

Digital UNIX (formerly DEC OSF/1)

Installation Guide

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This guide describes the update installation process and the basic and advanced installation procedures for a full installation for all supported processors.

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About This Guide

This guide describes the procedures to install Version 3.2C of the Digital UNIX® base operating system on all supported processors and single-board computers.

Digital has changed the name of its UNIX operating system from DEC OSF/1 to Digital UNIX. The new name reflects Digital's commitment to UNIX and its conformance to UNIX standards.

This guide describes how to prepare your system for installation, how to boot the system from the distribution media, and how to perform the installation procedure.

This guide also explains how to install the Digital UNIX worldwide language support software subsets after installing the base operating system.

In Digital UNIX Version 3.2C you can use the update installation procedure to update from DEC OSF/1 Version 3.2, 3.2A, or 3.2B to Digital UNIX Version 3.2C. The `installupdate` program preserves your user and data files and any system setup (networks, printers) you may have done.

The `wwinstallupdate` procedure performs an update to the Version 3.2C Worldwide Language Support software subsets.

If your system is delivered to you with Factory Installed Software (FIS), the software subsets necessary to get your system up and running have already been installed for you at one of Digital's manufacturing facilities. Follow the instructions for entering system information in the *FIS Quick Reference Card* delivered with your system, and then refer to Chapter 6 in this guide for instructions on how to configure and set up your system.

Audience

This book is intended for anyone installing the Digital UNIX base operating system software or Digital UNIX worldwide language support software. Before proceeding with an installation you must:

- Read the documentation supplied with your processor or single-board computer
- Read the current version of the Digital UNIX *Release Notes*
- Understand how to load and unload the installation media and know which disks are needed during the installation

- Know the names and unit numbers of your disk devices
- Have a basic understanding of the file system and commands

Organization

This guide is organized as follows:

Chapter 1	Describes the tasks you must complete before beginning an installation. This chapter also describes the different installation options.
Chapter 2	Explains how to perform an update installation.
Chapter 3	Describes the disk space planning you should complete before beginning an advanced installation.
Chapter 4	Describes how to boot each supported Digital UNIX processor or single-board computer.
Chapter 5	Describes how to perform a basic or advanced full installation.
Chapter 6	Describes how to configure and set up the system after installing the Digital UNIX operating system software.
Chapter 7	Describes how to restore file systems, modify disk labels, and perform system maintenance, in the single-user, standalone environment.
Chapter 8	Provides information on using the <code>setld</code> command to install and deinstall optional software subsets at any time after the installation.
Chapter 9	Describes how to perform a worldwide installation.
Chapter 10	Describes how to perform a worldwide update installation.
Appendix A	Describes how to load a Digital UNIX CD-ROM into a caddy and a drive, how to mount and unmount a CD-ROM, and how to remove a CD-ROM from a drive and a caddy.
Appendix B	Provides a description of each Digital UNIX base software subset.
Appendix C	Provides a description for each Digital UNIX additional software subset.
Appendix D	Provides a description for each Digital UNIX worldwide software subset.
Appendix E	Provides the size of each Digital UNIX software subset.

Appendix F	Provides disk partition information for supported disks.
Appendix G	Explains installation error messages.
Appendix H	Provides a sample log file for the basic installation.
Appendix I	Provides a sample log file for the advanced installation.
Appendix J	Provides a sample configuration log file.
Appendix K	Provides a sample log file for the update installation.
Appendix L	Provides sample logs for the files saved or modified by the update installation.

Related Documentation

The printed version of the Digital UNIX documentation set is color coded to help specific audiences quickly find the books that meet their needs. (You can order the printed documentation from Digital.) This color coding is reinforced with the use of an icon on the spines of books. The following list describes this convention:

Audience	Icon	Color Code
General Users	G	Teal
System Administrators	S	Red
Network Administrators	N	Yellow
Programmers	P	Blue
Reference Page Users	R	Black

Some books in the documentation set help meet the needs of several audiences. For example, the information in some system books is also used by programmers. Keep this in mind when searching for information on specific topics.

The *Documentation Overview* provides information on all of the books in the Digital UNIX documentation set.

Read the related documentation in the following order:

1. The documentation for your hardware shows how to set up the processor and its additional devices, and supplies valuable troubleshooting guidelines.
2. Before beginning the installation, read the current version of the Digital UNIX *Release Notes*.
3. Refer to *Sharing Software on a Local Area Network* for information about Remote Installation Services (RIS) and Dataless Management

Services (DMS). RIS lets you install software products over a network. DMS lets you to set up a dataless management environment on a server system.

4. Refer to *System Administration* for information on administering and maintaining your system. This guide also contains information about the POLYCENTER Advanced File System (AdvFS).
5. Refer to *Network Configuration* for network setup information after you install the software subsets and configure a standalone system.
6. Refer to *Software License Management* for information on using the License Management Facility (LMF) to install software licenses from Digital Equipment Corporation.

Reader's Comments

Digital welcomes your comments on this or any other Digital UNIX manual. A Reader's Comment form is located in the back of each printed Digital UNIX manual and on line in the following location:

`/usr/doc/readers_comment.txt`

You can send your comments in the following ways:

- Internet electronic mail: `readers_comment@zk3.dec.com`
- Fax: 603-881-0120 Attn: UEG Publications, ZK03-3/Y32
- Mail:

Digital Equipment Corporation
UEG Publications Manager
ZK03-3/Y32
110 Spit Brook Road
Nashua, NH 03062-9987

The Reader's Comment form located in the back of each printed manual is postage paid if you mail it in the United States.

If you have suggestions for improving particular sections or find any errors, please indicate the manual title, order number, and section numbers. Digital also welcomes general comments.

Conventions

%	A percent sign represents the C shell system prompt. A dollar sign
\$	represents the system prompt for the Bourne and Korn shells.
#	A number sign represents the superuser prompt.

>>>	The console subsystem prompt is three right angle brackets.
% cat	Boldface type in interactive examples indicates typed user input.
<i>file</i>	Italic (slanted) type indicates variable values, placeholders, and function argument names.
cat(1)	A cross-reference to a reference page includes the appropriate section number in parentheses. For example, cat(1) indicates that you can find information on the cat command in Section 1 of the reference pages.
Ctrl/ <i>x</i>	This symbol indicates that you hold down the first named key while pressing the key or mouse button that follows the slash. In examples, this key combination is enclosed in a box (for example, Ctrl/c).

Installation Overview 1

This chapter includes the following information:

- Describes the two types of software distribution media
- Describes the three types of installations that can be performed to install the Digital UNIX Version 3.2C base operating system
- Gives you information to help you decide what type of installation to perform
- Summarizes the installation process
- Describes preinstallation tasks
- Describes when and how you install worldwide language support software

1.1 Types of Software Distribution Media

There are two types of media to distribute the Digital UNIX base operating system onto your system:

- From the Digital UNIX CD-ROM labeled *Digital UNIX V3.2C Operating System (formerly DEC OSF/1) Disc 1 of 2* that contains Digital UNIX Version 3.2C
- Over a network connection to a remote installation services (RIS) server that is serving Digital UNIX Version 3.2C

1.2 Starting the Installation

Starting the installation is the same whether you use CD-ROM or RIS as the source of the Digital UNIX Version 3.2C software. To start the installation, shut down and halt your processor or single-board computer (SBC) to console mode and then boot off the CD-ROM or network to display the Installation Menu. The Installation Menu is similar to the following:

```

***  STANDALONE SYSTEM ENVIRONMENT  ***

Select the BASIC option to install the mandatory
software subsets for your system configuration.

Select the ADVANCED option to display optional
software subsets from a menu and/or customize
system disks and partitions.

Select the SYSTEM MANAGEMENT option to customize disk
partitions on the system disk.

Select one of the following options:

    1) BASIC Installation
    2) ADVANCED Installation
    3) SYSTEM MANAGEMENT

```

The remaining sections in this chapter describe the types of installations you can perform and the prerequisite tasks to complete before you begin the installation. Then, depending upon the type of installation you choose, the chapters in this guide provide step by step procedures for you to follow for your installation.

1.3 Determining the Type of Installation to Perform

In Digital UNIX Version 3.2C you can perform a full installation (which has basic and advanced procedures) or an update installation. The following briefly describes these three types of installations:

- **Basic installation** - A basic installation is a full installation that overwrites the existing `root`, `usr`, and `var` file systems and installs a basic mandatory set of Digital UNIX software subsets on a default file system layout and on default disk partitions. Refer to Section 1.3.1 for more detailed information about the basic installation.
- **Advanced installation** - An advanced installation is a full installation that overwrites the existing `root`, `usr`, and `var` file systems. In addition to installing the mandatory set of Digital UNIX software subsets, the advanced installation lets you install optional software subsets to customize your system and to customize your file system layout. Refer to Section 1.3.2 for the other choices you have during an advanced installation.
- **Update Installation** - An update installation updates DEC OSF/1 Version 3.2, 3.2A, or 3.2B to Digital UNIX Version 3.2C. The update installation preserves user files, data files, print and network configurations, user accounts, and any other system setup you may have done. An update installation does not update optional layered products. An update installation is started by entering the `/sbin/installupdate` command from the command line; an update installation is not invoked from the Installation Menu. Refer to Section 1.3.3 for more detailed information about the update installation process.

A full installation (basic or advanced) must be done if your operating system predates DEC OSF/1 Version 3.0.

The Digital UNIX installation procedure checks for the amount of memory on a system, and if it is 24 MB, performs the recommended system configuration changes transparently. You can choose either the basic or advanced installation when installing on a low end workstation. Systems with less than 32 MB of memory are not provided with the option to select the Advanced File System (AdvFS) as the file system type for `/root`, `/usr` or `/var`.

The Installation Menu also provides a System Management option called the *standalone environment*. The standalone environment is a combination of a virtual disk and file system environment. The standalone environment provides commands that help you recover from serious problems such as root file system corruption and enables you to perform general file system and disk maintenance tasks when no other environment is available. The standalone environment is a primitive environment and does not perform like a full operating system environment. This feature is described in Chapter 7. Digital recommends that only experienced users choose the System Management option.

1.3.1 Description of a Basic Installation

By performing a basic installation you can get your system running with a minimum amount of work because a basic installation uses preset defaults, and you do not have to make many decisions.

The basic installation is designed for novice users of the Digital UNIX operating system. This installation process is simpler and takes a shorter time to accomplish. However, the installation is generic, installing only the mandatory software subset to provide you with a minimally configured system. You have no control over the allocation of file systems as you do during an advanced installation.

The basic installation is recommended for systems with limited disk space and memory (less than 32 MB of memory). Optional subsets can be installed later by using the `setld` command.

The basic installation provides a default file system layout. Disk space of 64 MB is allocated for the root file system on whatever disk you select for your system disk. The `b` partition of the same disk is used for dumps and contains the swap space. The `g` partition of the disk is used for the `/usr` and `/var` file systems.

The following mandatory subsets are installed during a basic installation:

```
Base System
Base System - Hardware Support
Compiler Back End
Kernel Header and Common Files
Standard Kernel Objects
Hardware Kernel Objects
Basic Networking Services
DECwindows Mail Interface
RAND Corp. Mail Handler (MH)
Local Printer Support
NFS(tm) Utilities
```

If Asynchronous Mode Transfer (ATM) hardware is detected during the installation process, the following subsets are installed:

```
ATM Kernel Objects
ATM Commands
```

If you have a workstation with graphics capability, the following subsets are installed: The following software subsets are hardware specific. They are mandatory and are installed automatically if you have the hardware; they are optional otherwise:

```
X Servers
X Servers for TurboChannel, PCI, or QVision
Basic X Environment
Keyboard Support
X Fonts
DECwindows 100dpi Fonts
Adobe Fonts
```

Refer to Appendix B for full descriptions of the mandatory subsets.

Choose the basic installation if *all* of the following conditions are true:

- You are not familiar with UNIX operating systems.
- You do not need to preserve custom disk partition tables or disk labels.
Custom disk partition tables are partition tables that are changed to sizes other than the default values. The disk partition table is included in the disk label.
- You do not want to use the Advanced File System (AdvFS) as the file system type for `root`, `/usr`, or `/var`.
- You do not need to put the `/usr` file system on a disk other than the system disk.
- You do not need to allocate the `/usr` file system on a partition other than the `g` partition of the system disk.
- You do not need to allocate a separate `/var` file system.
- You do not need to allocate a second swap space. You can allocate a second swap space after the installation.

- You do not need to install optional software at this time.

Optional subsets that are part of the base operating system are installed by using the `setld` utility after the basic installation is complete. Refer to Chapter 8 for information about installing optional software subsets after the installation. Refer to Section B.2 for descriptions of the optional software subsets,

Additional software subsets that are not part of the base operating system can be installed after the basic installation is complete. Refer to Appendix C for descriptions of the additional software subsets.

To perform a basic installation, shut down your system to console mode and boot your system as described in Chapter 4.

1.3.2 Description of an Advanced Installation

An advanced installation is a full installation that overwrites the existing `root`, `usr`, and `var` file systems. In addition to installing the mandatory base Digital UNIX software subsets, you can install optional software subsets and customize your file system layout and disk partitions.

Choose the advanced installation only if you are experienced with UNIX file systems and if you want to do the following:

- Preserve custom partition tables or disk labels
Custom partition tables are partition tables that are changed to sizes other than the defaults. The defaults are defined by the `/etc/disktab` file and are listed in Appendix F. Refer to Section 3.6 for information about modifying your disk partition layouts.
- Select file system layouts other than the default layouts. The default file system layout is described in Section 1.3.1.
- Allocate the `/usr` file system to any disk on your system
- Allocate the `/var` file system under the `/usr` file system or to any other disk on your system
- Select either the UNIX File System (UFS) or the Advanced File System (AdvFS) as the file system type for the `root`, `/usr`, or `/var` file systems. Systems with 24 MB of random access memory (RAM) are not permitted to select AdvFS as the file system type.
- Allocate two swap areas to any unused disk partitions on your system
- Install optional as well as mandatory software subsets
- Select specific kernel options
- Set up a dataless management environment on a server system

If you plan to install software on a Dataless Management Services (DMS) server, you must perform an advanced installation because you need more

than just the mandatory software subsets on a DMS server. DMS client systems are not installed by using the procedures documented in this guide. The `dmu` utility is used to install software on DMS clients. Refer to *Sharing Software on a Local Area Network* for information about setting up disk partitions for DMS servers, software requirements for DMS servers, and installing software on DMS clients.

- Set up a remote installation services (RIS) server

If you plan to install software on a RIS server, you must perform an advanced installation because you need more than just the mandatory software subsets on a RIS server. Refer to *Sharing Software on a Local Area Network* for information about setting up RIS servers.

The mandatory software subsets are automatically installed and you can install some or all of the optional software subsets. If the default disk partitions are used, 64 MB of disk space is allocated for the root file system for all disks.

The following mandatory software subsets are loaded and you are provided with a menu of optional software subsets:

```
Base System
Base System - Hardware Support
Hardware Kernel Header and Common Files
Hardware Kernel Objects
Kernel Header and Common Files
POLYCTR advfs Kernel Objects
Standard Kernel Objects
Basic Networking Services
DECwindows Mail Interface
RAND Corp. Mail Handler (MH)
Local Printer Support
NFS(tm) Utilities
Compiler Back End
POLYCTR advfs
```

Two POLYCENTER AdvFS software subsets are usually optional. They are installed automatically only if AdvFS is chosen as the file system type for the `root`, `/usr`, or `/var` file systems.

If Asynchronous Mode Transfer (ATM) hardware is detected during the installation process, the following subsets are installed:

```
ATM Kernel Objects
ATM Commands
```

The following software subsets are hardware specific. They are mandatory and are installed automatically if you have the hardware; they are optional

otherwise:

- Adobe Fonts
- Basic X Environment
- DECwindows 100dpi Fonts
- X Fonts
- X Servers
- Keyboard Support
- X Servers for TurboChannel, PCI, or QVision

For descriptions of the mandatory software subsets, refer to Appendix B.

Optional software subsets are part of the base operating system; they can be installed during the advanced installation or after the installation is complete. Refer to Chapter 8 for information about installing optional software subsets after the installation. For descriptions of the optional software subsets, refer to Appendix B.

