Red Hat Linux 7.0

The Official Red Hat Linux Alpha Installation Guide

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1 Introduction

Welcome to the *Official Red Hat Linux Alpha Installation Guide*. Once you have completed the installation as outlined in this manual, you will have a fully functioning Red Hat Linux operating system running on your Alpha.

1.1 How to Use This Manual

This manual focuses on the server-class and custom-class installation processes. It will help you prepare your system for the installation, and then walk you through the installation.

Please Note

No graphical environment is installed during a server-class installation. If you want to install a graphical environment, you'll need to customize the installed packages or choose a different class of installation.

If you are an experienced user who wants to perform a server-class installation but don't need a review of the basics, you can skip ahead to Chapter 3, *GUI Installation of Red Hat Linux* to begin the installation process.

Many Alpha users will choose to perform a custom-class installation. A custom-class installation allows you to choose and configure every option for your system. Custom-class installations allow for the most flexible installation, but are not recommended for new users. If you choose a custom-class installation, you must be prepared to make decisions regarding the partitioning and configuration of your machine; the installation program will not make decisions for you.

Refer to the **Red Hat Frequently Asked Questions** for answers to questions and problems that may occur before, during, or after the installation. You'll find the FAQ online at the following URL:

http://www.redhat.com/support/docs/faqs/rhl_general_faq/FAQ.html

Upgrading

If you currently use Red Hat Linux 3.0.3 (or greater), you can perform an upgrade. Skim through this chapter to review the basics, then read Chapter 3, *GUI Installation of Red Hat Linux*, following the directions as you go. Once you have chosen to perform an upgrade in the installation program, refer to Chapter 4, *Upgrading Your Current System*.

1.1.1 Document Conventions

When you read this manual, you'll see that certain words are represented in different fonts, typefaces, 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:

Commands

Linux commands (and other operating system commands, when used) are represented in this style: command. This formatting 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 (for example, 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.

Filenames

Filenames, directory names, paths, and RPM package names are represented in this style: filename, which should indicate that a particular file or directory exists by that name on your 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.

Applications

When you see a term displayed like application, it is an end-user application (as opposed to system software). For example:

Use Netscape Navigator to browse the Web.

Keys

A key on the keyboard is shown in like this: [key]. 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 stop 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.



Don't perform 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. Don't choose this installation class unless you're sure you have no data you need to save.

1.1.2 We Need Feedback!

If you spot a typo in this manual, if you have input on how to explain the installation process, if there are topics that you'd like to see included, or if you've thought of a way to make it better, we'd love to hear from you! Be sure to mention the manual's identifier:

```
AlphaInst(EN)-7.0-Print-RHI (2000-11-01T10:08-0400)
```

If you include the identifier, we'll know exactly which version of the guide you have.

Please send mail to: docs@redhat.com

If you have a suggestion for improving the documentation, try to be as specific as possible when describing it. If you've found an error, please include the section number and some of the surrounding text so we can find it easily. We may not be able to respond to every message sent to us, but you can be sure that we'll be reading them all.

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

1.2 Installation-Related New Features

This section describes installation features new to Red Hat Linux 7.0.

Improvements to Red Hat Linux 7.0 which will make installation even easier include:

New multi-CD installation process

As the number and size of the packages included in Red Hat Linux continues to grow, Red Hat has developed an installation program capable of installing Red Hat Linux from multiple CD-ROMs.

X configuration

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

Help text available during text mode installation

Help text has been added to the text mode installation program to further assist you during your installation of Red Hat Linux 7.0. Press the [F1] key to enable help text for that specific screen. Press [Enter] to close the help text screen.

LDAP and Kerberos configuration

Network security has been enhanced with the addition of LDAP and Kerberos to Red Hat Linux 7.0. For more information on these programs, refer to the *Official Red Hat Linux Reference Guide*.

1.3 System-Related New Features

There are many features new to Red Hat Linux 7.0 that are not part of the installation process. Some new features are tools or applications that you can use; others are new versions of the kernel or desktop environments. These items are improvements that you'll see once you are using the OS itself.

Linux 2.2.x kernel

Red Hat Linux 7.0 includes the latest stable version of the 2.2.x Linux kernel.

XFree86 version 4.0.1

Red Hat Linux 7.0 contains the latest version of XFree86 — version 4.0.1, which supports many new drivers.

Red Hat Network

Red Hat now offers a customizable way to receive updates for your Red Hat Linux software. Using Red Hat Network and product registration, Red Hat will now help you keep up with the latest in hardware drivers and security fixes, enable automatic notification of updates, and much more. For more information, please refer to http://www.redhat.com/now.

GNOME 1.2

The GNOME GUI desktop environment version 1.2 is included in Red Hat Linux.

Sawfish window manager

The **sawfish** window manager is now included in Red Hat Linux 7.0 as the default window manager for GNOME. Based on a Lisp-like language, **sawfish** is extensible and GNOME-aware.

KDE 1.1.2

The KDE GUI desktop environment version 1.12 is included in Red Hat Linux 7.0.

GCC compiler 2.96 snapshot

A snapshot of GCC compiler development, the gcc compiler in Red Hat Linux 7.0 allows for faster optimized code and more complete C++ support.

Encryption-related changes

Certain encryption and authentication system tools are now available:

- Kerberos and LDAP authentication has been added to the installation program.
- OpenSSH encryption tools are included in Red Hat Linux 7.0, to allow secure remote logins to your system.
- The OpenSSL cryptography library is included in Red Hat Linux 7.0. OpenSSL supports secure transactions for mail, web and FTP communications.

1.4 Do You Have Everything You Need?

Before you start installing Red Hat Linux, make sure you have all the components you need. If you've purchased the Official Red Hat Linux boxed set, you're ready to go! However, mistakes occasionally happen, so now is a good time to double-check the contents of your boxed set.

A 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, diskettes, and manuals that are included with the version of Red Hat Linux that you purchased.

If you've purchased the Official Red Hat Linux boxed set from Red Hat, Inc. (or one of its distributors), and you're missing one or more of the items listed, please let us know! Contact information is also available on the Registration 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'll need to contact the company that produced your boxed set. Normally, third-party producers will include their logo and/or contact information on the outside of the box; an official Red Hat Linux boxed set lists only our name and contact information.

1.4.1 Register Your Red Hat Linux Boxed Set

If you have purchased an official Red Hat Linux 7.0 boxed set, you should register your product. Registration offers you many useful services, including installation support.

To register your product, go to http://www.redhat.com/now. You'll 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 the scope of Red Hat's technical support offerings, see http://www.redhat.com/apps/support/programs.html.

1.4.2 No Boxed Set? No Problem!

Of course, not everyone purchases a Red Hat Linux boxed set. It's 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 image diskettes to get started.

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

For information on making diskettes, see Appendix C, Writing Image Files to Diskettes.

2 Before You Begin the Installation Process

2.1 Installation Overview

Installing Red Hat Linux on an Alpha system is slightly more complex than installing Red Hat Linux on an x86 machine because a variety of Alpha machine architectures exist. In general, the sequence of steps to a successful installation are the following:

- 1. Use SRM commands to identify system information that you'll need to boot the installation program and Red Hat Linux.
- 2. If you can't boot from the CD-ROM, make diskettes from the boot image and RAM disk image files provided with Red Hat Linux.
- 3. Using the SRM console and the aboot bootloader, load and run the kernel, and boot into the Red Hat Linux installation program.

MILO Is Not Supported

As a resource for the Linux and Alpha communities, information that might be useful for MILO users is provided in Appendix A, *MILO*. Before you use MILO to boot your Alpha, however, you should realize that MILO is not supported by Red Hat, Inc..

2.1.1 Disk Space Requirements

Before you begin the installation, be aware that you'll need certain amounts of free disk space to install Red Hat Linux on an Alpha.

- At minimum, you'll need 64 MB of RAM and 500 MB of free hard disk space to install Red Hat Linux.
- You should have 128 MB of RAM and 2 GB of free hard disk space on your machine for a full installation of Red Hat Linux.

You may need a 3.5-inch diskette drive — referred to by Red Hat Linux as /dev/fd0 (known as the A: drive in certain circles). Note that many modern Alphas can boot the installation program from the CD-ROM drive.

2.2 Is Your Hardware Supported?

Before you begin trying to install Red Hat Linux on an Alpha, you should check to see if your hardware is supported. The most recent list of hardware supported by Red Hat for Alpha systems can be found on the Hardware Compatability List (HCL) at http://hardware.redhat.com. Hardware not explicitly listed on the Hardware Compatibility List is, by definition, not supported.

If you have successfully installed Red Hat Linux on a particular class of Alpha machine, and you have information that you think can help increase the reliability of ensuring future installations on machines of that class, you can fill out the Community Knowledge Submission Form, which is also available from http://hardware.redhat.com.

2.3 Checking for Errata

Occasionally, revised diskette images are needed for the installation to work properly. In these cases, we make special images available via the Red Hat Linux errata listing. Since this is relatively rare, you will save time if you try to use the standard diskette images first. Review the errata only if you experience problems completing the installation.

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

There are two ways to review the errata:

- 1. At the Errata page on Red Hat's website, located at http://www.redhat.com/support/errata, you can read errata online, and you can download diskette images.
- 2. If you send an empty email message to errata@redhat.com, you will receive an email containing a text listing of the complete errata of the installation program and related software (if errata exist at that time). Also included are URLs to each updated package and diskette image in the errata. Using these URLs, you

can download any necessary diskette images. Please note: use binary mode when transferring a diskette image.

If you experience problems, focus on entries that include new diskette images (the filenames always end in .img). If you find an entry that applies to your problem, download a copy of the diskette images, and create them using the instructions in Appendix C, *Writing Image Files to Diskettes*.

2.4 The SRM Firmware Console

Before you start to install Red Hat Linux on an Alpha, you'll need a basic understanding of the SRM console, what it does, and the information it can provide.

SRM is a UNIX-like firmware console used by many Alpha systems to boot into an operating system. When the system is booted, the SRM console is displayed as a blue screen with a prompt. The prompt looks like P00>>> (the 00 indicates the primary processor). On multi-processor machines, the prompt could be P01>>>, P02>>>, etc.

