

Installation Guide

INTERACTIVE™
OPERATING SYSTEM
UNIX®

 **SunSoft**
A Sun Microsystems, Inc. Business

INTERACTIVE™ UNIX® System V/386

Release 3.2

Installation Guide

2550 Garcia Avenue
Mountain View, CA 94043
U.S.A.

Part No: 801-7870-10
Revision A, June 1994

UNIX is a registered trademark of
UNIX System Laboratories, Inc.,
a wholly owned subsidiary of Novell, Inc.



© 1994 Sun Microsystems, Inc.
2550 Garcia Avenue, Mountain View, California 94043-1100 U.S.A.

© 1987-1988 AT&T Corporation.

© 1981, 1982, 1983, 1984, 1985, 1986, 1987 Microsoft Corporation

All rights reserved. This product and related documentation are protected by copyright and distributed under licenses restricting its use, copying, distribution, and decompilation. No part of this product or related documentation may be reproduced in any form by any means without prior written authorization of Sun and its licensors, if any.

Portions of this product may be derived from the UNIX® and Berkeley 4.3 BSD systems, licensed from UNIX System Laboratories, Inc., a wholly owned subsidiary of Novell, Inc., and the University of California, respectively. Third-party font software in this product is protected by copyright and licensed from Sun's font suppliers.

RESTRICTED RIGHTS LEGEND: Use, duplication, or disclosure by the United States Government is subject to the restrictions set forth in DFARS 252.227-7013 (c)(1)(ii) and FAR 52.227-19.

The product described in this manual may be protected by one or more U.S. patents, foreign patents, or pending applications.

TRADEMARKS

Sun, Sun Microsystems, the Sun logo, SunSoft, the SunSoft logo, Solaris, Easy Windows, NFS, and VP/ix are trademarks or registered trademarks of Sun Microsystems, Inc. in the U.S. and certain other countries. UNIX is a registered trademark of UNIX System Laboratories, Inc., a wholly owned subsidiary of Novell, Inc. 3Com and EtherLink are registered trademarks of 3Com Corporation. Adaptec is a registered trademark of Adaptec, Inc. Archive is a trademark of Archive Corporation. Compaq is a registered trademark of Compaq Computer Corporation. Hercules is a trademark of Hercules Computer Technology, Inc. Intel and Pentium are trademarks or registered trademarks of Intel Corporation. INTERACTIVE and TEN/PLUS are trademarks or registered trademarks of INTERACTIVE Systems Corporation. AT, IBM, Micro Channel, OS/2, and PS/2 are trademarks or registered trademarks of International Business Machines Corporation. LOGITECH is a trademark of LOGITECH, Inc. Microsoft, MS-DOS, and XENIX are trademarks or registered trademarks of Microsoft Corporation. Open Desktop and SCO are trademarks or registered trademarks of The Santa Cruz Operation, Inc. All other product names mentioned herein are the trademarks of their respective owners.

X Window System is a product of the Massachusetts Institute of Technology.

INTERACTIVE™ NFS is derived from System V NFS® developed by Lachman Associates, Inc.

Programs described in this manual are copyrighted and their copyright notices may be found in heralds, by using the UNIX System *what* program, and by reading files whose names start with "coprisc".

THIS PUBLICATION IS PROVIDED "AS IS" WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, OR NON-INFRINGEMENT.

THIS PUBLICATION COULD INCLUDE TECHNICAL INACCURACIES OR TYPOGRAPHICAL ERRORS. CHANGES ARE PERIODICALLY ADDED TO THE INFORMATION HEREIN; THESE CHANGES WILL BE INCORPORATED IN NEW EDITIONS OF THE PUBLICATION. SUN MICROSYSTEMS, INC. MAY MAKE IMPROVEMENTS AND/OR CHANGES IN THE PRODUCT(S) AND/OR THE PROGRAM(S) DESCRIBED IN THIS PUBLICATION AT ANY TIME.



Please
Recycle

Contents

About This Book	vii
 1. Before You Begin.....	1
Hardware Requirements.....	2
Fixed Disk Partitions.....	4
Backing Up Partitions	5
Using the On-Line Help, Menus, and Forms	5
Using Help	6
Using Menus	10
Using Forms	11
 2. Installing the INTERACTIVE UNIX System.....	15
When to Perform a Full Installation or an Update Installation	16
Booting the System	17
A Step-by-Step Example of a Full Installation	21
Preparing Your Disk	23
Formatting Your Disk	27

Running the <code>fdisk</code> Program to Partition the Disk	27
Running a Surface Analysis on the Disk	32
Entering Known Bad Sectors on the Fixed Disk	32
Creating INTERACTIVE UNIX System File Systems	33
Installing the Base Operating System	38
Initializing the INTERACTIVE UNIX System	40
Setting Passwords for the System and Administrative Logins	40
Setting the Date, Time, and Time Zone	42
Giving Your System a Name	43
Configuring the Software for Use	44
Adding a Second Fixed Disk	46
Getting the System Ready to Use	49
Installing the INTERACTIVE UNIX System From Tape	51
Installing the System Using Boot-Loadable Device Drivers ...	56
Using the Boot/Install Disk for System Maintenance or Repair	57
3. Shutting Down and Rebooting the System	59
Shutting Down the System	59
Using the <code>powerdown</code> Administrative Login	59
Using the <code>shutdown</code> Command	61
Rebooting the System	63
4. Installing Optional Software	65
Installing Optional INTERACTIVE UNIX System Subsets and Extensions	65
Installing XENIX or SCO UNIX Software	70

Installing Other Software From Commercial Vendors	70
5. Reading Disks and Controllers	71
Physical Components of a Fixed Disk.....	71
Fixed Disk Parameters and the INTERACTIVE UNIX System	72
Fixed Disk Controller Interface Types.....	72
Fixed Disk Controller Compatibility.....	73
Using Multiple Fixed Disk Controllers.....	73
Customizing Your System to Maximize the Disk Configuration	74
6. The Hardware Setup Program	75
Selecting a Fixed Disk Type	75

About This Book

This guide describes the basic requirements and steps for installing INTERACTIVE™ UNIX® System V/386 Release 3.2 from SunSoft. It also provides instructions for installing optional INTERACTIVE UNIX System subsets, as well as optional extensions such as INTERACTIVE TCP/IP and INTERACTIVE X11.

The installation procedures are designed to be as self-explanatory as possible, with easily accessible on-line help. This guide provides more information than is available in the on-line help facility and gives additional information necessary for users with nonstandard hardware configurations or special system needs. (The screens shown in this document are for purposes of illustration. Your screens may vary slightly.)

Who Should Use This Book

This guide is intended for users who are installing the INTERACTIVE UNIX Operating System and its optional subsets and extensions.

Before You Read This Book

Refer to the *INTERACTIVE UNIX System V/386 Release 3.2 Release Notes* for any last-minute caveats, problems, or workarounds.

If you are new to the INTERACTIVE UNIX Operating System and other UNIX-based systems, read Part 1 — “INTERACTIVE UNIX System Primer” in the *INTERACTIVE UNIX System V/386 Release 3.2 User’s Guide*, before attempting to install the INTERACTIVE UNIX Operating System.

Once you have completed the basic system installation described in this guide, refer to Part 2 — “System Administration for New Users” in the *INTERACTIVE UNIX System User’s Guide* to learn how to install user accounts, back up and maintain files on the system, and tailor the system to match your requirements.

How This Book Is Organized

Each chapter in this guide is briefly described below.

Chapter 1, “Before You Begin,” outlines the minimum hardware requirements and some configuration information you need to install the INTERACTIVE UNIX Operating System. It also describes how to use the menus, forms, and on-line help that make up the INTERACTIVE UNIX Operating System installation program.

Chapter 2, “Installing the INTERACTIVE UNIX System,” explains how to boot the system and load the operating system software. It provides a step-by-step example of an uncomplicated installation for new INTERACTIVE UNIX System users. It also describes how to back up your *Boot/Install* diskette and how to install non-INTERACTIVE UNIX System partitions on the fixed disk.

Chapter 3, “Shutting Down and Rebooting the System,” describes how to initiate an orderly shutdown of the system and how to reboot the system after the computer has been turned off.

Chapter 4, “Installing Optional Software,” describes how to install optional software subsets and extensions, or separately purchased packages, including XENIX® software.

Chapter 5, “Reading Disks and Controllers,” describes the physical components of a fixed disk, interface types, and the compatibility of various disks and controllers with the INTERACTIVE UNIX System. It also provides information you will need if you plan to use multiple disks and controllers on your system.

Chapter 6, “The Hardware Setup Program,” gives you the information needed to set up a machine so that the INTERACTIVE UNIX Operating System can be installed.

Related Books

Advanced users can refer to the *INTERACTIVE UNIX System V/386 Release 3.2 Maintenance Guide* for information about configuring the INTERACTIVE UNIX System.

Part 2 — “System Administration for New Users” in the *INTERACTIVE UNIX System User’s Guide* contains instructions for common system administration tasks.

Conventions

Various font types are used in this guide to distinguish between information you type, information displayed by the system, and items that either you or the system replace with a variable. Table P-1 shows the type changes and symbols used in this book.

Table P-1 Typographic Conventions

Typeface or Symbol	Meaning	Example
AaBbCc123	An initial capitalized key name refers to that key on your keyboard	Press Enter to store the file. Press Control-d to quit.
AaBbCc123	The names of commands, files, and directories; on-screen computer output	Edit your .profile file. Use ls -a to list all files. \$ You have mail.
AaBbCc123	What you type, contrasted with on-screen computer output	\$ rlogin host2 password:
AaBbCc123	Placeholder: replace with a real name or value; book titles; first mention of a new term; words to be emphasized	To delete a file, type rm <i>filename</i> . See the <i>INTERACTIVE UNIX System User's Guide</i> . The system displays a <i>prompt</i> . You <i>must</i> be root to do this.

Code samples are included in plain boxes and may display the following:

UNIX C shell prompt	%
UNIX Bourne and Korn shell prompt	\$
UNIX superuser prompt	#

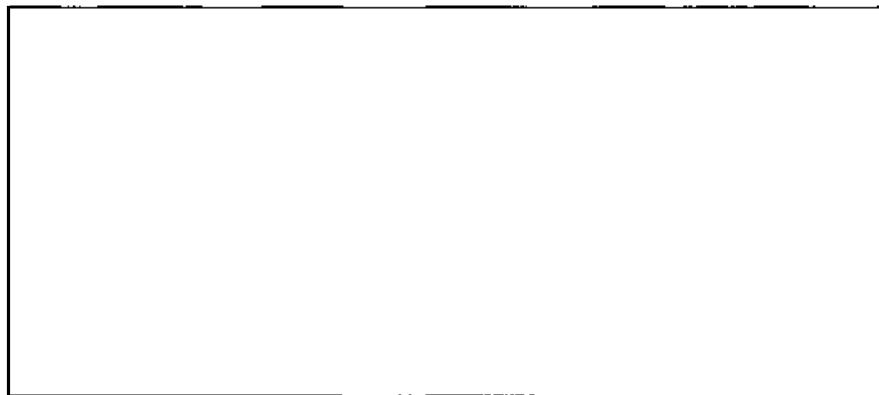
Note – Keys on your keyboard may be labeled differently than those shown in this guide. For example, the Enter key is labeled Return on some keyboards. If your hardware or software vendor supplies additional documentation with your system, read that documentation for information on key names before you continue.

Plain boxes represent screen displays, system responses, file contents, path names, or program code. They may contain text that you type, which is indicated by bold lettering. For example:

```
login: tony
*** Welcome to the UNIX Operating System. ***
$
```

Highlighting in screens is represented by reverse type. For example:

```
Install Update Help      Shell   Exit
Do full installation
```



References of the form *name(n)* refer to an entry called name in section "n" of the reference manual or manual entries associated with that product or as stated in the documentation.

Throughout the rest of this guide, the following full documentation titles are referenced in shortened versions as follows:

Full Title	Shortened Version
<i>INTERACTIVE UNIX System V/386 Release 3.2 User's Guide</i>	<i>INTERACTIVE UNIX System User's Guide</i>
<i>INTERACTIVE UNIX System V/386 Release 3.2 Maintenance Guide</i>	<i>INTERACTIVE UNIX System Maintenance Guide</i>
<i>INTERACTIVE UNIX System V/386 Release 3.2 Release Notes</i>	<i>INTERACTIVE UNIX System Release Notes</i>
<i>INTERACTIVE UNIX System V/386 Release 3.2 Hardware Compatibility List</i>	<i>INTERACTIVE UNIX System Hardware Compatibility List</i>

Before You Begin

1 

Before you install the INTERACTIVE UNIX Operating System on your computer, you (or someone, such as your vendor) *must* complete the following tasks:

1. Assemble and set up your hardware.
2. Read this chapter to verify your hardware configuration and to determine what you need to do to configure your hardware to support the installation of the INTERACTIVE UNIX System.
3. Perform any hardware-related setup and configuration required by your system, including the ROM BIOS or diskette-based *setup* program. Additionally, EISA systems typically require use of EISA configuration utilities, usually named CF or SD.
4. Determine your partitioning requirements and back up any existing partitions you plan to move or delete. You must also back up the partition onto which you plan to install the INTERACTIVE UNIX System.

This chapter explains the specific hardware information you need to install the INTERACTIVE UNIX System. It also explains the features of the on-line installation procedure.

Hardware Requirements

To successfully install and use the INTERACTIVE UNIX Operating System, in addition to the basic 386, 486, or Pentium™ ISA, EISA, PCI, VL-Bus, or Micro Channel® Architecture platform, you must have the following hardware components:

RAM

A minimum of 4 megabytes (MB) of 32-bit Random Access Memory (RAM) are required.

A fixed disk

One fixed disk of at least 40 MB capacity is required. An 80 MB or larger fixed disk is *strongly recommended*, and certain bundled solutions may require additional storage capacity (see chart on the packaging).

A fixed disk controller

A fixed disk controller or SCSI host adapter supported by the INTERACTIVE UNIX System is required. For a list of supported controllers, refer to the *INTERACTIVE UNIX System Hardware Compatibility List* available from SunSoft. Certain disk controllers require the use of a third-party driver diskette during the installation.

A 3.5-inch diskette drive (not required if using tape)

A high-density diskette drive that supports 3.5-inch media is required. A 5.25-inch diskette drive can be used as the primary drive from which to boot. The remainder of the installation must be done using 3.5-inch diskettes or tape.

A 1/4-inch tape drive (optional)

One of the following is required if you install from tape:

- A SCSI tape drive on either the primary or secondary SCSI controller
- A Wangtek tape drive

The default configuration for the Wangtek tape drive uses I/O address 300, IRQ 3, and DMA channel 1. If you need to override this (for example, COM2 is using IRQ 3 or you cannot use I/O address 300), then when booting the INTERACTIVE UNIX Operating

System message appears, press the spacebar. At the Enter the name of a kernel to boot: prompt, type the desired Wangtek configuration in the following format:

```
/unix wt=I/O,IRQ,DMA
```

For example, to use an I/O address of 338 (hexadecimal), an IRQ value of 5, and DMA channel 1, type the following:

```
/unix wt=0x338,5,1
```

Note that if you are using an IRQ value of 2, you should specify it as "9." (This is due to the way in which the interrupt controllers are wired on the PC bus.) Additionally, the second port uses IRQ 3. On most machines, the secondary serial port uses IRQ 3 and must be disabled if you intend to use IRQ 3 for the tape.

A display controller and monitor

A monochrome, Hercules™, CGA, VGA, or EGA display adapter and monitor, or other display that correctly emulates one or more of those video standards, is required.