You can install additional software subsets that are not part of the base operating system after the advanced installation is complete. Refer to Appendix C for descriptions of the additional software subsets that you can install.

If you want to perform an advanced installation, start with Chapter 3. The worksheets in Chapter 3 help you plan disk space for your Digital UNIX file systems and whether or not you should use the default disk partitions or customize them.

1.3.3 Description of an Update Installation

The `installupdate` program is an operating system update procedure that preserves disk partitions, file systems, and file customizations on a system where DEC OSF/1 is already running.

This means that your system retains any special customizations – changes that you made to the version of DEC OSF/1 that is currently installed on your system. The amount of postinstallation administrative work after an update installation is greatly reduced when compared to a full installation because the update installation preserves your print and network configuration, your user accounts, and any other system setup you may have done.

Only the software subsets that are part of the Digital UNIX base system are updated. Digital UNIX base subset names start with OSF, and they are located in the product area of the distribution media. The distribution media can be either a CD-ROM or a RIS server area. The product area on a RIS server usually exists in the `/var/adm/ris/risn.alpha` directory. The number *n* represents the number assigned to any one of the many RIS areas that may be installed on the RIS server. The product area on a CD-ROM is located in the `/ALPHA/BASE` directory.

You cannot install additional optional subsets during an update installation; you must use `setld` when the update installation is complete. Refer to Chapter 8 for more information about `setld`.

The update installation does not affect any user files (that is, files that you created that are not shipped as part of the Digital UNIX product). The files that the update installation affects are the following:

- Protected System Files (files prefixed with `.new.`)
- Unprotected System Files
- Obsolete System Files

Chapter 2 contains more information about the system files affected by the update installation.

To perform an update installation, follow the instructions in Chapter 2.

1.4 Summary of Installation Steps

Table 1-1 summarizes the steps in a Digital UNIX installation for all supported processors for all basic, advanced, and update installations:

Table 1-1: Summary of Installation Tasks

Installation Task	For Which Installation? (Update/Basic/Advanced)	Follow Instructions In:
Determine the type of installation to perform	All	Section 1.3
Check hardware for installation readiness	All	Section 1.6
Check software distribution kit	All	Section 1.6
Back up (save) the current version of your operating system	All	Section 1.6
Read the Digital UNIX <i>Release Notes</i>	All	Section 1.6

Table 1-1: (continued)

Installation Task	For Which Installation? (Update/Basic/Advanced)	Follow Instructions In:
If you are performing a RIS installation, ensure your system is registered as a client of the RIS server.	Basic/Advanced	Section 1.6
Update a DEC OSF/1 system running Version 3.2, 3.2A, or 3.2B to Digital UNIX Version 3.2C	Update	Chapter 2
Plan disk space and disk partitions	Advanced	Chapter 3
Shut down your system; update your system's firmware; run configuration utilities if necessary	Basic/Advanced	Chapter 4 and Section 4.1
Boot your system from the network or CD-ROM	Basic/Advanced	Chapter 4
Select the type of installation to perform	Basic/Advanced	Chapter 5
Select a system disk	Basic/Advanced	Section 5.6
Select file system type for root	Advanced	Section 5.7.1
Customize disk partitions	Advanced	Section 5.7.3
Reboot the system	Basic/Advanced	Section 5.8
Customize file system layout	Advanced	Section 5.9

Table 1-1: (continued)

Installation Task	For Which Installation? (Update/Basic/Advanced)	Follow Instructions In:
Select file system type for /usr	Advanced	Section 5.9.1
Allocate swap space	Advanced	Section 5.9.2
Select location of and file system type for /var	Advanced	Section 5.9.3
Install mandatory software subsets only	Basic	Section 5.10.1
Install mandatory and optional software subsets	Advanced	Section 5.10.2
Configure the system software	Update/Basic/Advanced	Section 6.1
Enter system name, password, time zone, date and time	Basic/Advanced	Section 6.2
Build the kernel	Basic/Advanced	Section 6.3
Select kernel options	Advanced	Section 6.3.1
Load and register software licenses	Basic/Advanced	Section 6.7
Set up system for general use	Basic/Advanced	Section 6.11

1.5 If Your System Has Factory Installed Software (FIS)

Your processor or single-board computer may have been delivered to you with Factory Installed Software (FIS); that is, a version of Digital UNIX is already installed. Included in the box with your system is the *Factory Installed Software Information Sheet* that describes the software products that have been preinstalled for you and how the system is configured.

Connect the hardware as shown in the hardware documentation, and turn on power to the processor and monitor. After some initial system initialization messages are displayed, you are prompted to enter information such as the system name, password, and the date and time. The *FIS Quick Reference Card* is also included in the box with your system and describes how to respond to the prompts for this information. After the kernel build process is complete, use the `lmfsetup` utility to load and register the Product Authorization Key (PAK) that authorizes you to use the Digital UNIX operating system. After running `lmfsetup`, reboot your system to activate your license. Refer to Section 6.2 in this guide for more information about setting up your system for general use.

Under some circumstances, you may need to reinstall the Digital UNIX software subsets. This can happen if an error occurs during FIS setup or if you plan to install optional hard disks.

If the FIS setup halts unexpectedly and you see the `#` prompt, make a note of any error messages that appear on the screen.

Next, press `Ctrl/d` to restart the installation. Usually the installation continues, but you will need to correct the error when setup is complete. Refer to the appropriate Digital UNIX document or hardware document to identify and correct the error.

If the error prevents the installation from proceeding, it may be necessary to reinstall Digital UNIX. To do this, boot your processor as shown in Chapter 4 and refer to Section 1.3 to decide whether you need to do a basic or advanced installation. If you choose the advanced installation, be aware that the system disk may already have a customized disk partition table. The customization is usually done at the factory to create disk partitions that are large enough to hold all the software originally installed on the disk.

During the advanced installation, you are asked whether you want to preserve the customized partitions or use the default partition table. This option is described in Section 5.7.3. If you choose not to preserve the customized partitions, you may not be able to reload all the software that was originally installed.

If you do not need to reinstall all the original software subsets, perform a basic installation.

The basic and advanced installation procedures are described in Chapter 5.

1.6 Before Beginning an Installation

Before you begin an installation, complete the following tasks:

1. Check the hardware needed for an installation

Ensure that you have the hardware needed for an installation. You must know the location and function of the controls and indicators on your

hardware. You should also understand how to load and unload the installation media (CD-ROM) and know which disks are needed during the installation. Verify that all cables and connectors are hooked up and that the system is plugged in. Refer to your hardware documentation for more information.

You need some or all of the following items to install the Digital UNIX operating system software:

- You need a software distribution device if you are installing the software from the Digital UNIX CD-ROM distribution media. This CD-ROM is labeled *Digital UNIX V3.2C Operating System (formerly DEC OSF/1) Disc 1 of 2*.

- System disk (required)

A system disk is required to boot your system. After the installation, the system disk contains the `root` file system.

- Data disks (optional)

A data disk is a disk on which you store data files. For a basic installation, you need only one disk to install the Digital UNIX operating system. If you perform an advanced installation, you can allocate certain file systems to disks other than the system disk.

- Console terminal (required)

The console terminal communicates with your system during the installation. Depending on your system and its configuration, you can perform the installation at the console display prompt (`>>>`) on either a serial hard copy terminal, a serial video terminal, or an Alpha workstation that has graphics capability.

2. Check the software distribution kit.

Use the *Part Listing* that is included with your hardware to check your software distribution kit. The software distribution kit consists of two CD-ROM optical discs labeled *Digital UNIX V3.2C Operating System (formerly DEC OSF/1) Disc 1 of 2* and *Digital UNIX V3.2C Online Documentation (formerly DEC OSF/1) Disc 2 of 2*. The documentation shipped with the kit includes this guide and the *Release Notes*.

3. Check network connections for RIS installations

You need a connection to the network (via Ethernet, FDDI, or Token Ring) if you are going to do a RIS (Remote Installation Services) installation over a Local Area Network (LAN). Refer to your hardware installation guide for information about network connections.

If you are installing from a RIS server, the server's System Administrator must register your system as a client of the RIS server. Refer to *Sharing Software on a Local Area Network* for more information.

4. Read the Digital UNIX *Release Notes*.

The *Release Notes* document any last-minute changes to the software. This information might be required for a successful installation.

5. Back up your system.

Before you begin any installation, Digital recommends that you back up your system to retain any information from your previous operating system. Refer to *System Administration* for information about backing up your system.

6. Update your system's firmware.

Update your system's firmware before installing the latest version of Digital UNIX. Chapter 4 provides information about the minimum firmware revision for each supported processor. Digital distributes console firmware for certain processors whenever the operating system is updated or as is required. The firmware update is packaged on a separate CD-ROM labeled *Alpha Systems Firmware CD-ROM Version 3.3*. The firmware CD-ROM is included with your Digital UNIX Version 3.2C media kit. Firmware updates for all supported processors reside on the firmware CD-ROM and the revision level may be different for each processor. The Firmware Update Utility is the mechanism provided to update the firmware. The *Alpha AXP Systems Firmware Update Release Notes Overview* describes how to access and print processor-specific firmware update instructions.

1.7 System Management Option

When you start an installation, you can choose the System Management option from the Installation menu. This option puts you into a Bourne shell in single-user mode. The standalone environment is primitive and supports the initial phases of an installation. If you intend to do an advanced installation, you may need to choose this option and run one or more utility programs. For example, if you have to customize disk partition tables after you complete the installation planning worksheets in Chapter 3, use the System Management option to run the `disklabel` command.

The standalone environment also includes commands that you use to recover from root file system corruption. You can also perform limited file system and disk maintenance tasks. You should perform system management tasks in the standalone environment only if you have extensive Digital UNIX operating system experience. Refer to Chapter 7 for more information about the standalone environment.

1.8 Software Licensing

You need an OSF-BASE Product Authorization Key (PAK) to register a license to use Digital UNIX. An OSF-BASE PAK is included in the documentation sent to you when you purchased your system. Use the License Management Facility (LMF) to register and load the license PAK for Digital UNIX and other Digital products after software subsets are installed. Refer to *Software License Management* or Section 6.7.1 for information about using LMF to load your PAKs.

The OSF-BASE PAK must be registered before you can use Digital UNIX. This PAK provides simultaneous login capacity for two interactive operating system users and lets you use the Bookreader application to access the online documentation. The user `root` does not count as an interactive operating system user.

The license for the Digital UNIX base operating system includes the right to use the operating system, windowing environment, basic Logical Storage Manager features, POLYCENTER Advanced File System, NetWorker SingleServer Save and Restore, and many other optionally-installed features that are included on the Digital UNIX CD-ROM.

The following additional licenses are available:

- **Digital UNIX OSF-USR**
The OSF-USR license grants the right to interactive use of the operating system. This license is available in various quantities that can be combined to match the desired number of interactive users. An interactive user, either a person or a device, is one that is logged in to a Digital UNIX processor or is interactively using the operating system software by means other than a login.
- **Digital UNIX C Developer's Extensions**
The Digital UNIX C Developer's Extensions license grants the right to use the C compiler and software development tools for program development and debugging.
- **Digital UNIX Developer's Toolkit**
The Digital UNIX Developer's Toolkit license grants the right to use the software development tools for program development and debugging without the C compiler.
- **Digital UNIX Server Extensions**
The Digital UNIX Server Extensions license lets you set up systems to be Remote Installation Services (RIS) and Dataless Management Services (DMS) servers.
- A separate license is required to use the Logical Storage Manager features of mirroring and striping and the LSM Graphical User Interface (GUI).

The C compiler, software development tools, and RIS components are supplied in the installation kit. Before using these components, you must purchase the appropriate license and load a Product Authorization Key (PAK), using the License Management Facility (LMF).

Any additional interactive user licenses must be loaded into the system by using LMF. For information about using the `lmf` utility, refer to Section 6.7.1. After the installation, you can use the Bookreader application to view the *Software License Management* guide for information about the `lmf` utility.

1.9 If You Want to Install Worldwide Language Support Software

Digital UNIX is an internationalized operating system. The worldwide language support software subsets provide support for various native languages and countries. Installing the worldwide language support software subsets enables software developers to develop internationalized software that can be used in different countries.

If you want to install Digital UNIX Version 3.2C worldwide language support software subsets, your system must be installed with the Digital UNIX Version 3.2C base operating system. Then, follow the worldwide installation instructions in Chapter 9.

If you want to perform an update installation of the worldwide language subsets from DEC OSF/1 Version 3.2, 3.2A, or 3.2B to Digital UNIX Version 3.2C, follow the worldwide update installation instructions in Chapter 10.

Descriptions of the worldwide language support software subsets are located in Appendix D.

Performing an Update Installation **2**

This chapter describes how to prepare for and perform an update installation. This chapter also explains the phases of the update installation and lists the postinstallation tasks that you should perform.

2.1 What is an Update Installation?

In Digital UNIX Version 3.2C, you can perform an update installation procedure to update your DEC OSF/1 system that is running Version 3.2, 3.2A, or 3.2B to Digital UNIX Version 3.2C. An update installation preserves disk partitions, file systems, file customizations, your print and network configuration, user accounts, user files, and any other system setup you may have done on a system that is already running the Digital UNIX operating system. The update installation process is started by entering the `/sbin/installupdate` command from the command line.

There are two ways to perform an update installation:

- From the Digital UNIX CD-ROM distribution media
- Over a network connection to a Remote Installation Services (RIS) server that is serving Digital UNIX Version 3.2C

The update installation is performed from single-user mode. You must be `superuser` or `root` to bring a system down to single-user mode.

The update installation takes from 60 to 90 minutes to complete. Actual time depends on your processor type, how many software subsets have to be updated, and the type of media used to perform the update (CD-ROM or RIS). You only have to respond to prompts during the initial phase of the update. After that, the update installation runs unattended.

Caution

Do not use the `setld -l` command to update from DEC OSF/1 Version 3.2, 3.2A, or 3.2B to Digital UNIX Version 3.2C. The only method to update your system other than performing a full installation is to use the `/sbin/installupdate` program that is described in this chapter.

2.2 Updating Systems with Layered Products Installed

Layered products are not updated by the update installation process. Some layered products will operate correctly after an update installation. However, if you see a warning about these layered products during the update installation, test the layered product after the update is complete. Section 2.8.4 shows an example of the messages you see.

Some layered products must be deleted before the update installation can proceed. Section 2.8.5 shows an example of the messages you will see during the update installation. The following layered products, and any software subsets that require the layered product, halt the update installation and should be deleted before beginning the update:

- Common Desktop Environment (CDE)
- DECnet/OSI
- Worldwide Language Support
- DEC Open3D
- TruCluster
- System V Environment
- DECsafe Available Server Environment (ASE)

Use the `setld` utility to delete the software subsets associated with these layered products. If you do not delete these layered products before the update installation, you must delete them during the update installation. Digital suggests deleting these products before the update installation. Section 2.8.5 describes how to delete layered products.

2.3 Summary of Steps in an Update Installation

The following summarizes the steps in an update installation:

1. Perform prerequisite tasks such as backing up your system, updating your system firmware, and checking disk space. These tasks are described in Section 2.5.
2. Decide whether you are updating to Digital UNIX Version 3.2C from the CD-ROM or RIS distribution media.
3. Perform prerequisite tasks depending upon what distribution media you choose. Refer to Section 2.6.1 for CD-ROM prerequisite tasks. Refer to Section 2.7.1 for RIS prerequisite tasks.
4. Delete layered products shown in Section 2.2 if the layered product is installed.
5. Start the update installation by entering `/sbin/installupdate`.

6. Respond to prompts during the initial phase of the update.
7. Perform postinstallation tasks:
 - Check the installation logs to make sure all file merges were successful
 - Manually merge customizations where necessary
 - Use the Update Administration Utility to perform file administration tasks
 - Install optional software subsets if desired.

2.4 Files Affected by the Update Installation

This section describes the files that are affected by the update installation.

The update installation does not delete any user files (that is, files that are not shipped as part of the Digital UNIX operating system). The files that the update installation affects are the following:

- Protected System Files (.new..)