We recommend that you upgrade your SRM firmware to the most recent version available. Use the show version command at the SRM console prompt to see what version of SRM you're running. For more information about SRM firmware upgrades, see the following URL:

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

Additional information on the SRM console can be found at the SRM Firmware HOWTO at the following URL:

```
http://www.alphalinux.org/faq/srm.html
```

The SRM console provides important system information which you'll need to use when installing Red Hat Linux and when administering your Alpha.

2.4.1 SRM Device Names

To see information about system devices that SRM recognizes, use the following command:

show device

The show device command will display a list of devices. You can alternatively use the shorthand show dev or a command such as show dev dk, which will only display SRM-recognized devices that begin with 'dk' (i.e., all SCSI disk drives).

SRM doesn't identify devices the same way as Red Hat Linux. As an example of SRM's device-naming syntax, the output provided after a show device on a Compaq AlphaServer ES40 will look similar to the following:

| P00>>> show device | | |
|----------------------|------|------------------------------|
| resetting all I/O bu | ses | |
| dka0.0.0.4.1 | DKA0 | RZZDD-LS 0306 |
| dqa0.0.0.15.0 | DQA0 | TOSHIBA CD-ROM XM-6302B 1017 |
| dva0.0.0.1000.0 | DVA0 | |
| ewa0.0.0.6.1 | EWAO | 00-00-F8-1B-42-D5 |
| pka0.7.0.4.1 | PKA0 | SCSI Bus ID 7 |

The following list provides explanations for the most common SRM device names:

dka0

The 'dk' is SRM's designation for a SCSI device. The 'a' after the 'dk' signifies that it is the first SCSI controller; the '0' indicates the SCSI ID number. So, dka0, dka100, dka200 and dka300 are all SCSI devices on the first SCSI controller. Their SCSI ID numbers are, respectively, 0, 1, 2 and 3. (Note that the 'a' and numeric portions of the device identifier work the same way for the other devices; they identify the ordering of the same type of device and provide an ID number.)

If these four devices are all SCSI hard drives, Red Hat Linux would refer to the same four devices as /dev/sda, /dev/sdb, /dev/sdc and /dev/sdd.

If your Alpha has a SCSI CD-ROM (instead of an IDE CD-ROM), usually the CD-ROM drive device will be on the second SCSI controller. The SRM device name will then be something like 'dkb0' or 'dkb500' ('b' for the second SCSI controller, followed by the SCSI ID number). If your machine is set up like this, then Red Hat Linux would refer to the CD-ROM drive as /dev/scd0.

Identification of CD-ROM Drives

If the device is a CD-ROM drive, the entry in the third column will identify it as a CD-ROM or be something like "CD-224E" (older Alphas may identify a CD-ROM drive as "RRD46 1337" or something similar).

dqa0

The 'dq' is SRM's designation for an IDE device (for example, an IDE hard drive or an IDE CD-ROM drive). As in the previous example, the 'a' indicates that it is the first IDE device, and the '0' is the device's ID number.

Red Hat Linux would refer to the same IDE device as /dev/hda.

If your Alpha has an IDE hard drive and an IDE CD-ROM, then SRM will refer to the hard drive as something like 'dqa0' and to the CD-ROM drive as something like 'dqb0' or 'dqb500.' Red Hat Linux would refer to the same devices as /dev/hda and /dev/hdb.

dva0

The dva0 device name is the floppy disk drive; Red Hat Linux would refer to the floppy disk drive as /dev/fd0.

ewa0

The ewa0 device name is the network card; if it is an Ethernet network card, Red Hat Linux would refer to it as eth0.

Other SRM device name examples include mka0, the first SCSI tape device; and pka0, a SCSI host adapter for the first SCSI bus.

Before you begin the installation process, look at the list provided in response to show device on your Alpha's SRM console. Write down how SRM refers to the devices in Table 2–1, *SRM Device Names for your System*.

| Table 2–1 SRM Device | Names for | your System |
|----------------------|-----------|-------------|
|----------------------|-----------|-------------|

| Device | SRM Device Name |
|--|-----------------|
| 3.5-inch diskette drive (usually dva0) | |
| Hard drive | |
| CD-ROM drive | |

In this document, we've used the SRM device name dka0 to refer to the hard drive and dqa0 to refer to the CD-ROM drive.

You must choose one of these devices from which to boot Red Hat Linux, during the installation process and every time you wish to boot your machine, unless you set up your SRM boot parameters to boot automatically.

Devices that SRM Can't Detect

You may have a SCSI adapter, IDE drives, or networking hardware that is compatible with Red Hat Linux, but is neither OEM Digital or Compaq hardware or otherwise detectable by the SRM console. These types of hardware won't be displayed after the show device command on the SRM console. Using unrecognized hardware may not impede your running Red Hat Linux on your Alpha machine, but you must boot from a device recognized by the SRM console.

2.4.2 SRM Boot Parameters

Certain SRM system parameters designate information needed to boot an operating system. These parameters include the device from which SRM will boot, which kernel to use, and what filesystem it will use as the root filesystem.

To see the boot parameters recognized by SRM, use the following command:

show boot*

For example, the output provided for a show boot* on the SRM console might look like the following:

| P00>>> show boot* | |
|-------------------|----------------|
| boot_dev | dka0.0.0.4.1 |
| boot_file | 3/boot/vmlinuz |
| boot_osflags | root=/dev/sda3 |
| boot_reset | ON |
| bootdef_dev | dka0.0.0.4.1 |
| booted_dev | dka0.0.0.4.1 |
| booted_file | 3/boot/vmlinuz |
| booted_osflags | 0 |
| | |

The bootdef_dev parameter specifies the device from which SRM will try to boot. In this example, SRM will boot from dka0, which is the first SCSI hard drive.

The boot_file parameter sets the partition, location, and name of the kernel file from which SRM will boot. In this example, boot_file is set to boot from the vmlinuz kernel, which is located in the /boot directory on the third partition of the hard drive. The boot_file variable is equivalent to the -file value for boot on the SRM command line.

The boot_osflags parameter can specify which filesystem will be used as the root filesystem. Note that if this parameter is used, it requires Red Hat Linux (instead of SRM) device naming conventions. The boot_osflags variable is equivalent to the -flags value for boot on the SRM command line.

You can use the set command to change the boot parameters. After you've finished the installation, you'll need to set these variables to the right values, if you want your Alpha to automatically boot Red Hat Linux. Setting the boot parameters to automatically boot Red Hat Linux is covered in *Setting SRM Boot Variables* in Section 3.21.1.

To set a boot parameter, use the following command:

set variable "value"

When you're setting a value for an SRM console parameter, integer values and single word string values don't have to be in quotes; however, since multiple word string values need to be quoted, it is recommended that you enclose all string values in quotes.

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

```
set variable ""
```

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

2.4.3 Displaying System Information Using SRM

The SRM console can provide more information about your Alpha. Use the following command:

show config | more

Note the video card on your system. The video card information will be helpful to you if the Red Hat Linux installation program has any trouble probing your video card.

2.4.4 Booting the Installation Program

Your Alpha system will probably be able to boot the Red Hat Linux installation program directly from the Red Hat Linux CD 1. If your Alpha can't boot the installation program from the CD-ROM (or if you want to perform a hard drive, NFS image, FTP, or HTTP installation) you'll need to boot from a diskette. See *Booting the Installation Program from a Diskette* in Section 2.4.4 for more information on booting from a diskette.

Booting the Installation Program from the CD-ROM

Red Hat Linux CD 1 has a valid aboot block, so many modern Alphas which use SRM and aboot can boot directly from the Red Hat Linux CD 1 shipped in the boxed set. The command to boot from an IDE CD-ROM drive looks like the following:

boot dqa0 -flags 0

If the previous command is problematic for your system, the format for the full command is as follows:

boot dqa0 -file /kernels/vmlinux.gz -flags "root=/dev/hda initrd=images/ramdisk.img"

Please note that in the above command, we've used dqa0 (SRM) and /dev/hda (Linux) to refer to an IDE CD-ROM device. Your system may be set up differently, so the command may need to be changed. For example, if your Alpha uses a SCSI CD-ROM device, you might use a command like the following:

boot dkb0 -file /kernels/vmlinux.gz -flags "root=/dev/scd0 initrd=images/ramdisk.img"

If you'd like to perform a text-mode installation instead of a GUI installation, you'll need to add the text flag to the flags at the end of the full boot command. For example, if you wanted to use the previous boot command to boot a text mode installation, you'd use the following command:

boot dkb0 -file /kernels/vmlinux.gz -flags "root=/dev/scd0 initrd=images/ramdisk.img text"

See Section 2.4.1, *SRM Device Names* for more information on how SRM refers to system devices.

Returning to SRM from the aboot Prompt

If your boot command doesn't work for some reason, you'll end up at the aboot prompt. To return to the SRM console, use the q command.

Once the installation program has booted, follow the instructions contained in Chapter 3, *GUI Installation of Red Hat Linux* to install Red Hat Linux. If you'd prefer to perform a text mode installation, use the instructions provided in *Installing Red Hat Linux Via Text Mode* in the Official Red Hat Linux Reference Guide. Before you perform a text mode installation, please read through Chapter 3, *GUI Installation of Red Hat Linux* in this manual, so that you understand all of the Alpha-specific installation issues.

Booting the Installation Program from a Diskette

If your Alpha won't boot the Red Hat Linux installation program directly from Red Hat Linux CD 1, you'll need to boot from a diskette. If you want to perform a hard drive, NFS image, FTP or HTTP installation, you'll need to boot from a diskette.

You'll need to create a boot image file diskette from the boot image file on CD 1: images/generic.img. You'll also need a RAM disk image made from images/ramdisk.img, also on CD 1. Instructions for creating disk images are located in Appendix C, *Writing Image Files to Diskettes*. Remember to label the diskettes appropriately.

Put the boot image diskette into your floppy drive. If you're going to load the installation program from the CD-ROM drive, you'll need to also put CD 1 into the CD-ROM drive. Use the following command to boot the Red Hat Linux installation program:

boot dva0 -flags 0

This command assumes that the aboot bootloader file is on the diskette and that the boot parameters on the diskette are all correct. If you're booting from the diskette provided with Red Hat Linux, this boot command will work.