When the way in which the system will be used mandates it, this controller and/or monitor can be left out of the configuration, and a serial terminal connected to a COM: port (directly or via a modem) can be used as the console instead. The terminal can be used to do the installation as well. Refer to the *INTERACTIVE UNIX System Maintenance Guide* for more information.

Compare these requirements with your hardware configuration. Make sure that you have available at least the minimum configuration. Then, if your hardware vendor has not already assembled and set up your system, follow the manufacturer's instructions to determine how to assemble and attach all components for operation, and use the *setup* program supplied by the hardware manufacturer to configure your fixed disk and fixed disk controller. Refer to Chapter 6, "The Hardware Setup Program," for the INTERACTIVE UNIX System requirements that you must consider when you configure your system using the hardware manufacturer's *setup* program.

Both basic and more advanced information about fixed disks and controllers is presented in Chapter 5, "Reading Disks and Controllers." The remaining hardware components (RAM, diskette drives, display controller, and monitor) are not discussed further since the installation procedures provided with the INTERACTIVE UNIX System require no information about them.

Fixed Disk Partitions

The INTERACTIVE UNIX Operating System allows you to divide the fixed disk into multiple "logical disks" called *partitions*. Multiple partitions enable you to have more than one operating system resident on a single disk. For example, you may use one partition to store the UNIX System and another partition to store MS-DOS® (DOS), OS/2®, or the Solaris™ environment. Your fixed disk may already be divided into several partitions.

Before you install the INTERACTIVE UNIX System, you must determine your partitioning requirements. If you plan to use multiple operating systems (DOS, XENIX, and the INTERACTIVE UNIX System, for example), you will require one partition for each operating system. The VP/ix™ Environment does not require a separate partition for installation; it resides on the INTERACTIVE UNIX System partition. Before you install the system, you should consider how you plan to use each operating system you intend to install. You will want to allocate more disk space for the operating system that you will be using most frequently.

Note – If you want to change your partitioning later, you will need to perform a destructive (complete) installation.

Remember that when you determine your partitioning requirements, you must establish one partition of at least 40 MB in which to install the INTERACTIVE UNIX System. You will establish this partition during the installation process (see Chapter 2, "Installing the INTERACTIVE UNIX System").

Backing Up Partitions

If you do not delete, move, or change any existing partitions on your fixed disk (and you do not reformat your disk), then installing the INTERACTIVE UNIX System on your machine will destroy only the data in the partition in which you are installing the INTERACTIVE UNIX System. However, it is *always* a good idea to back up the partitions on your fixed disk, even if you do not plan to alter them.



Warning – Deleting, moving, or changing any existing partitions on your fixed disk will cause *all the data in those partitions to be destroyed by the installation*. You should back up any data in such partitions *before* you proceed with the installation. Reformatting the disk during installation *will destroy ALL the data on the disk*. Back up everything you want from your disk if you plan to reformat it.

To back up data that currently reside on your fixed disk onto diskettes or tape, use the backup facilities available with your existing operating system (for example, DOS, XENIX, UNIX). Use the BACKUP command on DOS and the backup or dump command on XENIX. Use the sysadm backup procedure on the INTERACTIVE UNIX Operating System. See Part 2 — “System Administration for New Users” in the *INTERACTIVE UNIX System User’s Guide* for instructions.

Certain copy-protected DOS applications may require special backup procedures. If necessary, refer to the documentation supplied with your operating system or application for additional instructions on how to back up the data.

Using the On-Line Help, Menus, and Forms

The INTERACTIVE UNIX Operating System has an easy to use and understand installation procedure. It is designed so that all the information you need to perform an uncomplicated installation is available on-line. Although it may be helpful, you do not need to read this section before installing the INTERACTIVE UNIX System on your computer. You can safely explore the system on-line; no destructive actions occur unless you are warned and then confirm that the action should take place. If you need to refresh the screen at any time during the installation, press Control-r and the screen will be refreshed the next time it changes.

This section discusses the menus and forms that make up the installation procedure. It also details how to get on-line help when you are not sure what you should do or if you just want more information about a particular part of the process.

The system is self-explanatory. For each part of the process, there is an introductory screen. Introductory screens either 1) explain something about the information being requested and tell you why it is needed or 2) explain what is happening to the system at this point during the installation. Experienced users who are familiar with the INTERACTIVE UNIX System installation procedure can turn off the introductory screens.

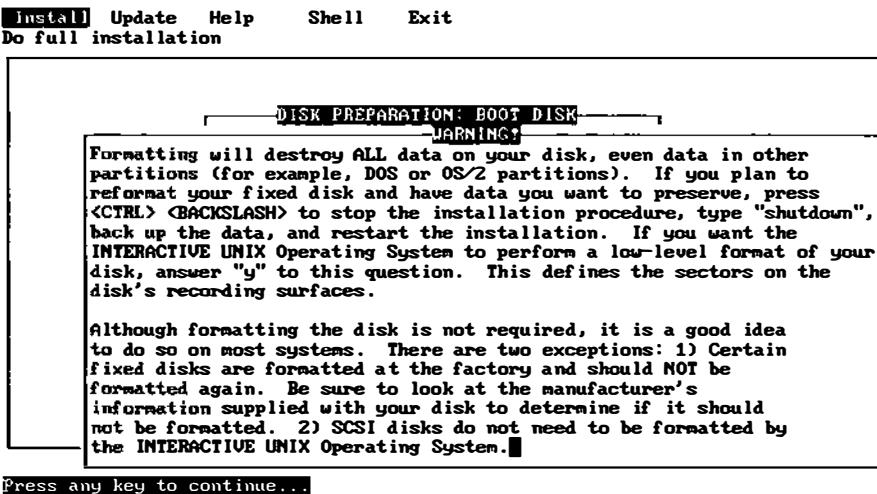
Using Help

Two levels of help are available at almost any time during installation: context-specific help and general information found in the Help Index.

Context-Specific Help

Context-specific help is associated with a particular question, menu option, or form field. To obtain context-specific help, press the help key, F1, when the cursor is on an item you want to know more about. Whenever you are not sure

what to do or what is being asked of you, press F1. If context-specific help isn't available, the Help Index appears instead. For example, if you press F1 at the Format disk? question on the DISK PREPARATION form, the system displays:



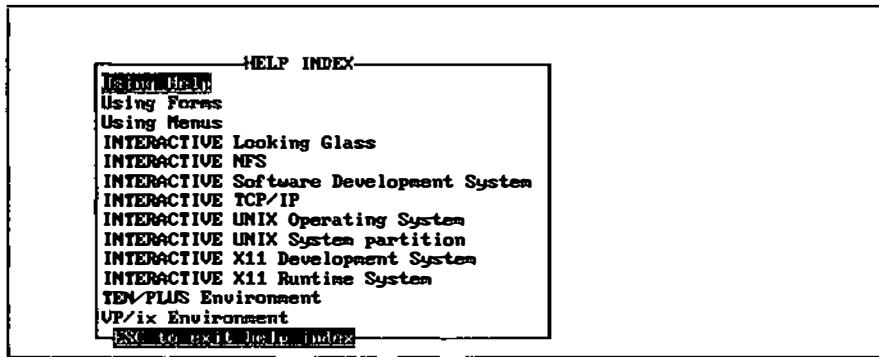
You can press any key to refresh the screen and continue with the installation.

The Help Index

Users who want more information about a topic than the help key provides can access a list of help topics, called the Help Index, by pressing F1 a second time. Words that are highlighted on the screen as you move through the installation procedure have corresponding entries in the Help Index.

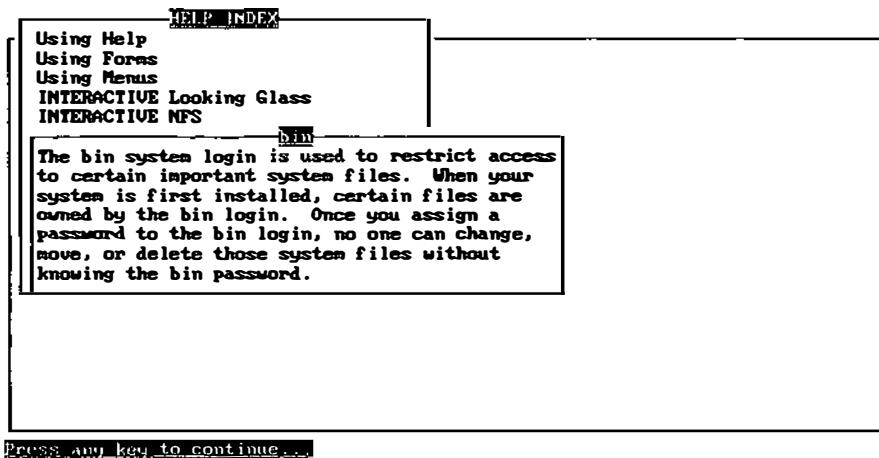
The Help Index is a list of topics that appears on your screen when you press F1 twice. (If context-specific help is not available, then the Help Index appears the first time F1 is pressed.) The list is alphabetical, except for the first three topics, Using Help, Using Forms, and Using Menus. These topics contain a condensed version of this section, which is important for users to read if they

plan to install the INTERACTIVE UNIX Operating System without reading this entire document. When you press F1 the second time, your screen looks similar to this:



The currently active item is highlighted. (Highlighting on the screens is represented here by reverse type.) You may use the up and down arrow keys and Page-Up and Page-Down to look through the Help Index. Move to an option using the arrow keys, or type enough of the first characters in the option's name to distinguish it from the other items in the list. For example, if you type c, the cursor will move to checkfsys; if you want to move immediately to conventions, type co. The cursor will move immediately to checkfsys and then drop down to conventions.

Select an option by pressing Enter. When you select an option, explanatory text is displayed in a box. For example, if you select bin, the system displays the following:



Press any key to return to the Help Index. Exit the Help Index by pressing Escape.

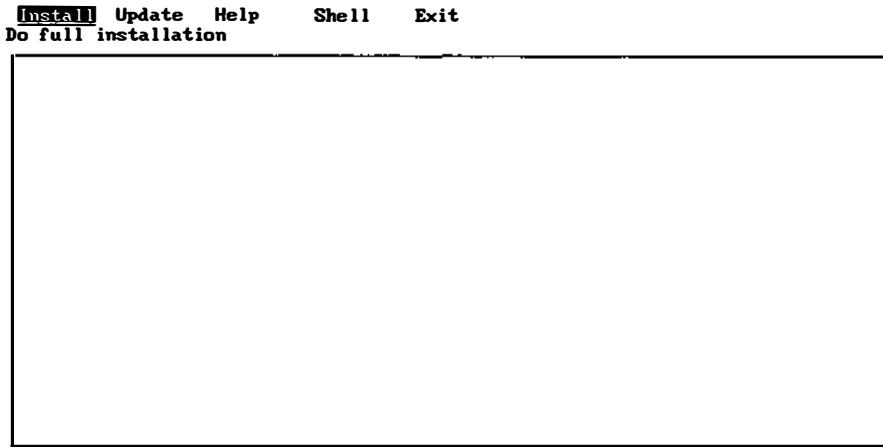
Note – If you are installing on a portable computer or a computer with an 84-key keyboard, you may have to press the Num-Lock key until the Num-Lock LED turns off after booting to enable the cursor motion, Page-Up/Page-Down, Home, and End functions of the numeric keypad.

Using Menus

A menu is displayed whenever you have to make a choice among different options. There are two type of menus: bar menus and pop-up menus.

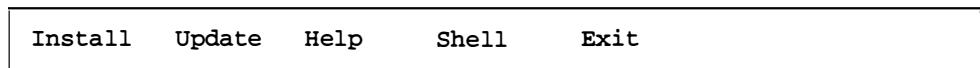
Bar Menus

The first menu you see during installation is a bar menu:



Bar menus appear at the top of the screen. The currently active option in a menu is highlighted. Use the arrow keys to move between the menu options. As you move to each option, a brief description of that option appears under the menu. Additional, context-specific information is available for each menu option when you press F1. If you want more information after reading the context-specific help, press F1 a second time to display the Help Index and look through the index to see if there is a related entry.

Move to an option using the arrow keys or type enough of the first characters in the option's name to identify it. For example, on the installation menu:



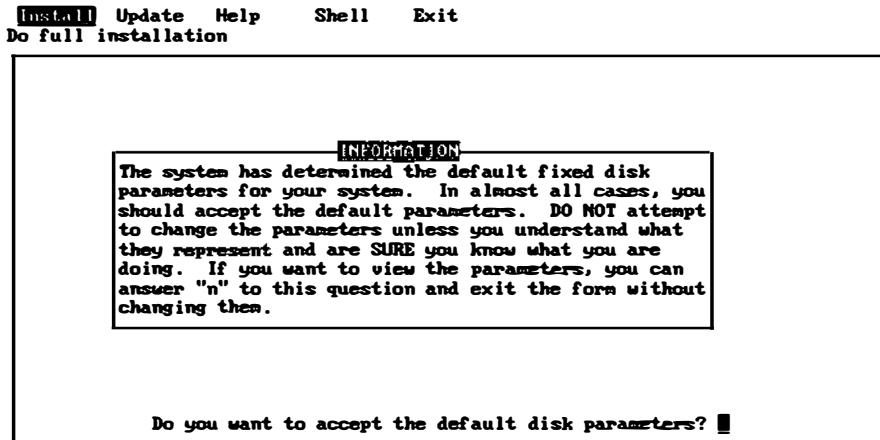
you can move immediately to the Help option by typing h or H. Select an option by moving to it and pressing Enter.

Pop-Up Menus

In a pop-up menu, such as the Help Index, you can use the arrow keys or Page-Up and Page-Down to move from option to option. The currently active option is highlighted. Move to an option using the arrow keys or by typing enough of the first characters in the option's name to uniquely identify it. Select an option by moving to it and pressing Enter. To exit from a menu (or in some cases, to return to a previous menu), press Escape. Examples using a pop-up menu are presented in "Using Help."

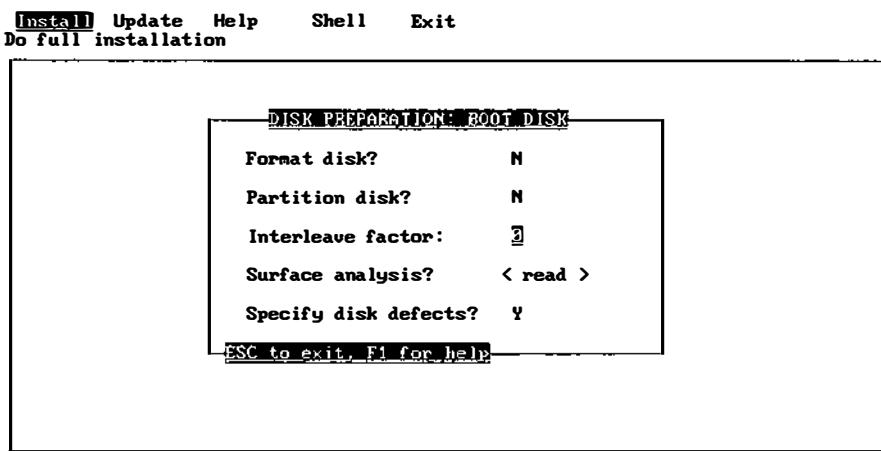
Using Forms

Whenever this installation procedure requires you to provide information, a form is displayed. Some forms consist of just one question, which is answered yes or no. For example:



Answer such questions by typing y or n and pressing Enter.

Other forms contain one or more fields for you to fill in. If a value appears in the form when it is first displayed, that value is either a recommended default value or the operating system has determined that it is the correct value for your computer. For example, the DISK PREPARATION form displays with default values already on the form:



Move *between* fields using Enter or the Tab and Back-Tab keys. The cursor wraps from the bottom item back up to the top and vice versa.