An inspection of your system will show a number of files labeled with `.new..` prefixed to the file name. Examples of these files are listed in Appendix L. These files are special to the Digital UNIX update installation. The `.new..` prefix lets a file be delivered onto the system without overwriting the existing, and possibly customized, version of the file. One example of a protected file is the `/etc/hosts` file that is shipped as `/etc/.new..hosts`. The `/etc/hosts` file is considered the configured version of the file and typically contains customizations that were not present in the `/etc/.new..hosts` file. Only the configured version of protected system files should be customized. The `.new..` version of a file should never be customized.

Similar to the `.new..` prefix, the `.proto..` prefix also exists for all protected system files. Every `.new..` file has a corresponding `.proto..` file. The `.proto..` files have special significance for Dataless Management Services (DMS) environments where a centralized server maintains the `root`, `/usr`, and `/var` file systems for client systems. DMS server System Administrators provide site-wide customizations in the `.proto..` files before the configured versions are used by the server's dataless clients.

A benefit of performing an update installation is that customizations to protected system files are preserved. The mechanism for preserving customizations is the merge process. The `installupdate` procedure detects whether customizations exist by comparing the existing `.new..` file against the configured version. If customizations have been made, new functionality is merged into the configured file.

It is important that you do not delete the `.new..` and `.proto..` versions of protected system files because they are crucial to the proper operation of the `installupdate` procedure.

- **Unprotected System Files**

Other customized system files that may be on your system that are not **merge protected** by the update installation are detected. As each file is saved it is recorded in the log file `/var/adm/smlogs/upd_custom_files`. You must manually merge your customizations into the new files when the update is complete.

When your manual merges are complete, you can use the Update Administration utility, `/usr/sbin/updadmin`, to perform administrative tasks on the saved file versions.

Most of the changes to system files, not just the files that you deliberately modified are found. Some system files might be changed by a process, such as during the installation of a software application. Other system files might be changed as part of the normal system operation. For example, an empty log file becomes filled with data as the system runs.

- **Obsolete System Files**

Obsolete files are files that were shipped in DEC OSF/1 Version 3.2, 3.2A, or 3.2B but are no longer part of Digital UNIX Version 3.2C. After an update installation you have an opportunity to save these obsolete files so that you can archive them or delete them from the operating system.

2.5 Prerequisite Tasks

Whether you are performing the update installation from CD-ROM or a RIS server, you must perform the following tasks before you begin:

- **Back Up Your System**

Digital recommends that you back up your system before beginning an update installation. If there are any interruptions after the update is loading software subsets, it is unlikely that the update will complete successfully. Should this happen, you must restore the original version of DEC OSF/1 that was previously installed on your system before you can attempt another update. Consult *System Administration* for information about backing up your current system.

- **Check Disk Space**

Refer to Section E.1.1 for information on the disk space requirements for the update installation of Digital UNIX Version 3.2C. Check your current disk usage by using the `df` command. An update installation can

be performed even if your disks are between 100% and 111% of capacity, although this is not recommended by Digital.

If your disk is already beyond 100% of capacity, consider using the `setld` utility to delete unwanted subsets before you begin the update. You should also remove all unnecessary `core` files and kernels that are wasting space. Refer to Chapter 8 for more information about `setld`.

Note

If you previously performed an update installation on your system, you should have used the Update Administration Utility to remove unnecessary files before attempting the next update installation. If you have not removed these files, please do so now. By using the Update Administration Utility you can remove obsolete files that may conflict with the newly loaded subsets. Removing obsolete files also frees up disk space. Refer to Section 2.11 for more information about the Update Administration Utility.

- Update System Firmware

To run Digital UNIX Version 3.2C, your system might require a firmware update. Firmware updates are located on the *Alpha Systems Firmware CD-ROM Version 3.3* compact disc that is included with your Digital UNIX media kit. Update your system's firmware before beginning the update installation. Chapter 4 provides information about the minimum firmware revision for each supported processor.

After you back up your system, update the firmware, and make sure your system has enough disk space to perform the update, proceed to Section 2.6 if you are using the Digital UNIX CD-ROM to perform the update. Proceed to Section 2.7 if you are using RIS to perform the update.

2.6 Running the Update Installation from CD-ROM

Read this section if you are performing an update installation from CD-ROM media.

2.6.1 Before you Start

If you plan to update your system from CD-ROM media, you need to know the correct device name for the CD-ROM device where the CD-ROM will be mounted. An example of a device name is `/dev/rz4c`.

If you are uncertain of your CD-ROM's device name, as the user `root` enter

the `file` command, specifying the raw device, as follows:

```
# file /dev/rrz*c
/dev/rrz1c: character special (8/1026) SCSI #0 RZ25 disk #8 (SCSI ID #1)
/dev/rrz2c: character special (8/2050) SCSI #0 RZ25 disk #16 (SCSI ID #2)
/dev/rrz3c: character special (8/3074) SCSI #0 RZ25 disk #24 (SCSI ID #3)
/dev/rrz4c: character special (8/4098) SCSI #0 RRD42 disk #32 (SCSI ID #4)
```

CD-ROM devices are prefixed with the letters RRD. In the previous example, the CD-ROM device is RRD42 on device `/dev/rz4c`.

2.6.2 Starting the Update Installation from CD-ROM

Perform the following steps to start the update installation from CD-ROM:

Note

Before beginning the update installation, be aware that the process takes from 60 to 90 minutes to complete.

1. Verify that your system is backed up so that you can recover the previous version if necessary. The *System Administration* guide documents backup procedures (using the `dump` command).
2. As superuser or `root`, boot to single-user mode or shut down your system. The following example shows how to switch to superuser and then shuts down the system:

```
# su -
password:
# shutdown +10 preparing to update the system
```

In the previous example, `+10` shuts down the system in ten minutes and sends the message `preparing to update the system` to all logged in users.

Caution

If your system has the DCE Distributed File System (DFS) installed, the DFS kernel daemons will continue to run and disrupt the update installation. Before you start the update installation, you must use the `shutdown -h` command to shut down and halt the system, thereby killing the DFS kernel daemons. Halting the system brings the system down to the console mode, and the console mode prompt (`>>>`) is displayed. Then, enter the following command to boot your

system to single-user mode:

```
# boot fl s system_disk
```

In the previous example, *system_disk* is an entry such as *DKA0*. Use the `show dev` command to determine your system disk device.

3. Follow this step only if you installed and are using the Logical Storage Manager (LSM); otherwise, proceed to Step 4.

Once the system is in single-user mode, enter the following command to activate LSM before running `bcheckrc` (in Step 4):

```
# /sbin/lsmbootstrap
```

4. When the system is in single-user mode, mount the local file systems as follows:

```
# /sbin/bcheckrc
```

The `bcheckrc` command also runs `fsck` to check the file system. If `fsck` finds a problem with the `root (/)` partition, the system shuts down and reboots to multiuser mode.

5. There are two ways to start `installupdate` depending upon how the CD-ROM is mounted:

- a. To run `installupdate` from a CD-ROM device, ensure that the CD-ROM is loaded in the caddy and drive as described in Appendix A. Enter the following command:

```
# /sbin/installupdate device
```

In the previous example, *device* is the name of the CD-ROM device special file where the distribution volume for Digital UNIX Version 3.2C (such as `/dev/rz4c`).

- b. If you already have an instruction in your `/etc/fstab` file to mount the CD-ROM device, the distribution media is automatically mounted on the mount point that is specified in your existing `/etc/fstab` file. In that case, enter the following command to run `installupdate`:

```
# /sbin/installupdate mnt-pt
```

In the previous example, *mnt-pt* is the mount point specified in your `/etc/fstab` file.

Caution

Do not press `Ctrl/C` for any reason during the update. Pressing `Ctrl/C` causes `installupdate` to abort. You must then restore the previous version of the operating system before you can attempt another update.

Proceed to Section 2.8 to continue the update installation.

2.7 Running the Update Installation from a RIS Server

Read this section if you are performing an update installation from a RIS server.

Note

Before beginning, be aware that the update installation takes from 60 to 90 minutes to complete.

2.7.1 Before You Start

Complete these steps before you start the update installation from a RIS server:

1. Ask the person responsible for server system administration to ensure that the full pathname for the RIS kit is exported to your machine, for example: `/var/adm/ris/ris0.alpha/kit`. Another way to see the RIS server's exports list is to execute the following command:

`/usr/bin/showmount -e RIS_hostname`

The Internet name and address of the server may need to be in your system's `/etc/hosts` file. You can run `netsetup` to add the name and address of the server or edit the `/etc/hosts` file to include an entry for the server, similar to the following:

```
16.141.113.221  risky.dec.com risky
```

The hosts entry in `/etc/svc.conf` must allow for local resolution of host (Internet) addresses, for example: `hosts=local,yp`. You can run `svcsetup` to modify hosts to local or edit the `/etc/svc.conf` file. Refer to *Network Configuration* if you need more information about obtaining network status. Refer to *Sharing Software on a Local Area Network* if you need more information about RIS.

2. Ensure that your system can communicate with the RIS server by executing the `/sbin/ping` command to verify the network connection. Enter the command in the following format and replace *server* with the

name of your local RIS server:

```
# /sbin/ping -c2 server
```

Successful output of the `/sbin/ping` command is similar to the following:

```
# ping -c2 system9
PING system9 (16.59.124.96): 56 data bytes
64 bytes from 16.59.124.96: icmp_seq=0 ttl=255 time=1 ms
64 bytes from 16.59.124.96: icmp_seq=1 ttl=255 time=0 ms

----system9 PING Statistics----
2 packets transmitted, 2 packets received, 0% packet loss
round-trip (ms)  min/avg/max = 0/0/1 ms
```

In the previous example, `system9` is the name of the RIS server.

Your system is not able to communicate with the RIS server if you obtain the following results from the `/sbin/ping` command:

- Only your system name and IP address is displayed if the RIS server recognizes your system name but the network connection is not set up.
 - The message `Unknown host` is displayed if the RIS server does not recognize your system name.
3. Make sure that the optional subset `OSFINET320` (Additional Networking Services) is installed on your system. This subset contains the named file, the Internet domain name server, that `installupdate` requires for RIS operation. To determine if `OSFINET320` is installed, enter the following command as superuser:

```
# setld -i | grep OSFINET
```

If `OSFINET320` is installed, the following message should appear:

```
OSFINET      installed      Additional Networking Services
                                (Network-Server/Communications)
```

If `OSFINET320` is not installed, use the `setld` command to load this subset. Chapter 8 describes how to use the `setld` command.

4. Ask your RIS server administrator to ensure that your system is registered as a RIS client and is able to access the Digital UNIX Version 3.2C RIS kit. Refer to *Sharing Software on a Local Area Network* for more information about RIS.
5. Verify that your system is backed up so that you can recover the previous version of the operating system if necessary.

2.7.2 Starting the Update Installation from a RIS Server

Perform the following steps to start the update installation from a RIS server:

1. As superuser or `root`, boot to single-user mode or shut down your system. The following example shows how to switch to superuser and then shuts down the system:

```
# su -  
password:  
# shutdown +10 preparing to update the system
```

In the previous example, `+10` shuts down the system in ten minutes and sends the message `preparing to update the system` to all logged in users.

Caution

If your system has the DCE Distributed File System (DFS) installed, the DFS kernel daemons will continue to run and disrupt the update installation. Before you start the update installation, you must use the `shutdown -h` command to shut down and halt the system, thereby killing the DFS kernel daemons. Halting the system brings the system down to the console mode and the console mode prompt (`>>>`) is displayed. Then, enter the following command to boot the system to single-user mode:

```
# boot fl s system_disk
```

In the previous example, `system_disk` is an entry such as `DKA0`. Use the `show dev` command to determine your system disk device.

2. Follow this step only if you installed and are using the Logical Storage Manager (LSM); otherwise proceed to Step 4.

Once the system is in single-user mode, enter the following command to activate LSM before running `bcheckrc` (in Step 4):

```
# /sbin/lsmbootstrap
```

3. Once in single-user mode, mount the local file systems as follows:

```
# /sbin/bcheckrc
```

4. To run `installupdate` from a RIS server, enter the following

command:

```
# /sbin/installupdate server:
```

Replace `server:` with the name of your local RIS server. The server name must be appended with a colon (:).

Caution

Do not press `Ctrl/C` for any reason during the update installation. Pressing `Ctrl/C` causes `installupdate` to abort. You must then restore the previous version of the operating system before you can attempt another update.

Proceed to Section 2.8 to continue the update installation.

2.8 What Happens During the Update Installation Process

This section describes the information and prompts that are displayed during the update installation process.

The update installation may take from 60 to 90 minutes. The number of subsets installed on your system and the type of installation media used affects the time required for an update. If there are no errors during the update, you are required to enter information only once during the early phases of the update. You do not need to monitor the update. However, if an error occurs, messages notify you and offer options for proceeding.

The phases of the update installation include the following:

- Verifying that the system was backed up (you must respond)
- Checking for registered Product Authorization Keys (PAKs) (potential response from you)
- Checking layered products (potential response from you)
- Checking the system status
- Checking file conflicts
- Detecting unprotected customized files
- Loading and merging subsets
- Configuring and merging subsets
- Building the kernel

The following sections describe the information displayed on your screen during each phase of the update.

Caution

Do not press `Ctrl/c` to terminate the update. If you press `Ctrl/c`, you must reinstall the version of the operating system that was installed on your system before you can update to Digital UNIX Version 3.2C.

2.8.1 Verifying the System Backup

The first message displayed on your screen confirms the new version of the operating system, and the version that you are updating from. This message also reminds you that your system should be backed up so that you can recover the current version of the system if an interrupt should occur.

The Digital UNIX Version 3.2C (Rev. xxx) Update Installation will update the following Digital UNIX products:

```
Digital UNIX V3.2 (Formerly DEC OSF/1 V3.2)
Digital UNIX V3.2A (Formerly DEC OSF/1 V3.2A)
Digital UNIX V3.2B (Formerly DEC OSF/1 V3.2B)
```

Digital Equipment Corporation recommends that you perform complete system software backups before proceeding.

At this point, the update procedure also checks for certain layered products that may be incompatible with update installations. If these products are found on your system, warning messages are displayed as described in Section 2.8.3. If the layered product messages are not displayed, and you are satisfied with the state of your system backup, you can proceed with the update. A prompt is displayed as follows:

```
Do you want to continue the update installation? (y/n) [n]:
```

Enter `y` to proceed with the installation or `n` if you want to exit and back up your system.

2.8.2 Checking for the OSF-BASE Product Authorization Key (PAK)

The OSF-BASE PAK is an availability PAK that must be loaded and registered by using the License Management Facility utility called `lmfsetup` before you can use Digital UNIX Version 3.2C. This PAK provides simultaneous login capacity for two users and allows access to the online documentation. The `root` login does not count toward the two user capacity. OSF-BASE PAKs registered for DEC OSF/1 Version 3.2, 3.2A, or 3.2B are valid for Digital UNIX Version 3.2C.

OSF-USR PAKs provide simultaneous login capacity for additional users above and beyond those provided by the OSF-BASE PAK. Register any other PAKs that may have been included with your distribution kit.

You will be able to update install your system to Digital UNIX Version 3.2C without having the OSF-BASE PAK registered. However, you are only allowed root login until an OSF-BASE PAK is registered. Once the update completes, refer to *Software License Management* or Section 6.7.1 of this guide for more information on registering PAKs.

The update installation procedure checks for the existence of a valid registered OSF-BASE PAK. If none is found, the following warning message is displayed:

```
WARNING:  OSF-BASE PAK not installed.  The OSF-BASE PAK must
be registered before you can use Digital UNIX V3.2C (Rev. xx).
After the update installation completes, refer to the License
Management Facility (LMF) section in the Installation Guide
for information about registering PAKS.
```

Press <RETURN> to review message again.

Do you want to continue the update installation? (y/n) []:

As mentioned previously, you can proceed with the update installation if a valid OSF-BASE PAK is not registered. However, when the update completes, you must register the appropriate PAKs with the license management facility (LMF) to use Digital UNIX Version 3.2C.

2.8.3 Checking for Layered Products

This section applies only if the update installation detects layered products that cannot be updated. If no layered products were found, proceed to Section 2.8.6 to continue the update installation.