If for some reason you need the long version of the command to boot from a diskette, it looks like the following:

boot dva0 -file vmlinux.gz -flags "root=/dev/fd0 load_ramdisk=1 prompt_ramdisk=1"

In the previous command, you'll need to modify the parameters to match the location of the kernel file on your diskette and the location of the root filesystem.

After you've booted from the floppy, you'll be prompted to take out the boot image diskette and insert the RAM disk diskette with the following message:

VFS: Insert root floppy disk to be loaded into RAM disk and press ENTER

Insert the RAM disk diskette and press [Enter].

If you aren't using the Red Hat Linux CD, the installation program will start in textmode. You'll need to choose a few basic options for your system and then you'll need to select which installation method you'd like to use. See Section 3.2, *Selecting an Installation Method* for more information on different installation methods.

If you're using the CD-ROM to load the installation program, follow the instructions contained in Chapter 3, *GUI Installation of Red Hat Linux* to install Red Hat Linux.

3 GUI Installation of Red Hat Linux

This chapter explains how to install Red Hat Linux from the CD-ROM using the graphical, mouse-based installation program. If you need text mode installation instructions, refer to the *Installation Via the Text Mode* chapter in the Official Red Hat Linux Reference Guide.

3.1 The Installation Program User Interface

If you've used a graphical user interface (GUI) before, you'll be familiar with this process. If not, simply use your mouse to navigate the screens, "click" buttons, or enter text in text fields. You can also navigate through the installation using keystrokes. The [Tab] key moves between fields. The [Enter] key (on the Next button) and the [F12] key will advance to the next screen.

Stopping the Installation Program

To stop the installation program, simply reboot your machine and eject the CD-ROM and/or boot image diskette. You can safely cancel the installation at any point before the **About to Install** screen (see Section 3.17, *Preparing to Install Packages*).

3.1.1 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 method for entering commands from a shell prompt. It presents this information on five virtual consoles, among which you can switch using a single keystroke.

These virtual consoles can be helpful if you encounter a problem while installing Red Hat Linux. Messages displayed on the installation or system consoles can help pinpoint a problem. Please see Table 3–1, *Console, Keystrokes, and Contents* for a listing of the virtual consoles, keystrokes to switch to them, and their 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 |

Table 3–1 Console, Keystrokes, and Contents

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

3.2 Selecting an Installation Method

If you booted the installation program using a boot image diskette, and you don't have Red Hat Linux CD 1 in the CD-ROM drive, you will be asked what type of installation method you wish to use. If you booted from the CD-ROM, skip this section and go to Section 3.3, *Language Selection*. You can install Red Hat Linux via the following methods:

CD-ROM

If you choose to install from the CD-ROM, continue to Section 3.3, *Language Selection*.

Hard Drive

To install from your hard drive, you'll need to have obtained and copied all Red Hat Linux installation packages to a local hard drive (if you're copying from Red Hat Linux CDs, remember that you'll need to copy from both CD 1 and CD 2). During the installation process, after you've chosen to install from a hard drive, you'll be prompted to select the device name for the partition

containing the RedHat directory tree. You'll also need to provide the path to the directory which contains the RedHat directory (if RedHat is not in the root directory on that partition).

Once you've told the installation program where to find the Red Hat Linux files, continue with the installation process as described in Section 3.3, *Language Selection*.

NFS Image

If you choose to install from an NFS image server which is exporting a mirror image of Red Hat Linux, you'll need to provide networking configuration information. You'll need to choose whether your machine should use a dynamic IP address provided by either BOOTP or DHCP; or, if your machine will have a static IP address, you'll need to provide the IP addresses for your machine, the default gateway, and the primary nameserver. You'll also need to provide the netmask. (Contact your network administrator if you have questions about what to provide here.)

Next, you'll need to provide the NFS server's name or IP address and the path to the directory on the NFS server which contains the RedHat directory. If the NFS server is exporting a mirror of the Red Hat Linux installation tree, enter the directory which contains the RedHat directory. For example, if your NFS server contains the directory /mirrors/redhat/alpha/RedHat, enter /mirrors/redhat/alpha.

Check the File Permissions

If you are performing an NFS installation and are copying the files from the Red Hat Linux CD-ROMs, 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. After you've completed the NFS setup, refer to Section 3.3, *Language Selection* and continue with the installation process.

FTP

You'll need to identify the FTP server to the installation program. After choosing to install via FTP, you'll need to 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/mir-rors/redhat/alpha/RedHat, enter /pub/mirrors/redhat/al-pha.

If your inputs were specified properly, a message box will appear indicating that base/hdlist is being retrieved.

You may now continue with the installation process; refer to Section 3.3, *Language Selection*.

HTTP

If you choose to install from an HTTP (web) server, you'll need to specify the name or IP address of the HTTP site, and the name of the directory on that site which contains the RedHat installation files for your architecture. For example, if the HTTP site contains the directory /pub/mirrors/redhat/al-pha/RedHat, enter /pub/mirrors/redhat/alpha.

If you've provided the correct information, a message box appears indicating that base/hdlist is being retrieved.

Refer to Section 3.3, Language Selection to continue the installation process.

3.3 Language Selection

Using your mouse, select the language you would prefer to use for the installation and as the system default (see Figure 3–1, *Language Selection*).

| Online Help | Language Selection |
|---|--|
| Language Selection Which language would you like to use during the installation and as the system default once Red Hat Linux is installed? Choose from the list at right. | What language should be used during the installation process? |
| 💡 Hide Help | I Back Dext |

Figure 3–1 Language Selection

3.4 Keyboard Configuration

Choose the model that best fits your system (see Figure 3–2, *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 \tilde{N} , \hat{O} , and \tilde{C}) 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.

Changing Your Keyboard Type After the Installation

To change your keyboard type post-installation, become root and use the /usr/sbin/kbdconfig command, or you can type setup as root at the shell prompt (in other words, [root@yourmachine currentdirectory]#). ¹



| Online Help | Keyboard Configuration |
|---|---|
| Keyboard | Model |
| Configuration | Dell 101-key PC |
| What kind of keyboard do you have? | Everex STEPnote Generic 101-key PC Generic 102-key (Inti) PC |
| If you can't find an exact match, choose the | Generic 104-kev PC / Layout |
| closest <i>Generic</i> match (for example, Generic 101-key PC). | Inal U.S. English U.S. English w/ deadkeys U.S. English w/ ISO9955-3 |
| Then choose the layout | United Kingdom |
| type for your keyboard | Dead Keys |
| (for example, U.S. | Disable dead keys |
| English). | Enable dead keys |
| Entering special characters (such as \tilde{N} , \hat{O} , and C) is done using "dead keys" (also known γ | Test your selection here: Type your "test" text here! |
| 💡 Hide Help | |

3.5 Mouse Configuration

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

¹ 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].

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 can't 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 3–3 Mouse Configuration

| Online Help | Mouse Configuration |
|--|--|
| Mouse Configuration What kind of mouse do you have? Do you have a PS/2, Bus or serial mouse? (Hint: If the connector your mouse plugs into is round, you have a PS/2 | ALPS GlidePoint (PS/2) ASCII ATI Bus Mouse Generic - 2 Button Mouse (PS/2) - 2 Button Mouse (PS/2) - 2 Button Mouse (USB) - 2 Button Mouse (PS/2) - 3 Button Mouse (Serial) - 3 Button Mouse (serial) - 9 Genius |
| or a Bus mouse; if it's rectangular, it's a serial mouse.) | Port Device |
| Try to find an exact match in the first box at right. If an exact match cannot be found, choose | ttyS0 /dev/ttyS0 (COM1 under DOS) ttyS1 /dev/ttyS1 (COM2 under DOS) ttyS2 /dev/ttyS2 (COM3 under DOS) ttyS3 /dev/ttyS3 (COM4 under DOS) |
| one which is compatible with yours. Otherwise, | Z Emulate 3 Buttons |
| 💡 Hide Help | Sack Next |

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, it's easiest to use the X Window System if you have a three-button mouse. If you select this checkbox, you can emulate a third, "middle" button by pressing both mouse buttons simultaneously.

Changing Mouse Configuration After Installation

To change your mouse configuration after you've finished the installation, become root. You can then use the /usr/sbin/mouseconfig command from a shell prompt.

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

3.6 Welcome to Red Hat Linux

The **Welcome** screen (see Figure 3–4, *Welcome to Red Hat Linux*) does not prompt you for any installation input. Please read over the help text in the left panel for additional instructions and information on where to register your Official Red Hat Linux product.



Figure 3–4 Welcome to Red Hat Linux

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

Click on the Next button to continue.

3.7 Choose an Installation Class

Choose whether you would like to perform a full installation or an upgrade (see Figure 3–5, *Choose Install or Upgrade*).



Figure 3–5 Choose Install or Upgrade

instead.

If you choose to install, Red Hat Linux is normally installed on a clean disk partition or set of partitions, or over another installation of Linux.



When you choose to perform an installation, you must also choose the class of the installation. Your options are **Workstation**, **Server System**, or **Custom System**.

Red Hat Linux includes four different classes or types of installations. The classes give you the option of simplifying the installation process (with some potential for loss of configuration flexibility), or retaining flexibility by using a more complex installation process. The classes are the following:

• 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.

WARNING

A workstation-class installation will erase *all information* in *all Linux-related partitions* from *every* system hard drive.

If you choose automatic partitioning, a workstation-class installation will remove *all* existing Linux partitions on *all* hard drives in your system; non-Linux partitions will not be removed. A workstation-class installation uses all free unpartitioned disk space to create the following partitions:

- A 64MB swap partition.
- 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).
- A 16MB partition (mounted as /boot) for the Linux kernel and related files.

Please Note

You'll need at least 900MB of free disk space in order to perform a workstation-class installation.

A workstation-class installation will install your choice of a GNOME or KDE (or both) desktop environment and the X Window System.

A workstation-class installation will not allow you to customize your group package selection. If you do not want the installation program to select packages for you, please choose a custom-class installation.