Some fields are present for your information only and cannot be changed. The system does not allow you to move the cursor to a field that cannot be changed. If you are using a color monitor, fields that can be changed are highlighted in blue. The currently active field appears in reverse video on monochrome monitors and is highlighted in white on color monitors.

Move *within* a field using the left and right arrow keys. Certain fields allow you to toggle through your choices using the spacebar. These fields are surrounded by the symbols < and > (like the Surface analysis? field above). Otherwise, enter data into the fields by typing it in. The default mode is to overwrite text, but you may toggle between the overwrite and insert modes using the Insert key. The Backspace and Delete keys work as you would normally expect.

If the system “beeps” at you and does not respond, you have entered a value that is not allowed or have attempted to use an inappropriate key. Delete your entry and try again.

As you finish with each field, press Enter. The system then checks the validity of your answer and displays an error message at the bottom of your screen if there is a problem. If a problem occurs, you will not be allowed to leave the field until you have entered an acceptable value. Some fields may not be left blank.

When you are finished entering data, press Escape. The system then displays this message at the bottom of your screen:

Press Y to confirm, N to cancel, E to continue editing

This gives you a chance to confirm your input (Y), return the form to its default values and re-edit it (N), or leave the values as they are and continue editing (E). You do not need to press Enter after making this choice; the system acts as soon as y, n, or e is typed.

Press F1 to display help on the current field. If no context-specific help is available, the Help Index appears instead. If context-specific help is available, pressing F1 a second time displays the Help Index.

Installing the INTERACTIVE UNIX System

2 

This chapter outlines the full installation and update procedures in greater detail than is possible on-line. Users who are already familiar with the INTERACTIVE UNIX System do not need to read this section in its entirety.

Later in this chapter, other installation procedures are described. These include:

- Installing the INTERACTIVE UNIX System from tape
- Installing the system using boot-loadable device drivers
- Using the *Boot/Install* diskette for maintenance or repair

As discussed previously, the installation procedure is designed so that you can obtain on-line all the information you need to perform an uncomplicated installation. You can safely explore the on-line system; no destructive actions occur unless you are warned and then confirm that the action should take place. The installation can be terminated by pressing Control-\ and then typing shutdown.

Note – The default state of the numeric keypad is that state set by the system BIOS. During the boot process, the Num-Lock key may be turned on, enabling the numeric keypad. If you would like to use the numeric keypad for its cursor motion and Page-Up/Page-Down, Home, and End functions, press the Num-Lock key after booting. This step is only necessary during the installation procedure. Also, if your system BIOS allows configuration of the Num-Lock state at startup, you may want to adjust this setting.

On 101-key keyboards, the cursor-movement, Page-Up/Page-Down, Home, and End keys that are *not* located on the numeric keypad function as expected, regardless of the state of the Num-Lock key.

When to Perform a Full Installation or an Update Installation

If you have never installed the INTERACTIVE UNIX Operating System on your computer, you *must* perform a full installation. This destroys the data on your fixed disk *in the partition on which you install the INTERACTIVE UNIX Operating System*.

If you already have an existing release of the INTERACTIVE UNIX System on your computer, you may be able to perform an update rather than a full installation. An update is a nondestructive procedure that makes the minimum number of changes necessary (such as replacing certain system files), but it does not disturb any data. If the new release allows updating and the on-line procedure finds an existing INTERACTIVE UNIX System when it examines your fixed disk, you can either update or perform a full installation.

Note – Regardless of the type of installation you perform, *be sure* to read the release notes that accompanied your software *before* you begin the installation.

“A Step-by-Step Example of a Full Installation” later in this chapter illustrates the full installation procedure. Read your release notes to find out how to perform an update installation.

Booting the System

The INTERACTIVE UNIX System is delivered on a set of 3.5-inch diskettes, a 1/4-inch tape, or a CD-ROM (compact disc read-only memory) that you install onto your fixed disk.

Note – Before you begin installation, be sure you have the serial number and authorization key that accompanied your software.

When you install the system, the first task is to *boot* (bring up) the system. This is done using the diskette labeled *Boot/Install*. For convenience, both 5.25-inch and 3.5-inch versions of this diskette are supplied, since you must boot from the primary floppy disk drive (drive A: on MS-DOS systems).

Follow these steps to start the system:

1. Insert the diskette labeled *Boot/Install* into the high-density diskette drive 0.
2. Turn on any expansion units (such as an external fixed disk) that are present.
3. Turn the computer on. (If the power is already on, turn the computer off, then turn it on again.)

Note – On some systems, you can simultaneously press Control, Alt, and Delete to reboot a system that is already installed on a fixed disk or to reboot a computer system when the power is already on. On other systems, there is a RESET switch or button that can be used. You can always turn the power off then on again to restart the installation process on any system.

Your screen will look similar to this:

Booting the INTERACTIVE UNIX Operating System

4. When the system has been booted from the *Boot/Install* diskette (note that this may take a while), some copyright notices are displayed. The system then displays this message:

Checking for hard disk controller ...

This will take a while. If the fixed disk controller used is not supported by the boot kernel, a second diskette containing a boot-loadable driver for the controller will be needed to continue the installation. See "Installing the System Using Boot-Loadable Device Drivers" toward the end of this chapter for more details.

Note that if you press Enter when there is no diskette in the drive or after inserting the wrong diskette, the system will lock up. You will have to power down the machine, insert the *Boot/Install* diskette, and begin the installation over again.

5. Some system-dependent messages reporting that a disk controller has been found will appear on the screen, followed by the message:

Uncompressing RAM disk ... done

The boot version of the INTERACTIVE UNIX System and the software necessary to perform the remainder of the system installation are now installed and running in RAM. Remove the diskette labeled *Boot/Install*, as you will no longer need it. Store it in a safe place.

6. Use the up and down arrow keys to select the country type of your keyboard and press Enter. The screen then refreshes and the system asks:

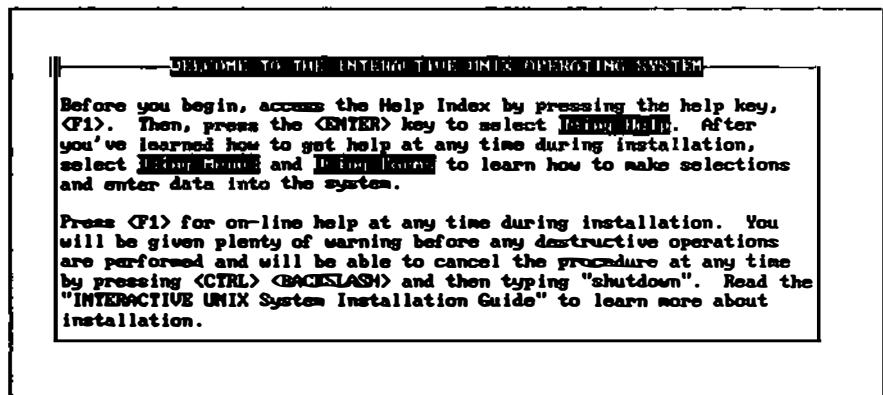
Do the lines in this box appear in different colors?

If you are using a color monitor and the display on your screen appears in color, type *y* and press Enter. If you have a monochrome monitor, the display will not appear in color; type *n* and press Enter.

7. The next screen asks if you want to view the errata information now. Choose *yes* if this is the first time you are installing the current release of the INTERACTIVE UNIX System.
8. You are now prompted to enter the serial number and authorization key for your INTERACTIVE UNIX System software. Type in this information from the card included with your software, pressing Enter when complete.

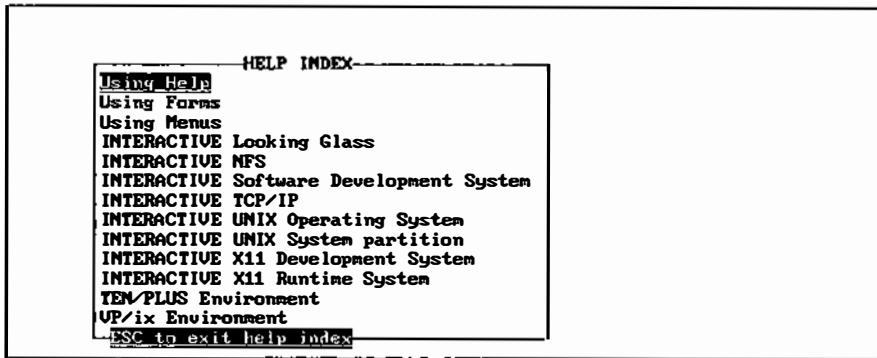
If your authorization code is valid, the system confirms this and will continue with the installation.

9. If you need to supply a boot-loadable driver for your hard disk controller, the next screen will ask you to insert the diskette. See "Installing the System Using Boot-Loadable Device Drivers" toward the end of this chapter for more information.
10. The system then displays an information screen:



11. If you have read about using the on-line system in the previous chapter, you do not need to read the Help Index topics and can press any key to continue with the installation. You should then skip to step 13.

If you have *not* read the previous chapter, you should access the Help Index by pressing the help key, F1. When you access the Help Index, the cursor will always be on the topic Using Help.



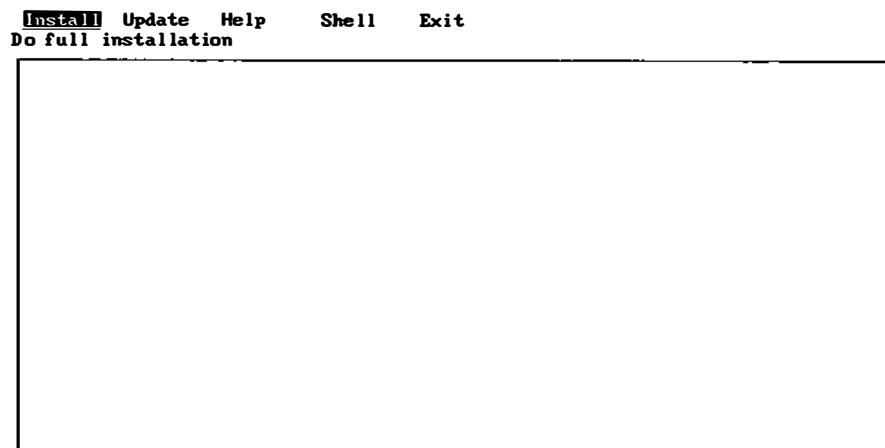
12. Press Enter to select Using Help and read the information there. Press any key to exit that topic. Select and read Using Forms and Using Menus, as well. Then press Escape to exit from the Help Index and continue with the installation.
13. The system then asks you whether you want additional help information to be displayed throughout the installation procedure. If you are a new INTERACTIVE UNIX System user, answer *y* to this question. If you are an experienced INTERACTIVE UNIX System user and you are familiar with the INTERACTIVE UNIX System installation procedure, you may want to answer *n* to suppress the information screens.
14. The system now checks for an existing INTERACTIVE UNIX Operating System on your fixed disk.

Note – At this point and others during installation, depending on what type of fixed disk you have, your fixed disk may spin down and then spin back up again. This is normal and will not affect your installation.

- If the INTERACTIVE UNIX System *does* find an existing INTERACTIVE UNIX System and an update is possible, a different information screen is displayed. You may perform either an update or a full installation. If you plan to perform a full installation, select **Install** from the bar menu and proceed to “A Step-by-Step Example of a Full Installation.”
- If you plan to perform an update, you should refer to your release notes for any special information about updating the system. Then select the **Update** option from the bar menu and skip to “Installing the Base Operating System” later in this chapter.

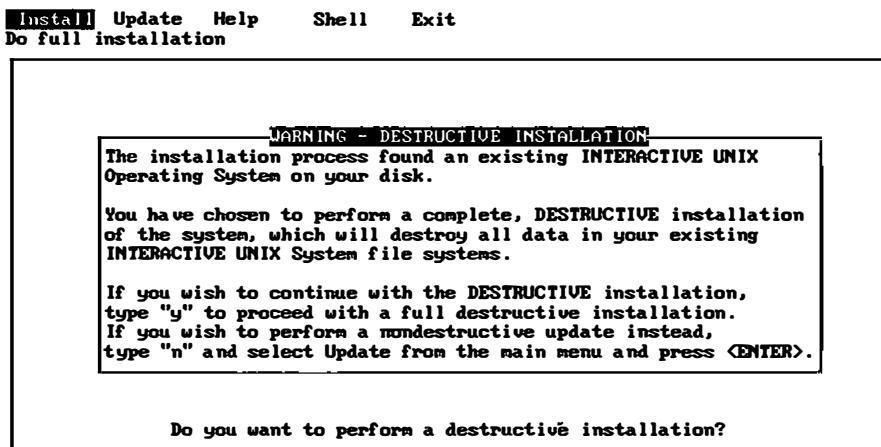
A Step-by-Step Example of a Full Installation

At this point in the installation procedure, the installation menu is displayed:



Note that if it is not possible for you to perform an update, the **Update** option will not appear on your screen.

1. To perform a full installation, select **Install** and press Enter. If the system finds an existing INTERACTIVE UNIX System, you will be prompted to confirm that you really want to perform a complete, destructive installation (which means that the data of your existing system will be destroyed). Your screen will look similar to this:



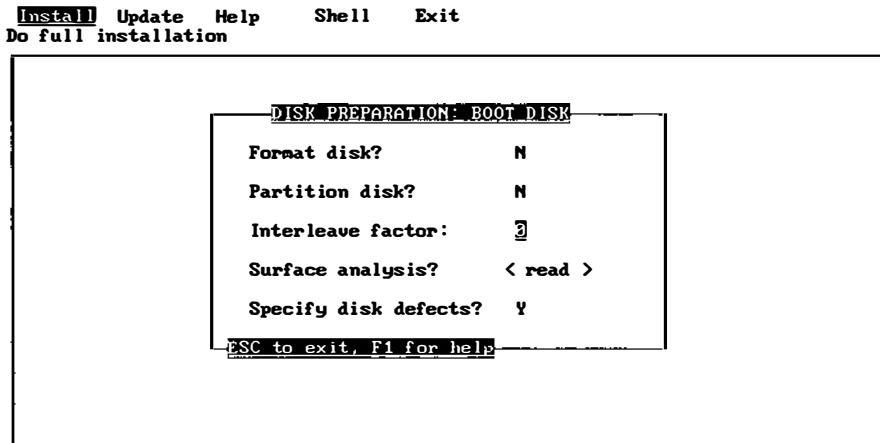
- If you type **n**, the system will return to the installation menu, allowing you to select the **Update** option.
 - If you type **y**, the system will continue with the full installation procedure. The system takes a few seconds to determine the parameters (characteristics) of your fixed disk and then asks you whether you want to accept the parameters it has determined.
2. Type **y** to accept the default disk parameters. In most cases, the system functions smoothly if you accept the defaults. Do *not* attempt to change the parameters unless you understand what they represent and are sure you know what you are doing.

However, if you are performing a complete (destructive) installation of the INTERACTIVE UNIX System onto a fixed disk with more than 1024 cylinders, you will want to answer **n**. Enter the correct number of cylinders available to the INTERACTIVE UNIX System into the form. If your system

has more than 1024 cylinders and some are reserved for diagnostics or defect management, enter the number that the INTERACTIVE UNIX System can use. (This applies when you are adding additional disks using sysadm addhd as well.)

Preparing Your Disk

The system now asks some questions about your fixed disk. It displays the following:



The form is displayed with the recommended default values in place. You can use the spacebar to toggle through the acceptable values for each field (except Interleave factor: for which you must enter a number).

