescue** at the boot:
     prompt.

•   Using the network boot disk, type **linux rescue** at the boot:
     prompt. You will then be prompted to retrieve the rescue image from
     the network.

•   Using the boot disk included with the Red Hat Linux boxed set, type
     linux rescue at the boot: prompt. You then pick an installation
     method and choose a valid installation tree to load from.

For more information regarding rescue mode, refer to *Official Red Hat Linux
Customization Guide*.

For use if another operating system overwrites LILO — 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 MBR (originally containing LILO) 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 LILO.

Do not **Install LILO** — if you have Windows NT installed on your system, *you may not want to install LILO*. If you choose not to install LILO for this 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 LILO if you do not want to write LILO to your hard drive. Make sure the **Install LILO** option is not selected unless you wish to install LILO.

A.5.2 Alternatives to LILO

If you do not wish to use LILO to boot your Red Hat Linux system, you have the following alternatives:

Boot disk

> As previously stated, you can use the boot disk created by the installation program (if you elected
> to create one).

LOADLIN

You can load Red Hat Linux from MS-DOS. Unfortunately, it requires that a copy of the Linux kernel (and an initial RAM disk, if you have a SCSI adapter) are available on an MS-DOS partition. The only way to accomplish this is to boot your Red Hat Linux system using some other method (for example, from LILO on a diskette) and then copy the kernel to an MS-DOS partition. LOADLIN is available from ftp://metalab.unc.edu/pub/Linux/system/boot/dualboot/ and associated mirror sites.

SYSLINUX

SYSLINUX is an MS-DOS program very similar to LOADLIN. It is also available from ftp://metalab.unc.edu/pub/Linux/system/boot/loaders/ and associated mirror sites.

Certain commercial boot loaders

Certain commercial boot, such as System Commander and Partition Magic, are able to boot Red Hat Linux (but will still require LILO to be installed in your Linux root partition).

A.5.3 SMP Motherboards and LILO

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

The two entries will be `linux` and `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.

A.6 Upgrading Packages

At this point there is nothing left for you to do until all the packages have been upgraded or installed (see Figure A–6, *Installing Packages*).

Figure A–6   Installing Packages

A.7 Upgrade Complete

Congratulations! Your Red Hat Linux 7.1 upgrade is now complete!

You will now be prompted to prepare your system for reboot. Do not forget to remove any diskette in the floppy drive or CD in the CD-ROM drive. If you do not have LILO installed, you will need to use your boot disk now.

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*.

B   Installing Without Partitioning

This chapter explains installing Red Hat Linux without creating Linux partitions on your system.

Note

This is a great way to explore the world of Red Hat Linux without putting Linux partitions on your system. However, please note that you will still have to perform a full Red Hat Linux installation as outlined in this manual.

You must currently have a formatted DOS (FAT) filesystem in order to perform this type of installation. Users who have Windows 95/98 installed should have no problems with this type of installation. Users who have NTFS partitions (such as those using Windows NT) will have to create and format a DOS (FAT) filesystem before this installation can be performed. This installation will not work unless the DOS (FAT) filesystem has been formatted prior to starting the Red Hat Linux installation.

WARNING

If you choose to perform a partitionless installation, you must create a boot disk. Without this diskette, you will not be able to boot into Red Hat Linux. If you lose or destroy this diskette, you will not be able to boot into Red Hat Linux.

B.1 The Ups and Downs of a Partitionless Installation

There are valid reasons for performing a partitionless installation, but there also are some drawbacks (depending on how you look at them). We will discuss these potential drawbacks in this section. This section also covers the basics of what will happen during a partitionless installation and as a result of this type of installation, and how your system will be affected.

Basic Installation

You will perform a basic Red Hat Linux installation. However, instead of adding Linux partitions to your system, you will edit an existing, formatted DOS (FAT) partition (with enough free space) to be named root (/).

Unlike a typical Red Hat Linux installation, you will not need to format any partitions, since you will not be adding any partitions to your system.

LILO (*LI*nux *LO*ader) and Boot Disk

During a partitionless installation, you will *not* configure LILO. (During a typical installation, you are able to choose where you would like LILO to be installed — either on the master boot record (MBR) or on the first sector of your root partition — or you can choose not to install LILO at all.)

You must create a boot disk in order to access Red Hat Linux, and you will be prompted to create a boot disk at the end of the installation.