Unlike earlier workstation-class installations, performing a Red Hat Linux 7.0 workstation-class installation will not install the network daemon xinetd (inet services). Withholding xinetd results in a more secure installation;² however, inbound network-related services such as finger, telnet, talk, and ftp will not work. If you require these types of services, choose a server-class or custom-class installation.

• Server — A server-class installation is most appropriate for you if you'd like your system to function as a Linux-based server, and you don't want to heavily customize your system configuration. The X Window System and the GNOME and KDE desktop environments will not be installed during a server-class installation, unless you customize the set of packages to be installed and select the X Window System and desktop packages that you want.

WARNING

A server-class installation will erase *all partitions* (both Linux and non-Linux) from *every* system hard drive.

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

- Server (minimum): 500 MB
- Server (choosing everything): 1 GB

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

If you plan to choose all group packages, as well as select additional individual packages, you may want to allow yourself 2 GB or more of disk space. This will provide space for additional data to be written.

• The custom-class installation provides 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 need to decide how disk space will be partitioned. You have complete control over the packages that will be installed on your system. Unless you have prior experience with Red Hat Linux or another flavor of Linux, you should not select the custom-class installation method.

The recommended disk space requirements for a custom-class installation are the following:

- Custom (minimum): 500 MB
- Custom (choosing everything): 2 GB

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

• 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 you can choose to upgrade rather than do a fresh installation. To perform an upgrade, please refer to Chapter 4, *Upgrading Your Current System*.

3.8 Automatic Partitioning

If you are performing a custom-class installation, you will not see the Automatic Partitioning screen. Please skip this section and continue to Section 3.9, *Manual Partitioning*. The Automatic Partitioning screen is displayed during workstation-class or server-class installations. Here you choose whether to automatically partition or to partition manually with either Disk Druid or fdisk.

Automatic partitioning allows you to perform an installation without making decisions about partitioning your system — the installation program will decide how to partition your system for you. If you do not feel comfortable with partitioning your system, it is recommended that you choose to automatically partition.

You can also use the **Back** button to choose a different installation method (see Figure 3–6, *Automatic Partitioning*).

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

Figure 3–6 Automatic Partitioning




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



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

If you are unsure how you want your system to be partitioned, please refer to the partitioning chapter in the *Official Red Hat Linux Reference Guide*.

3.9 Manual Partitioning

If you chose to perform a custom-class installation, or if you chose to manually partition during a workstation-class or server-class installation, the Manual Partitioning screen is the next screen that you'll see.

When you partition manually, you'll use the partitioning tools provided with Red Hat Linux, but you'll need to make all of the decisions regarding partitioning your system. If you don't feel comfortable partitioning your system, it is recommended that you *do not* partition manually; instead select **Automatic Partitioning** by clicking the **Back** button and choosing to perform a workstation-class or server-class installation.



Figure 3–7 Manual Partitioning

On this screen, you'll need to choose whether you want to partition with Disk Druid or fdisk. Disk Druid is more user-friendly; fdisk should only be used by experienced users.

3.9.1 General Partitioning Guidelines

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

One of the partitions should be your swap partition. It should be approximately twice the size of the amount of physical RAM present in your machine. The swap partition should be set to the correct partition type (82 for Linux Swap if you're using Disk Druid and 1 if you're using fdisk).

The rest of the partitions compose your Linux filesystem layout. They should be sized appropriately and set to the correct types, depending upon their function.

3.9.2 Partitioning with Disk Druid

If you want to manually partition your system, but you'd prefer to use fdisk to partition, please skip to Section 3.9.3, *Partitioning with fdisk*.

At this point, you'll need to let the installation program know where it should install Red Hat Linux. This is done by defining mount points for one or more disk partitions where Red Hat Linux will be installed. You may also need to create and/or delete partitions at this time (refer to Figure 3–8, *Partitioning with Disk Druid*).

Please Note

If you need to learn the basics about how to partition your system, read the *An Introduction to Disk Partitions* chapter in *Official Red Hat Linux Reference Guide*. As a bare minimum, you'll need a boot partition, a swap partition, and at least one Linux partition.

Partitionless Installations are Not Officially Supported

Partitionless installations on Alpha machines are not officially supported by Red Hat.

| Online Help | Disk Druid Partitions | |
|--|--|------------|
| | Mount Point Device Requested Actual Type | |
| Partitions | /boot sda1 16M 23M Linux native <swap> sda2 256M 258M Linux swap</swap> | |
| Where do you want to | / sda3 1M 8385M Linux native | э 🛛 |
| install Red Hat Linux? | | |
| Please note: If you are performing a Partitionless Installation you will need to define an existing | | |
| DOS/Windows partition as root, shown as /. Click on the FAT partition you | Add Edit Delete Reset Make F | AID Device |
| want to select for this | Drive Geom [C/H/S] Total (M) Free (M) Used (M) | Used (%) |
| installation. Once it is highlighted, click <i>Edix</i> to assign it the mount point of <i>t</i> (root). Click <i>Ok</i> when you're done. Once you have confirmed this choice, you will need to dofine the communicate | sda [1106/255/63] 8675M 8M 8667M | 99% |
| 💡 Hide Help | Sack | ⊳ Next |

Figure 3–8 Partitioning with Disk Druid

Red Hat Linux 7.0 uses Disk Druid for partitioning. With the exception of certain esoteric situations, Disk Druid can handle the partitioning requirements for a typical Red Hat Linux installation.

SRM has two special partitioning requirements: the use of BSD disk labels and that unallocated space is left at the beginning of the hard drive. Disk Druid is aware of these requirements and will partition your system accordingly — unless your hard drive has a valid MS-DOS partition table. Disk Druid will not convert a hard drive with a valid MS-DOS partition table to use BSD disk labels. To remove the MS-DOS partition table, you'll need to use fdisk to delete all the partitions and write the partition table to the hard drive. After removing the MS-DOS partition table, you can then partition your hard drives using BSD disk labels.

Partition Fields

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

Mount Point

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

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.

Туре

This field shows the partition's type (for example, Linux Native).

Recommended Partitioning Scheme

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

• A swap partition — 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 you are unsure about what size swap partition to create, make it equal to the amount of RAM on your machine. In Disk Druid, the partition field for swap should look similar to the following:

<Swap> sda2 256M 258M Linux swap

• A /boot partition (as small as possible; 16 MB maximum) — the partition mounted on /boot will be the SRM boot partition and will contain aboot, the boot loader which will load Red Hat Linux. In Disk Druid, the partition field for /boot should look similar to:

/boot sdal 16M 23M Linux native

A root Linux partition — where "/" (the root directory) resides. In this setup, all files (except those stored in /boot) reside on the root partition. A 850MB root partition will permit the equivalent of a workstation-class installation (with *very* little free space), while a 2 GB root partition will let you install every package. You may wish to have more than one Linux partition. For example, if you'd like to have /usr on its own disk partition, you'll need to create the /usr partition now. In Disk Druid, the partition field for / should look similar to:

/ sda3 1M 8385M Linux native

Problems When Adding a Partition

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.

If you attempt to add a partition and Disk Druid can't carry out your request, you'll see a dialog box listing partitions that are currently unallocated, along with the reason they could not be allocated. Unallocated partition(s) are also displayed on Disk Druid's main screen (you may have to scroll through the Partitions section to see them).

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.

Drive Summaries

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

Drive

This field shows the hard disk's device name.

Geom [C/H/S]

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

Total

This field shows the total available space on the hard disk 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, you'll need to use the **Allowable Drives** field in *Adding Partitions* in Section 3.9.2.

Disk Druid's Buttons

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

Add

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

Edit

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

Delete

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

Reset

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

Make RAID Device

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

Adding Partitions

To add a new partition, select the Add button. A dialog box will appear (see Figure 3–9, *Adding a Partition*).

Please Note

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

| Mount Point: | | | | | |
|------------------------|--------------|--------|--|--|--|
| Size (Megs): | | | | | |
| ⊔ Use remaining space? | | | | | |
| Partition Type: | Linux native | | | | |
| Allowable Drive | is: | | | | |
| | Ok | Cancel | | | |

- Mount Point: Highlight and enter the partition's mount point. For example, if this partition should be the root partition, enter /; enter /boot for the /boot partition, and so on. You can also use the pull-down menu to choose the correct mount point for your partition.
- Size (Megs): Enter the size (in megabytes) of the partition. Note this field starts with a "1" in it; unless changed you'll end up with a 1 MB partition.
- Use remaining space: This checkbox indicates if the size you entered in the previous field is to be considered the partition's exact size, or its minimum size. When selected, the partition will grow to fill all available space on the hard disk. The partition's size will expand and contract as other partitions are modified. You can make multiple partitions growable; if you do, the additional free space will be shared among all growable partitions.
- **Partition Type**: This field contains a list of different partition types (for example, Linux Native). Select the appropriate partition type 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 direct Disk Druid to place partitions as you see fit, or let Disk Druid decide where partitions should go.

- Ok: Select Ok once you're satisfied with the settings, and wish to create the partition.
- **Cancel**: Select **Cancel** if you don't want to create the partition.

Editing Partitions

To edit a partition, select the **Edit** button or double-click on the existing partition (see Figure 3–10, *Editing a Partition*).

Figure 3–10 Editing a Partition

| Mount Point: / | | | | |
|-------------------------------|--|--|--|--|
| Size (Megs): 868 | | | | |
| 🗖 Use remaining space? | | | | |
| Allocation Status: Successful | | | | |
| Partition Type: Linux native | | | | |
| Allowable Drives: | | | | |
| Ok Cancel | | | | |

Please Note

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

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 3.10, Formatting Partitions for further installation instructions.

3.9.3 Partitioning with fdisk

If you've chosen to use fdisk to manually partition your system, read this section. If are not using fdisk, please skip to Section 3.8, *Automatic Partitioning* for automatic partitioning or Section 3.9.2, *Partitioning with Disk Druid* for partitioning with Disk Druid.



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.