Remember that, as with all forms used in the INTERACTIVE UNIX System installation procedure, it is quite safe for you to explore the form if you are unsure about how to use it or what values to enter. No action will be taken until you explicitly confirm that you have finished editing. Use the Tab and Back-Tab keys to move between fields, and experiment with entering values. Use the F1 key to display context-specific help on the currently highlighted field.

Formatting the Fixed Disk

On some systems, it is required that you format (or reformat) your fixed disk when you install a new system. In general, it is better to use the format disk utility supplied by the disk manufacturer. This means that you should skip (or respond no to) the format option during the INTERACTIVE UNIX Operating System installation procedure. Use this option only as a last resort if your first attempt at installation fails.

Note that some disk manufacturers specify that their disks must never be reformatted outside the factory or without unusual procedures. For example, most IDE fixed disks are formatted at the factory and should *not* be formatted when installing the INTERACTIVE UNIX System.

If you already have another operating system partition that you want to keep on your disk, you should not reformat the disk until you have backed up that partition so that you can reinstall it after the INTERACTIVE UNIX System is installed. Refer to "Formatting Your Disk" later in this chapter for more information.

Partitioning the Fixed Disk

If you have an unused fixed disk or you have just reformatted your disk, it will not contain any partitions. You must partition it, even if you plan to install the INTERACTIVE UNIX System on the entire disk. You can use the entire disk for the INTERACTIVE UNIX System or you can establish a second partition (and optionally, third and fourth partitions) for MS-DOS or another operating system, such as Windows NT™, OS/2, or Solaris. (Remember that if you have the VP/ix Environment, you do not need a separate partition for the MS-DOS operating system to run DOS applications.)

If you *do* plan to use more than one operating system on your machine, you must divide your fixed disk into at least two partitions. When establishing more than one partition, begin the non-INTERACTIVE UNIX System partition on cylinder 0, and begin the INTERACTIVE UNIX System partition on the cylinders above the first partition. The INTERACTIVE UNIX System partition must be the *active* partition. Refer to "Running the fdisk Program to Partition the Disk" later in this chapter for more information.

Your Fixed Disk Interleave Factor

The interleave factor is used when a disk is formatted to determine how the sectors within a track should be numbered. On some disks, sectors within a track are not interleaved and read sequentially. How they are numbered depends on the rate at which the computer can most efficiently read the data as the sectors pass under the recording head. Fixed disks function most efficiently if an appropriate interleave factor is used when reading them.

If you use the INTERACTIVE UNIX System to format your disk, you must enter an interleave value. Even if you have decided not to format your disk, knowing the appropriate interleave factor helps the system to mark bad tracks in the most space-efficient manner. If you do not format your disk and do not know the appropriate interleave factor, it is safe to enter 0.

If the system displays a value other than 0 in this field, it was automatically determined from your disk. *Do not change* this value unless you are formatting and are sure that a different value is more suitable. Refer to the manufacturer's information supplied with your disk to determine the appropriate interleave factor. Interleave factors are frequently reported as a ratio, for example, 3:1. In this case, the interleave factor is 3. Values ranging from 0 to 9 are acceptable (unless you choose to format your disk, in which case the value must not be 0).

Performing a Surface Analysis

You may perform a complete (write) surface analysis, a partial (read) surface analysis, or none at all. We recommend that you perform a surface analysis unless you have a controller or disk that is capable of compensating for its defects and hiding them from the system, for example, a SCSI disk. It is a good idea to perform a complete surface analysis if you have never before installed the INTERACTIVE UNIX System on your machine.

A complete analysis reads and writes every portion of the INTERACTIVE UNIX System partition. It may take quite a long time, depending on your system.



Caution – Performing a complete surface analysis is time-consuming and *destroys all data on the INTERACTIVE UNIX System partition*. However, it is usually more effective at finding any disk errors.

The partial analysis is faster and is nondestructive; choose this option if you have data in an existing INTERACTIVE UNIX System partition that you want to preserve. Note that if you are performing a full installation, all data on your disk will be destroyed. Refer to "Running a Surface Analysis on the Disk" later in this chapter for more information.

Specifying Known Bad Sectors on the Disk

The manufacturer usually supplies a list of defects with each fixed disk. The defects are either listed in the documentation supplied by the manufacturer or printed on a label attached to the fixed disk itself. Defects are potentially unusable portions of the disk that are discovered during the manufacturer's testing.

If you have a disk or controller that is capable of compensating for its defects without involving the operating system (for example, a SCSI disk), your manufacturer may not supply a defect list. If your drive manufacturer does supply a defect list, answer *y* to this question so that you can enter them into the defect table on the disk. The system can then avoid writing data into these bad spots, guarding against data loss.

You do not need to enter the defects on the manufacturer's list if you are using a SCSI disk or ESDI drive on an IBM® PS/2® because any sectors in the manufacturer's defect list will automatically be redirected to alternates by the controller during formatting. Refer to "Entering Known Bad Sectors on the Fixed Disk" later in this chapter for more information.

Exiting the Disk Preparation Form

1. When you have finished with the DISK PREPARATION form, press *Escape*.
The system displays this message at the bottom of your screen:

Press *Y* to confirm, *N* to cancel, *E* to continue editing

2. Type *y* to confirm your input, *n* to return the form to its default values and re-edit it, or *e* to leave the values as they are and continue editing. (Note that you do not need to press *Enter* after making this choice. The system acts as soon as *y*, *n*, or *e* is typed.)

If you chose to format the disk, to run some form of surface analysis, and/or to partition the disk, these actions will be performed when you exit from this form.

Formatting Your Disk

If you answered n to the Format disk? question, skip to "Running the fdisk Program to Partition the Disk."

The system will give you one more opportunity to change your mind about formatting the disk (which will destroy all data stored on it). You should be sure that you have a disk that can be reformatted by the operating system. If you already have another operating system partition on your disk that you want to keep, be sure you have backed up that partition.

If you confirm that you want to format the disk, the formatting process then begins. Progress messages are displayed at the bottom of the screen to allow you to keep track of the formatting and to estimate how long it will take.

Running the fdisk Program to Partition the Disk

If you answered n to the Partition disk? question, skip to "Running a Surface Analysis on the Disk."

If you chose to partition your fixed disk, the system prompts you to press any key to run the fdisk program.

1. Press any key. The fdisk program, which is responsible for the display on your screen, prompts you through the procedure. If you have ever used the fdisk program on your fixed disk, skip to step 3. If you have *never* used the fdisk program on your fixed disk before, your screen will look similar to this:

Do you want to partition your hard disk as follows?

85% "UNIX" -- lets you run UNIX programs
15% "DOS" -- lets you run DOS without UNIX
To do this, please type "y". To partition your hard disk differently, type "n" and the "fdisk" program will let you select other partitions.

2. Type **y** if this division is acceptable to you and you do not want to establish a partition for any additional operating system. Type **n** if you want to choose different sizes or establish more than two partitions.
3. Your screen will look similar to this, depending on the size of your fixed disk and the number and type of partitions already on it:

```
Available hard disk size is 823 cylinders.

      Cylinders
Partition Status Type      Start   End Length %
-----  -----  -----
1       Active  DOS        1     823  823    100
2                   UNUSED
3                   UNUSED
4                   UNUSED

SELECT ONE OF THE FOLLOWING:

1. Create a partition
2. Change Active (Boot from) partition
3. Delete a partition
4. Display Partition Table
5. Exit (Update disk configuration and exit)
6. Cancel (Exit without updating disk configuration)

Enter selection:
```

If you have an existing DOS or Other type of partition that is small enough to allow creation of an INTERACTIVE UNIX System partition, you do not need to delete the existing partition. If you have a DOS or Other type partition that uses most or all of the fixed disk, you must delete it before continuing.



Warning – Deleting a partition destroys all files in that partition. Before you delete it, be sure you have backed up any files you want to save. (For more information on backing up files, refer to the *INTERACTIVE UNIX System User's Guide*.)

If your disk is large enough to have several DOS partitions (one primary and up to 11 extended partitions) and you want to keep them all, you will be able to display information about them using option 4 above.

4. If you want to delete the partition, type 3 and press Enter, then type the number of the partition you want to delete. Your screen will look similar to this:

```
Available hard disk size is 823 cylinders.
          Cylinders
Partition Status Type      Start   End Length %
----- -----
There are no partitions currently defined
```

SELECT ONE OF THE FOLLOWING:

1. Create a partition
2. Change Active (Boot from) partition
3. Delete a partition
4. Display Partition Table
5. Exit (Update disk configuration and exit)
6. Cancel (Exit without updating disk configuration)

Enter selection:

5. Now create a partition by typing 1. Your screen will look similar to this:

```
Indicate the type of partition you want to create
(u=UNIX, d=DOS, o=Other, x=Exit):
```

6. Type u to create the INTERACTIVE UNIX System partition. The system displays:

```
Indicate the percentage (1-100) of the hard disk you want this
partition to use (or enter "c" to specify in cylinders):
```

7. If you plan to have only one partition, type 100. If you plan to have more than one partition, type a number that allocates enough of the fixed disk to run the INTERACTIVE UNIX System—at least 40 MB (not necessarily 40 percent); 80 MB or more is recommended.

Note that if your disk has more than 1024 cylinders and you make the INTERACTIVE UNIX System partition larger than that, the following message appears:

```
Ending cylinder n truncated to 1023 due to ROM BIOS limits
on fdisk table.
But do not worry, UNIX can use all n cylinders of the disk.
```

The ending cylinder number appears smaller than it actually is, but the INTERACTIVE UNIX System will use all cylinders and access the disk correctly.

Your screen will then look similar to this:

```
Do you want this to become the Active partition?
If so, it will be activated each time you reset
your computer or when you turn it on again.
Please type "y" or "n":
```

8. Type y to make the INTERACTIVE UNIX System partition your active partition. Only one partition can be active at a time; this must be your INTERACTIVE UNIX System partition. (Note that if you have an extended DOS partition of type EXT DOS, it may never be made active.) The system displays:

```
Partition 1 is now the Active partition.
```

After the partition is created, your screen will look similar to this (if you plan to have only one partition):

```
Available hard disk size is 823 cylinders.
```

Partition	Status	Type	Cylinders			
			Start	End	Length	%
1	Active	UNIX	1	823	823	100
2		UNUSED				
3		UNUSED				
4		UNUSED				

```
SELECT ONE OF THE FOLLOWING:
```

1. Create a partition
2. Change Active (Boot from) partition
3. Delete a partition
4. Display Partition Table
5. Exit (Update disk configuration and exit)
6. Cancel (Exit without updating disk configuration)

```
Enter selection:
```

9. If you want to create additional partitions to contain other operating systems, select 1 again and step through this same procedure.
10. When you have finished creating partitions, type 5 to exit the program. If you exit the fdisk program without making the INTERACTIVE UNIX System partition the *active partition* or if the system is unable to locate an INTERACTIVE UNIX System partition, you are automatically returned to fdisk until you correct the problem.

Note that if the *first* cylinder in the INTERACTIVE UNIX System partition contains bad sectors, the installation will fail later during the procedure. In this case, the system displays an error message that gives the cylinder number you should use as the first cylinder of the INTERACTIVE UNIX System partition. Restart the installation and when fdisk is run, use the value you are given by the system as the beginning of the INTERACTIVE UNIX System partition.

Running a Surface Analysis on the Disk

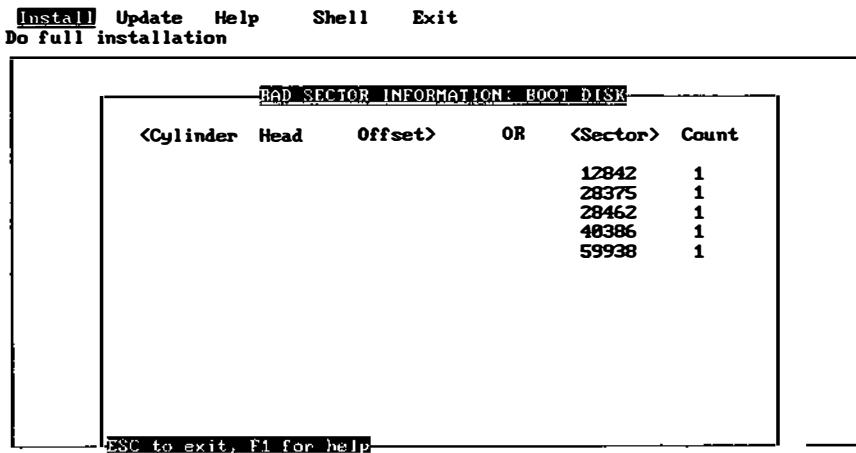
If you answered n to the Surface analysis? question, skip to "Entering Known Bad Sectors on the Fixed Disk."

If you chose a partial analysis, the analysis proceeds at this point. If you chose a complete, destructive analysis (write), the system gives you an opportunity to change your mind and choose to partial (read) instead.

Progress messages are displayed at the bottom of the screen to allow you to keep track of the analysis and to estimate how long it will take. A surface analysis can be quite time-consuming, depending on the size of your disk.

Entering Known Bad Sectors on the Fixed Disk

If you did not choose to specify your disk defects, skip to "Creating INTERACTIVE UNIX System File Systems." If you chose to specify your disk defects, the system next displays an information screen followed by the BAD SECTOR INFORMATION form:



If you ran a surface analysis, the bad sectors found by the system are already entered into the form in *absolute sector* format (the <Sector> column). If the system finds more errors than the form can accommodate, they are not displayed. Instead, a message appears to explain that these bad sectors can be viewed in the /etc/partitions file after installation is complete.

Your manufacturer's defect list will probably be in *cylinder*, *head*, and *offset* format. As you enter new sectors in this format, the system automatically converts these entries to absolute sector values. If you have bad sector information previously reported by the INTERACTIVE UNIX System, enter it directly in the absolute sector format. If a defect is difficult to locate or falls very near a sector boundary, it may require several sectors to be marked as bad. This information appears in the Count field as you enter the defects.

Use the arrow keys to move up and down as necessary. The screen scrolls automatically to make room for all entries. Use the Tab and Back-Tab keys or the Enter key to move from field to field.

To delete an entry you have made in cylinder, head, and offset format, erase the Cylinder field and type in 0; to delete an absolute sector format entry, type in 0 in the Sector field. When you have finished entering the bad sector data, press Escape to exit the form.

You have now finished preparing your fixed disk. The next step is to configure the INTERACTIVE UNIX System file systems.

Creating INTERACTIVE UNIX System File Systems

Based on the amount of system memory (RAM) and the size of the fixed disk, the system next calculates the recommended amount of space on your fixed disk for swap space and the INTERACTIVE UNIX System file systems, such as *root* and *usr*.

1. The FILE SYSTEM INFORMATION form looks similar to this:

FILE SYSTEM INFORMATION: BOOT DISK					
Tag	Mount-point	Size (MB)	Start Cylinder	Number of Cylinders	FS Type
<ALTS>	reserved	4	2	1	SSL
<ROOT>	/	58	3	13	<SSL >
<SWAP>	swap	28	16	7	<SSL >
<USER>	/usr	512	23	130	<SSL >
<USER>	/home	512	153	130	<SSL >
<USER>	/home2	512	283	130	<SSL >
<USER>	/home3	298	413	71	<SSL >
<USER>					<SSL >
<USER>					<SSL >
<USER>					<SSL >
<USER>					<SSL >
				Unallocated space: 0	0
				Size of INTERACTIVE UNIX partition: 1985	482
ESC to exit, F1 for help					

This form allows you to specify the number and size of the file systems you want to create on your fixed disk. The form operates like a spreadsheet. As you enter a value into one field, the values of the other fields are recalculated in order to ensure that the totals and the relationships among the fields are always correct.

Some systems may contain more than one fixed disk. This form is used to divide your primary, or *boot*, fixed disk. This is the disk from which the system will be started each time you shut the system down and reboot.