For Digital UNIX Version 3.2C, `installupdate` checks if certain layered products are installed on your system. Layered products are products that are installed on top of the Digital UNIX operating system. If detected, these layered products may be affected by the update as follows:

- Some layered products operate correctly after an update. However, if you see a warning about these layered products, test the layered product after the update is complete. Section 2.8.4 shows an example of the messages you see.
- Some layered products must be deleted before the update can proceed. Section 2.8.5 shows an example of the messages you will see.

2.8.4 Layered Products that Allow the Update Installation to Continue

If any layered products currently installed on your system allow `installupdate` to continue but require reinstallation, a message similar

to the following is displayed:

```
-----  
The following layered products may require re-installation after  
the update installation has completed:
```

```
Product A  
.  
.  
.  
Product Z
```

```
-----  
Press <RETURN> to review message again.
```

You have the option to exit from the installation procedure at this point and the following prompt is displayed:

Do you want to continue the update installation? (y/n) [n]:

Enter y to proceed with the update installation or n if you want to exit the update installation and remove the layered products before restarting the update.

If you decide to proceed without removing these layered products, test the layered product when the update is finished. Digital recommends that you reinstall any layered products that are critical to the use of the updated operating system. Go to Section 2.8.6 to continue the update installation.

2.8.5 Layered Products that Halt the Update Installation

If applications or layered products installed on your system prevent installupdate from continuing, a message similar to the following is displayed:

```
-----  
This system cannot be updated with the following layered products  
installed on it. Please remove these products from your system  
before attempting an update installation:
```

```
Product A  
.  
.  
.  
Product Z
```

```
-----  
Press <RETURN> to review message again.
```

Both of the messages shown in Section 2.8.4 and this section may be displayed, but the message in this section takes precedence. If the second message appears, the installation cannot proceed and you must exit at the

following prompt:

Enter any character and press Return to stop:

If you enter a character and press Return, your system is returned to its original state, that is, the state your system was in before the update procedure.

Follow these steps to delete the layered product that is preventing the update installation from continuing.

1. First, use the `setld -i` command to determine the correct subset names to delete. In the following example, assume that DECnet/OSI prevented the update installation from continuing. The following example shows how to determine the subset names associated with DECnet/OSI and then how to delete them:

```
# setld -i | grep -i decnet | grep installed
DNABASE300      installed      DECnet/OSI Base Components
                  (DECnet/OSI Standard Run-time
                  Environment)
DNADLI300       installed      DECnet/OSI Datalink Components
                  (DECnet/OSI Standard Run-time
                  Environment)
DNAMOP300       installed      DECnet/OSI MOP Utilities
                  (Optional DECnet/OSI
                  Components)
DNANETMAN300    installed      DECnet/OSI Network Management
                  (DECnet/OSI Standard Run-time
                  Environment)
```

The output of the `setld` command shows that DNABASE300, DNADLI300, DNAMOP300, and DNANETMAN300 are the installed DECnet/OSI subsets that must be deleted.

2. Next, use the `setld -d` command to delete the subsets:

```
# setld -d DNABASE300 DNADLI300 DNAMOP300 DNANETMAN300
```

3. After subset deletion is complete, restart the update installation by entering:

```
# /sbin/installupdate server:
```

When the update installation is complete, reinstall the correct version of the layered product that is compatible with Digital UNIX Version 3.2C.

2.8.6 Checking the System Status

The next step in the update involves checking the system status and collecting data that is used in the update. This step takes up to 20 minutes, and you are not required to enter any data.

A series of messages similar to the following is displayed:

```
*****   Checking current state of system
```

Depending on the system configuration, this may take
up to 20 minutes...

```
Working...Wed Jul  5 12:10:27 EDT 1995
Working...Wed Jul  5 12:11:52 EDT 1995
Working...Wed Jul  5 12:13:59 EDT 1995
Working...Wed Jul  5 12:16:11 EDT 1995
Working...Wed Jul  5 12:18:21 EDT 1995
Working...Wed Jul  5 12:20:30 EDT 1995
Working...Wed Jul  5 12:22:40 EDT 1995
Working...Wed Jul  5 12:23:53 EDT 1995
```

During this phase of the update, the update procedure does the following:

- Makes a list of installed subsets. This list is used for selecting and loading Digital UNIX Version 3.2C subsets.
- Checks for file type conflicts. File type conflicts are described in Section 2.8.6.1.
- Makes a list of files that are obsolete in Digital UNIX Version 3.2C.
- Makes a list of system files that have been customized.
- Runs `fitset` to ensure that there is adequate disk space for the updated subsets.

If no problems are detected during the checking phase, you do not need to enter any more information beyond this point. If no conflicts are displayed, proceed to Section 2.8.7 to continue the update installation process.

2.8.6.1 File Type Conflicts

In Digital UNIX, system file types can be files, directories, symbolic links, block devices, or pipes. The update installation procedure expects to find system file types currently installed as they were shipped with the base system. The status of the file types is verified during the system status check. For example, if a file is shipped as type symbolic link in DEC OSF/1 Version 3.2, 3.2A, or 3.2B and is later changed to a type directory, when the same file name ships as type symbolic-link in Digital UNIX Version 3.2C, the update installation detects the difference and aborts. When file system types are modified as part of a system customization, the update installation cannot proceed. This is intended to preserve the integrity of the software product about to be installed.

Messages display when file type conflicts are found. In the following sample message, `/usr/tmp` was shipped as a symbolic link and was changed to a directory:

The following directories on this system conflict with assigned file types originally shipped in the Digital UNIX operating system. This can be caused, for example, if a symbolic link is replaced with a real directory.

These conflicts must be resolved before an update installation can be performed on this system. Additional file status information can be found in subset inventory files located in the /usr/.smdb. directory.

For later review, this message is also logged in

```
/var/adm/smlogs/update.log
```

```
./usr/tmp should be Symbolic Link to ../var/tmp
```

The update procedure will exit and return the system to the state it was in prior to starting the procedure.

You can review the list of file conflicts or exit as follows:

Press Return to review message again.

Enter any character and press Return, to exit:

When you exit from the update procedure, the following message is displayed:

```
Returning system to Pre-Update state...done
Update Installation exiting.
```

You must resolve any conflicts shown in the message before you can restart the update installation. If you do not resolve the conflicts, you cannot perform an update installation.

2.8.6.2 Unprotected Customized File Detection

If installupdate detects any unprotected customized system files as described in Section 2.4, an attempt is made to save them to a .PreUPD extension, for example, custom_file.PreUPD, so that you can decide what to do with them after the update is complete. If unprotected customized system files are found from a previous update installation, a message similar to the following is displayed:

```
*** Files with .PreUPD extensions detected ***
```

```
-----
```

The Update Installation has detected files on this system with .PreUPD file name extensions. This could be the result of a previous update installation on this system. These files are in danger of being overwritten unless some action is taken to save them.

If you have already backed up your system, you can continue with the installation by answering 'y' to the question below.

If you have not backed up your system, or if you are unsure about what action you should take, answer 'n' to the question

below and the system will return to the state it was in prior to invoking the update installation.

Do you want to continue the installation? (y/n) [n]:

If you enter y, the following message is displayed:

```
Continuing Update Installation....  
      Working....Wed Jul  5 12:22:40 EDT 1995  
      Working....Wed Jul  5 12:23:53 EDT 1995
```

If you enter n, the update installation procedure halts to give you the opportunity to back up your files.

If disk space limitations prohibit saving unprotected customized files, the Update Administration Utility is invoked automatically and lets you view these files and save them to backup media. The file name of each unprotected customized file is also logged in the /var/adm/smlogs/upd_custom_files file as a reminder of the files that require recustomization.

Files that are successfully saved to the .PreUPD extension are listed as such in the file /var/adm/smlogs/upd_custom_files.

The following message is displayed if customized files are found and successfully saved:

```
Unprotected customized system files have been found on  
this system and have been saved to 'filename.PreUPD'.  
A listing of the files has been logged in  
/var/adm/smlogs/upd_custom_files.
```

```
After the update installation has completed, use the  
Update Administration Utility (/usr/sbin/updadmin)  
to perform system administration tasks on these files.
```

The following message from the Update Administration Utility is displayed if customized files are found but could not be saved due to disk space limitations:

```
***** Unprotected Customized System File Administration *****
```

```
There are unprotected customized versions of DEC OSF/1 system  
files currently installed on your system that are in danger of  
being overwritten by new Digital UNIX Version 3.2C (Rev. xxx)  
versions of the files.
```

```
These files are typically customized by users for projects they  
may be working on, or by layered product software implementation.
```

```
If you haven't already backed up your system, save these files to  
back up media at this time. You can restore these files back onto
```

your system after the update installation has completed.

```
Unprotected Customized System File Admin Menu
```

```
-----
```

```
q) Quit installation
s) Save files
v) View list of files
x) Return to installation
```

Enter your choice:

In the previous example, the Update Administration Utility is invoked automatically, and the menu shows the available options. The Update Administration Utility is described in Section 2.11. If you choose to continue with the update, the following message is displayed:

```
A listing of unprotected customized system files
found by the Update Installation has been logged
in /var/adm/smlogs/upd_custom_files.
```

```
After the update installation has completed, use the
Update Administration Utility (/usr/sbin/updadmin)
to perform system administration tasks on these files.
```

2.8.6.3 File Size Checks

The update installation procedure performs size checks to make sure that the list of new subsets fits on your system. In the preparation stage before the update, you should have removed all unwanted core files, crash dumps, and extra kernels that may be wasting space.

If the update installation process determines that there is adequate space for all new subsets, no user interaction is required, and the process continues by loading the subsets. If the update installation determines that there is inadequate space for the loading of new subsets, it attempts to buy back space from saved unprotected customized files. If the amount of space it can buy back from removing saved copies of unprotected customized files is greater than the space it needs to load new subsets, a message similar to the following is displayed:

```
-----
```

```
file system /usr needs 9555 Kbytes more to install the software
specified.
```

```
-----
```

```
The Digital UNIX Version 3.2C Update Installation has used
13021 Kbytes of disk space to save unprotected customized system
files on your system to a .PreUPD extension.
```

```
Unprotected customized system files are Digital UNIX system
files that have been customized by users or by layered product
```

implementation. The files are in danger of being overwritten without the customizations in them being saved because they are unprotected.

If you have already backed up your entire system, you can continue with the update installation and restore customizations to the newly installed files at a later time. Continuing at this point causes all files saved to a .PreUPD extension to be removed.

If you want to ensure that the unprotected customized system files on this system have been backed up, you can select option u from the following menu and invoke the Update Administration Utility. This utility allows you to view and save unprotected customized system files on your system. The utility also allows you to continue or quit the update installation procedure. If you quit the update installation procedure at this point, the system returns to the same state it was in prior to invoking the update installation.

```
Digital UNIX Update Installation Main Menu
-----
c) Continue installation
q) Quit installation
u) Update Administration Utility
v) View error message again
```

Enter your choice:

If the amount of space that the update installation can buy back is not enough to allow the loading of new subsets, a message similar to the following is displayed:

```
-----
file system /usr needs 11104 Kbytes more to install the software
specified.
```

```
-----
You will need to remove some software subsets and/or user files
from this system before performing an update installation.
```

```
Returning system to Pre-Update state...done.
Update Installation exiting.
```

2.8.7 Loading Subsets and Merging

Next, `installupdate` loads the Digital UNIX Version 3.2C subsets that match the subsets already loaded on your system. All new mandatory subsets are loaded automatically. Optional subsets are loaded only if they were loaded previously. If you want to install additional optional subsets provided in Digital UNIX Version 3.2C, you must load these by using the

setld command when installupdate is complete.

A series of messages similar to the following is displayed:

```
*****   Updating system to Digital UNIX V3.2C   (Rev.xxx)
        Working....Wed Jul  5 12:26:10 EDT 1995
```

```
Base System
  Copying from system9.dec.com (inet)
    Working....Wed Jul  5 12:27:20 EDT 1995
    Working....Wed Jul  5 12:29:21 EDT 1995
  Verifying
    Working....Wed Jul  5 12:31:27 EDT 1995
```

```
Base System - Hardware Support
  Copying from system9.dec.com (inet)
    Working....Wed Jul  5 12:32:09 EDT 1995
  Verifying
```

```
Compiler Back End
  Copying from system9.dec.com (inet)
    Working....Wed Jul  5 12:33:38 EDT 1995
  Verifying
```

```
.
.
.
```

```
Ref Pages: Programming
  Copying from system9.dec.com (inet)
    Working....Wed Jul  5 13:20:43 EDT 1995
    Working....Wed Jul  5 13:22:44 EDT 1995
  Verifying
```

```
Ref Pages: Admin/User
  Copying from system9.dec.com (inet)
    Working....Wed Jul  5 13:23:42 EDT 1995
  Verifying
```

```
Ref Pages: Realtime
  Copying from system9.dec.com (inet)
  Verifying
```

When the subsets are loaded and verified, the protected customized system files are automatically merged with any customized files found on your system. Refer to Section 2.4 for a description of the protected files. A series of merge messages similar to the following may be displayed:

```
*** Merging new file ./new..DXsession into
    existing ./proto..DXsession
```

```
Resources *applications, *AppMenu, and *num_AppMenu in /DXsession
have been updated!
```

```
Merge completed successfully.
```

```
*** Merging new file
    existing
```

```

removing Strpush option
Modifying SLIP option
adding SNMPINFO option
adding NFSSERVER option
adding PROCFS option
Updating pseudo-device rpty to an option
Removing STREAMS protocol entry
Adding STREAMS module entry
Fixing pseudo-device rpty to an option entry
adding makeoptions CCOMPRESS

*** Merging new file ./usr/sys/conf/.new..files into
    existing ./usr/sys/conf/.proto..files

Replacing /usr/sys/conf/.proto..files with
/usr/sys/conf/.new..files. The original file has
./proto..files.PreMRG.

This file has been found to be customized, which most
likely is the result of one or more kernel layered products
that have been installed in a non-recommended fashion.

If this file has been modified due to kernel layered
product installation, you can either re-install the
affected kernel layered product(s), or manually merge
the customizations from /usr/sys/conf/.proto..files.PreMRG
into the newly delivered /usr/sys/conf/.proto..files.
Customizations made to /usr/sys/conf/.proto..files.PreMRG
can be found by executing the following commands:

# cd /usr/sys/conf
# diff .proto..files.PreMRG .proto..files.V32

A copy of this message has been saved to
./var/adm/smlogs/update.log.

Merge completed successfully.

*** Merging new file ./usr/sys/io/common/.new..conf.c into
    existing ./usr/sys/io/common/.proto..conf.c

Merge completed successfully.

```

When all merges are complete the following message is displayed:

```

Update Installation complete with loading of subsets.
Rebooting system with Digital UNIX V3.2C (Rev. xxx)
generic kernel for configuration phase...

Exiting Update Installation...

```

Next, the update installation configures the software subsets. Proceed to Section 2.8.8.

Note

If the Logical Storage Manager (LSM) was previously installed, the update installation of LSM may produce some file system warning messages during the reboot process regarding unreferenced files. You can ignore these messages. These unreferenced files are the LSM-specific device special files that are modified during the update installation procedure.

2.8.7.1 Recovering from Failures During Loading of Subsets

If the update installation fails before subsets are loaded, you can usually recover. If necessary, you can bring your system back to multiuser mode by issuing the following command:

```
# init 3
```

Error messages describe the type of error that occurred. Fix the errors reported by the messages and restart the update installation process. Refer to Section 2.6 if you are running `installupdate` from a CD-ROM, or Section 2.7 if you are running `installupdate` from a RIS server.

If the update installation fails during the loading of subsets, you probably will have to restore your operating system back to the previous version that was installed on your system and reattempt the update installation after the source of failure has been identified.