SRM Partitioning Requirements

When you allow the Red Hat Linux installation program to partition for you (automatic partitioning), the installation program will handle certain special partitioning requirements for SRM. Disk Druid is also aware of SRM's partitioning requirements and will partition your system accordingly. If you use fdisk to partition manually, however, you'll need to be aware of these issues, since you'll need to take care of them yourself. Special partitioning issues for SRM include the following:

- 1. You'll need to use BSD-style disklabels. When you use fdisk in the graphical installation program, it will start in BSD disklabel mode.
- 2. You'll need to leave unallocated space at the beginning of your hard drive.

You'll need to use BSD-style disklabels because of aboot's partitioning requirements. When you're using the SRM firmware to boot Linux, you're using the aboot bootloader. The aboot program supports the creation of bootable block devices and contains a program which can load Linux kernels from a filesystem that is bootable by SRM.

The aboot program does not understand DOS-style partition tables. You'll need to use BSD-style disklabels, which aboot does understand.

BSD-style disk labeling is different in certain ways from standard fdisk-style partitioning (used on x86 installations) in the following ways:

- The partitions are identified by letters (a, b, c...) instead of numbers.
- The partition types are different. For example, instead of using "83" and "82" to correspond to "Linux" and "Linux Swap," respectively, ext2 partitions are identified as "8"; the swap partition is "1".
- You can have a maximum of eight partitions (a to h) per drive.
- Partition types must be explicitly set after creation. The BSD disklabel program uses a default partition type of "unknown" which causes the Disk Setup portion of the installation program not to see the partitions.

Another requirement for partitioning is that you provide initial unallocated space at the beginning of the hard drive. The initial unallocated space is unallocated disk space that is not explicitly allocated to any label other than the "whole disk" label. This space should be approximately 1 MB to 10 MB (2048 to 20480 sectors), depending on exactly what configuration of aboot you're using.

The unallocated disk space provides space at the very beginning of the hard drive for aboot to write the boot block and object file that allows booting to kernels located

within the disk labels. For more information on the process aboot uses to boot, please see the *SRM Firmware HOWTO* at the following URL:

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

WARNING

To provide the initial unallocated space, you'll need to start your partitions at cylinder 2. If you do a workstation- or server-class installation and allow the installation program to partition for you, the installation program will provide the initial unallocated space. If you're using Disk Druid, Disk Druid knows about this requirement, and it will not allow you to start the partitions at cylinder 1 during manual partitioning. If you're using fdisk, however, you'll need to remember to start your partitions at cylinder 2.

Using fdisk

If you have chosen to use fdisk, the next screen (see Figure 3–11, *fdisk*) will prompt you to select a drive to partition using fdisk.

| Online Help | Select drive to run fdisk on |
|---|------------------------------|
| fdisk Select which drive you want to partition. When you click on the drive, you will be presented with the fdisk partitioning screen. You may then use fdisk to create, delete, or modify partitions on the selected hard drive. | sda |
| If you decide that you don't want to use fdisk, click Back to return to the previous screen, deselect Use fdisk , and click Next to continue. Once you have partitioned the drive | / |
| 💡 Hide Help | ⊲ Back Next |

Figure 3–11 fdisk

Once you have chosen which drive to partition, you will be presented with the fdisk command screen (see Figure 3–12, *Partitioning with fdisk*). If you are unsure as to what command you should use, type [m] at the prompt for help.

Figure 3–12 Partitioning with fdisk



The following table provides the most common fdisk commands.

| Command | What it Does | |
|---------|--|--|
| b | enters BSD disklabel command line mode | |
| m | displays help | |
| q | displays the current partition table | |
| d | deletes a partition | |
| n | creates a new partition | |
| W | writes the partition table to disk | |
| t | sets the type of partition | |

Table 3–2 fdisk commands

| Command | What it Does |
|---------|-------------------------------------|
| L | display the list of partition types |
| q | quits fdisk |

You'll need to be aware of a few issues regarding partitioning with fdiSk. First, Linux fdiSk creates partitions of type unknown by default. When you create partitions, don't forget to change swap partitions to type Linux swap, and Linux partitions to type ext2 using the t command. The value for the Linux swap type is 1; ext2 partitions are 8. For other partition types, use the L command to see a list of partition types and values.

Linux allows up to four (4) partitions on one disk. If you wish to create more than that, one (and only one) of the four may be an extended partition, which acts as a container for one or more logical partitions. Since it acts as a container, the extended partition must be at least as large as the total size of all the logical partitions it is to contain.

It's a good idea to write down which partitions (e.g., /dev/sda2) are meant for which filesystems (for example, /usr) as you create each one.

When you've finished making partitions, type w to save your changes and quit. You will be taken back to the original fdisk screen where you can choose to partition another drive or continue with your installation.

When you are finished partitioning your disks, press **Done**; you may see a message indicating that the installation program needs to reboot. This is a normal occurrence after changing a disk's partition data; it usually happens if you created, changed or deleted any extended partitions. After you press **OK**, your machine will reboot and the installation will begin again. Repeat the same installation steps you performed earlier until you reach the **Partition Disks** dialog; then simply choose **Done**.

Please Note

None of the changes you make take effect until you save them and exit fdisk using the w command. You can quit fdisk at any time without saving changes using the q command.

After you have partitioned your drive(s), click Next. Then you'll 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 those you have already created.

Figure 3–13 Editing with Disk Druid

| Online Help | | Disk Druid- | | | | | |
|----------------------------|---------------------|---------------|-----------|--------------|---------|------------|--------------|
| | $\overline{\Delta}$ | Partitions | | | | | |
| | | Mount Point | Device | Requested | Actual | Туре | |
| Partitions | _ | /boot | sda1 | 133M | 133M | Linux na | tive |
| | | <swap></swap> | sda2 | 258M | 258M | Linux sw | /ap |
| Where do you want to | | 17 | sda3 | 8275M | 8275M | Linux na | tive |
| install Red Hat Linux? | | | | | | | |
| Please note: If you are | | | | | | | |
| performing a | | | | | | | |
| Partitionless Installation | | | | | | | |
| you will need to define | | | | | | | |
| an existing | | I | | | | | |
| DOS/Windows partition | | Edit | 1 | Reset | | Make R | AID Device |
| as root, shown as /. Click | | | 1 | | | | |
| on the FAT partition you | | Drive Summa | ary | - | | - | 1 |
| want to select for this | | Drive Geo | om [C/H/3 | S] Total (M) | Free (M | I) Used (N | v1) Used (%) |
| installation. Once it is | | sda. [11 | 06/255/6 | 63] 8675M | 48 | / 8667 | M I 99% |
| highlighted, click Edit to | | | | | | | |
| assign it the mount point | | | | | | | |
| of / (root). Click Ok when | | | | | | | |
| you're done. Once you | | | | | | | |
| have confirmed this | | | | | | | |
| choice, you will need to | 7 | | | | | | |
| dofino the environmiste | 7 | p. | | | | | |
| | | | | | | Back | D Novt |
| 8 Line Leih | | | | | | DACK | ► Next |

For each partition you created with Disk Druid, click on the Edit button, choose the appropriate mount point for that partition from the pull-down menu, and click on OK.

See Section 3.10, Formatting Partitions for further installation instructions.

3.10 Formatting Partitions

After you've created partitions, you'll 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 3–14, *Choosing Partitions to Format*).

Figure 3–14 Choosing Partitions to Format

| Online Help | Choose partitions to Format |
|--|---------------------------------------|
| | r /dev/sda3 / |
| Choose | r /dev/sda1 /boot |
| Partitions to | |
| Format | |
| Choose the partitions that you would like to format for Red Hat Linux. | |
| Do you want to check for bad blocks? | |
| Checking for bad blocks can help prevent data loss by finding the bad blocks on a drive and making a list of them to prevent data from being written to them in the future. | Check for bad blocks while formatting |
| ? Hide Help | Sack Next |

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

Please Note

Selecting **check for bad blocks** may dramatically increase your total installation time. Since most newer hard drives are quite large in size, checking for bad blocks may take a while depending on the size of your hard drive.

3.11 Network Configuration

If you have a network card and have not already configured your networking information, you now have the opportunity to configure networking (as shown in Figure 3–15, *Network Configuration*).

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

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

| Online Help | Network Configuration | | |
|---|--|---|--------|
| Network | eth0 | P | |
| Configuration | E Activate on boot | | |
| Configuration Choose your network card and whether you would like to configure using DHCP. If you have multiple Ethernet devices, each device will have its own configuration screen. You can switch between device screens, (for example eth0 and eth1); the information you give will be specific to each screen. If you select Activate on boot, your network card will be started when you boot. | IP Address: 192.168. Netmask: 255.255. Network: 192.168. Broadcast: 192.168. Hostname: spa Gateway: 192 Primary DNS: 207 Secondary DNS: Ternary DNS: 1 | 0.1 255.0 0.254 0.1 rky.redhat.com 1.168.0.1 1.175.42.153 | |
| 💡 Hide Help | | d Back | ▷ Next |

Providing a Name for Your Machine

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

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

3.12 Time Zone Configuration

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



Figure 3–16 Configuring Time Zone

Notice the two tabs at the top of the screen (see Figure 3–16, *Configuring Time Zone*). The first tab offers you the ability to configure by location. With this option, you can choose your view. Under View, your options are: World, North America, South America, Pacific Rim, Europe, Africa, and Asia.

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

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

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

Changing Time Configuration After Installation

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

3.13 Account Configuration

The **Account Configuration** screen allows you to set your root password. Additionally, you can set up user accounts for you to log into once the installation is complete (see Figure 3–17, *Account Creation*).

Figure 3–17 Account Creation

| Online Help | Account Configura | tion |
|--------------------------|----------------------------|--|
| Account Configuration | Root Password: Confirm: | ******* ****** Root password accepted. |
| root account. The | Account Name: | kath |
| password must be at | Account Name. | |
| least six characters in | Password: | Password (confirm): |
| nassword by | | User password accepted. |
| re-entering the | Full Name: | Katherine E. Brock |
| password in the second | | |
| entry field. The Next | Add | Edit Delete New |
| button will become | Account Name E | |
| fields match | Account Name P | atharina E. Brack |
| Here's Here's | Kaut K | |
| Then create a user | | |
| account. | | |
| Enter a user account | | |
| name. Next, create a | A I | |
| 🔋 Hide Help | | Sack Dext |

3.13.1 Setting the Root Password

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

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

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

Please Note

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

3.13.2 Setting Up User Accounts

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

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

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

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

3.14 Authentication Configuration

If you are performing a workstation-class installation, please skip ahead to Section 3.16, *GUI X Configuration Tool*.