Types of File Systems

The alts Area

The *alts* area holds alternate sectors used to compensate for bad sectors on your fixed disk. You cannot decrease its size.

The swap Space

Because the INTERACTIVE UNIX Operating System is a multi-user, multi-tasking system with many processes running simultaneously, a swap space is needed. The swap space is the area where partial or complete processes (programs in execution) are temporarily transferred from memory to wait for main memory to become available again.

Generally speaking, the more users and/or less memory your system has, the larger the amount of swap space needed. If you are using networking packages such as INTERACTIVE NFS or INTERACTIVE TCP/IP, or large graphical programs such as INTERACTIVE X11, you will need to increase your swap space.

The root File System

The root file system holds the files needed for operating system functions and many of the applications and networking packages you use. If you know which INTERACTIVE UNIX System subsets and extensions you plan to install, you can look at the release notes that accompanied your software to see approximately how much disk space each package needs. Add to this the memory needed for any other software packages you plan to install and you can calculate a reasonable value for your root file system.

The tmp File System

The tmp file system holds temporary files created by a number of system processes; these files are deleted each time the system is shut down. Note that it is *not* necessary to make a separate file system to hold temporary files. The /tmp directory in the root file system is used for this purpose if no tmp file system is created. Also, it is often difficult to estimate the correct size for the tmp file system. If it is too small, some programs may fail during execution; if it is too large, the extra space is wasted. Unless you are confident that you can estimate the required size, you should not specify a tmp file system.

The user File Systems

The first user file system (usr) holds some system files and, optionally, files created by users. The other user file systems (up to eight user file systems may be created with default names of /home, /home2, /homen) hold files created by users. (Note that you do *not* need to have a user file system for each system user.)

Changing the Size of File Systems

Change the **Size** field of each file system to the number of megabytes you want to allocate. As you change the size of each file system, the installation program automatically recalculates the starting cylinder number of each file system and adjusts the amount of space in the **Unallocated space:** field to maintain the correct totals. You may specify file system sizes in cylinders, but you will probably find it simpler to use megabytes.

When you make a file system smaller (or delete it), its space is allocated to the pool of unallocated space. If you make a file system bigger or add a new file system, the necessary space is taken from the pool. Thus, before you can increase the size of a file system, you must delete or decrease the size of another file system in order to free up the necessary space.

Note that sometimes the totals of all allocated and unallocated space do not exactly match the total amount of space available in the INTERACTIVE UNIX System partition. This is due to rounding errors (typically, the number of cylinders per megabyte is not a whole number) and will not affect the operation of the system.

The following restrictions apply to file system sizes:

- You cannot decrease the size of the **alts** area. The default values that appear on your screen are the minimum required by the INTERACTIVE UNIX System to provide alternates for the current known bad sectors and those estimated to develop in the future.

The system calculates the default based on the bad sectors found during surface analysis and those entered from the manufacturer's defect list. It should be more than sufficient for a typical system.

- You may not decrease the size of the **root** and **usr** file systems and **swap** space below certain minimums required by the INTERACTIVE UNIX System software.

Adding and Deleting File Systems

To delete a file system, simply erase the contents of its **Mount-point**, **Size**, or **Number of Cylinders** field. To add a new file system, ensure that there is sufficient space available in the **Unallocated space:** field, then modify the **Mount-point** and **Size** fields.

Changing the Mount Point

By default, the system provides mount points for the user file systems. Using these defaults is encouraged, but it is possible to change the names to indicate other devices where the user file systems are to be mounted. Simply type the new name over the default shown in the Mount-point field.

Changing the File System Type

S5L (for "System V Long") is the default file system type, which allows file names of up to 512 characters. If you prefer, you may select S51K, the standard System V 1 kilobyte file system that supports file names of up to 14 characters.

For file systems other than root, you may also select file system type OTHER. This will reserve space for the file system, but will not actually create a file system there. This is useful if you want to create a file system of a type that is not supported during the installation process (that is, VF or S52K). Space will be reserved for the file system, but you must install the Additional Drivers subset after the basic system installation, then create the actual file systems with the appropriate command. (Do not select OTHER for the /usr file system.)

Finishing the Form

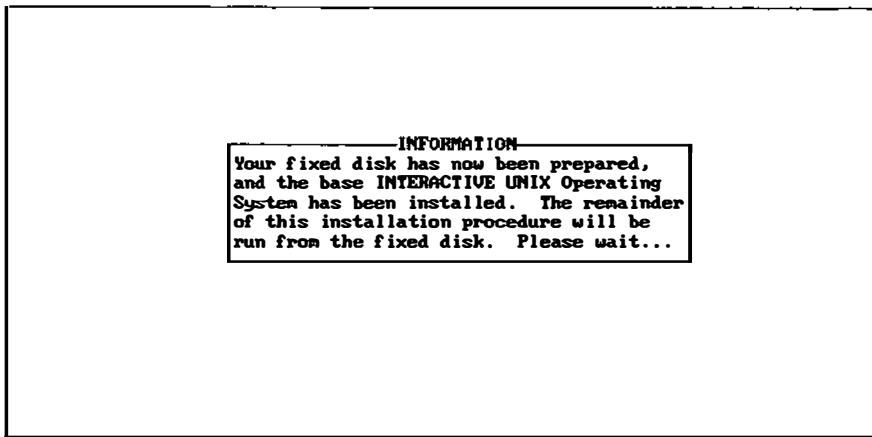
1. When you are satisfied with the values on this form, press Escape. If you have not allocated all of the available space, the system will display an error message; you must allocate all of the available space before you can continue. If you have allocated all of the available space, the system displays:

Press Y to confirm, N to cancel, E to continue editing

2. Type y when you are ready to exit the form. As soon as you exit, the system will begin to set up your INTERACTIVE UNIX System partition. This can take quite some time.

Installing the Base Operating System

Whether you are performing an update or a full installation, the system now copies the new files to the fixed disk. If you are performing a full installation, it also creates directories and installs configuration files at this point. When the system has finished, your screen will look similar to this:



There will be another few minutes' wait while the system finishes the necessary preparations.

The following message is then displayed:

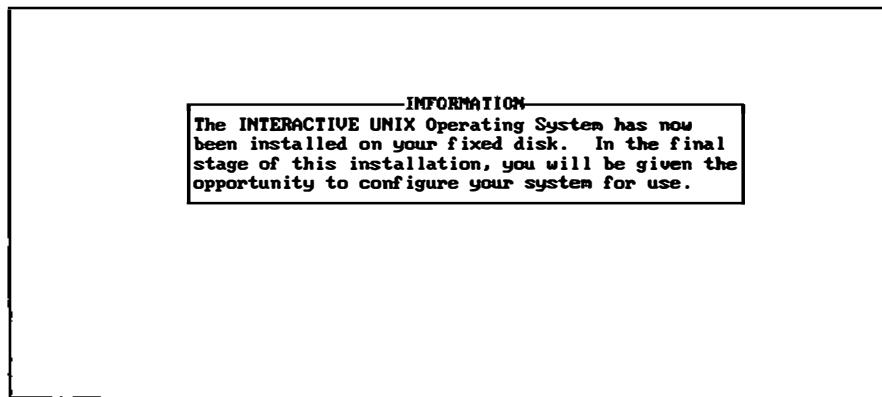
Are you installing from tape?

The INTERACTIVE UNIX System may be purchased on a single tape. To continue the installation from tape, type **y** and press Enter, then proceed to "Installing the INTERACTIVE UNIX System From Tape" later in this chapter.

When delivered on diskettes, the INTERACTIVE UNIX Operating System comes with a set of *Core* diskettes and a number of subsets, depending on the configuration you have purchased. Type **n** and press Enter to accept the default and continue with the installation.

Once the INTERACTIVE UNIX System partition of the fixed disk is completely set up, you are ready to load the Core system onto the fixed disk.

Follow the prompts instructing you to insert the diskettes. As files are copied to your fixed disk, their names are displayed on the screen. Regardless of whether the system was booted off a 5.25-inch drive or a 3.5-inch drive, the remainder of the installation is performed from 3.5-inch diskettes. When all of the Core system has been installed, a message similar to this is displayed:



Press any key to continue.

Initializing the INTERACTIVE UNIX System

If you are performing an update of an existing INTERACTIVE UNIX System, you will not be asked to set passwords, the date and time, and the system name. You should now skip to "Configuring the Software for Use."

Setting Passwords for the System and Administrative Logins

The system next gives you the opportunity to establish passwords for the system and administrative logins. An *administrative login* is used to perform the system administration tasks required to keep the system running smoothly. The system administrator can give a few privileged users restricted access to perform the tasks that need to be done most frequently. The most important administrative logins are sysadm, powerdown, checkfsys, makefsys, mountfsys, and umountfsys.

A *system login* is used to perform system administration tasks that require privileged access to the most restricted files and directories on the system. Some of the system logins on the INTERACTIVE UNIX System include root, bin, daemon, sync, nuucp, and uucp.

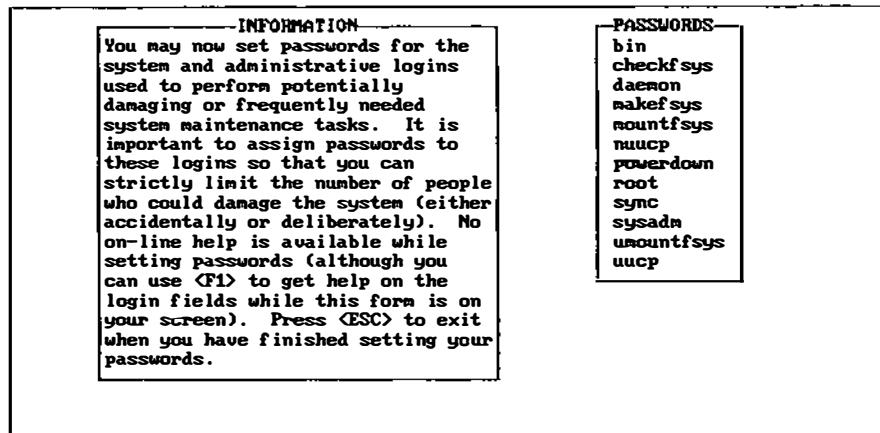
Passwords are very important on INTERACTIVE UNIX Systems since they are used to control access to accounts. Passwords prevent unauthorized users from accessing an account and damaging or possibly destroying important data, either accidentally or deliberately. You should set a password for all the important system and administrative accounts. Until you have set passwords for these accounts, it will be impossible to log in to them because they are "locked." The only exception is root, which is not locked.



Caution – You should set a password for root *immediately*. You can later use the root login to set passwords for the other system and administrative accounts.

A password should be a unique word at least six characters long that is not easily guessed. It generally may include upper- and lowercase characters, numbers, and symbols.

No on-line help is available while setting passwords (although you still have access to help while the pop-up menu is on your screen). Your screen will look similar to this:



1. Use the up and down arrow keys to move to the login for which you want to set a password and select it by pressing Enter. The system displays:

New password:

2. Type in the password. The system displays:

Re-enter new password:

3. Type in the password again. The system returns you to the PASSWORDS menu.
4. When you have finished setting all the passwords you want to set, press Escape to exit.

Setting the Date, Time, and Time Zone

After setting passwords, you have the opportunity to set the system date and time. The system displays:

INFORMATION	
<p>You may now set the date, time, time zone, and whether or not Daylight Saving Time (DST) is to be observed. If you observe DST in your time zone, be sure to answer "y" to the last question on this form.</p>	
SYSTEM DATE AND TIME	
Day:	5
Month:	<May >
Year:	1994
Hour:	20
Minute:	38
Time zone:	<Pacific >
Daylight saving? Y	
ESC to exit, F1 for help	

Default values are already on the form.

1. Use Enter or the Tab and Back-Tab keys to move from field to field, correcting the values where needed. You can use the spacebar to toggle through the acceptable values for the month and time zone.
2. When you are satisfied with the values on this form, press Escape. The system displays:

Press Y to confirm, N to cancel, E to continue editing
--

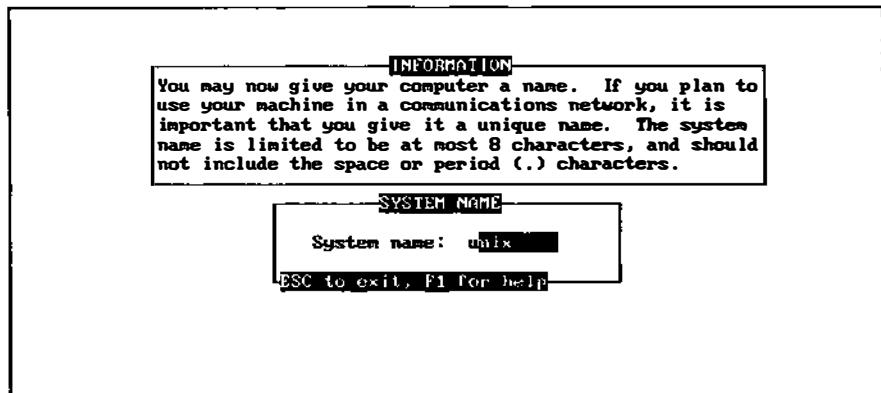
3. Type y when you are ready to exit the form.

Many INTERACTIVE UNIX Systems are used in areas that observe Daylight Saving Time. If the computer is running during the change of Daylight Saving Time, the system time will automatically adjust. However, the next time the system is rebooted, it will pick up the time as maintained in CMOS RAM. You

will have to *manually reset* the system clock during each seasonal time change. To make the change permanent, you can use your manufacturer's *setup* program, or use the INTERACTIVE UNIX System date command or sysadm datetime. You can do this at the same time you reset your other clocks in your home and office. For more details, refer to the *INTERACTIVE UNIX System User's Guide* or to *timezone(4)*.

Giving Your System a Name

After setting the date and related information, you should give your system a name. The system displays:



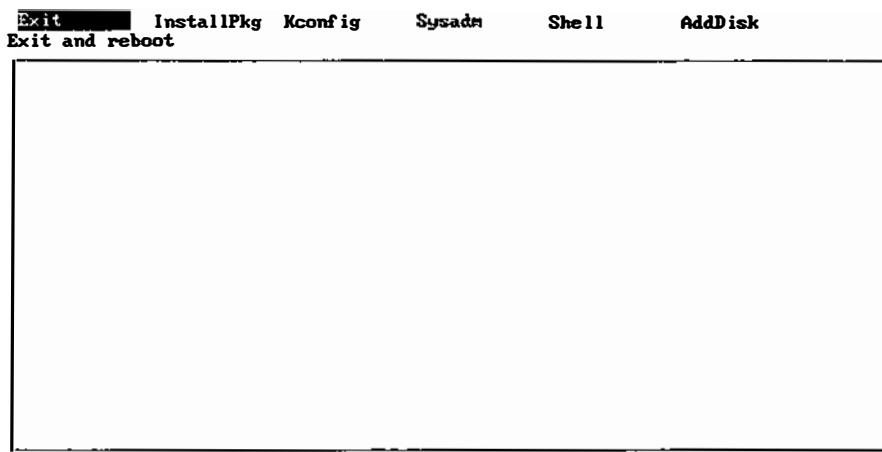
1. Type in the name you want to give your system. Be sure to give your computer a unique name if you plan to use it in a network. The name should contain at most eight characters; spaces and dots are not allowed.
2. After you type the name you want, press Escape. The system displays:

Press Y to confirm, N to cancel, E to continue editing

3. Type y when you are ready to exit the form.

Configuring the Software for Use

The system then gives you the opportunity to perform some optional software configuration. The system displays information screens describing the configuration process and the software package you are installing; then the configuration menu is displayed. Your screen will look similar to this:



The configuration menu provides the following options:

Exit

Select **Exit** when you have configured the system to your satisfaction.