Note

In order to boot Red Hat Linux with a boot disk after a partitionless installation, your BIOS must be configured correctly. Your BIOS must be set to boot from the floppy drive (A) in order to use the boot disk.

To change your BIOS settings, take note of the instructions displayed when your computer first begins to boot. Often you will see a line of text telling you to press the [Del] or [F1] key to enter the BIOS settings.

Next, you must find the section that allows you to alter your boot sequence. The default is often C, A or A, C (depending if you boot from your hard drive [C] or a floppy drive [A]). Change this sequence so that the floppy drive (A) is first in your boot order and that your hard drive (C) is second. This instructs the computer to first look at the floppy drive for bootable media, if it cannot be found there, it will look at your hard drive next.

Make sure to save your changes before exiting the BIOS. For more information, refer to the documentation that came with your system.

Performance Implications

Red Hat Linux will be slower than it would be if it had its own dedicated partitions. However, if speed is not a primary consideration, a partitionless installation is a great way of seeing what Red Hat Linux has to offer without having to deal with partitioning your system.

B.2 Performing a Partitionless Installation

If you have a DOS (FAT) filesystem, first make sure you have a DOS (FAT) partition with enough free space to dedicate to this installation.

B.2.1 How Much Space Do I Need?

Like a typical installation, you will need to have enough available space in order to install Red Hat Linux on your system. A list of installation methods and their *minimum* space requirements is provided as follows:

• Workstation - 1.2 GB

• Server - 650 MB

• Custom (choosing *Everything*) - 2.4 GB

For more information about these installation classes, see Section 2.5, *Step 5 - Which Installation Class is Best For You?*.

B.2.2 Using Disk Druid

Since you will not be adding partitions or creating new partitions, you do not need to do much with Disk Druid (a GUI partitioning tool).

When Disk Druid's main screen appears, you will see a list of your DOS (FAT) partitions (see Figure B–1, *Choosing a DOS (FAT) Partition to Define as /*). Choose a DOS (FAT) partition with enough available free space to install your choice of installation classes. Highlight the partition by clicking on it with your mouse or by using the [Tab], [Up] and [Down] keys.

Figure B–1   Choosing a DOS (FAT) Partition to Define as /
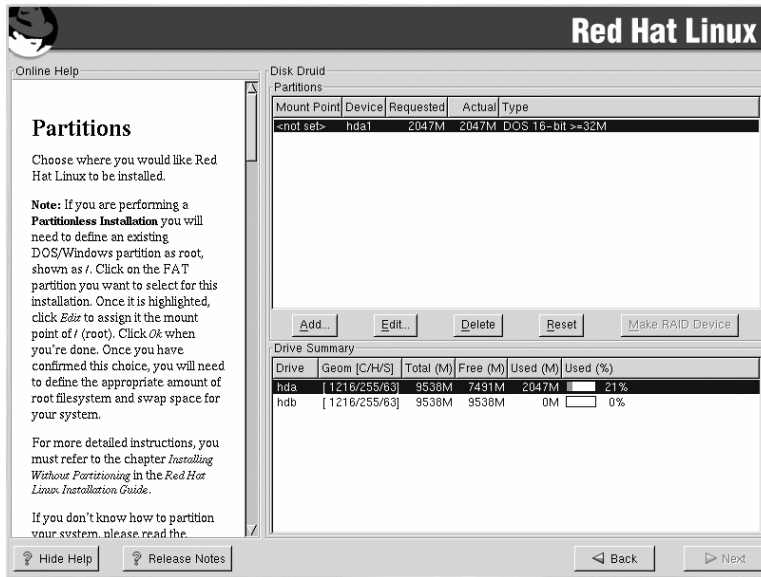
Once the desired partition is highlighted, choose **Edit**. A new window will appear allowing you to name this partition (see Figure B–2, *Editing a DOS (FAT) Partition*). In the **mount point** field, label this partition as / (known as root) and click **Ok**.

A confirmation window (see Figure B–3, *Confirmation*) appears next, asking you to confirm that you want to continue with this installation. It explains that you cannot have any Linux partitions on your system other than the / labeled DOS partition you have just created. Click **Yes** to continue.

Next, you will be able to determine the root filesystem size and the swap size of this / partition.