If you are performing a server-class installation, please skip ahead to Section 3.17, *Preparing to Install Packages*.

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

Unless you are setting up **NIS** authentication, you will notice that both **MD5** and **shadow** passwords are selected (see Figure 3–18, *Authentication Configuration*). We recommend you use both to make your machine as secure as possible.

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

| Online Help | Authentication Configuration |
|---|----------------------------------|
| | 🗖 Enable MD5 passwords |
| Authentication | F Enable shadow passwords |
| Configuration | ☐ Enable NIS |
| You can skip this section | NIS Domain: |
| if you will not be setting | Use broadcast to find NIS server |
| up network passwords. | NIS Server: |
| ask your system administrator for assistance. | LDAP Server: |
| Unless you are setting up an <i>NIS</i> password, you will notice that both <i>MD5</i> and shadow passwords are selected. We recommend you use both to make your machine as secure as possible. | LDAF Base DN: |
| 💡 Hide Help | |

Figure 3–18 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 of retaining passwords. The passwords are stored in /etc/shadow, which is readable only by root.
- Enable NIS allows you to run a group of computers in the same Network Information Service domain with a common password and group file. There are two options to choose from here:
 - NIS Domain allows you to specify which domain or group of computers your system belongs to.
 - NIS Server causes your computer to use a specific NIS server, instead of broadcasting a message to the local area network asking for any available server to host your system.

- Enable LDAP the use of LDAP can consolidate 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 the *Official Red Hat Linux Reference Guide*. If you're using LDAP, you should provide these two parameters: LDAP Server and LDAP Base DN.
- Enable Kerberos Kerberos is a secure system for providing network authentication services. For more information about Kerberos, refer to the *Official Red Hat Linux Reference Guide*. There are three Kerberos-related parameters you'll need to provide here: the Realm, the KDC or Key Distribution Center (KDC), sometimes called a Ticket Granting Server or TGS, and the Admin Server.

3.15 Package Group Selection

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

You can select components, which group packages together according to function (for example, **C Development**, **Networked Workstation**, or **Web Server**), individual packages, or a combination of the two. Depending on whether you chose to do a workstation-class, server-class, or custom-class installation, you'll see a different subset of package groups.

To select a component, click on the checkbox beside it (see Figure 3–19, *Package Group Selection*).

| Online Help | Package Group Selection | |
|---|----------------------------|------------------------|
| Selecting | Printer Support | |
| Package Groups | r X Window System | Ļ |
| Select the package groups that you want to install. To select a | г 🍪 дноме | |
| package group, click on the check box beside it. | LI SOS KDE | |
| To select packages individually, you must check the Select | F Mail/WWW/News Tools | |
| the bottom of the screen. | DOS/Windows Connectivity | |
| | | JZ |
| | Select individual packages | rotar mstan size: 395M |
| 💡 Hide Help | | 🛛 Back 🛛 🕞 Next |

Figure 3–19 Package Group Selection

Select each component you wish to install. Selecting **Everything** (at the end of the component list) installs all packages included with Red Hat Linux. Selecting every package will require approximately 2 GB of free disk space.

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

3.15.1 Selecting Individual Packages

After selecting the components you wish to install, you can select or deselect individual packages. The installation program presents a list of the packages in that group, which you can select or deselect using your mouse (see Figure 3–20, *Selecting Individual Packages*).

| Name: xlockmore-4.16.1-7 Package De Size: 2220.0 KBytes Select Package For Installa Total Install size: 735M The xlockmore utility is an enhanced version of the standard xlock program, which allows you to lock a session so that other users can't access it. Xlockmore runs a provided screensaver until you type in you password. | Amusements Games Games Graphics Gevelopment Documentation Gocumentation Guesem Environment User Interface | Up Klockmore | kdetoys koletoys xmorph | xdaliclock Koreensaver | xloadimage Xisadimage Xisri |
|--|---|-----------------------------------|-------------------------------|---------------------------|-----------------------------------|
| Size: 2220.0 KBytesSelect Package For Installa Total install size: 735M The xlockmore utility is an enhanced version of the standard xlock program, which allows you to lock a session so that other users can't access it. Xlockmore runs a provided screensaver until you type in yo password. | Name: xlockmore-4.16.1-7 | | | | Package Detail: |
| Total install size: 735M The xlockmore utility is an enhanced version of the standard xlock program, which allows you to lock a session so that other users can't access it. Xlockmore runs a provided screensaver until you type in yo password. | Size: 2220.0 KBytes | ☐ Select Package For Installation | | | |
| The xlockmore utility is an enhanced version of the standard xlock program, which allows you to lock a session so that other users can't access it. Xlockmore runs a provided screensaver until you type in yo password. | Total install size: 735M | | | | |
| nnstan the xilockmore package if you need a locking program to secure X sessions. | | | | | |

Figure 3–20 Selecting Individual Packages

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

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

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

Please Note

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

3.15.2 Unresolved Dependencies

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

If any package requires another package which you have not selected to install, the program presents a list of these unresolved dependencies and gives you the opportunity to resolve them (see Figure 3–21, *Unresolved Dependencies*).

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





3.16 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 3.18, *Installing Packages*. By default, the X Window System is not installed during server-class installations.

3.16.1 Configuring Your Monitor

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

| Online Help | Monitor Configuration |
|---------------------------|----------------------------|
| | |
| | COMPAQ 1024 Monitor |
| v | COMPAQ 151FS Monitor |
| Λ | COMPAQ 171FS Monitor |
| Configuration | COMPAQ P110 Color Monitor |
| Configuration | COMPAQ P1610 Color Monitor |
| The installation was many | COMPAQ P50 Color Monitor |

Figure 3–22 Monitor Selection



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



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

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

Click Next when you have finished configuration of your monitor.

3.16.2 Video Hardware Configuration

Next, Xconfigurator will probe for any video hardware you have (see Figure 3–23, *Videocard Setup*). Failing that, Xconfigurator will present a list of video cards and monitors for you to select from.

Xconfigurator Won't Probe Video RAM Size

Please note that Xconfigurator won't probe an Alpha machine's video RAM size. You'll need to choose your video RAM size (see Figure 3–23, *Videocard Setup*).

If your video card does not appear on the list, XFree86 may not support it.³ 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.

³ See http://www.xfree86.org for information about the video cards supported by XFree86.

| Online Help | X Configuration Your video ram size can not be autodetected. Choose your video size from the choices below: | ram |
|--|---|------|
| X Configuration Although, the installation program probes to determine the best video card for your system, you can choose another video card if needed. | ELSA GLOria-XL ELSA GLOria-XL ELSA Gloria-4 ELSA Gloria-4 ELSA Sloria-4 ELSA VICTORY ERAZOR ELSA VICTORY ERAZOR LT ELSA VICTORY ERAZOR LT ELSA VICTORY 3D ELSA VICTORY 3D ELSA WINNER 1000/T2D ELSA WINNER 1000/T2D ELSA WINNER 1000 R3D | |
| Once you have selected your video card, choose the amount of video RAM present on your card. After your hardware configuration is set, you can test your settings. You can also choose | Image: Configuration Image: Configuration Image: Customize X Configuration Image: Customize X Configuration | |
| 💡 Hide Help | → Back | lext |

Figure 3–23 Videocard Setup

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

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

If you would like to customize the X configuration, please make sure the **Customize X Configuration** checkbox is selected. If you choose to customize, you will be presented with another screen that lets you select what your resolution should be (see Figure 3–24, *X Customization*). Again, you will have the option of testing the configuration.

Be sure to select either GNOME or KDE as your desktop default, if you installed one or both of them.

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

Figure 3–24 X Customization

| Online Help | Customize X Configurat | tion | |
|--|-------------------------|------------------|-------------------|
| | 8Bits per Pixel | 16Bits per Pixel | 32Bits per Pixel |
| Gustan | ☐ 640×480 | ∐ 640×480 | □ 640×480 |
| Custom Configuration | □ 800×600 | ⊒ 800×600 | _ 800×600 |
| coninguration | □ 1024×768 | □ 1024×768 | □ 1024×768 |
| Now choose the correct resolution for your X | ☐ 1152×864 | ⊒ 1152x864 | _ 1152×864 |
| configuration. Click Test this configuration to try | □ 1280×1024 | □ 1280×1024 | |
| out this configuration. If | ☐ 1600×1200 | □ 1600×1200 | |
| are presented with while testin, click No to choose another resolution. | Test this configuration | | |
| 💡 Hide Help | | d Back | D Next |

3.17 Preparing to Install Packages

You will now see a screen preparing you for the installation of Red Hat Linux (see Figure 3–25, *Ready to Install*).

WARNING

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

Figure 3–25 Ready to Install



3.18 Installing Packages

At this point there's nothing left for you to do until all the packages have been installed (see Figure 3–26, *Installing Packages*). How quickly this happens depends on the number of packages you've selected, and your computer's speed.

Figure 3–26 Installing Packages

| Online Help | Installing Package | es | | |
|--|--|----------|--------|---------|
| Installing Packages | Package: glibc-devel-2.1.90-15 Size: 32,230 KBytes Summary: Header and object files for development using standard C libraries. | | | |
| We've gathered all the | Status | Packages | Size | Time |
| information needed to | Total | 349 | 539 M | 0:13.57 |
| unur gustem It meu teke | Completed | 115 | 197 M | 0:05.05 |
| a while to install | Remaining | 234 | 342 M | 0:08.51 |
| now many packages need to be installed. | | | red | nat, |
| 💡 Hide Help | | | d Back | ⊳ Next |

3.19 Note the Kernel Filename and Partition Number

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

Switch to the second virtual console using [Alt]-[F2] in text-mode, or using [Ctrl]-[Alt]-[F2] in X. Type in the following command:
```
bash# cat /mnt/sysimage/etc/aboot.conf
```

You should see output similar to the following:

aboot default configurations
0:2/boot/vmlinuz-2.2.17-4 root=/dev/sda2

Use Table 3–3, *Kernel Location* to write down the kernel filename and the location of the root filesystem. Hopefully, you won't need to use it, but you'll be prepared. Switch back to the installation program using [Ctrl]-[Alt]-[F7].