InstallPkg

Select **InstallPkg** to install optional INTERACTIVE UNIX System subsets and extensions or other software packages. `installpkg` is a subcommand of the `sysadm` system administration program. Refer to Chapter 4, "Installing Optional Software," for a list of the INTERACTIVE UNIX System subsets and extensions and for details about using `installpkg`. Refer to the *INTERACTIVE UNIX System User's Guide* for a general description of the `sysadm` program.

Note – The Kconfig option is discussed next. You must use the InstallPkg option to install the Kernel Configuration subset *before* you attempt to use the Kconfig option.

Kconfig

Select Kconfig to run the kconfig program, which is used to configure, build, and install a new kernel for the operating system. You will need to do this when you add subsets and extensions that contain drivers for different physical devices, such as printers and networking cards, and to “tune” certain kernel parameters so that they are optimal for your particular system.

Refer to the *INTERACTIVE UNIX System Maintenance Guide* for a discussion of the kconfig program.

Note – If you were required to use a boot-loadable driver to support your fixed disk, use InstallPkg to load the driver onto your fixed disk file system, then use kconfig to configure and build a kernel to use this device driver. If you do not do this, your system may not be able to be booted from the fixed disk.

Sysadm

The sysadm program can be used to perform most system administration tasks, such as installing additional software packages, adding new users, mounting and unmounting file systems, backing up files, and many more. Select the Sysadm option to run this program. The *INTERACTIVE UNIX System User’s Guide* contains a general description of the sysadm program.

Shell

Select the Shell option to run a shell, which is the standard interface between the user and the INTERACTIVE UNIX System. Select this option if you need to perform system configuration tasks for which you do not want to use sysadm. After finishing with the shell, type exit or press Control-d to return to the menu.

AddDisk

Select AddDisk if you want to add a second (or additional) fixed disk to your system. The AddDisk option invokes the addhd subcommand

of the `sysadm` system administration program. Refer to “Adding a Second Fixed Disk” for an example of adding a second fixed disk to your system.

The system then automatically shuts down and reboots itself. Your system is now set up and ready to use.

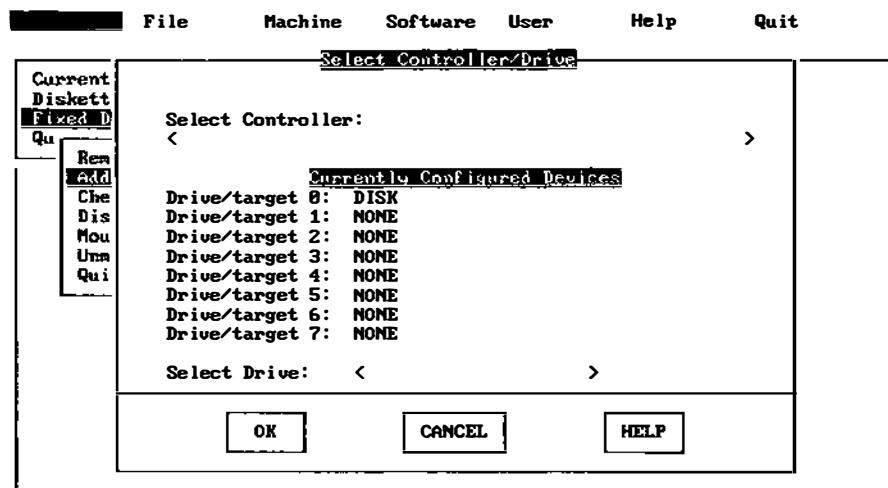
Adding a Second Fixed Disk

You may add a second (or additional) fixed disk to your system configuration at the time of installation, or you may add disks at a later time using the `sysadm addhd` option.

Note that from this point on, the `sysadm` program will have an enhanced look and feel. If you are unfamiliar with the features of the enhanced `sysadm` program, you can get on-line help by pressing the F1 key once or twice to access the Help Index. The Help Index is a list of topics for which help is available. Tab to a topic and press Enter to view a-help screen.

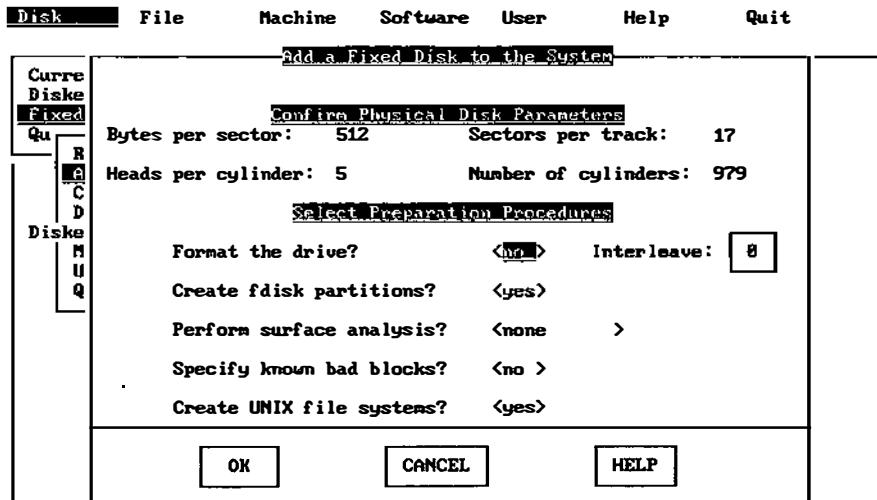
1. To add a second (or additional) fixed disk to your system configuration at the time of installation, select the AddDisk option from the configuration menu. The `sysadm addhd` command is run.

2. The system displays a screen reminding you that you must format a fixed disk before you add it to the system. If you have not yet formatted your disk, exit the installation and format it before proceeding. If you are ready to proceed with installation, select the OK button at the bottom of the form. Your screen will look similar to this:



3. In the first field, press the spacebar to view a list of the controllers currently configured on this system. Use the up and down arrow keys to move to the one you want, then press Enter to select it.
4. In the next field, press the spacebar to view a list of the fixed disk drives attached to the controller you selected. Move to the drive you want, then press Enter to select it.

5. Select the OK button at the bottom of the form. Your screen will look similar to this:



6. The first section of the form, Confirm Physical Disk Parameters, may or may not be editable, depending on the controller on your system. If your controller allows these parameters to be changed, the field will be editable. However, you should only edit this section of the form if the values listed are incorrect. Refer to the manufacturer's specifications included with your drive to verify the values shown. Refer to Chapter 5, "Reading Disks and Controllers," for more information about fixed disk parameters and the INTERACTIVE UNIX System.
7. The next section of the form, Select Preparation Procedures, contains the following fields:

Format the drive?

Toggle the spacebar to select yes or no. Select yes to format the disk. Remember that formatting destroys all data on the entire disk. If you want to reformat the disk but have data you want to preserve, select CANCEL to stop this procedure, back up the data, then restart this procedure.

Interleave:

This field cannot be edited directly. If you decide to format your disk, another menu will be displayed, which allows you to change the interleave factor.

Create fdisk partitions?

Use the spacebar to select yes or no. Select yes if you want to create more than one partition on your disk. For example, if you plan on having more than one operating system on your disk, you will need to create a partition for each operating system. In this case, select yes and follow the on-line instructions. If the INTERACTIVE UNIX System is the only operating system you plan to install, you only need one partition. Press Enter to make your selection.

Perform surface analysis?

Toggle the spacebar to read-write, read-only, or none. You should normally select either read-write or read-only.

Specify known bad blocks?

If the manufacturer of your disk supplied a defect list for your drive, select yes to enter the bad blocks into the defect table on the disk. This allows the system to avoid writing data to these bad blocks. You may also select yes if you just want to inspect the defect table. You may select CANCEL to leave the form at any time.

Create UNIX file systems?

If you want to divide the INTERACTIVE UNIX System file system partitions into file systems, such as `root` and `tmp`, select yes in this field.

8. When you have completed the form, select the OK button at the bottom of the form. The system will now perform all requested operations. When all operations are successfully completed, the fixed disk is added to the system.

Getting the System Ready to Use

After completing the setup of your system, you should establish accounts for your users. If you are familiar with the INTERACTIVE UNIX System, all system administration functions can be run from the installation menu using the `sysadm` option. If you are new to the INTERACTIVE UNIX Operating System, refer to the *INTERACTIVE UNIX System User's Guide* for a general overview of the `sysadm` program and to find out how to create login accounts.

You may also need to customize your kernel. By default, the INTERACTIVE UNIX System is optimized to support a system that has only 4 MB of RAM installed. Your system may have more memory available. (The total memory installed is reported during the boot procedure.) It is not necessary to reconfigure the kernel during the initial setup; however, if your system has more than 4 MB of RAM installed, you will want to reconfigure the kernel before users begin to use the system to make efficient use of all the memory available. Refer to the *INTERACTIVE UNIX System Maintenance Guide* for an explanation of how to use the kconfig utility to change the default parameters for memory size. (Note that you cannot use the kconfig utility until you have installed the Kernel Configuration optional subset.)

After installation is complete, you should customize your disk driver configuration for your disk configuration. Use kconfig to configure the High Performance Device Driver (HPDD); it will significantly speed up the boot process. For some controllers it will also allow you to run the controller in its native mode, taking advantage of all its features. Refer to the *INTERACTIVE UNIX System Maintenance Guide* for more information about the HPDD.

Customization may not be required if you plan to use only one controller, but you *must* customize your disk driver configuration if you plan to use multiple controllers, a SCSI tape drive, or a RAM disk. Refer to the *INTERACTIVE UNIX System Maintenance Guide* for more information.

Note – If you were required to use a boot-loadable driver to support your fixed disk, use InstallPkg to load the driver onto your fixed disk file system, then use kconfig to configure and build a kernel to use this device driver. If you do not do this, your system may not be able to be booted from the fixed disk.

You have now completed the initial setup for your machine. After you have established a login account, you may log in to the system. The system is now fully operational.

If you are new to the INTERACTIVE UNIX System and are not familiar with any other UNIX-based system, you should already have read Part 1 — “INTERACTIVE UNIX System Primer” in the *INTERACTIVE UNIX System User’s Guide*. Refer to Part 2 — “System Administration for New Users” in that same guide to learn how to shut down and reboot the system, install user accounts, back up and maintain files on the system, and tailor the system to match your requirements.

Installing the INTERACTIVE UNIX System From Tape

If you purchased the tape version of the INTERACTIVE UNIX System rather than the floppy disk version, type *y* and press Enter when the installation procedure asks if you are installing from tape.

To install from tape, one of the following tape drives is required:

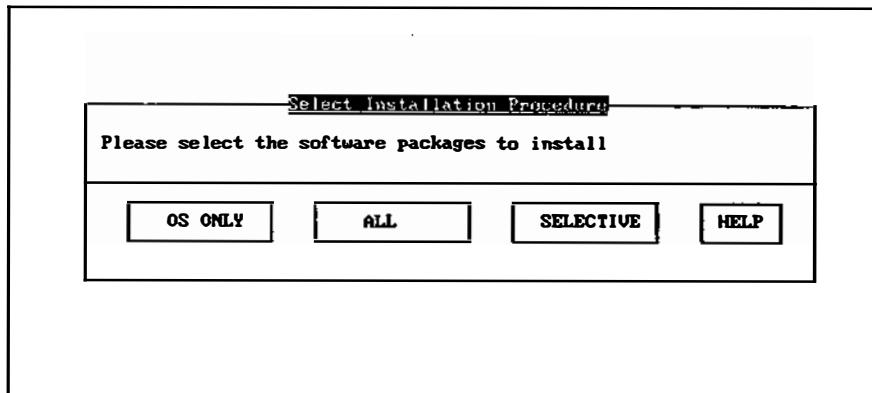
- A SCSI tape drive on either the primary or secondary SCSI controller.
- A Wangtek tape drive. You may want to jumper the Wangtek tape controller to IRQ 3 (the factory default is IRQ 5) because the INTERACTIVE UNIX System expects it to be set at that value. However, you may configure the INTERACTIVE UNIX System to expect the Wangtek at another IRQ. See the information about Wangtek tape drives in the “Hardware Requirements” section of Chapter 1, “Before You Begin.”

You must disable any other hardware that uses the same IRQ as the Wangtek tape controller. For example, on most machines, the secondary serial port uses IRQ 3 and must be disabled if the Wangtek is set at IRQ 3.

SCSI tapes can have any target ID (0-7) as long as it does not conflict with any other SCSI device. The tape installation procedure will probe all SCSI tapes for the INTERACTIVE UNIX System installation tape.

The tape installation procedure provides three installation options. The option you select will depend on your familiarity with the INTERACTIVE UNIX System. Note that help is available at all times by pressing the F1 key.

Your screen will look similar to this:



OS ONLY

The first option is OS ONLY (Base Operating System). This option is for users who are not familiar with the INTERACTIVE UNIX System or who choose to install extensions at a later date. By choosing this option, the Core, File Management, and Kernel Configuration subsets will be loaded onto your computer. After rebooting your computer, you will have the ability to rebuild kernels and perform some system administration duties. The advantage of OS ONLY versus ALL (the second option) is that only the vital components of the operating system will be loaded, so the installation will take less time.

ALL

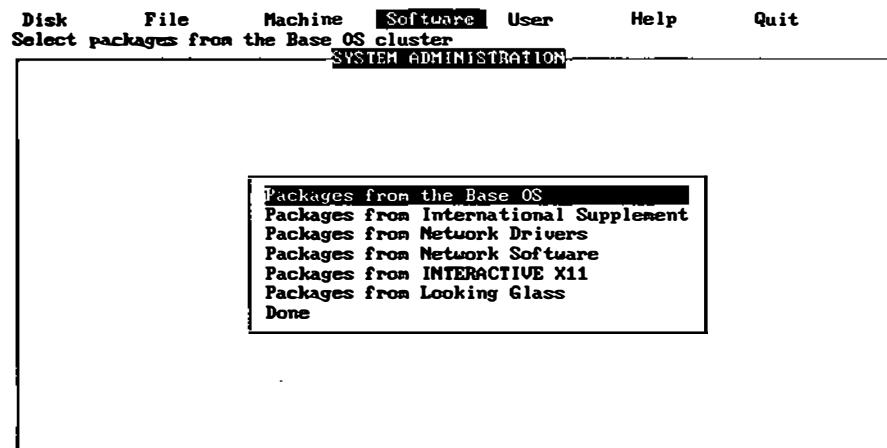
The second option, ALL, will install all of the software you have purchased.

SELECTIVE

The third and final option is SELECTIVE. This option is for users who are familiar with the INTERACTIVE UNIX System and know exactly which subsets they want to install.

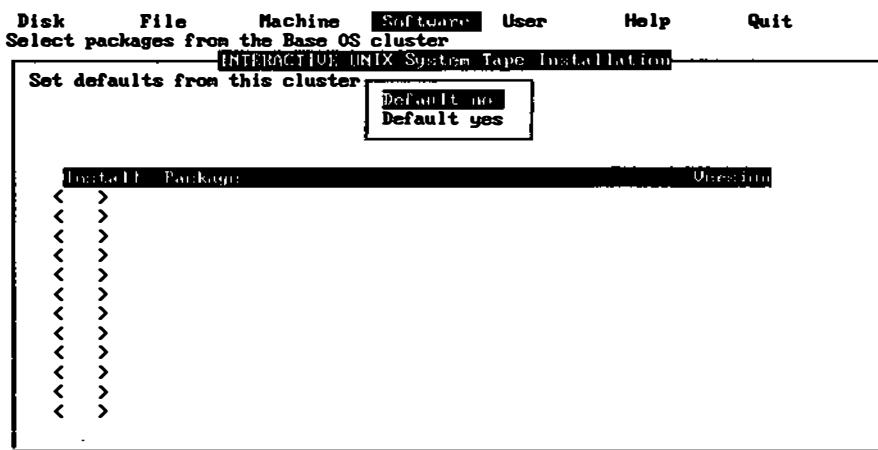
When you choose the SELECTIVE option, a menu appears, listing the software by groups or “clusters.” By default, none of the packages within the clusters are installed.