2.8.8 Configuring Subsets and Merging

If the system is set to boot to multiuser mode, configuration of the new system starts automatically. If the system reboots to single-user mode, enter the following command:

```
# init 3
```

A series of messages similar to the following is displayed:

```
*** SYSTEM CONFIGURATION ***
```

```
Configuring "Base System " (OSFBASE350)
```

```
*** Merging new file ../new..DXsession into
existing ../DXsession
```

```
Resources *applications, *AppMenu, and *num_AppMenu in /DXsession
have been updated!
```

```
Merge completed successfully.
```

```
Configuring "Base System - Hardware Support " (OSFHWBASE350)
```

```
Configuring "Compiler Back End " (OSFCMPLRS350)
```

```
Configuring "Kernel Header and Common Files " (OSFBINCOM350)
```

```
*** Merging new file
    existing

    removing Strpush option
    Modifying SLIP option
    adding SNMPINFO option
    adding NFSSERVER option
    adding PROCFS option
    Updating pseudo-device rpty to an option
    Removing STREAMS protocol entry
    Adding STREAMS module entry
    Fixing pseudo-device rpty to an option entry
    adding makeoptions CCOMPRESS

Merge completed successfully.
```

```
.
.
.
```

```
Configuring "Ref Pages: Windows Admin/User " (OSFMANWOS350)
```

```
Configuring "Ref Pages: Programming " (OSFMANOP350)
```

```
Configuring "Ref Pages: Admin/User " (OSFMANOS350)
```

```
Configuring "Ref Pages: Realtime " (OSFMANRT350)
```

2.8.9 Building the Kernel

The kernel configuration begins after the configuration of subsets is complete. The system automatically builds a kernel and then reboots. During this phase of the update, the system configuration file `/sys/conf/<system_name>` is automatically saved to `/sys/conf/<system_name>.bck`, and the following message is displayed:

```
Saving /sys/conf/JERSEY as /sys/conf/JERSEY.bck
```

In the previous example, JERSEY is the host name of the system. If you customized this file, one of the postinstallation tasks is to edit the new version and include your customizations.

The kernel build proceeds with the following messages:

```
The system will now automatically build a kernel
and then reboot. This will take approximately 15
minutes, depending on the processor type.
```

```
*** PERFORMING KERNEL BUILD ***
Working...Wed Jul  5 13:25:43 EDT 1995
Working...Wed Jul  5 13:27:44 EDT 1995
```


Caution

The update provides a basic kernel configuration file that includes the required options and pseudodevices needed to be compatible with the current installed version. However, the update does not propagate any special configuration options (such as those required for layered products).

If your system also has devices not supplied by Digital, manually add these options or devices to the kernel configuration file after the update installation completes. Use the `doconfig` command and refer to Chapter 6 for more information.

After the kernel builds successfully, you are prompted to log into your system. If you have a workstation, a login window is displayed. Enter the same login name and password that you used before the update installation. If you do not have a workstation, enter your login name at the `login` prompt and your password at the `password` prompt.

After you successfully log in, the update installation is done; your system is fully updated to Digital UNIX Version 3.2C and ready to use.

If a tailored kernel failed to build, refer to Section 2.8.9.1 for more information.

Go to Section 2.10 for information about performing postinstallation tasks.

2.8.9.1 Recovering from Failures During Kernel Build

The tailored kernel build can fail at the end of your update installation because of an incompatibility of a layered product with Digital UNIX Version 3.2C.

In this case, a failover kernel build with only base operating system support is reattempted. The update installation log file located in `/var/adm/smlogs/it.log` contains the reasons for the kernel build failure. After examining the log, use `setld` to deinstall the layered product that caused the failure and then use `setld` to reinstall the most recent version of the layered product. You should then be able to build a new customized kernel with support for the layered product by using the `doconfig` command.

2.9 Device Special File Name Changes

Device special file names may change as a result of the update installation. After successfully completing an update installation, it is possible that if you added tape devices to your system after the initial installation, the unit numbers and device special file names may be reordered (remapped) as a result of the update process.

As an example, tape device tz13 is installed with device special file names `*rmt0*`. Then, tape device tz12 is installed and assigned device special file names `*rmt1*`. After an update installation, tape device tz12 is assigned device special file names `*rmt0*`, and tape device tz13 is assigned device special file names `*rmt1*`.

2.10 Postinstallation Tasks

This section describes any tasks that must be completed after the update is complete.

2.10.1 Reviewing Update Installation Log Files

Information about the update installation is stored in log files for you to review. Installation and configuration data is appended to any existing log files. Review the last entries in the following files to check the latest installation and configuration data:

- The update installation log is located at:
`/var/adm/smlogs/update.log`
- Information about the system configuration is stored in a log file at:
`/var/adm/smlogs/it.log`
- Obsolete files are listed in:
`/var/adm/smlogs/upd_obsolete_files`
- Customized files are listed in:
`/var/adm/smlogs/upd_custom_files`
- Failed merges are listed in:
`/var/adm/smlogs/upd_mergefail_files`

If no obsolete, customized, or failed merge files are detected during the update installation, the relevant log files do not contain any data.

A sample installation dialogue is located in Appendix K. Sample listings of files that were found and saved during the update are shown in Appendix L. Digital recommends that you examine the log file when the update is complete to ensure that all files merged successfully.

2.10.2 Manually Merging Customizations

Some protected files may not be correctly merged during the update and unprotected files are not automatically merged. Manual merging involves editing the new versions of system files with a text editor to paste in your customizations. The following information is saved so that you can merge your customizations into the new versions.

- Unprotected system files

When the update is complete, you should check for any saved files. Refer to the log file: `/var/adm/smlogs/upd_custom_files`. Edit the new version of each logged file to include your customizations.

- Configuration file

You must also edit the system configuration file `/sys/conf/system_name` if you customized this file in the previous version of DEC OSF/1. The saved version is located in `/sys/conf/system_name.bck`.

- Failed merges

If any files failed to merge during the update, an error message is displayed on your screen. This error is also logged in a file located at: `/var/adm/smlogs/upd_mergefail_files`. Check the log to identify any failed merges and manually edit any files that failed to merge, adding your customizations. The original version of the files is always preserved for your reference as: `filename.PreMRG`. Refer to Section 2.11 for information on how to access the original version of a file.

When any manual merges are complete, your system is ready to use. At this time you can install additional optional subsets provided on the Digital UNIX Version 3.2C distribution media. Refer to Chapter 8 for information about installing optional subsets.

2.11 Update Administration Utility

When you are satisfied that all merges are correct and your system is working as expected, use the Update Administration Utility to perform management tasks (such as saving, viewing, or deleting files) on the unprotected customized, obsolete, and PreMRG files. Unprotected customized files are saved to files with `.PreUPD` extensions.

Apart from managing system resources effectively, using this utility provides two important safeguards:

- You can archive and delete customized files so that future update installations can reuse the file names. If you attempt to run an update without having first used this utility to administer PreUPD files from the previous update, you are prompted to overwrite the existing PreUPD files or to exit the utility.
- You can remove obsolete files that may cause problems when running the new version. In particular, many obsolete reference pages can remain in system directories, and there is a risk that an incorrect reference page might be displayed.

Note

Refer to Section 2.12 for information about updating the whatis reference page database after performing an update installation.

2.11.1 Update Administration Utility Main Menu

Enter the following command to access the Update Administration Utility Main menu:

```
# /usr/sbin/updadmin
```

You can also invoke the Update Administration Utility from the Setup menu. If you have a workstation, choose the Setup option from the Applications menu in the window's Session Manager. If you do not have a workstation, enter the following command to access the Update Administration Utility:

```
# /usr/sbin/setup
```

A submenu of options is displayed that varies depending on the software installed on your system. Choose the Update Administration option from this submenu. The Update Administration Utility can be invoked only after an update.

Regardless of the manner in which you invoked the utility, the Update Administration Utility Main menu is displayed as follows:

The Update Administration Utility is used to perform administration functions on a system that has been updated by /sbin/installupdate.

Please make a selection from the following menu.

```
Update Administration Utility Main Menu
-----
c) Unprotected Customized File Administration
o) Obsolete System File Administration
p) PreMRG File Administration
x) Exit this utility
```

To exit from the utility and return to the operating system prompt at any time, choose the exit option as follows:

```
# Enter your choice: x
```

Choose the following options to perform file administration tasks (such as saving, viewing, or deleting files):

- Unprotected Customized File Administration

When you choose this option, the following information is displayed:

```
***** Unprotected Customized System File Administration *****
```

Unprotected customized system files are typically Digital UNIX system files that have been customized by users for projects they may be working on, or by layered product software implementation.

Some of these customized files may no longer be compatible with the Digital UNIX Version 3.2C operating system.

- **Obsolete System File Administration**

When you choose this option, the following information is displayed:

```
*** Obsolete System File Administration ***
```

There are DEC OSF/1 files currently installed on your system that are no longer shipped or supported in Digital UNIX Version 3.2C.

Some of these Obsolete files may no longer be compatible with the Digital UNIX Version 3.2C operating system. You may want to back up these files and then delete them from your system to regain disk space. For your reference, the Obsolete files are listed in /var/adm/smlogs/upd_obsolete_files.

- **PreMRG File Administration**

Premerge (PreMRG) files are copies of system files as they existed before the update installation. When you choose this option, the following information is displayed:

```
***** PreMRG System File Administration *****
```

There are .PreMRG files left over on your system from an update installation. PreMRG files are copies of system files as they existed prior to updating your system. They are left on the system after an update installation for reference purposes only.

If any system file customization merges were not successful, you can reference the .PreMRG file to include those customizations in the post merged file now residing on the system.

In most cases, PreMRG files can be deleted from the system.

If you choose any of the three main menu options, a submenu is displayed. This submenu displays options to view, save, or delete the unprotected, obsolete, or PreMRG files.

The following examples show only Unprotected Customized File Administration. The administration process and the submenu options are exactly the same for Obsolete System File Administration and PreMRG File Administration.

To choose an option from any menu, enter the character displayed before

each option and press the Return key. For example:

```
#      Enter your choice: c Return
```

2.11.2 File Administration Menu Options

If you choose any of the three Administration options from the main menu, the File Admin menu is displayed as follows:

```
Unprotected Customized System File Admin Menu
-----
s) Save files
d) Delete files
v) View list of files
x) Return to previous menu
```

The type of the submenu depends on the option you chose from the Main menu. Enter x to return to the Main menu. The other options in this submenu are described in the following sections.

2.11.3 Save Files Option

This option enables you to decide where to save all the files that are found during the update installation. This option is useful for managing disk space.

If you choose this option, another menu is displayed as follows:

```
Select a method of archiving your files:
-----
d) Save files to directory on disk
i) Save files to tar image on disk
t) Save files to tape media device

Enter your choice from the menu above, or
press <RETURN> to go back to the previous menu:
```

- If you want to save the files to a tape device, enter t and press Return. You are prompted to enter the name of a backup device, as follows:

```
Enter the name of the tape backup device (for example: /dev/nrmt0h)
that you want to use to back up customized files, or press <RETURN>
to go back to the previous menu:
```

Enter the device name as follows:

```
....previous menu: /dev/nrmt0h
```

The save utility verifies the device and saves the files as follows:

```
Inspecting /dev/nrmt0h...
```

```
Saving customized files to /dev/nrmt0h...
done.
```

- If you want to save files to a directory, enter d. The following message

is displayed:

```
Enter the directory that you want to use to back up obsolete
files, or press <RETURN> to go back to the previous
menu:
```

If the pathname that you specify does not already exist, you are asked to confirm if the directory or file should be created (in this example the /obsolete was specified and does not exist):

```
There is no /obsolete directory on this system.
```

```
Do you want to create one? (y/n) [y]: y
```

```
Saving obsolete files to /obsolete
Finished saving obsolete files.
```

The files are now saved. You can return to the File Administration menu to either choose another option or exit to the Update Administration Utility Main menu.

2.11.4 Delete Files Option

This option enables you to delete all the files (obsolete, PreMRG, or unprotected customized) that are found during the update install. Use this option if you have either backed up the files to a storage device or if you no longer need them and you want to recover the disk space.

If you choose this option, the following prompt is displayed:

```
Please confirm your intent to delete customized system files from the
system. (y/n) [n]:y
```

If you confirm the deletion, a message is displayed as follows:

```
Removing customized files...
```

```
Finished deleting customized files.
```

When the deletion is complete, the File Administration menu is displayed again.

2.11.5 View List of Files Option

This option is used to display a list of the customized files that are found during the update installation. It can be used to verify what files were found, before you decide whether you want to save or delete the files.

If you choose this option, the list of files is displayed screen by screen and you can press Return to display each screen. At the end of the list you can display the complete list again or return to the File Administration menu. A sample of the output follows:

```

=====
= Unprotected Customized OSFBASE Files
=====
./etc/zoneinfo/Australia/South.PreUPD

=====
= Unprotected Customized OSFINET Files
=====
./sbin/named.PreUPD
./usr/sbin/screend.PreUPD

Enter 'r' to review files again, or press RETURN
to go back to the previous menu:

```

2.11.6 Messages and Archive Options

There are several messages and options that the Update Administration Utility displays only under certain conditions. These messages are explained as follows:

- If you choose an option to process certain files and the list of files has already been removed from the system, one or more of the following messages is displayed:

```

No customized file list exists.
No obsolete file list exists.
No PreMRG file list exists.

```
- If you attempt to save files to a directory that does not exist you are prompted to confirm that you want this new directory to be created.

```

There is no <name> directory on this system.
Do you want to create one? (y/n) [y]:

```
- If the program cannot create the directory that you specified, the following message is displayed:

```

Cannot create <directory name>.

```
- If you choose an option relating to .PreMRG files, the following message warns you that the utility will search every file system that is UNIX File System (UFS) mounted:

```

Checking system for .PreMRG files. Depending on the number
of file systems mounted, this may take a few minutes...

```
- If you choose an option to save files to a tar image, the following message gives you a further option to compress your tar file and save storage space.

Compressing the tar image will result in less disk space used.
Do you want to compress the tar image? (y/n) [y]:

- If the save program was unable to compress the tar file, the following warning message is displayed:
Unable to compress <tar file>
- If you chose an option to delete files that are not backed up, you are given an option to select another menu item and save the files first.
Back up of <file type> files not detected.

If you have not backed up the <file type> files yet, please do so at this time by answering 'no' to the question below and selecting the 's' option from the previous menu.
- If you are attempting to save files that are saved, the following message is displayed:
You have already saved the <file type> files.
Do you want to save them again? (y/n) [n]:
- If you specify a device for a save operation, and the save program cannot access that device, the following message is displayed:
Cannot locate a special device named <device name>
- If the device that you specified was available, but the save program was not able to write to that device, the following message is displayed:
Cannot write to <device name>
- If you specify an existing tar file name, you are given the option to append saved files to the existing file:
A file named <file name> already exists on this system.
If this is a tar archive file you can append additional files to it. Otherwise, answer 'n' to the question below.
Do you want to try appending to it? (y/n) [n]:

2.12 Updating the whatis Database

If the `whatis` database exists on your system, you should update the database by executing the `catman -w` command whenever you perform an update installation. The `apropos` and `whatis` commands access reference page entries in the `whatis` database.

An update installation does not delete entries from an existing `whatis` database. You must manually rebuild the database to synchronize it with reference page files that currently exist on the system. Rebuild the `whatis` database after you use the Update Administration Utility to remove reference pages that are flagged as obsolete after the update installation and after you

are finished adding layered product reference pages. For information about using the `catman -w` command to rebuild the `what is` database, refer to the `catman(8)` reference page.

Planning Disk Space 3

Read this chapter if you plan to perform an advanced installation. This chapter contains information to help you determine which disk partition to use for file systems, swap space, and crash dump space. You should know what the file systems will be used for and understand the concepts associated with allocating a file system to a disk partition.

Throughout this chapter you are encouraged to complete worksheets to calculate the size of a file system. These worksheets will help you to:

- Identify available disks
- Plan the swap space
- Plan the `var` area
- Plan the `/usr` file system
- Decide whether to use the default disk partition layout, the existing disk partition layout, or change the partition layout if necessary

It will be helpful to keep in mind the following equations:

- One block equals $\frac{1}{2}$ kilobyte (kB) or 512 bytes
- One megabyte (MB) equals 1024 kB (1,048,576 bytes), or 2048 blocks.

To determine the size in MB of the default disk partitions for a disk, divide the size in blocks by 2048.

If you are installing a new system on a disk currently being used under a Digital UNIX or another OSF/1 implementation, and the disks have been labeled, you can determine the size of the disk partitions by becoming `root` and using the `disklabel` command, which is described in Chapter 7. You can also refer to the disk information provided in Appendix F to determine the default size of the disk partitions.

The Digital UNIX system uses 15 percent of a partition for UNIX file system (ufs) overhead and 20 percent of a partition for Advanced File System (AdvFS) overhead. When you determine the size your disk partitions need to be, subtract 15 or 20 percent of the partition size to give you the total available space.