Table 3–3 Kernel Location

| Path to and Filename of Kernel | Location of Root Filesystem |
|--------------------------------|-----------------------------|
| | |

3.20 Installation Complete

Congratulations! Your Red Hat Linux 7.0 installation is now complete!

The installation program will prompt you to prepare your system for reboot (see Figure 3–27, *Installation Complete*). Don't forget to remove any diskette in the floppy drive or CD in the CD-ROM drive.

Figure 3–27 Installation Complete



For the commands you'll need to boot Red Hat Linux, see Section 3.21, *Booting Your Machine and Post-Installation Setup*.

3.21 Booting Your Machine and Post-Installation Setup

This section describes how to boot your Alpha into Red Hat Linux and how to set your SRM console variables so that Red Hat Linux is automatically booted when the machine is powered on.

3.21.1 Recommended Boot Method

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

boot dka0 -fl 0

In this example, dka0 is the hard drive on which the /boot partition resides (the SRM device on which the installation program installed the aboot secondary boot loader).

Setting SRM Boot Variables

After you've installed Red Hat Linux, at the SRM prompt, use the show boot* command to display the list of devices recognized by SRM. The system hard drive should be displayed as the bootdef_dev. If it isn't, set bootdef_dev to the hard drive with a command like the following:

set bootdef_dev dka0

In the previous example, dka0 may be a different value, depending upon your system. Refer to Section 2.4.1, *SRM Device Names* if you need more information on how SRM refers to system devices.

Set the boot_osflags SRM console variable with the following command:

```
set boot_osflags 0
```

Unset the boot_file variable with the following command:

set boot_file ""

After setting these variables, your Alpha should then boot Red Hat Linux in response to the command boot at the SRM console prompt.

3.21.2 Alternate Boot Method

If the boot dka0 -fl 0 command is problematic for your machine, the complete format of the command for booting from SRM is as follows:

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

In the above command, *<device>* is the SRM device on which the aboot secondary boot loader is installed. *<boot file>* is the uncompressed kernel file that you installed. You should have noted these values during the installation process, as described in Section 3.19, *Note the Kernel Filename and Partition Number*. You'll need to preface the kernel filename with the number of the partition where the kernel resides, and include the full path to the kernel.

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

For example, if you installed aboot on the first SCSI device on the second SCSI bus (dkb0), the root of your Linux filesystem is the third partition of your first SCSI drive (/dev/sda3), and you installed version 2.2.17-4 of the Linux kernel, then the boot command to boot your Alpha is:

```
boot dkb0 -file 3/boot/vmlinuz-2.2.17-4 -flags "root=/dev/sda3"
```

Setting SRM Boot Parameters Using Alternate Boot Method

After you've installed Red Hat Linux, at the SRM prompt, use the show boot* to display the list of devices recognized by SRM. Set bootdef_dev to the hard drive with a command like the following (note that this is an example; you'll need to provide the correct values for your machine):

set bootdef_dev dkb0

In the previous example, *device* should be set to your hard drive, as recognized by SRM. Refer to Section 2.4.1, *SRM Device Names* if you need more information on how SRM refers to system devices.

Set the boot_osflags SRM console variable to the boot flags you need with a command like the following:

set boot_osflags root=/dev/sda3

Set the boot_file variable with the following command:

set boot_file 3/boot/vmlinuz-2.2.17-4

In the above command, you'll need to provide the location of the boot file, including the partition and the path to the file.

After setting these variables, your Alpha should then boot Red Hat Linux in response to the command boot at the SRM console prompt.

3.21.3 Booting Red Hat Linux Automatically

After you've set your boot parameters according to either Section 3.21.1, *Recom*mended Boot Method or Section 3.21.2, Alternate Boot Method, and if you have a HALT button on your machine, you can use the auto_action variable to automatically boot Red Hat Linux upon power-up.

If you have a HALT button, you can set the SRM console to autoboot using the auto_action SRM console variable. The auto_action parameter can be set to HALT or BOOT to set the default power-on function of the Alpha machine when it is booted into the SRM console.

If you set auto_action to BOOT and your other SRM boot variables are set correctly, your Alpha will automatically boot Red Hat Linux when booted into the SRM console. If you set auto_action to halt, your Alpha will stop at the SRM console when it is powered on.

Does Your Alpha Have a HALT Button?

When setting the value of the auto_action SRM console variable, note that your machine will not be able to return to the SRM console unless you press the HALT button on the machine. Some Alpha machines don't have a HALT button. Don't set the auto_action value to BOOT unless your Alpha machine has a HALT button (which will allow you to return to SRM).

Other methods for halting your machine may work, depending upon your hardware. You can try pressing [Ctrl]-[c] several times in a row. You can also try the halt command in Red Hat Linux to halt your machine and return to the SRM console. Neither of these methods are guaranteed to work on your machine.

If you want to set your machine to automatically boot, and you have a HALT button, use the following command:

set auto_action BOOT

4 Upgrading Your Current System

This chapter walks you through a typical Red Hat Linux 7.0 upgrade.

4.1 What it Means to Upgrade

The installation process for Red Hat Linux 7.0 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 2.2.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 using an .rpmsave extension (e.g., sendmail.cf.rpmsave) and leaves a log of the actions it took in /tmp/upgrade.log. As software evolves, configuration file formats can change, so you should carefully compare your original configuration files to the new files before integrating your changes.

Upgrading Certain Packages May Create Dependencies

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

4.2 Upgrading Your System

At this point, you should have chosen **Upgrade** as your preferred installation type (see Figure 4–1, *Choosing to Upgrade*).



Figure 4–1 Choosing to Upgrade

4.3 Customizing Your Upgrade

Do you want to choose your packages to be upgraded or let the installation program perform an automated installation (see Figure 4–2, *Upgrade Customization*)?

To let the installation program do the upgrade process for you, make sure the **Customize packages to be upgraded** is *not* selected and click **Next** (see Section 4.5, *Upgrading Packages*).

To customize the packages to be upgraded, select the **Customize packages to be upgraded** checkbox and then click **Next**.

| Online Help | Upgrade Examine |
|---|--|
| Conline Help Upgrading your System Once you have chosen to upgrade, you can also decide whether you want to customize your packages. If you do not want to select additional packages for upgrade, click Next to continue. To customize your packages, select the Customize packages to be upgraded button and then click Next. | Upgrade Examine Customize packages to be upgraded |
| Provide Help | Sack Dext |

Figure 4–2 Upgrade Customization

4.4 Selecting Packages to Upgrade

Here, you are given the opportunity to choose which packages you would like to upgrade (see Figure 4–3, *Individual Package Selection*).

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

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

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

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.

Figure 4–3 Individual Package Selection



4.4.1 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 4–4, *Unresolved Dependencies*).

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

| nline Help | Unresolved Dep | pendencies | |
|---------------------------------------|----------------|---------------------------------|------------|
| | Package | Requirement | |
| | Xconfigurator | XFree86 | |
| Unresolved | xinitrc | XFree86 | |
| Dependencies | mkxauth | XFree86 | |
| Dependencies | control-cente | r xscreensaver | |
| Many software | Mesa | XFree86 | |
| packages depend on | griome-core | xscreensaver | |
| ther packages or | | | |
| ibraries in order to work | | | |
| correctly. To make sure | | | |
| your system has all the | | | |
| packages it needs in | | | |
| order to work, Red Hat | | | |
| Linux checks these | | | |
| package dependencies | | | |
| each time you install or | | | |
| remove a package. If | | | |
| one package requires | | | |
| another package that | | | |
| has not been installed, | | | |
| unresolved dependencies | , | | |
| exist. | 7 - | Install packages to satisfy dep | oendencies |
| · · · · · · · · · · · · · · · · · · · | | | |
| Hide Help | | 🚽 Back | ▷ Next |

Figure 4–4 Unresolved Dependencies

4.5 Upgrading Packages

At this point there's nothing left for you to do until all the packages have been upgraded or installed (see Figure 4–5, *Installing Packages*).

Time 0:07.18 0:01.13 0:06.05

▷ Next

| nline Help | Installing Packages |
|----------------------------|---|
| | Package: XFree86-libs-3.3.5-1.6.0 |
| | Size: 2061.2 KBytes Summary: Shared libraries needed by the X Window |
| Installing | System version 11 release 6. |
| Packages | |
| | |
| Please wait while the | Status Packages Size |
| completed information | Total 293 352 M |
| and beging installing your | Completed 35 58 M |
| and begins instanning your | Bemaining 258, 293 M |

Figure 4–5 Installing Packages

```
4.6 Upgrade Complete
```

Hide Help

Congratulations! Your Red Hat Linux 7.0 upgrade is now complete!

If you're going to boot your Alpha from the SRM console, take the time to note the kernel filename using the instructions in Section 3.19, *Note the Kernel Filename and Partition Number*, before you reboot your machine.

🚽 Back

You will now be prompted to prepare your system for reboot. Don't forget to remove any diskette in the floppy drive or CD in the CD-ROM drive. See Section 3.21, *Booting Your Machine and Post-Installation Setup* for information on how to boot Red Hat Linux.

Congratulations Congratulations Congratulations, installation is complete. Press return to reboot, and be sure to remove your boot medium as the system reboots, or your system will rerun the install. For information on fixes which are available for this release of Red Hat Linux, consult the Errata available from http://www.redhat.com/errata. Information on configuring and using your Red Hat Linux system is contained in the Red Hat Linux manuals. Image: Show Help

Figure 4–6 Upgrade Complete

A MILO

This chapter provides information that might be useful for those who want to install Red Hat Linux on an Alpha which boots using MILO, the Alpha Miniloader, instead of the SRM console.