To install packages from a cluster, use the up and down arrow keys to highlight the cluster, and then press Enter:

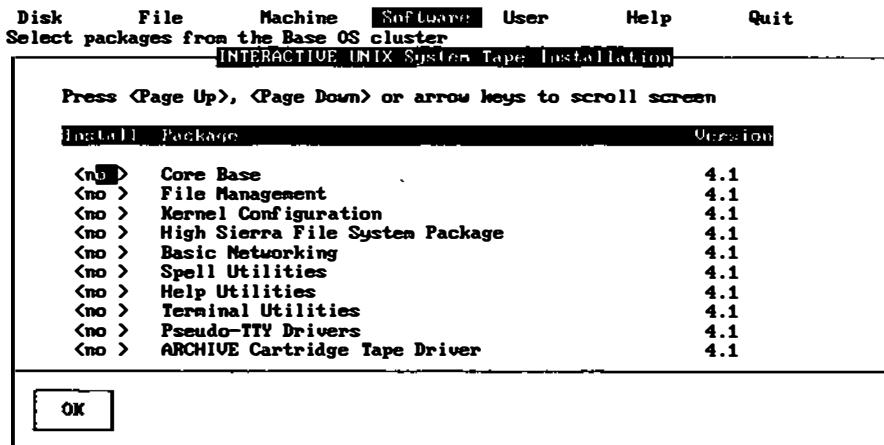


Note – The clusters listed on your screen may vary, depending on the type of installation tape you've purchased.

After you choose a cluster, select the default installation setting for the packages within that cluster (yes or no):



Next, you can choose the installation setting for each package within the cluster using the up and down arrow keys and spacebar:



Note that of the three installation options, only SELECTIVE requires further selections. If you choose OS ONLY or ALL, you do not have to make any decisions about which subsets to load.

At this point, all of the subsets you have selected will be loaded onto your machine. The installation procedure will then report any errors that have occurred. Any subset-specific questions you need to answer appear at the end of the installation procedure.

Installing the System Using Boot-Loadable Device Drivers

Sometimes the INTERACTIVE UNIX System must be installed on a system with a disk controller that is not supported by the kernel on the *Boot/Install* diskette. In this case, the INTERACTIVE UNIX System can be installed using the Boot-Loadable Device Drivers feature. If your controller is not an Adaptec 1540, ATHD, IDE, MFM, ESDI, or RLL no known fixed disk controller is detected after booting the Base system (as described earlier in "Booting the System"), the system will display the following message:

There is no driver configured for your hard disk, or your disk is improperly configured.

If you have a diskette containing a loadable driver for your hard disk, insert it when requested. Otherwise, enter q at any of the following prompts, then type shutdown, and power down your machine and make appropriate corrections.

Insert the driver diskette and press <ENTER>

Insert the diskette containing the device driver for your disk controller in the primary diskette drive and press Enter. If you have two diskette drives on your system, you must type the number of the diskette drive. 0 refers to the primary diskette drive and 1 refers to the secondary diskette drive.

The system will load the driver into the current kernel or, if more than one driver is available, list a number of drivers to choose from. In this case, type the number corresponding to the name of the desired driver and press Enter.

The remainder of the installation follows the standard procedures. Note, however, that the third-party driver diskette must be installed using sysadm installpkg, and a new kernel containing the third-party driver must be configured, built, and installed before the system is rebooted from the fixed disk.

Using the Boot/Install Disk for System Maintenance or Repair

The *Boot/Install* disk can be used to boot a minimal INTERACTIVE UNIX Operating System kernel and run it in maintenance mode (in other words, in single-user mode and without automatically mounting the fixed disk). This might be necessary if the system is so badly damaged that it will no longer boot from the fixed disk.

To use the *Boot/Install* disk in this way, follow this procedure:

1. Insert the *Boot/Install* diskette and turn on the computer. The following message appears:

Booting the INTERACTIVE UNIX Operating System

2. Press the spacebar.
3. The system prompts you for the name of a kernel from which to boot. Type /maint.

The system then initializes to run in single-user mode, using a RAM disk. When the following message appears, you are up and running in maintenance mode:

Allowing system maintenance. Type "shutdown" to shut down the system.

Shutting Down and Rebooting the System

Shutting Down the System

Since the INTERACTIVE UNIX System is a multi-tasking system, when you are ready to turn off your computer, you must arrange to have the system complete all of the tasks that are currently running. Use the shutdown program, which gracefully terminates the tasks that are currently executing before halting the system. You can safely turn off the computer when shutdown has finished. If you do not run the shutdown program, you may lose data and cause damage to your file system.

The shutdown program can be initiated in one of two ways:

- Using the powerdown administrative login
- Executing the shutdown command

Using the powerdown Administrative Login

When you are ready to turn your machine off, you may bring the system down with the powerdown administrative login.

1. Log out of your ordinary user account.
2. Log in to the system with the powerdown user ID.

Note – You must know the powerdown password if one has been set.

3. Once you have successfully logged in to the system using the powerdown login, the system automatically executes the shutdown program. The system displays a screen similar to this:

```
login: powerdown
Password:
INTERACTIVE UNIX System V/386 Release 3.2, Version 4.1
amadeus
Copyright (C) 1994 Sun Microsystems, Inc.
Copyright (C) 1988 AT&T
Copyright (C) 1988 Microsoft Corp.
All Rights Reserved
Login last used: Thu Apr  7 20:31:37 1994
/          :      Disk space:   82.84 MB of 100.00 MB available(82.84%)
/home      :      Disk space:  222.46 MB of 226.00 MB available(98.44%)

Total Disk Space:           305.30 MB of 326.00 MB available(93.65%)

Once started, a powerdown CANNOT BE STOPPED.
Do you want to start an express powerdown [y, n, ?, q]
```

4. If you are ready to bring the system down, type y. The system responds:

```
Shutdown started.    Thu Apr  7 20:33:37 PDT 1994

Broadcast message from root (console) on amadeus Thu Apr  7 20:33:38...
THE SYSTEM IS BEING SHUT DOWN NOW ! ! !
Log off now or risk your files being damaged.
```

```
INIT: New run level 0
The system is coming down. Please wait.
System services are now being stopped.
cron aborted: SIGTERM
! SIGTERM Thu Apr  7 20:33:43 1994
! ***** CRON ABORTED ***** Thu Apr  7 20:33:43 1994

The system is down.
Press any key to reboot.
```

5. When the Press any key to reboot message appears, the computer can be turned off.

Using the shutdown Command

To execute the shutdown command manually, you must log in to the system using the root login. When you are logged in as root, you will see the # prompt:

```
login: root
Password:
INTERACTIVE UNIX System V/386 Release 3.2, Version 4.1
amadeus
Copyright (C) 1994 Sun Microsystems, Inc.
Copyright (C) 1988 AT&T
Copyright (C) 1988 Microsoft Corp.
All Rights Reserved
Login last used: Thu Apr 7 20:31:37 1994
#
```

If you are logged in to the system as root and want to execute the shutdown command manually, follow these instructions:

1. Make the root directory your current directory by executing this command at the # prompt:

```
# cd /
```

2. Run the shutdown program with this command:

```
# shutdown
```

The system will automatically generate a message on every terminal currently in use to warn users that the system is being shut down. The message will look something like this:

```
Shutdown started.      Thu Apr  7 20:03:35 PDT 1994

Broadcast message from root (console) on amadeus Thu Apr  7 20:04:36...
THE SYSTEM IS BEING SHUT DOWN NOW ! !
Log off now or risk your files being damaged.
```

The system will wait 1 minute to give users a chance to exit editors and save files before the system goes down.

3. Your screen will then look similar to this:

```
Do you want to continue (y or n)
```

Type y. Shutdown will then proceed. (If you do not want to be prompted at this point while shutting down the system, you can use the -y option when typing the shutdown command.)

4. If you want to give users a different warning period before the system comes down, run the shutdown program using the -g option:

```
# shutdown -gtime
```

In actual use, *time* is replaced by the number of seconds you want to have elapse before the system is halted. It is a good idea to allow at least 2 minutes (120 seconds) to elapse before the system is brought down. For example:

```
# shutdown -g120
```

The system automatically runs shutdown. A screen similar to the one generated by the powerdown procedure will display.

-
5. When the Press any key to reboot message appears, the computer can be turned off.

Rebooting the System

You are now ready to begin using the INTERACTIVE UNIX Operating System. This section explains how to reboot the system if you have turned the computer off or run shutdown.

If you would like to continue exploring the INTERACTIVE UNIX Operating System and have already shut down your system, you must reboot the system and log in with your user ID.

To reboot the system, use this procedure:

1. Be sure there is no diskette in the diskette drive. If you have turned off the computer, turn on the power. The INTERACTIVE UNIX Operating System is automatically booted from the fixed disk.
2. If your computer is still turned on, either 1) turn it off and then turn on the power again or 2) press any key.

The message Booting the INTERACTIVE UNIX Operating System will display, and the system will automatically reboot.

Installing Optional Software

4 

Installing Optional INTERACTIVE UNIX System Subsets and Extensions

After you have installed the Core subset, you will probably want to install one or more of the optional subsets and extensions delivered with your system. Depending on your requirements and the size of your fixed disk, select and install only those software packages that are necessary for your daily use. You can do this directly from the final installation (configuration) menu using the InstallPkg option. This option is described in "Configuring the Software for Use" in Chapter 2, "Installing the INTERACTIVE UNIX System."

Some subsets and extensions depend upon the presence of other subsets or extensions to function properly. When installing or updating one of the subsets or extensions with a known dependency, be sure to install any required subsets or extensions first. Table 4-1 and Table 4-2 list the dependencies.

Note – Refer to the *INTERACTIVE UNIX System Release Notes* to see if there is a more up-to-date list of subsets or extensions.

Table 4-1 Optional Subsets

Subset	Dependencies
File Management	none
Kernel Configuration	none
Basic Networking	none
High Sierra File System	none
Spell Utilities	File Management
Help Utilities	none
Terminal Utilities	none
STREAMS Facilities	Kernel Configuration
XENIX File System Package	Kernel Configuration
2 Kilobyte File System Utility Package	Kernel Configuration
VF File System	Kernel Configuration
Additional Drivers	Kernel Configuration
Network Drivers	Kernel Configuration STREAMS Facilities
TEN/PLUS Environment	none
User's Manual Entries	none
International Supplement	File Management Kernel Configuration Basic Networking
International Contributed Software	International Supplement

Table 4-2 Optional Extensions

Extension	Dependencies
Programmer's Manual Entries	none
VP/ix Environment Core	File Management
VP/ix Environment Configuration	Kernel Configuration VP/ix Environment Core
VP/ix Environment MS-DOS	File Management VP/ix Environment Core
INTERACTIVE TCP/IP	Kernel Configuration STREAMS Facilities
SNMP	Kernel Configuration STREAMS Facilities
INTERACTIVE NFS Extension	Kernel Configuration INTERACTIVE TCP/IP STREAMS Facilities
INTERACTIVE Network Information Service	Kernel Configuration INTERACTIVE TCP/IP INTERACTIVE NFS Extension STREAMS Facilities
INTERACTIVE X11	Kernel Configuration STREAMS Facilities
INTERACTIVE Software Development System	Kernel Configuration File Management
INTERACTIVE X11 Development System	Kernel Configuration STREAMS Facilities INTERACTIVE Software Development System INTERACTIVE X11
Motif Development System	Kernel Configuration STREAMS Facilities INTERACTIVE X11 INTERACTIVE X11 Development System
Enhanced C2 Security Extension	Kernel Configuration

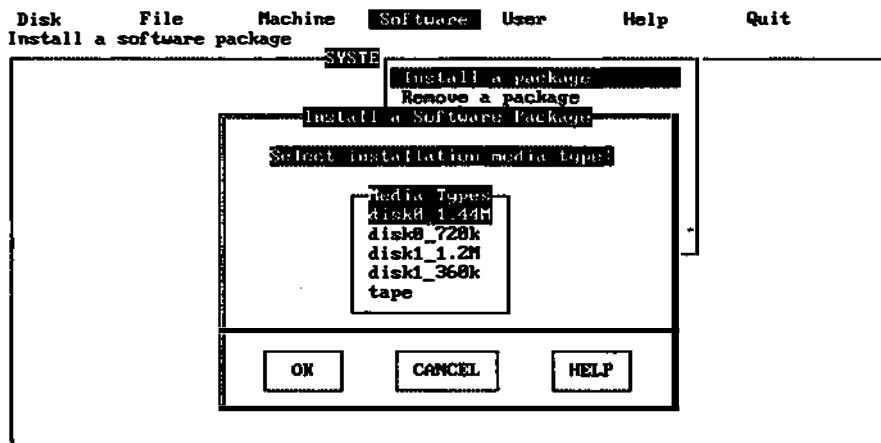
Remember that installation of a particular subset or extension will fail if the subset or extension it depends on is not already installed.

Use the final installation menu to install any optional subsets and extensions you want.

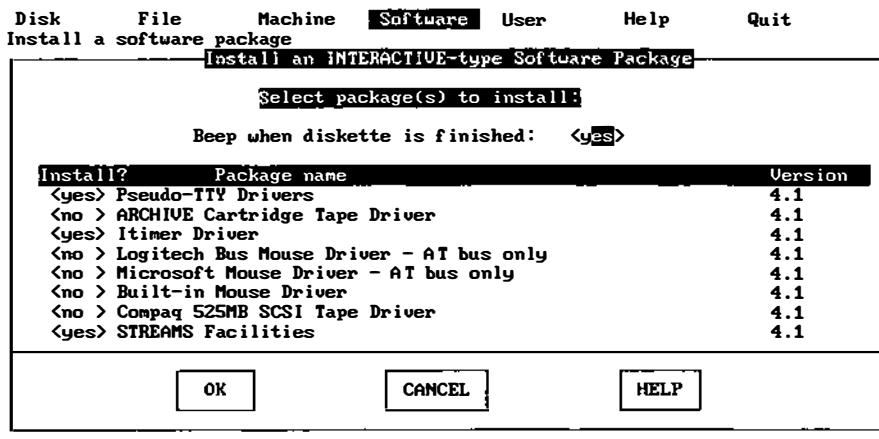
Note – If you decide to add packages at a later date, you can use the sysadm program. You can access the menu by logging in to the system with the sysadm user ID, or you can use the sysadm command if you are already logged in to the system.

Note – If you are installing software that contains its own sysadm scripts for configuration, you must exit and re-enter the sysadm program before these scripts will appear as options on the appropriate sysadm menu.

1. Access the InstallPkg option or the sysadm Install a package option under Software. Your screen will look similar to this:



2. Select the type of diskette you are using for the installation, then select the OK button at the bottom of the form. You will be prompted to insert the diskette, then your screen will look similar to this:



3. In the first field, use the spacebar to specify whether you want the system to beep when the diskette is finished.
4. The next part of the form lists the packages that can be installed on your system. Usually, packages are set by default to no, meaning they won't be installed. However, certain packages that are necessary if you install other packages from the same diskette, or are recommended, are set by default to yes. To select a different installation setting for a package, use the up and down arrow keys to highlight the package, then press the spacebar to change the field to yes or no. Note that this form can be scrolled if there are more packages available than can be listed on the screen at one time.
5. Select the OK button when you have finished editing the form.
6. The system now displays a list of the files being installed for this software package. If the software package requires that a new kernel be built, your screen will display a message directing you to rebuild a kernel using kconfig. If you intend to install additional packages, you should install them before rebuilding the kernel.