Figure B–2   Editing a DOS (FAT) Partition

Mount Point: /

Size (Megs): 2047

☐ Use remaining space?

Allocation Status: Successful

Partition Type: DOS 16–bit >=32M

Ok   Cancel

Figure B–3   Confirmation

You've asked to put your root (/) filesystem on
a DOS–style FAT partition. You can do this,
but you may not use any other filesystems for
your Linux system. Additionally, there will be
a speed penalty for not using Linux–native
partitions. Do you want to continue?

Yes   No
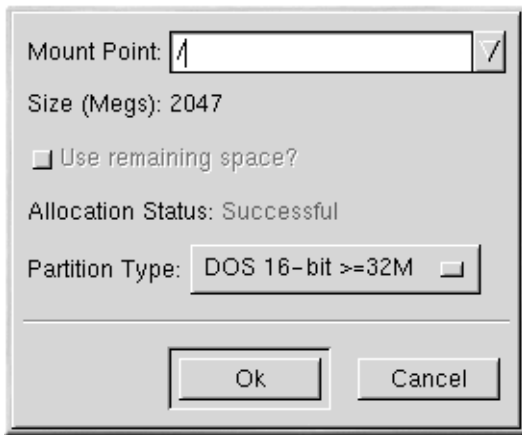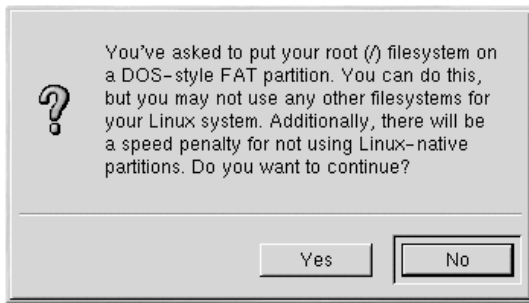
The installation program will determine the maximum size for the root filesystem (Figure B–4, *Configuration of Filesystem*). You can make the root filesystem anything you would like, as long as it does not exceed the maximum size recommendation.

The size you set for the root filesystem is the amount of disk space available for the entire filesystem (this means that you need to keep in mind the size of the installation class as well as allow space for writing and saving data).

Swap space acts like 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. The installation program will set swap to 32 MB as a default. You can choose to increase the swap size if desired, but there is no need to create a swap space larger than 256 MB.

Figure B–4   Configuration of Filesystem
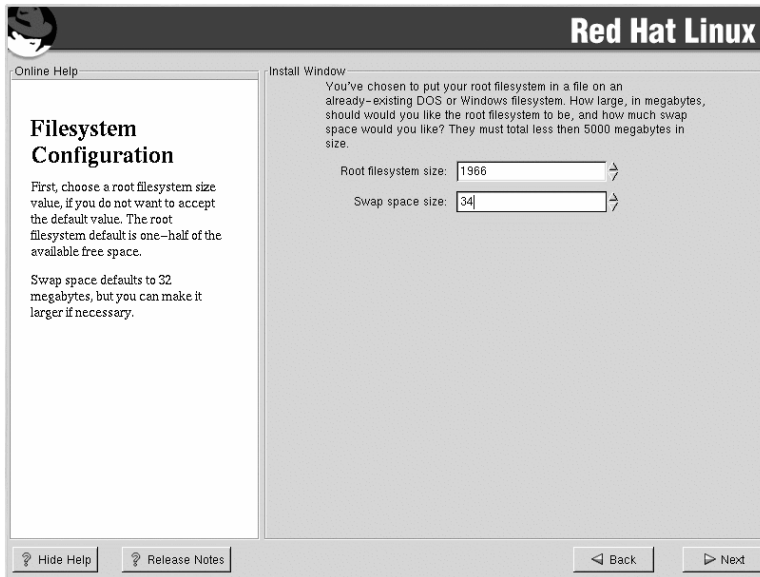
From this point on, you can continue following the main installation chapter (see Section 4.15, *Network Configuration*) for further installation instructions. The only difference you will see after this is a screen prompting you to create a boot disk. Once you make the boot disk and follow the other instructions, your installation will be complete.

To access Red Hat Linux, make sure the boot disk that you created during the installation is in your floppy drive. When you reboot your system it will boot into Red Hat Linux rather than your other OS. To access your other OS, remove the boot disk and reboot your system.