If you plan to use the POLYCENTER Advanced File System (AdvFS) as the file system for Digital UNIX and you install the optional AdvFS Utilities, space planning is greatly simplified. With the AdvFS utilities (separate

license required), you can add or remove volumes from the AdvFS file systems with no changes to the directory structure and with no user interruption.

With the exception of the `root` file system, AdvFS file system size can be modified at any time (with the `addvol` command). Increases or decreases to file system size are transparent to the user. Consequently, there is no need to greatly over allocate file system space.

The information in Section 3.1, Section 3.2, Section 3.3, Section 3.4, and Section 3.5 will help you complete the summary worksheet in Section 3.6. When complete, this worksheet provides the file system layout information that is required during the advanced installation.

3.1 Planning Disk Layout

Your system disk must be one of the supported devices. Table 3-1 shows the supported devices and their associated Digital UNIX names.

Table 3-1: Supported System Disks

Software Device Name	Disk Type
<code>ra</code>	RA60, RA71, RA72, RA73, RA81, RA82, RA90, RA92
<code>rz</code>	RZ25, RZ25F, RZ25L, RZ25M, RZ26, RZ26L, RZ26N, RZ28, RZ28B, RZ28M, RZ29B, RZ35, RZ55, RZ56, RZ57, RZ58, RZ73, RZ74, HSZ10, HSZ40

Refer to the Digital UNIX *Software Product Description* (SPD) for a list of supported system and data disks. A copy of the SPD is located on the CD-ROM labeled *Digital UNIX V3.2C Operating System (formerly DEC OSF/1) Disc 1 of 2* in the directories `/DOCUMENTATION/POSTSCRIPT` or `/DOCUMENTATION/TEXT`.

Note

Refer to Section 5.6.3 for restrictions surrounding the use of the RZ55 disks as a system disk. The RZ25 disk is not large enough to hold all mandatory and optional software subsets.

The system disk contains the `root` file system. The unit number for the system disk must be in the range 0 to 255 for `ra` type devices, in the range 0 to 47 for `re` type devices (SCSI disks employing RAID technology), and in the range 0 to 127 for `rz` type devices.

Use the console command `show device` to determine the disks on your system. Use your system's hardware documentation and the disk information in Appendix F to determine the device name and the size of each partition. Complete the worksheet in Table 3-2 to record this information.

Although the worksheet provides space for four disks, you can configure many more disks. Refer to the *Digital UNIX Software Product Description* (SPD) for the number of devices that can be configured on each type of system.

If you are installing a new system on a disk, use the `disklabel` command to look at the existing disk partition layout. Invoke the `disklabel` command if your system is already running Digital UNIX or invoke `disklabel` from the System Management option from the Installation menu. Refer to Chapter 7 for more information about invoking `disklabel` from the System Management option.

If you are invoking the `disklabel` command as the user `root`, enter the command in the following format and replace the variable `n` with the unit number of the disk:

`disklabel -r rzn`

If you are invoking the `disklabel` command from the System Management option from the Installation menu, you must first make the device as shown in this example:

```
# cd /dev
# MAKEDEV rzn
# disklabel -r rzn
```

The existing disk partition layout is displayed. If you want to create a new partition table, choose the System Management option before starting the installation and use the `disklabel` command to customize partition tables. During an advanced installation, if a customized partition table exists on the system disk, you are given an option to use either the default partitions or the existing customized partitions. Refer to Section 7.8 for more information about customizing disk partitions.

Table 3-2: Disk Configuration Worksheet

Disk Number	Device Name	Partition	Size (MB)
1	_____	a	_____
		b	_____
		c	_____
		d	_____

Table 3-2: (continued)

Disk Number	Device Name	Partition	Size (MB)
2	_____	e	_____
		f	_____
		g	_____
		h	_____
		a	_____
		b	_____
		c	_____
		d	_____
3	_____	e	_____
		f	_____
		g	_____
		h	_____
		a	_____
		b	_____
		c	_____
		d	_____
4	_____	e	_____
		f	_____
		g	_____
		h	_____
		a	_____
		b	_____
		c	_____
		d	_____
		e	_____
		f	_____
		g	_____
		h	_____
		a	_____
		b	_____
		c	_____
		d	_____

3.2 Planning the Swap Space

Virtual memory is implemented in the Digital UNIX operating system by transparently moving pages back and forth between physical memory and swap space. The amount of virtual address space that can be created is limited only by the amount of swap space. This section discusses some of the factors to consider when configuring swap space on your system. *System Tuning and Performance Management* provides additional information about optimizing the use of swap space.

The advanced installation procedure lets you configure two swap areas: a primary swap partition named `swap1` and an optional swap partition named `swap2`. Additional swap partitions can be configured after the installation is complete by using the procedures described in *System Administration*.

During an advanced installation, you are asked to choose which disk partition to use for `swap1`. The default choice is partition `b` of the system disk. To optimize the use of your swap space, spread out your swap space across multiple devices and use the fastest disks for swap devices. To ensure the best performance, place each swap partition on its own disk instead of placing multiple swap partitions on the same disk. A general rule is to allocate two times your physical memory for swap space. However, the amount of swap space you allocate also depends on the virtual memory requirements of the applications you plan to install.

An effective strategy to determine how much disk space to set aside for swapping is to compare the aggregate modifiable virtual address space needs of the processes that you plan to run with the size of your system's physical memory. Modifiable virtual address space holds data elements and structures that are modified during process execution, such as heap space, stack space, and data space. If you expect the aggregate need for modifiable virtual address space to be greater than your system's physical memory, consider allocating at least as much swap space as the size of your system's physical memory.

Be prepared to add more swap space later if the system issues warning messages that indicate that swap space is approaching exhaustion. On systems where the balance between modifiable virtual address space usage and available physical memory is more even, somewhat less swap space is required.

Refer to the worksheet in Table 3-2 to identify partitions that are large enough for use as swap partitions. Record the location of the swap space in the following table:

Swap Space	Size in MB	Disk Number	Partition
swap1	_____	_____	_____
swap2	_____	_____	_____

3.3 Planning the Crash Dump Space

Two disk areas are used when the system produces a crash dump. The first area is used to hold the crash dump until the system is rebooted. This area must be large enough to hold a single crash dump and is referred to as the crash dump partition. The second area is where the `savecore` utility copies the crash dump and a copy of the kernel, `/vmunix`, when the system is rebooted. This area is located in the `/var/adm/crash` directory. The disk partition that contains `/var/adm/crash` must be at least large enough to hold one crash dump and one copy of `/vmunix`, but can be made as large as resources permit if retention of multiple crash dumps is desired.

In the event of a system crash, the kernel writes the contents of physical memory to the crash dump partition. The amount of information written, and hence the size of the crash dump, depends on several factors:

- If the system is configured to produce full dumps as described in the *System Administration* guide, the size of the crash dump will be the same as the size of the system's physical memory.
- If the system is configured to produce partial dumps, the crash dump might be considerably smaller.

The factor that determines the size of a partial crash dump is the amount of physical memory in use at the time of the crash by various kernel data structures that define the state of the system. The more tasks and threads that are active, the more kernel data structures that will be in use, and the larger the resulting partial crash dump.

The crash dump partition must be as large as the size of physical memory on systems configured for full dumps, and can be somewhat smaller on systems configured for partial dumps. The disk partition that contains `/var/adm/crash` must be large enough to hold at least one crash dump and one copy of `/vmunix`. If retention of multiple crash dumps is desired, the required size of this partition can be estimated by multiplying total size required for a single crash dump and a copy of `/vmunix` by n , where n is the number of crash dumps that you want to retain. To determine the size

and to record the location of the crash dump space, provide the following information:

1. The memory size in MB for your system is _____.
2. You need _____ memory to accommodate your crash dump partition. Refer to Table 3-2 to identify the partition that is large enough for the crash dump space.
3. You need _____ MB minimum disk space in the `/var/adm/crash` directory.

3.4 Planning the var Area

The `var` area contains volatile, machine-specific directories and directories such as `tmp` and `adm`.

You can allocate the `var` area either as a file system on its own partition, or as a directory in the `/usr` file system. Depending on system use, the `var` area can potentially use large amounts of space in the `/usr/var` directory. If system use is heavy, you might want to create a separate `var` area.

If you choose the default allocation, the installation software allocates the `var` area as the `/usr/var` directory.

To determine the size of the `var` area, consider the following:

- Crash dump space
- Error logger
- System accounting
- Size of the `/var/adm/ris` directory, if your system is going to be used as a RIS server
- Space required for mail, print, and uucp spooling
- If you are planning to run a dataless environment, you should decide whether you want `/var` on a separate file system or whether you want to reserve a partition to mount under `/var/adm/dms`. Refer to *Sharing Software on a Local Area Network* for more information about running a dataless management environment.

Section 3.4.5 describes how these items affect the size of the `var` area. As you read through each section, complete the worksheet in Table 3-3.

If you plan to use the POLYCENTER Advanced File System (AdvFS) as the file system for Digital UNIX along with the AdvFS Utilities (available with a separate license), you do not need to greatly over allocate space for the `/var` file system. AdvFS file system space can be dynamically increased without changing directory structures and without system interruption. Refer to *System Administration* for more information about AdvFS.

3.4.1 Error Logger and syslog Files

The `var` area requires room to accommodate the log files produced by both `syslog` and the binary error logger. These log files are a record of system events and errors in ASCII text (`syslog`) and binary formats.

The `syslog` utility collects information regarding such system activities as mail, system startup, shutdown, rebooting, root account logins, time daemon, printer subsystem, and `syslog` itself. Summary information on hardware errors is also logged. The amount of data logged is related to system activity and the number of users.

The binary error logger records information on hardware errors and system startup.

If you are creating a new system, estimate your total requirements at about 500 kB per week. There is no limit to how large the `/var/adm/binary.errlog` and the `/var/adm/syslog` files can grow, so they might eventually fill their partition. If you plan to back up or remove these log files once a month, you need to plan your total requirements at about 2 MB.

Enter the amount of space needed for the error logger on the second line of Table 3-3.

3.4.2 System Accounting

The `/var/adm` directory in the `var` area contains data files generated by administrative programs such as `acct` and `wtmp`. The data that these programs generate can vary widely from system to system and over time. For example, if you create a `/var/adm/acct` file, it can grow by 50 kB a day for a large system and by 5 kB a day for a workstation.

As a general guideline for system accounting, you should allot 10 kB per day for workstations and 100 kB per day for larger systems. If you back up or remove the system accounting file once a month, you should plan for accounting files that occupy about 300 kB for workstations and 3 MB for large systems. Refer to *System Administration* for more information on the space requirements for system accounting.

Enter the amount of space needed for system accounting on the third line in Table 3-3.

3.4.3 Size of the /var/adm/ris Directory

If you are going to set up your system as a RIS server, you can transfer software subsets from distribution media to the `/var/adm/ris` directory in the `var` area. Refer to *Sharing Software on a Local Area Network* for more information on setting up the network kit.

You must reserve enough space in the `/var/adm/ris` directory in the `var` area for the software you want to install. Refer to Appendix B for a description of each software subset and the names of other subsets or kernel configuration file options related to its operation. Refer to Appendix E for the subset sizes.

Fill in the fourth line on the worksheet in Table 3-3 with the amount of space needed for the `/var/adm/ris` directory in the `var` area. If you plan to mount a separate partition on the `/var/adm/ris` directory after the installation, enter a 0 (zero) for item 4 in Table 3-3. (Refer to Section 3.4.5.)

3.4.4 Size of the `/var/adm/dms` Directory

This section applies only if you are going to set up your system as a dataless management environment server.

In a dataless management environment, the dataless server's environment file systems are located in `/var/adm/dms/dmsn.alpha`. Each environment must have at least the Digital UNIX mandatory subsets installed as well as other optional software subsets. Space must be reserved for layered products plus an additional 10% for file system administration tasks and file system information. Refer to the *Release Notes* for software subset sizes. For more information about the size requirements of a dataless environment, refer to *Sharing Software on a Local Area Network*. A worksheet in that guide is provided to help you calculate the amount of space required for a single `/var/adm/dms` file system.

Fill in the fifth line on the worksheet in Table 3-3 with the amount of space needed for the `/var/adm/dms` environments in the `var` area. If you plan to mount a separate partition on the `/var/adm/dms` area after the installation, enter a 0 (zero) for item 5 in Table 3-3.

3.4.5 Completing the var Worksheet

Add the values in column 3 of Table 3-3 to determine the space requirements for the `var` area.

Table 3-3: var Worksheet

Item	Obtain Number From ...	Space Required in var
Crash dump space	Section 3.3	_____
Error logger	Section 3.4.1	_____
System accounting	Section 3.4.2	_____

Table 3-3: (continued)

Size of the <code>/var/adm/ris</code> directory	Section 3.4.3	_____
Size of the <code>/var/adm/dms</code> directory	Section 3.4.4	_____
Total space required in var		_____

3.5 Planning the /usr File System

The `/usr` directory contains the majority of the operating system files, including libraries, executable programs, and documentation. The directory structure contains directories such as `/usr/sys`, `/usr/adm`, and `/usr/bin`.

During the installation procedure, you allocate the `/usr` file system either by accepting the default partition or by specifying another partition. If you choose the default allocation, the installation software allocates the `g` partition of the system disk.

To determine the size of the `/usr` file system, consider the following:

- Software subsets you plan to install on `/usr`
- Amount of user space needed
- Size of the `var` area if it is on the same partition as `/usr`

Over time, you will probably add files to the `/usr` file system. Because of this, the file system can potentially run out of space. Be sure to allow for free space on the `/usr` file system.

If you plan to use the POLYCENTER Advanced File System (AdvFS) as the file system for Digital UNIX along with the AdvFS Utilities (available with a separate license), you do not need to greatly over allocate space for the `/usr` file system. AdvFS file system space can be dynamically increased without changing directory structures and without system interruption. Refer to *System Administration* for more information about the AdvFS file system.

Section 3.5.1 to Section 3.5.3 briefly describe how these items affect the size of the `/usr` file system. As you work through each section, complete the worksheet in Table 3-4.

3.5.1 Software Subsets Within the /usr File System

The /usr file system must be large enough to accommodate the software subsets that will reside within it. A software subset is a collection of executable files and data files needed to perform a specific function or to provide a particular class of services; for example, you need the System Accounting Utilities subset to perform system accounting.

Appendix B contains descriptions of the software subsets and a list of other subsets and kernel configuration file options related to each subset. The Digital UNIX *Release Notes* contains a table of software subset sizes.

The mandatory subsets are always installed. The optional subsets are not needed for your system to function; you can choose none, some, or all of the optional subsets, depending on your system requirements and available space.

You may want to consider allocating space for other layered products that are available for Digital UNIX. When planning space requirements for /usr, allow additional space if you will be adding products in the future. Refer to the specific layered product's *Release Notes* for the exact block size of the application.

Determine which subsets you will install, add their sizes together, and include any additional space that will be required for large applications in the near future. Enter the total on the first line of Table 3-4.

3.5.2 User Space Required

The advanced installation does not provide an area for user files; you need to set up this area after the installation. However, you should consider the amount of space needed for user files when planning your system. If you plan to place the users directory on /usr, you should reserve at least 10 MB of disk space for each user on your system. For example, if there are 10 users, you should reserve a minimum of 100 MB of disk space.

If you intend to set quotas on the user area, multiply the quota for each user by the number of users to determine the amount of user space. Refer to *System Administration* for information on disk quotas.

Enter the amount of space needed for the users directory on the second line of Table 3-4.

3.5.3 Size of the var Area

If you plan to place the var area on the same partition as /usr, you must add the total size of the var area from the worksheet in Table 3-3 to the total of /usr.

If appropriate for your system, enter the amount of space needed for /var on the third line of Table 3-4.

3.5.4 Completing the /usr Worksheet

Add the values in column 3 of Table 3-4 to determine the total space requirements for the /usr file system.

Table 3-4: /usr Worksheet

Item	Obtain Number from ...	Space Required in /usr
Software subsets	Appendix E	_____
Size of the user area	Section 3.5.2	_____
Size of the var area	Section 3.5.3	_____
Total space required in /usr		_____

Refer to Table 3-2 to identify partitions that are large enough for the /usr file system.