WARNING

Red Hat does not provide support for the MILO miniloader. If you use MILO to boot your Alpha, you will not receive technical support from Red Hat.

You may need more information to help you with MILO. The *Alpha Miniloader HOWTO*, which contains in-depth information about the MILO miniloader, is available from the following URL: ftp://gatekeeper.dec.com/, in the file pub/Digi-tal/Linux-Alpha/Miniloader/docs/HOWTO/milo.howto.html.

Please Note

Many people will find the previous information to be very useful. However, this information is provided by sources outside of Red Hat, Inc. and it contains descriptions of procedures that are not supported by Red Hat, Inc.

A.1 MILO Installation Overview

Installing Red Hat Linux on an Alpha system using MILO is slightly more complex than installing Red Hat Linux on an Intel machine. In general, the sequence of steps to a successful installation are:

1. Create a boot image diskette, a MILO image diskette and a RAM disk image diskette.

- 2. Load and run the Red Hat Linux/Alpha kernel, and boot into the Red Hat Linux installation program using MILO.
- 3. Install the bootloader on a small partition on your machine.

A.2 MILO and Alpha Hardware

If you're reading this chapter, presumably you're intent upon using MILO to boot your Alpha. As you have already read, you will not receive any technical support from Red Hat if you're using MILO. Therefore, by definition, any hardware that you're using is unsupported.

Disk space requirements for installing Red Hat Linux on an Alpha are listed in Section 2.1.1, *Disk Space Requirements*.

A.3 Choosing Disk Images

To install Red Hat Linux on an Alpha using MILO, you'll need to create three diskettes: a boot image diskette, a RAM disk diskette and a MILO image diskette. Create a boot image file diskette from the boot image file on CD 1: images/generic.img. You'll also need a RAM disk image made from images/ramdisk.img, also on CD 1.

The MILO images are located in the milo/images directory on CD 1, in compressed gzip format. You'll need to choose the appropriate image for your system, uncompress it and write it to a diskette. If you don't know which image to choose for your system, see Table A-1, *MILO Images*.

| Machine Class | Model | Alias | MILO Image |
|------------------------------------|-----------------|---------|------------|
| Alcor | AS 600 | ALCOR | alcor.img |
| | AS 500 5/5xx | BRET | xlt.img |
| | XL-300 | XLT | |
| | XL-366 | XLT | |
| | XL-433 | XLT | |
| Digital Alpha | XL-233 | XL | xl.img |
| XL | XL-266 | XL | |
| Avanti | AS 200 4/xxx | MUSTANG | avanti.img |
| | AS 205 4/xxx | LX3 | |
| | AS 250 4/xxx | M3 | |
| | AS 255 4/xxx | LX3+ | |
| | AS 300 4/xxx | MELMAC | |
| | AS 400 4/xxx | AVANTI | |
| Digital Personal Workstation | PWS 433a, 433au | MIATA | miata.img |
| | PWS 500a, 500au | MIATA | |
| | PWS 600a, 600au | MIATA | |
| Mikasa | AS 1000 4/xxx | MIKASA | mikasa.img |
| Noname | AXPpci33 | NONAME | noname.img |
| | UDB/Multia | MULTIA | |

Table A–1 MILO Images

| Machine Class | Model | Alias | MILO Image |
|------------------|---------------|-----------|---------------|
| EB64+ | EB64+ | EB64+ | eb64p.img |
| | AlphaPC64 | CABRIOLET | cabriolet.img |
| | AlphaPCI-64 | CABRIOLET | |
| PC164 | AlphaPC164 | PC164 | pc164.img |
| | AlphaPC164-LX | LX164 | lx164.img |
| | AlphaPC164-SX | SX164 | sx164.img |
| EB164 | EB164 | EB164 | eb164.img |
| EB66+ | EB66+ | EB66+ | eb66p.img |
| EB66 | EB66 | EB66 | eb66.img |
| Takara | Takara | TAKARA | takara.img |
| Ruffian | AlphaPC 164UX | RUFFIAN | ruffian.img |
| AlphaBook1 | | | book1.img |
| Platform2000 | | | p2k.img |

Look through Table A-1, *MILO Images* for your machine or its alias. The appropriate MILO image (if applicable) is listed on the right. All of the MILO image files are located in the milo/images directory on Red Hat Linux CD 1.

Try the MILO images included on Red Hat Linux CD 1 first. MILO images are also available from the following URL:

ftp://gatekeeper.dec.com/pub/Digital/Linux-Alpha/Miniloader/latest-Images/

The subdirectories in this directory correspond to different Alpha systems. Within the subdirectory, the MILO image file is named milo.dd. You'll need to write this file to a diskette.

Refer to Appendix C, *Writing Image Files to Diskettes* for instructions on how to make diskettes from disk images. Label all three diskettes appropriately.

A.4 Disk Partitioning

The only special rule for partitioning the hard drive for MILO is that there should be a 2 MB FAT partition at the beginning of the drive where MILO will be installed.

A.5 Installations Using MILO

To boot Red Hat Linux using MILO, you'll need to use some version of either the ARC or AlphaBIOS console, plus the linload.exe program.

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

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

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

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

A.5.1 Setting up ARC for Installation

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

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

- 1. The correct MILO image diskette for the class of machine onto which you are installing Red Hat Linux. The MILO images, in compressed format, are located in the milo/images directory on CD 1. See Section A.3, *Choosing Disk Images* if you're not sure which MILO image to use.
- 2. A generic kernel diskette, made from images/generic.img on CD 1.
- 3. The RAM disk diskette, made from images/ramdisk.img on CD 1.

Please refer to Appendix C, *Writing Image Files to Diskettes* for instructions on writing image files to diskettes.

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

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

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

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

Please Note

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

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

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

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

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

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

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

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

A.5.2 Setting up AlphaBIOS for Installation

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

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

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

- 1. The correct MILO diskette for the class of machine onto which you are installing Red Hat Linux. The MILO images, in compressed format, are located in the milo/images directory on CD 1. See Section A.3, *Choosing Disk Images* if you're not sure which MILO image you need.
- 2. A generic installation kernel diskette, from images/generic.img on CD 1.

3. A RAM disk diskette, made from images/ramdisk.img on CD 1.

Please refer to Appendix C, *Writing Image Files to Diskettes* for instructions on writing image files to diskettes.

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

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

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

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

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

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

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

A.5.3 The MILO User Interface

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

Once you boot into MILO, you get a prompt that is very familiar to the standard bash# prompt in Linux. As mentioned earlier, MILO uses native Linux device

drivers; therefore, all devices in MILO are referred to in the same manner as a running Linux system (/dev/scd0 for a SCSI CD-ROM 0, /dev/hda for the first IDE device, etc.).

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

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

Please Note

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

Devices

Until you use a command that needs to make use of a device, no device initialization will take place. The first time you issue the show, ls, or run command, the devices

within MILO will be initialized. Devices are named exactly the same way that Linux names devices. So, the first IDE drive will be called hda and its first partition will be hda1. Use the show command to show what devices are available.

Filesystems

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

MILO> ls -t iso9660 scd0:

Variables

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

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

Please Note

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

A.5.4 Booting with MILO

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

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

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

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

MILO> boot fd0:

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

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

Type in linux and press [Enter].

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

A.5.5 Installation

See to Chapter 3, *GUI Installation of Red Hat Linux* for instructions on the graphical installation process. The next MILO-specific step you'll need to take is the installation of MILO to your hard drive, which should be done after the packages have been installed (see Section 3.18, *Installing Packages*). Instructions for installing MILO to the hard drive are as follows:

Stop when the packages you've selected are finished being transferred to the hard drive. At this point, the packages have been installed and you will need to press the **Next** button to finish the installation. Do *NOT* press the **Next** button yet. Instead, use the following instructions to install MILO to your hard drive.

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

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

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

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

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

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

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

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

bash# exit

Now switch back to the GUI using [Ctrl]-[Alt]-[F1] and select the Next button to finish the installation process.

A.6 Post-Installation MILO Setup

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

Add another boot selection, as described in Section A.5.1, *Setting up ARC for Installation* for ARC and in Section A.5.2, *Setting up AlphaBIOS for Installation* for AlphaBIOS. However, this time you should select the appropriate hard drive device. If you installed Linux to the first hard drive, the device should be:

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

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

```
Disk 0 Partition 1
```

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

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

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

B Other Sources of Information About Alphas

Other reference materials, related to running Red Hat Linux on an Alpha system, are available on the Web. A few of the available resources are as follows:

The AlphaLinux website provides a wealth of information regarding running Linux on an Alpha:

http://www.alphalinux.org

The *SRM Firmware HOWTO* describes how SRM firmware can be used to boot Linux:

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

The Brief Introduction to Alpha Systems and Processors document contains an overview of the Alpha architecture:

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

The Compaq website provides many additional resources for Alpha users. See the following URLs:

http://www5.compaq.com/alphaserver/support.html

http://www.tru64unix.compaq.com/linux/documentation.htm

Please Note

Many people will find the previous information to be very useful. However, this information is provided by sources outside of Red Hat, Inc. and it may contain descriptions of procedures that are not supported by Red Hat, Inc. For a description of Red Hat, Inc.'s installation support, please refer to Red Hat's website at http://www.redhat.com/apps/support/programs.html. Another source for information about Alpha systems is the Alpha mailing list. Information on how to join the Alpha mailing list, axp-list@redhat.com, is available from http://www.redhat.com/community/list_subscribe.html.

C Writing Image Files to Diskettes

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

C.1 Using the dd Command

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

```
bash# dd if=imagefile of=/dev/fd0 bs=72k
```

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

20+0 records in 20+0 records out

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

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

C.2 Using the rawrite Utility

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

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

ftp://ftp.redhat.com/pub/redhat/redhat-7.0/i386/en/dosutils/

The Red Hat FTP site is usually very busy, so you may want to try a mirror site. The list of mirror sites is available at the following URL:

http://www.redhat.com/download/mirror.html.

The rawrite command looks like the following (assuming you've copied rawrite to the dosutils folder on your C: drive):

C:\> dosutils> rawrite

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

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

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

Enter target diskette drive:a:

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

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

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

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

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