B.2.3 How to Remove a Partitionless Installation From Your System

To remove this partitionless installation, you will need to delete the following files from your DOS/Windows partition:

```
redhat.img
rh-swap.img
```

These files can be found in the partition's root directory (known as \ under DOS/Windows.)

Once these files have been removed, Red Hat Linux will no longer boot on your system. Your system will return to its previous state and you will be able to access the space used by Red Hat Linux as you normally would.

C   Removing Red Hat Linux

To uninstall Red Hat Linux from your system, you will need to remove the LILO information from your master boot record (MBR).

There are several ways to remove LILO from the MBR of your machine. If you are running Red Hat Linux, you can replace the MBR with an earlier saved version of the MBR using the /sbin/lilo command:

```
/sbin/lilo -u
```

In DOS, NT, and Windows 95 you can use fdisk to create a new MBR with the "undocumented" flag /mbr. This will ONLY rewrite the MBR to boot the primary DOS partition. The command should look like the following:

```
fdisk /mbr
```

If you need to remove Linux from a hard drive, and have attempted to do this with the default DOS fdisk, you will experience the "Partitions exist but they do not exist" problem. The best way to remove non-DOS partitions is with a tool that understands partitions other than DOS.

You can do this with the installation floppy by typing **linux expert** (without the quotes) at the boot: prompt:

```
boot: linux expert
```

Select install (versus upgrade) and at the point when you should partition the drive, choose fdisk. In fdisk, type [p] to print out the partition numbers, and remove the Linux partitions with the [d] command. When you are satisfied with the changes you have made, you can quit with a [w] and the changes will be saved to disk. If you deleted too much, type [q] and no changes will be made.

Once you have removed the Linux partitions, you can reboot your computer using [Control]-[Alt]-[Delete] instead of continuing with the install.

D   Getting Technical Support

D.1 Remember to Sign Up

If you have an official edition of Red Hat Linux 7.1, please remember to sign up for the benefits you are entitled to as a Red Hat customer.

You will 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.

- Red Hat Network — Easily update your packages and receive security notices that are customized for your system. Go to http://www.redhat.com/network for details.

- Priority FTP access — No more late-night visits to congested mirror sites. Owners of Red Hat Linux 7.1 receive free access to priority.redhat.com, Red Hat's preferred customer FTP service, offering high bandwidth connections day and night.

- 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/apps/activate/. You will find your **Product ID** on a red and white card in your Official Red Hat Linux boxed set.

D.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 supported hardware recognized by the Red Hat Linux operating system

- Assistance with drive partitioning

- Configuring Red Hat Linux and Windows 95 or Windows 98 to dual-boot using the Linux boot loader LILO (please note that third party boot loaders and partitioning software are not supported)

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

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

Our installation assistance service is designed to get Red Hat Linux running on your system 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 various Linux HOWTO documents are included with Red Hat Linux on the Documentation CD in the `/HOWTOS` directory. These HOWTOS are provided in 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:

```
http://www.redhat.com/
```