In the following table, record the software name (for example, rz0), disk number (for example 3), and partition where you plan to allocate the /usr file system:

Software Name	Disk Number	Partition
_____	_____	_____
_____	_____	_____

3.6 Determining the Disk Partition Layout

After you determine how much space your system needs for each file system, determine whether you can accept the default disk partition layouts. If you want to use a customized disk partition layout, choose the System Management option and use the `disklabel` command to modify the disks. The System Management option is offered when you start the installation. Refer to Appendix F or the `/etc/disktab` file for information on the default disk partition layout.

If you modify the partition tables for the system disk, the `root` (or the a partition) must be at least 81,920 blocks (40 MB). If the modified partition does not meet this requirement, the advanced installation requires that you choose the default partition table for the system disk or restart the installation to select a different system disk. Other disks on the system are unaffected.

Enter the values that you determined in the previous sections in Table 3-5. This table will provide you with the complete file system layout and space requirements for your system.

Table 3-5: File System Worksheet

Items	Approximate Size	Device Name	Partition
Root	_____	_____	_____
swap1 (from Section 3.2)	_____	_____	_____
swap2 (from Section 3.2)	_____	_____	_____
Crash dump space (from Section 3.3)	_____	_____	_____
Error logger	_____		
System accounting	_____		
RIS area	_____	_____	
var total (from Table 3-3; fill in disk and partition lines if applicable)	_____	(_____)	(_____)
/usr total (from Table 3-4)	_____	_____	_____

After completing the worksheet, verify the disk partition layout. If you are installing a system for the first time, refer to Table 3-2 and to Appendix F or the `/etc/disktab` file for the default partition layout for your disk or disks.

Compare the disk partition layout with the total `var` and `/usr` values in Table 3-5. If the space required consumes more than 75 percent of the available disk space, not including the 15 percent of the partition that the file system consumes, consider expanding the partition. After working the math out, choose the System Management option when you begin the installation (as described in Chapter 4) and use the `disklabel` command to modify the default partition layout before beginning the installation. Refer to Chapter 7 for more information.

Go to Chapter 4 for instructions on how to shut down and boot your system. Shutting down and booting the system is the first step in the installation process.

Booting Your Processor or Single-Board Computer 4

When you perform a basic or advanced installation of the Digital UNIX operating system software, you must prepare the hardware for the installation and then boot the system from the installation media (either CD-ROM or over a network connection to a server).

This chapter provides the following information:

- Minimum firmware revisions for all supported processors and single-board computers
- Minimum revision level of the EISA configuration utility (ECU)
- Minimum revision level of the RAID configuration utility (RCU)
- How to configure ISA devices on supported processors
- How to enable unattended reboots on multi-processor systems
- How to boot your processor or single-board computer from the Digital UNIX CD-ROM or over a network connection to begin the installation

Firmware update instructions begin in Section 4.1. Instructions for shutting down and booting your system begin in Section 4.4.

If you are using a CD-ROM optical disc to boot your system, Section A.1 and Section A.2 describe how to load the CD-ROM into a caddy and disc drive.

If you are booting your system over the network, you are initiating an installation from a remote server. You can also boot a standalone kernel from a remote server to perform system management tasks. To boot over the network, your processor or single-board computer must be registered as a client on a Remote Installation Services (RIS) server. Refer to *Sharing Software on a Local Area Network* for information about registration.

4.1 Minimum Firmware Revision Levels

To run Digital UNIX Version 3.2C, your system might require a firmware update. Firmware updates are located on the *Alpha Systems Firmware CD-ROM Version 3.3* compact disc that is included with your Digital UNIX media kit. Also included in the media kit is the *Alpha AXP Systems Firmware Update Release Notes Overview* that describes how to mount the firmware CD-ROM and how to print processor-specific firmware update

instructions. In order to mount the firmware CD-ROM, your kernel must be configured for the ISO 9660 Compact Disc File System (CDFS). The CDFS option must be present in the kernel configuration file to configure CDFS in the kernel. Refer to *System Administration* for more information.

Before beginning an installation, ensure that your system is running the correct firmware. Table 4-1 provides the minimum firmware requirements for processors running Digital UNIX Version 3.2C.

Table 4-1: Minimum Firmware Revision Levels for Alpha Systems

Alpha System	Minimum Firmware Level
AlphaPC64 SBC	Version 4.1
AlphaServer 400	Version 3.8
AlphaServer 1000	Version 5.0
AlphaServer 2000	Version 3.9
AlphaServer 2100	Version 3.9
AlphaServer 8200	Version 1.1
AlphaServer 8400	Version 1.1
AlphaStation 200	Version 3.8
AlphaStation 250	Version 3.8
AlphaStation 400	Version 3.8
AlphaStation 600	Version 3.7
AXPvme 64	Version 14.0
AXPvme 100	Version 14.0
AXPvme 160	Version 14.0
AXPvme 166	Version 14.0
AXPvme 230	Version 14.0
AXPpci	Version 4.1
DEC 2000	Version 1.6
DEC 3000	Version 6.0
DEC 4000	Version 3.5
DEC 7000	Version 4.1
DEC 10000	Version 4.1
Digital Alpha VME 2100	Version 4.0
EB64+ SBC	Version 4.1
EB66+ SBC	Version 4.1
EB164 SBC	Version 4.1

4.1.1 Updating Firmware on AlphaPC64, EB64+, EB66+, and EB164 Single-Board Computers

The EB64+ single-board computer uses a socketed firmware ROM chip. The EB66+, AlphaPC64, and EB164 single-board computers use an EPROM that

can be updated with new firmware. See your system documentation for details on how to update the console firmware in these systems.

4.1.2 Minimum EISA Configuration Utility (ECU) Firmware Revision Level

Before installing Digital UNIX on a system with an EISA bus, you must run the EISA Configuration Utility (ECU). Follow the instructions provided by your hardware documentation.

For Digital UNIX Version 3.2C software, the supported ECU firmware revision is 1.8.1 or higher. The ECU is distributed on a floppy disk that is included in the Digital UNIX media kit.

4.1.3 Minimum RAID Configuration Utility (RCU) Revision Level

Before installing Digital UNIX on a system employing RAID technology, you must run the RAID Configuration Utility (RCU). Follow the instructions provided in your hardware owners guide.

For Digital UNIX Version 3.2C software, the supported RCU revision level is 3.11 or higher. The RCU is included on the *Alpha Systems Firmware CD-ROM Version 3.3*.

4.1.4 Updating the Advanced RISC Computing (ARC) Console

Advanced RISC Computing (ARC) is an alternate console interface that was designed to support the Windows NT operating system. Some system configuration utilities may require you to switch to the ARC console. Refer to your hardware owner's guide for more information. To run Digital UNIX Version 3.2C, you may need to update the console firmware. The ARC firmware update is included on the *Alpha Systems Firmware CD-ROM Version 3.3*.

4.1.5 Updating the System Reference Manual (SRM) Console

To run Digital UNIX Version 3.2C, you may need to update the console firmware. The SRM firmware update is included on the *Alpha Systems Firmware CD-ROM Version 3.3*. Refer to your hardware owner's guide for more information.

4.2 Configuring ISA Devices

If you plan to connect ISA devices to your system, use the `isacfg` console command to supply the appropriate configuration information.

The SRM console firmware provides information about the ISA bus devices that come configured with Digital systems. Use the following console firmware command to view this information:

```
>>> isacfg -all
```

Use the `isacfg` console command to configure additional ISA bus devices on your system. When you specify a device with this command, you must use a handle as the name of the device. The following table lists the handles for optional ISA devices that you can configure for your system.

Table 4-2: Optional ISA Device Handles

Device	Handle
Ethernet LeMAC (DE203, DE204, DE205)	DE200-LE
Sound board	PCXBJ

Use the `-handle` handle-name flag to specify the device handle. The following example sets the parameters for configuring the DE205 Ethernet controller. When you issue such a command, let the input line wrap; do not press the Return key in the middle of the line:

```
>>> isacfg -slot 1 -dev 0 -mk -handle DE200-LE -irq0 5
      -iobase0 300 -membase0 d0000 -memlen0 10000
      -etyp 1 -enadev 1
```

See your hardware documentation for more information about ISA configuration.

4.3 Enabling Unattended Reboots on Multi-Processor Systems

To reduce system down time due to a processor failure on a multi-processor system, an unattended reboot feature is available for multi-processor platforms.

To enable unattended reboot functionality, set the following console parameters:

```
>>> set boot_osflags a
>>> set boot_reset off
>>> set auto_action restart
```

When processor failures are detected on a multi-processor platform, the system marks the faulting processor as failed, and the entire system is rebooted without any operator intervention. The faulting processor will not be restarted when the reboot occurs. To restart the faulting processor, corrective action must be taken. The system will not try to restart the failed

processor until the power has been recycled on the system or the console `init` command is issued at the console prompt (`>>>`).

4.4 Shutting Down and Booting the Processor

To prepare the hardware for the installation booting process, do the following:

1. If your system is already running a version of DEC/OSF1, you must shut down and halt the processor using a command similar to the following:

```
# shutdown -h +10 preparing to install software
```

In the previous example, the system is shut down and halted in ten minutes and sends the message `preparing to install software` to all logged in users. Consult the *System Administration* guide if you need more information about shutting down a system.

If you are adding peripheral devices to your system at this time, go to Step 2.

If you are not connecting additional peripheral devices to your system, go to Step 3.

2. If you are adding additional peripheral devices, turn off your system. Then, connect the peripheral devices while your system is turned off.
 - Turn on power to the console terminal and all additional peripheral devices; otherwise, the peripheral devices will not be automatically configured by your system.

If you connect additional peripherals or controllers after the installation, refer to the *System Administration* guide for instructions about how to reconfigure your system.

 - Turn on power to the processor. The console subsystem prints various startup and diagnostic messages and ends with the console mode prompt (`>>>`).
3. Boot your system from the console mode prompt (`>>>`). The boot command you enter depends on the processor and the type of software distribution you are using: CD-ROM or network. The DEC 7000 Series, DEC 10000 Series, and AlphaServer 8000 Series processors can be booted only from CD-ROM.

Note

Be sure to review your console firmware update documentation and perform the firmware update at the appropriate time. If you added peripherals, you may need to run configuration utilities, such as ECU and RCU, as well.

Locate your processor in Table 4-3 and follow the booting instructions in the corresponding section. When you have booted your processor, the basic and advanced installation procedures continue in Chapter 5.

Table 4-3: Location of Processor-Specific Boot Instructions

Alpha System	Section Number
AlphaServer 400 Series	Section 4.5
AlphaServer 1000 Series	Section 4.6
AlphaServer 2000 Series	Section 4.7
AlphaServer 2100 Series and Digital Alpha VME 2100	Section 4.8
AlphaServer 8200 Series	Section 4.9
AlphaServer 8400 Series	Section 4.9
AlphaStation 200 and 400 Series	Section 4.10
AlphaStation 250 Series	Section 4.11
AlphaStation 600 Series	Section 4.12
AXPvme Single-Board Computers (SBCs)	Section 4.13
AXPpci SBCs	Section 4.14
AlphaPC64, EB64+, EB66+, and EB164 SBCs	Section 4.15
DEC 2000 Series	Section 4.16
DEC 3000 Series	Section 4.17
DEC 4000 Series	Section 4.18
DEC 7000 and 10000 Series	Section 4.19
Processors and SBCs supported in hardware releases later than Digital UNIX Version 3.2C	Refer to the <i>Hardware Release Notes</i>

Note

If you have problems booting your system, refer to the hardware documentation for your particular processor. If the problem is not hardware related, refer to the *System Administration* guide. This guide provides information about boot options such as booting a generic kernel (`genvmunix`) or booting an alternate custom kernel.

4.5 AlphaServer 400 Series Processors

The following sections describe how to boot an AlphaServer 400 processor from a CD-ROM optical disc and from the network.

4.5.1 Setting the Console Flags

Before starting the boot procedure on an AlphaServer 400 processor, complete the following steps:

1. Enter the following command to clear the `boot_osflags` variable to ensure that the correct kernel file boots automatically:

```
>>> set boot_osflags ""
```

2. Set the `autoaction` variable to `halt`. This halts the system at the console prompt each time the system is turned on, when the system crashes, or when you press the `Halt` button.

```
>>> set auto_action halt
```

4.5.2 Booting from the CD-ROM Optical Disc Kit

If your CD-ROM optical disc is not already in a caddy, follow the instructions in Appendix A.

Follow this procedure to boot the system:

1. Insert the CD-ROM optical disc labeled *Digital UNIX V3.2C Operating System (formerly DEC OSF/1) Disc 1 of 2*.
2. Enter the following command to determine the unit number of the drive for your device:

```
>>> show dev
```

A device information table similar to the following is displayed:

dka0.0.0.6.0	DKA0	RZ25L 0003
dka100.1.0.6.0	DKA100	RZ26 T386
dka400.4.0.6.0	DKA400	RRD43 2893
dva0.0.0.0.1	DVA0	
ewa0.0.0.11.0	EWA0	08-00-2B-E2-74-32
pka0.7.0.6.0	PKA0	SCSI Bus ID 7

The second column shows the numbers assigned to each drive:

- The letters DK refer to a SCSI disk or CD-ROM device.
- The letters MK refer to a SCSI magnetic tape device.
- The third letter (A, B, C, D, or E) refers to the SCSI bus designation. Refer to your hardware owner's guide for more details.

- The number refers to the drive number.
- 3. Enter the init command with the following syntax:

```
>>> init
```
- 4. Enter the boot command with the following syntax to boot from a CD-ROM:

boot device

For example, to boot the system from CD-ROM drive number 1, enter the following command:

```
>>> boot dka400
```

Output similar to the following is displayed:

```
(boot dka400.4.0.6.0)
block 0 of dka400.4.0.6.0 is a valid boot block
reading 16 blocks from dka400.4.0.6.0
bootstrap code read in
base = 11e000, imagestart = 0, imagebytes = 2000
initializing HWRPB at 2000
initializing page table at 110000
initializing machine state
setting affinity to the primary CPU
jumping to bootstrap code
```

```
OSF boot - Wed Jul 5 17:18:57 EDT 1995
```

You have completed booting your system. Continue the installation procedure with Chapter 5.

4.5.3 Booting from the Network

To boot your system over the network, make sure it is registered as a client on a RIS server. Refer to *Sharing Software on a Local Area Network* for information about registering a client. The client must be on the same subnet as the server.

The device parameter is the network device from which you want to boot. The AlphaServer 400 processor supports two network adapters: ewa0 and ena0.

Set your device protocols to boot from either a Digital UNIX server or an ULTRIX server.

4.5.3.1 Booting from a Digital UNIX Server

Use the following command syntax to boot your system over the network:

```
set device_protocols bootp
set device_inet_init bootp
```


For example, if the device you are booting from with the `bootp` protocol is `ewa0`, enter the following commands:

```
>>> set ewa0_protocols bootp
>>> set ewa0_inet_init bootp
>>> boot ewa0
```

You can override a previously set boot protocol. For example, if your system was previously set to use the `mop` boot protocol, you can override it and use the `bootp` protocol by entering the following command:

```
>>> boot ewa0 -pro bootp
```

Some system information is displayed by the installation software followed by the memory and hardware configurations.

If your initial network boot fails, enter `init` at the console prompt. If you encounter other problems during the RIS installation, refer to *Sharing Software on a Local Area Network* for more information.

You have completed booting your system. Continue the installation procedure with Chapter 5.

4.5.3.2 Booting from an ULTRIX Server

If you are booting from an ULTRIX server, use the following command syntax:

```
set device_protocols mop
```

For example, if the device you are booting from with the `mop` protocol is `ewa0`, enter the following commands:

```
>>> set ewa0_protocols mop
>>> boot ewa0
```

If your initial network boot fails, enter `init` at the console prompt. If you encounter other problems during the RIS installation, refer to *Sharing Software on a Local Area Network* for more information.

Some system information is displayed by the installation software followed by the memory and hardware configurations.

You have completed booting your system. Continue the installation procedure with Chapter 5.

4.6 AlphaServer 1000 Series Processors

This section provides instructions for booting an AlphaServer 1000 Series processor.