Installing XENIX or SCO UNIX Software

The INTERACTIVE UNIX Operating System provides full support for applications written to run on the XENIX System V operating system. (This includes XENIX 286 and 386 x.out executable files.) An application written for XENIX may be installed and run under the INTERACTIVE UNIX System with no loss in functionality.

Most applications written for the SCO® UNIX System or SCO Open Desktop™ can be installed as well.

To install a XENIX application package, follow the directions that accompany the application. Most applications require that the person installing the package have root privileges.

To remove a XENIX package from an INTERACTIVE UNIX System file system, use the `rm` command. (Refer to *rm(1)*.)

Note – Most XENIX applications use the XENIX custom command during installation and removal of the package. For your convenience, this command is included with the INTERACTIVE UNIX Operating System. You can use the Shell option on the final installation menu to temporarily leave the installation program and run the custom command. Based on the application, you may be able to use the custom command to install application updates, customize the application, or remove it from the system.

Installing Other Software From Commercial Vendors

Many application packages are currently available for the INTERACTIVE UNIX Operating System. Call 1-800-SunSoft for a catalog of third-party UNIX System solutions. If you cannot use the toll-free number, contact your local SunSoft office or your distributor.

If a particular software package cannot be installed as described, follow the installation instructions provided with the application software or contact your software vendor.

Physical Components of a Fixed Disk

If you are an experienced computer user, you may want to skip this discussion of the basic components of fixed disks.

One of the more important pieces of hardware in your system is the fixed disk drive on which the INTERACTIVE UNIX Operating System is installed. A fixed disk drive is a permanent, nonremovable storage device for data that is connected to your computer. Fixed disks are produced by many different manufacturers and can range in size from 10 or 20 MBs to multiple Gigabytes.

The documentation supplied by the manufacturer of your fixed disk should describe the physical structure of your disk. A fixed disk may be described by the number of *heads* (typically a number between 4 and 16), *cylinders* (usually a number between 100 and 1630), and *sectors per track* (usually a number between 17 and 63) that are available on it. These parameters vary from disk manufacturer to disk manufacturer. Each different set of parameters is associated with a number called a *disk type*. You are generally asked to supply a disk type when you run your hardware manufacturer's *setup* program.

A disk drive has a number of *disks* or *platters*, which are stacked together somewhat like a stack of phonograph records. There are usually between 4 and 16 of these surfaces. Each of the recording surfaces in the drive has its own recording *head* (similar to a needle on the record). Each head reads and writes data that is stored on the circular *tracks* on each disk surface. Each track is divided into 17 or more *sectors*, which are accessed as units. Data is read and written in sectors. The recording heads are bound together and move in

unison. All the tracks that fall under the recording heads at any one point in time are called a *cylinder*. To save access time, data are generally written up or down all the tracks on the cylinder before the heads are moved to a new cylinder.

Fixed Disk Parameters and the INTERACTIVE UNIX System

During installation the INTERACTIVE UNIX Operating System attempts to determine the parameters of your fixed disk. These parameters should be correct for your system *even though* they *may not* match the true physical geometry (parameters) of your disk. They may instead reflect a virtual geometry imposed on the disk in support of MS-DOS or a modification of the true geometry that takes disk-specific methods of handling known bad sectors into account. Change the value(s) found by the system during installation *only* if you are certain that one or more of the parameters are incorrect and that you know the correct parameters for your disk. Certain disk controllers restrict the parameters that may be changed; if this is the case with your controller, the system will not allow you to change them.

You do *not* need to know the disk parameters to install the INTERACTIVE UNIX System under the following conditions:

- You are able to choose a disk type in your manufacturer's *setup* program that exactly matches your disk's parameters.
- You are using a SCSI adapter.
- You are using an Adaptec® or a Western Digital ESDI controller or a controller with a similar interface.

Fixed Disk Controller Interface Types

Another very important piece of hardware in your system is the fixed disk controller. All fixed disk drives require an associated piece of hardware, called a controller, in order to operate. This board is responsible for interpreting the instructions that the operating system sends to the fixed disk drives and ensuring that the fixed disks carry out those instructions.

There are two major types of controllers used in Intel-based systems: SCSI controllers (often pronounced "scuzzy") and AT-based controllers. SCSI controllers are frequently referred to as "host adapters." Most SCSI controllers can be configured to support multiple fixed disk drives and tape drives. Most

AT-compatible controllers can be configured to support one or two fixed disk drives (of the same interface type). Each AT-compatible controller and drive uses a particular type of interface to communicate. AT-compatible controllers are available for drives using most popular types of interfaces, including IDE, MFM, RLL, and ESDI.

The INTERACTIVE UNIX System must be compatible with the controller or controllers installed on your system. A wide variety of fixed disk controllers and drives are currently supported on the INTERACTIVE UNIX System, and SunSoft is continually adding support for new devices.

Fixed Disk Controller Compatibility

To determine if your controller is supported, refer to the release notes delivered with your INTERACTIVE UNIX System. If your controller is a standard AT-type controller that is not listed as supported, you may still be able to use it. Carefully follow the instructions for installing the INTERACTIVE UNIX System and see if your system will boot. If it does not, you may have to use a different controller.

Using Multiple Fixed Disk Controllers

This section assumes a knowledge of the functions and characteristics of fixed disks and controllers. Additional information is located in the *INTERACTIVE UNIX System Maintenance Guide*.

Most Intel-based computer systems use one fixed disk and one controller. To form a larger, more complex system, several different fixed disk drives and controllers may be configured together.

Several factors must be considered when more than one disk controller is to be configured into a system. A complete discussion of the interactions among all possible combinations of controllers is beyond the scope of this document, but some common problems are listed below. Consult the documentation that accompanied your controller or contact your controller hardware vendor to determine whether these problems may exist with your controllers.

Address spaces

The I/O addresses used for communicating with the controllers must not overlap. In addition, any memory shared between the controllers

and the system must have non-overlapping addresses. Most controllers allow such addresses to be selected by means of jumpers or switches on the controller boards.

Interrupts

For AT-compatible controllers (IDE, MFM, RLL, and ESDI), assign each to a unique interrupt level. Unfortunately, not all controllers allow you to select their interrupt levels. Consult your hardware manufacturer or the documentation that accompanied your controller to make sure that the additional controller you want to use can be configured to use a secondary interrupt. However, for Micro Channel Architecture bus controllers, the same interrupt level may be shared.

DMA channels

If DMA is used, each DMA controller must use a unique DMA channel. These can usually be selected with jumpers or switches.

BIOS interactions

If the controller boards include BIOS ROMs, the addresses of each must be unique. In addition, some BIOS ROMs will interfere with each other or with the system BIOS. A common problem is that which occurs when a SCSI BIOS conflicts with the system's fixed disk BIOS, making it impossible to successfully boot from a disk attached to an AT-compatible controller if the SCSI board is installed.

INTERACTIVE UNIX System defaults for each type of controller are set to correspond to those of the shipped boards, so no changes should be necessary in these if you are using controllers of different types. Be sure to consult your hardware vendor before attempting to use two controllers of the *same* type to ensure that they can be configured differently.

Customizing Your System to Maximize the Disk Configuration

Once you have installed the INTERACTIVE UNIX System, you should customize the HPDD configuration to speed up the boot process and to maximize the performance throughput. Refer to the *INTERACTIVE UNIX System Maintenance Guide* for details.

The Hardware Setup Program

If your hardware vendor does not set up your machine for you, then after you have verified that your hardware configuration meets the minimum hardware requirements, you must run the system manufacturer's *setup* program. (The actual name of this program may be something other than "setup." Check the documentation that accompanied your hardware. Some *setup* programs are incorporated into the system's ROM BIOS and are invoked by pressing a specific combination of keys soon after the system is powered up.) Many different types of hardware can be combined to create a working INTERACTIVE UNIX System. The *setup* program informs your computer of the types of hardware components that are present and their characteristics. This information is stored permanently on the system.

Selecting a Fixed Disk Type

The *setup* program will ask you to select a disk type. This is usually a number between 1 and 48, although it depends on the manufacturer. Since there are many more disks available today than there are defined disk types, you may need to select the disk type that comes the closest to matching your disk's number of heads, cylinders, and sectors per track. If there is no entry that lists the exact number of cylinders, choose an entry with the correct number of heads and sectors per track, and a smaller number of cylinders.

The INTERACTIVE UNIX Operating System attempts to make installation as simple as possible while still offering a great deal of flexibility in the types of hardware that you can use. The INTERACTIVE UNIX Operating System will either be able to determine the correct values from your controller, or it will

use the values that you enter using your manufacturer's *setup* program as the defaults, and then allow you to supply the actual physical characteristics of the disk during installation.

For the Adaptec 1540, ATHD, IDE, MFM, ESDI, and RLL controllers, the *Boot/Install* diskette will *automatically* determine the type of controller present in your system and use its first fixed disk as the boot device and location for the root file system. For other compatible controllers, use the Boot-Loadable Device Driver installation procedure, described in "Installing the System Using Boot-Loadable Device Drivers" in Chapter 2, "Installing the INTERACTIVE UNIX System."

- If you want to boot from a disk attached to an AT-compatible controller, use the exact match of disk type (if available), or set the disk type equal to 1. In most cases (as long as the INTERACTIVE UNIX System is your only operating system), a disk type of 1 is sufficient for any drive. A disk type of 1 indicates the smallest number of heads, cylinders, and sectors per track possible, and all fixed disks have at least this configuration available. Adaptec's AT-compatible disk controllers that support more than 17 sectors per track use their own disk type information. When installing one of these controllers, be sure to use your *setup* program to set the disk type to 1.
- If you are using an IDE controller, you should try to find an exact match for your disk type in the *setup* program. Many systems allow the configuration of at least one disk entry (typically number 47 or 48) to use a user-specified disk geometry.
- If you want to boot from a disk attached to a SCSI adapter, use the manufacturer's *setup* program to configure your computer system so that no AT-compatible fixed disks are installed. Set the disk type to 0 (note that in some *setup* programs, this is equivalent to making the choice Not installed). The SCSI boot disk should be configured so that it is Logical Unit Number (LUN) 0 on SCSI Target ID 0. A SCSI tape device should be configured to be a higher Target ID number than any other disk drive present. Refer to the documentation that accompanied your SCSI disk drive or contact your hardware vendor to determine this information for your drive, whether or not it can be changed, and how to change it, if necessary.
- For Micro Channel Architecture machines, run the reference diskette or the equivalent program supplied by the manufacturer to properly set up the controllers and the machines.

- For PCI machines, the system BIOS will automatically configure your PCI controller and assign it a port address.

Controllers other than those listed here may have other requirements; refer to your hardware manufacturer's installation instructions for such information.

Index

Symbols

/etc/partitions file
 and bad sector information, 33
/tmp directory, 35

A

absolute sector format, 33
active partition, 24
adding a file system, 36
adding a second fixed disk, 46 to 49
address, I/O, 73
administrative login
 setting password for, 40
alts area, 34
applications, XENIX
 installing, 70
assigning system name, 43
AT-compatible controller, 73
authorization key
 using system software with, 18

B

backing up
 data, 5
 partitions, 5

bad sectors
 specifying, 26

bad tracks
 marking, 25

bar menus, 10

BIOS ROM, 74

boot disk, 34

Boot/Install diskette
 used at installation, 17

booting the system, 17 to 21
 during installation, 17

Boot-Loadable Device Drivers, installing
 with, 56

C

changing mount points, 37
channel, DMA, 74

complete surface analysis, 25

configuring software, 44

controller

 AT-compatible, 73
 configuring multiple, 73
 SCSI, 72

controller, disk, 72

Control-r, to refresh screen, 5

Core diskettes, 38

cylinders, 72
 number per disk, 71

D

data destruction
 during installation, 5
data, back up, 5
date/time
 setting, 42
defect table, 26
deleting a file system, 36
directory
 /tmp, 35
disk
 partitions, 4
disk controller, 72
DISK PREPARATION form, 26
disk type, 71
DMA channel, 74
DOS partition, 29

E

extended DOS partition, 29
extensions, optional
 listing, 67

F

fdisk partitions, creating, 49
fdisk program
 partitioning disk with, 27
file system
 adding/deleting, 36
 changing size of, 36
 changing type, 37
 root, 35
 tmp, 35
 types, 34
 usr, 35
first cylinder
 containing bad sectors, 31

fixed disk
 adding second, 46 to 49
boot, 34
default parameters, 22
formatting, 24
parameters, 72
partitioning, 24
physical structure, 71
primary, 34

format disk utility, 24

formatting
 fixed disk, 24

forms
 in installation procedure, 11 to 13
full installation, 22 to 33

H

hardware components
 installing operating system with, 2 to 4
hardware requirements, 2 to 4
hardware setup program
 selecting disk type, 75
heads
 number per disk, 71
Help Index, 7 to 9
help, context-specific, 6
host adapter, 72

I

I/O address, 73
installation
 full, 22 to 33
 menus and forms, 6
 tape, 51 to 55
 update, 16
installing with Boot-Loadable Device
 Drivers, 56
installing XENIX applications, 70
interleave factor, 25
 setting a value for, 23
interrupt level, 74

-
- IRQ 3**
 - disabling for tape installation, 51
 - K**
 - kconfig** program
 - adding subsets with, 45
 - L**
 - locked password, 40
 - logical disks, 4
 - login, powerdown, 59
 - M**
 - maintenance mode, running in, 57
 - menu, bar, 10
 - menu, pop-up, 11
 - mount point
 - changing, 37
 - multiple controllers
 - common problems with, 73
 - multiple operating systems
 - and partitions, 4
 - N**
 - numeric keypad
 - change to default state, 16
 - O**
 - optional extensions
 - listing, 67
 - optional subsets
 - installing, 68
 - listing, 66
 - P**
 - parameters
 - fixed disk, 22
 - partial surface analysis, 25
 - partition**
 - active, 24
 - partitioning requirements**, 4
 - partitioning the fixed disk**, 24
 - partitions, backing up**, 5
 - password**
 - administrative login, 40
 - system login, 40
 - platters**
 - on disk drive, 71
 - pop-up menu**, 11
 - powerdown login**, 59
 - primary DOS partition**, 29
 - primary fixed disk**, 34
 - R**
 - rebooting the system**, 17, 63
 - reformatting the disk**
 - data destruction, 5
 - refreshing the screen**, 5
 - RESET switch**
 - for rebooting, 17
 - root file system**, 35
 - root login**
 - setting password for, 40
 - S**
 - screen refresh**, 5
 - SCSI controller**, 72
 - sectors**
 - numbering, 25
 - per track, 71
 - serial number**
 - for operating system software, 18
 - setting system date/time**, 42
 - setup program**
 - from manufacturer, 3, 75
 - shell**
 - in system configuration, 45

shutting down the system
 using powerdown login, 59
 with shutdown command, 61
software configuration, 44
space, unallocated, 36
subsets, optional
 installing, 68
 listing, 66
surface analysis, 25
swap space, 35
system configuration
 using shell, 45
system login
 setting password for, 40
system name, assigning, 43
system shutdown
 warning period, 62
system, rebooting, 17, 63

T

tape installation, 51 to 55
tmp file system, 35

U

update installation, 16
user (usr) file system, 35
user accounts
 establishing, 49

V

virtual geometry
 of fixed disk, 72

W

warning period
 at system shutdown, 62