Many Linux-related books are available. If you are 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/
```

D.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

D.4 How to Get Technical Support

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

Every Official Red Hat product comes with a Product Identification code: a 16-character alphanumeric string. The Product ID for Red Hat Linux 7.1 is located on a black, red and white card that can be found inside the box. Your Product ID is on a perforated card that you can punch out and keep in a safe place. You need this code, so do not lose the card!

Note

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

The 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 Product ID may also enable priority FTP access, depending on the product that you purchased, for a limited amount of time.

D.4.1 Signing up for Technical Support

To sign up for technical support, you will need to:

1. Create a customer profile at http://www.redhat.com/apps/activate/. 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. Using your login name and password you created during the customer profile, please login at the Red Hat Support website at http://www.redhat.com/support.

3. Update your contact information if necessary.

Note

If your email 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 email. Be sure that you give us your correct email address.

If you are worried about your privacy, please see Red Hat's privacy statement at http://www.red-hat.com/legal/privacy_statement.html.

4. Add a product to your profile. Please enter the following information:

    •   The Product ID for your 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 Product ID in order to obtain technical support via telephone (if the product you purchased came with phone support). Please do not lose your Product ID, or you might not be able to receive support.

D.5 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)

- Specific hardware devices that may be relevant to your problem (for example: If you cannot setup networking, what kind of NIC do you have?)

D.5.1 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 have purchased a phone support contract, the phone number you will need to call will be provided to you during the sign up process.

For more information on using Red Hat's online support system go to http://www.redhat.com/support/services/access.html.

D.6 Support Frequently Asked Questions (FAQ)

D.6.1 Q: Email Messages to support@redhat.com Bounce

I send email to support@redhat.com but my messages bounce back to me. What is the problem?

D.6.2 A: support@redhat.com Is Not Used at This Time

To better serve our customers, Red Hat is re-engineering our email support process. At this time, the support@redhat.com address is not functional. In the meantime, please use support via the web or by telephone.

D.6.3 Q: System Will Not Allow Login

I know that I have already signed up, but the system will not let me log in.

D.6.4 A: Old Logins and Passwords Will Not Work

You could be trying to use an old login and password, or simply mistyping your login or password. Refer to Section E.4.3, *Problems When You Try to Log In* for more information.

E   Troubleshooting Your Installation of Red Hat Linux

This appendix discusses some common installation problems you could encounter and provides solutions to these problems.

E.1 You are Unable to Boot Red Hat Linux

E.1.1 Are You Unable to Boot from the CD-ROM?

If you cannot boot from your Red Hat Linux CD-ROM, you have two options:

1.   You can change your BIOS so that booting from CD-ROM is recognized first, or

2.   Boot from the boot diskette included in the boxed set.

To change your BIOS, refer to your system manual for the correct keyboard combination that allows you to access your BIOS, or you can read the key sequence needed while the system begins to boot.

To boot from the boxed set using the Red Hat Linux boot disk, insert the diskette into your floppy drive and then boot/reboot your computer. Make sure that your BIOS is set to use A: to boot.

E.1.2 Are You Unable to Boot from the Local Boot Disk?

If you are experiencing difficulties in getting the local boot disk to boot your system correctly, you may need an updated boot disk.

Check the online errata (http://www.redhat.com/support/errata) for updated diskette images (if available) and follow the instructions in Section 2.4.2, *Making Installation Diskettes*to make an updated boot disk for your system.

E.1.3 Are You Unable to Boot from PCMCIA Boot Disks?

If you are experiencing difficulties in getting the PCMCIA boot disks you made to boot your system correctly, you may need an updated boot disk.

Check the online errata for updated diskette images (if available) and follow the instructions provided to make an updated boot disk for your system.

E.1.4 Is Your System Displaying Signal 11 Errors?

If you receive a fatal signal 11 during your installation, it is probably due to a hardware error in memory on your system's bus. A hardware error in memory can be caused by problems in executables or with the system's hardware. Like other operating systems, Red Hat Linux places its own demands on your

system's hardware. Some of this hardware may not be able to meet those demands, even if they work properly under another OS.

Check to see if you have the latest installation and supplemental boot diskettes from Red Hat. Review the online errata to see if newer versions are available. If the latest images still fail, it may be due to a problem with your hardware. Commonly, these errors are in your memory or CPU-cache. A possible solution for this error is turning off the CPU-cache in the BIOS. You could also try to swap your memory around in the motherboard slots to see if the problem is either slot or memory related.

For more information concerning signal 11 errors, refer to http://www.bitwizard.nl/sig11/.

E.1.5 Are You Unable to Boot from a Network Boot Disk?

If you are experiencing difficulties in getting the network boot disk you made to boot your system correctly, you may need an updated boot disk.

Check the online errata for updated diskette images (if available) and follow the instructions provided to make an updated boot disk for your system.

E.2 Trouble Beginning the Installation

E.2.1 Trouble Using PCMCIA Boot Disks?

If you booted using PCMCIA boot disks and want to install via FTP (or NFS or HTTP), but do not see these installation options, you may have a problem with your network card.

If the network card is not initialized during the boot process, the Red Hat Linux installation program will not enable you to configure your system for networking, either during or after the installation itself.

Check the hardware compatibility list (http://hardware.redhat.com) to see if your network card is compatible and/or supported. If your card is not listed, it may not be compatible with Red Hat Linux.

E.2.2 Is Your Mouse Not Detected?

If the **Mouse Not Detected** screen (see Figure E–1, *Mouse Not Detected*) appears, then the installation program was not able to identify your mouse correctly.

You can choose to continue with the GUI installation or use the text mode installation, which does not require using a mouse. If you choose to continue with the GUI installation, you will need to provide the installation program with your mouse configuration information (see Figure 4–3, *Mouse Configuration*).

Figure E–1   Mouse Not Detected

For an overview of text mode installation instructions, please refer to Chapter 5, *Installing Red Hat Linux via Text Mode*.

E.2.3 Problems with Booting into the Graphical Installation

The Red Hat Linux installation program uses frame buffers by default. However, there are some video cards that will not work with this new setting. The end result will be a problem booting into the graphical installation program.

The installation program will first try to run in frame buffer mode. If that fails, it will try to run in a lower resolution mode. If that still fails, the installation program will run in text mode.

Video cards that will not run at 800 x 600 resolution should type **lowres** at the boot: prompt to run the installation program in 640 x 480 resolution.

If this still does not work, you can run the installation program without frame buffers by typing **nofb** at the boot: prompt.

E.3 Trouble During the Installation

E.3.1 Do You Not See the Automatic Partitioning Screen?

If the **Automatic Partitioning** screen does not appear during your installation, you probably do not have enough free space in which to install Red Hat Linux.

If you do not want to partition manually, you should exit out of the installation (remove any diskettes and/or CD-ROMs from their respective drives and reboot your system). Then you can re-allocate space for your installation.

The best way to re-allocate space is to use the DOS-based fips utility. Review *An Introduction to Disk Partitions* in the *Official Red Hat Linux Reference Guide* for more information.

E.3.2 Partition Creation Problems

If you are having trouble creating a partition (for example, a root (/) partition, make sure you are setting its partition type to Linux Native.

Unless your BIOS supports otherwise, make not to exceed 1023 cylinders. If you do not, you will not be able to create a /boot or / partition. Some new systems allow you to exceed the 1023 limit (with the newer LILO versions that are available), but most machines with older BIOSes will not.

E.3.3 Using Remaining Space

You have a swap and a / (root) partition created, and you have selected the root partition to use the remaining space, but it does not fill the hard drive.

If you hard drive is more than 1024 cylinders, you must create a /boot partition if you want the / (root) partition to use all of the remaining space on your hard drive.

E.3.4 Other Partitioning Problems

If you are using Disk Druid to create partitions, but cannot move to the next screen, you probably have not created all the partitions necessary for Disk Druid's dependencies to be satisfied.

You must have the following partitions as a bare minimum:

• A /boot partition of type Linux native

• A / (root) partition of type Linux native

• A <swap> partition of type Linux swap

Tip

When defining a partition's type as Linux swap, you do not have to assign it a mount point. Disk Druid automatically assigns the mount point for you.

E.3.5 Are You Seeing Python Errors?

During some upgrades or installations of Red Hat Linux, the installation program (also known as Anaconda) may fail with a Python or traceback error. This error may occur after the selection of individual packages or while trying to save the upgrade log in /tmp. The error may look similar to:

```
Traceback (innermost last):
   File "/var/tmp/anaconda-7.0.1//usr/lib/anaconda/iw/progress_gui.py",
line 20, in run
     rc = self.todo.doInstall ()
   File "/var/tmp/anaconda-7.0.1//usr/lib/anaconda/todo.py", line 1468, in
doInstall
     self.fstab.savePartitions ()
   File "fstab.py", line 221, in savePartitions
     sys.exit(0)
 SystemExit: 0

 Local variables in innermost frame:
 self: <fstab.GuiFstab instance at 8446fe0>
 sys: <module 'sys' (built-in)>

 ToDo object:
 (itodo
 ToDo
 p1
 (dp2
 S'method'
 p3
 (iimage
 CdromInstallMethod
 p4
 (dp5
 S'progressWindow'
 p6

 <failed>
```

This error occurs in some systems where links to /tmp are symbolic to other locations or have been changed since creation. These symbolic or changed links are invalid during the installation process, so the installation program cannot write information and fails.

If you experience such an error, first try to download any available errata for Anaconda. Errata can be found at http://www.redhat.com/support/errata.

You can also search for bug reports related to this problem. To search Red Hat's bug tracking system, go to http://bugzilla.redhat.com/bugzilla.

Finally, if you are still facing problems related to this error, register your product and contact our support team. To register your product, go to http://www.redhat.com/apps/activate.

E.4 Problems After Installation

E.4.1 Trouble With the Graphical LILO Screen?

If for some reason you need to disable the graphical boot screen, you can do so, as root, by editing the /etc/lilo.conf file and then rerunning LILO.

To do this, comment out (or delete) the line which reads message=/boot/message in the lilo.conf file. To comment out a line, insert the ; character at the beginning of the line. Next, become the root user by typing su - and entering your root password when prompted. After you have become root, rerun LILO by typing /sbin/lilo -v. The next time you boot, you will see the text LILO: prompt, as used in previous Red Hat Linux releases.

You may re-enable the graphical boot screen by adding the above line back into the lilo.conf file and rerunning LILO.

E.4.2 Problems with Server Installations and X

If you performed a server installation and you are having trouble getting X to start, that is because the X Window System is not installed during a server-class installation.

If you want the X Window System, but you did a server-class installation, you can perform an upgrade to install X. During the upgrade, select the X Window System packages, and choose GNOME, KDE, or both.

Alternatively, you can install the XFree86 RPMs. For more information, refer to http://www.redhat.com/support/docs/howto/XFree86-upgrade/XFree86-upgrade.html.

E.4.3 Problems When You Try to Log In

If you did not create a user account during the installation you will need to log in as root and use the password you assigned to root.

If you cannot remember your root password, you will need to boot your system as linux single at the LILO boot: prompt. Then at the # prompt, you will need to type passwd root, which will allow you to enter in a new password for root. At this point you can type shutdown -r now and the system will reboot with your new password.

If you cannot remember your user account password, you must become root. To become root, type su - and enter your root password when prompted. Then, type passwd <username>. This allows you to enter a new password for the specified user account.

If you selected either the custom- or workstation-class installation and do not see the graphical login screen, check your hardware for compatibility issues. The *Hardware Compatibility List* can be found at http://hardware.redhat.com.

E.4.4 Does Netscape Navigator Crash on JavaScript Pages?

If Netscape Navigator continuously crashes on pages that contain JavaScripts, you may need to edit your `~/.mailcap` file.

Edit the file using pico by typing `pico ~/.mailcap` at the prompt in a terminal window. (You may use any text editor.)

Remove the following lines from the file:

```
application/x-javascript;;\
x-mozilla-flags=save
```

You can also turn off JavaScript within Netscape Navigator itself. Click on **Edit**=>**Preferences**=>**Advanced** and make sure the **Enable JavaScript** checkbox is not selected.

If these do not help, you can also try to use a newer version of Netscape Navigator if available. Check the Red Hat Linux errata website under security advisories for more information.

E.4.5 Your Printer Will Not Work Under X

If you are not sure how to set up your printer or are having trouble getting it to work properly, try using the graphical printtool program. To access printtool, log in as root, open a terminal window, and type `printtool`.

E.4.6 Is Your RAM Not Being Recognized?

Sometimes, the kernel does not recognize all of your memory (RAM). You can check this with the following command:

```
cat /proc/meminfo
```

Find out if the displayed quantity is the same as the known amount of RAM in your system. If they are not equal, add the following line to the `/etc/lilo.conf` file:

```
append="mem=xxM"
```

Replace *xx* with the amount of RAM you have in megabytes. Remember that per-image append lines completely overwrite the global append line. It might be worth adding this to the per-image descriptions, as shown in this example:

```
append="hdd=ide-scsi mem=128M"
```

In /etc/lilo.conf, the above example would look similar to the following:

```
boot=/dev/sda
        map=/boot/map
        install=/boot/boot.b
        prompt
        timeout=50
        image=/boot/vmlinuz-2.2.12-20
                label=linux
                root=/dev/sda1
                initrd=/boot/initrd-2.2.12-20.img
                read-only
                append="mem=128M"
```

Remember to run /sbin/lilo -v after changing /etc/lilo.conf.

Note that you can also produce the same effect by actually passing this option when you are specifying the label/image to use in LILO. For example if you had a label named *linux*, at the LILO boot: prompt you could type:

linux mem=xxM

Remeber to replace *xx* with your RAM amount.

E.4.7 Problems with Sound Configuration

If you do not have sound after your installation, you may need to run the sound configuration utility. As root, type sndconfig in a terminal window.

If the sndconfig application did not help, you may need to uncheck the mute buttons in the Audio Mixer. Click on **Panel**=>**Programs**=>**Applications**=>**Audio Mixer** to launch the application.

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