4.6.1 Running the EISA Configuration Utility (ECU) Before Installation

Before installing Digital UNIX Version 3.2C software on an AlphaServer 1000 Series processor, you must run the EISA Configuration Utility (ECU) if either of the following conditions is true:

- You are installing the Digital UNIX software for the first time on your system or you are installing a new version of the Digital UNIX software.
- You have changed the configuration of your system by adding, removing, or moving an EISA option card.

Refer to your hardware documentation for complete instructions on how to run the ECU program.

Note

You should always boot the generic kernel and run `doconfig` whenever you change your system configuration by adding, removing, or moving an EISA option card.

4.6.2 PCI RAID Controller

Digital UNIX provides support for both the EISA RAID (SWXCR-En) and the PCI RAID (SWXCR-Pn) controllers. You can use both concurrently as data devices. To use either as a boot (system disk) device, remove the other controller.

4.6.3 The `bus_probe_algorithm` Environment Variable

The `bus_probe_algorithm` console environment variable must be set to `new`. To verify that the `bus_probe_algorithm` environment variable is set to `new`, enter the following console firmware command:

```
>>> show bus_probe_algorithm
```

If the environment variable is set to `old`, set the variable to `new` and initialize the console as shown in the following example:

```
>>> set bus_probe_algorithm new
>>> init
```

4.6.4 Setting the Console Flags

Before starting the boot procedure on an AlphaServer 1000 Series processor,

complete the following steps:

1. Clear the `boot_osflags` variable. This ensures that the correct kernel file boots automatically.

```
>>> set boot_osflags
```

2. Set the `auto_action` variable to `halt`. This halts the system at the console prompt each time it is turned on, when it crashes, or when you press the Halt button.

```
>>> set auto_action halt
```

3. Set the `boot_file` variable. This ensures that an alternate boot file is not set.

```
>>> set boot_file
```

4.6.5 Booting from the CD-ROM Optical Disc Kit

Follow these steps to boot the AlphaServer 1000 Series processor from a CD-ROM optical disc:

1. Insert the CD-ROM optical disc labeled *Digital UNIX V3.2C Operating System (formerly DEC OSF/1) Disc 1 of 2*.
2. Enter the following command to determine the unit number of the drive for your device:

```
>>> show device
```

Output similar to the following is displayed by the `show device` command:

dka400.4.0.6.0	DKA400	RRD43	2893
dva0.0.0.0.1	DVA0		
ewa0.0.0.13.0	EWA0	08-00-2B-3E-B6-C8	
pka0.7.0.6.0	PKA0	SCSI Bus ID 7	

3. When the device table is displayed, look for the line with the CD-ROM device string `RRD43`. The device boot string for your system appears in that same line. The device boot string begins with the letters `DKA`.
4. Enter the `boot` command and the appropriate boot device string for your system. For example:

```
>>> boot DKA400
```

For more information about the `show device` and `boot` commands, see the hardware documentation that comes with your system.

4.6.6 Booting from the Network

To boot an AlphaServer 1000 Series system over the network, make sure it is registered as a client on a RIS server. Refer to the *Sharing Software on a Local Area Network* guide for information on registering a client. The client must be on the same subnet as the server.

Set your device protocols to boot from either a Digital UNIX server or an ULTRIX server.

To boot from a Digital UNIX Server, see Section 4.6.6.1. To boot from an ULTRIX server, see Section 4.6.6.2.

4.6.6.1 Booting from a Digital UNIX Server

Use the `show device` command to determine which network adapter (such as `ewa` or `era`) is in use:

```
>>> show device
```

Output similar to the following is displayed by the `show device` command:

dka400.4.0.6.0	DKA400	RRD43 2893
dva0.0.0.0.1	DVA0	
ewa0.0.0.13.0	EWA0	08-00-2B-3E-B6-C8
pka0.7.0.6.0	PKA0	SCSI Bus ID 7

Use the following command syntax to boot your system over the network:

```
set device_inet_init bootp
set device_protocols bootp
```

For example, if the device you are booting from with the `bootp` protocol is `ewa0`, enter the following commands:

```
>>> set ewa0_inet_init bootp
>>> set ewa0_protocols bootp
>>> boot -fi "" ewa0
```

You have completed booting your system. Continue the installation procedure with Chapter 5.

4.6.6.2 Booting from an ULTRIX Server

Use the `show device` command to determine which network adapter is in use. The network adapter will have a value such as `ewa0` or `era0`.

```
>>> show device
```

Output similar to the following is displayed by the `show device`

command:

dka400.4.0.6.0	DKA400	RRD43 2893
dva0.0.0.0.1	DVA0	
ewa0.0.0.13.0	EWA0	08-00-2B-3E-B6-C8
pka0.7.0.6.0	PKA0	SCSI Bus ID 7

Use the following command syntax to boot your system over the network:

set device_protocols mop

For example, if the device you are booting from with the mop protocol is ewa0, enter the following command:

```
>>> set ewa0_protocols mop
>>> boot -fi "" ewa0
```

You have completed booting your system. Continue the installation procedure with Chapter 5.

4.7 AlphaServer 2000 Series Processors

The following sections describe how to boot AlphaServer 2000 Series processors from a CD-ROM optical disc and from the network.

4.7.1 Determining the Firmware Revision

To determine the current firmware revision, enter the following console firmware command at the prompt:

```
>>> show version
```

The system displays a line similar to the following:

```
version      V3.10-33
```

For more information about updating firmware on a AlphaServer 2000 Series processor, refer to the *Alpha AXP Systems Firmware Update Release Notes Overview*.

4.7.2 Running the EISA Configuration Utility (ECU) Before Installation

Before installing the Digital UNIX Version 3.2C software on a AlphaServer 2000 Series, you must run the EISA Configuration Utility (ECU) if either of the following conditions is true:

- You are installing the Digital UNIX software for the first time on your system or you are installing a new version of the Digital UNIX software.
- You have changed the configuration of your system by adding, removing, or moving an EISA option card.

Refer to your hardware documentation for complete instructions on how to run the ECU program.

Note

You should always boot the generic kernel and run `doconfig` whenever you change your system configuration by adding, removing, or moving an EISA option card.

4.7.3 The `bus_probe_algorithm` Environment Variable

The `bus_probe_algorithm` console environment variable must be set to `new`. To verify that the `bus_probe_algorithm` environment variable is set to `new`, enter the following console firmware command:

```
>>> show bus_probe_algorithm
```

If the environment variable is set to `old`, set the variable to `new` and initialize the console as shown in the following example:

```
>>> set bus_probe_algorithm new
>>> init
```

4.7.4 Setting the Console Flags

Before starting the boot procedure, complete the following steps:

1. Clear the `boot_osflags` variable. This ensures that the correct kernel file boots automatically.

```
>>> set boot_osflags ""
```

2. Set the `auto_action` variable to `halt`. This halts the system at the console prompt each time the system is turned on, when the system crashes, or when you press the Halt button.

```
>>> set auto_action halt
```

4.7.5 Booting from the CD-ROM Optical Disc Kit

If your CD-ROM optical disc is not already in a caddy, follow the instructions in Appendix A.

Follow this procedure to boot the system:

1. Insert the CD-ROM optical disc labeled *Digital UNIX V3.2C Operating System (formerly DEC OSF/1) Disc 1 of 2*.
2. Enter the following command to determine the unit number of the drive for your device:

```
>>> show dev
```

A device information table similar to the following is displayed:

dka0.0.0.0.0	DKA0	RZ28
dkb0.0.0.1.0	DKB0	RZ28
dkc0.0.0.2.0	DKC0	RZ26
dkc100.1.0.2.0	DKC100	RZ26
dkc200.2.0.2.0	DKC200	RZ26
dkc300.3.0.2.0	DKC300	RZ26
dke100.1.0.4.0	DKE100	RRD43
mka500.0.0.0.0	MKA500	TLZ04
mke0.0.0.4.0	MKE0	TZ85
ewa0.0.0.6.0	EWA0	08-00-2B-2C-CE-DE
ewb0.0.0.7.0	EWB0	08-00-2B-2C-CE-DF
p_d0.7.0.3.0		Bus ID 7
pka0.7.0.0.0	PKA0	SCSI Bus ID 7
pkb0.7.0.1.0	PKB0	SCSI Bus ID 7
pkc0.7.0.2.0	PKC0	SCSI Bus ID 7
pke0.7.0.4.0	PKE0	SCSI Bus ID 7

The middle column shows the numbers assigned to each drive:

- The letters DK refer to a SCSI disk or CD-ROM device.
- The letters MK refer to a SCSI magnetic tape device.
- The third letter (A, B, C, D, or E) refers to the SCSI or DSA bus designation. Refer to your hardware owner's guide for more details.
- The number refers to the drive number.

3. Enter the `init` command with the following syntax:

```
>>> init
```

4. Enter the `boot` command with the following syntax to boot from a CD-ROM:

boot device

For example, to boot the system from CD-ROM drive number 1, enter the following command:

```
>>> boot dke100
```

Output similar to the following is displayed:

```
(boot dke100.1.0.4.0)
block 0 of dke100.1.0.4.0 is a valid boot block
reading 16 blocks from dke100.1.0.4.0
bootstrap code read in
base = 1ee000, image_start = 0, image_bytes = 2000
initializing HWRPB at 2000
initializing page table at 1e0000
initializing machine state
setting affinity to the primary CPU
jumping to bootstrap code
```

```
OSF boot - Mon Aug 5 15:49:49 EDT 1993
```

You have completed booting your system. Continue the installation procedure with Chapter 5.

4.7.6 Booting from the Network

To boot your system over the network, make sure it is registered as a client on a RIS server. Refer to *Sharing Software on a Local Area Network* for information on registering a client. Note that the client must be on the same subnet as the server.

The `device` parameter is the network device from which you want to boot. AlphaServer 2000 Series processors support two network adapters: `ewa0` and `ewb0`.

Set your device protocols to boot from either a Digital UNIX server or an ULTRIX server.

4.7.6.1 Booting from a Digital UNIX Server

Use the following command syntax to boot your system over the network:

```
set device_protocols bootp  
set device_inet_init bootp
```

For example, if the device you are booting from with the `bootp` protocol is `ewa0`, enter the following commands:

```
>>> set ewa0_protocols bootp  
>>> set ewa0_inet_init bootp  
>>> boot ewa0
```

You can override a previously set boot protocol. For example, if your system was previously set to use the `mop` boot protocol, you can overwrite it and use the `bootp` protocol by entering the following command:

```
>>> boot ewa0 -pro bootp
```

Some system information is displayed by the installation software followed by the memory and hardware configurations.

If your initial network boot fails, enter `init` at the console prompt. If you encounter other problems during the RIS install, refer to *Sharing Software on a Local Area Network*.

You have completed booting your system. Continue the installation procedure with Chapter 5.

4.7.6.2 Booting from an ULTRIX Server

If you are booting from an ULTRIX server, use the following command syntax:

set device_protocols mop

For example, if the device you are booting from with the mop protocol is ewa0, enter the following commands:

```
>>> set ewa0_protocols mop
>>> boot ewa0
```

If your initial network boot fails, enter `init` at the console prompt. If you encounter other problems during the RIS install, refer to *Sharing Software on a Local Area Network*.

Some system information is displayed by the installation software followed by the memory and hardware configurations.

You have completed booting your system. Continue the installation procedure with Chapter 5.

4.7.7 Prestoserve Option

These instructions apply to AlphaServer 2000 Series processors equipped with the Prestoserve option.

4.7.7.1 Firmware Requirements

The minimum firmware revision is Version 3.6. To determine which revision is on your system, enter the following command:

```
>>> show conf
```

The output will be similar to the following:

```
DEC 2000 (tm) console V3.9.....
```

4.7.7.2 The prcache Command

AlphaServer 2000 Series system consoles provide the `prcache` command to support the Prestoserve option (NVRAM). Refer to hardware documentation for a description of this command.

You have completed booting your system. Continue the installation procedure with Chapter 5.

4.8 AlphaServer 2100 Series and Digital Alpha VME 2100 Series Processors

The following sections describe how to boot AlphaServer 2100 Series and Digital Alpha VME 2100 Series processors from a CD-ROM optical disc and from the network.

4.8.1 Determining the Firmware Revision

To determine the current firmware revision, enter the following console firmware command at the prompt:

```
>>> show version
```

The system displays a line similar to the following:

```
version      V3.10-33
```

For more information about updating firmware on AlphaServer 2100 Series or Digital Alpha VME 2100 Series processors, refer to the *Alpha AXP Systems Firmware Update Release Notes Overview*.

4.8.2 Running the EISA Configuration Utility (ECU) Before Installation

Before installing Digital UNIX Version 3.2C software on AlphaServer 2100 Series and Digital Alpha VME 2100 Series processors, you must run the EISA Configuration Utility (ECU) if either of the following conditions is true:

- You are installing the Digital UNIX software for the first time on your system or you are installing a new version of the Digital UNIX software.
- You have changed the configuration of your system by adding, removing, or moving an EISA option card.

Refer to your hardware documentation for complete instructions on how to run the ECU program.

Note

You should always boot the generic kernel and run `doconfig` whenever you change your system configuration by adding, removing, or moving an EISA option card.

4.8.3 The bus_probe_algorithm Environment Variable

The `bus_probe_algorithm` console environment variable must be set to `new`. To verify that the `bus_probe_algorithm` environment variable is set to `new`, enter the following console firmware command:

```
>>> show bus_probe_algorithm
```

If the environment variable is set to `old`, set the variable to `new` and initialize the console as shown in the following example:

```
>>> set bus_probe_algorithm new
>>> init
```

4.8.4 Setting the Console Flags

Before starting the boot procedure, complete the following steps:

1. Clear the `boot_osflags` variable. This ensures that the correct kernel file boots automatically.

```
>>> set boot_osflags ""
```

2. Set the `auto_action` variable to `halt`. This halts the system at the console prompt each time the system is turned on, when the system crashes, or when you press the Halt button.

```
>>> set auto_action halt
```

4.8.5 Booting from the CD-ROM Optical Disc Kit

If your CD-ROM optical disc is not already in a caddy, follow the instructions in Appendix A.

Follow this procedure to boot the system:

1. Insert the CD-ROM optical disc labeled *Digital UNIX V3.2C Operating System (formerly DEC OSF/1) Disc 1 of 2*.
2. Enter the following command to determine the unit number of the drive for your device:

```
>>> show dev
```

A device information table similar to the following is displayed:

dka0.0.0.0.0	DKA0	RZ28
dkb0.0.0.1.0	DKB0	RZ28
dkc0.0.0.2.0	DKC0	RZ26
dkc100.1.0.2.0	DKC100	RZ26
dkc200.2.0.2.0	DKC200	RZ26
dkc300.3.0.2.0	DKC300	RZ26
dke100.1.0.4.0	DKE100	RRD43
mka500.0.0.0.0	MKA500	TLZ04
mke0.0.0.4.0	MKE0	TZ85

ewa0.0.0.6.0	EWA0	08-00-2B-2C-CE-DE
ewb0.0.0.7.0	EWB0	08-00-2B-2C-CE-DF
p_d0.7.0.3.0		Bus ID 7
pka0.7.0.0.0	PKA0	SCSI Bus ID 7
pkb0.7.0.1.0	PKB0	SCSI Bus ID 7
pkc0.7.0.2.0	PKC0	SCSI Bus ID 7
pke0.7.0.4.0	PKE0	SCSI Bus ID 7

The middle column shows the numbers assigned to each drive:

- The letters DK refer to a SCSI disk or CD-ROM device.
 - The letters MK refer to a SCSI magnetic tape device.
 - The third letter (A, B, C, D, or E) refers to the SCSI or DSA bus designation. Refer to your hardware owner's guide for more details.
 - The number refers to the drive number.
3. Enter the `init` command with the following syntax:
 4. Enter the `boot` command with the following syntax to boot from a CD-ROM:

```
>>> init
```

boot device

For example, to boot the system from CD-ROM drive number 1, enter the following command:

```
>>> boot dke100
```

Output similar to the following is displayed:

```
(boot dke100.1.0.4.0)
block 0 of dke100.1.0.4.0 is a valid boot block
reading 16 blocks from dke100.1.0.4.0
bootstrap code read in
base = 1ee000, image_start = 0, image_bytes = 2000
initializing HWRPB at 2000
initializing page table at 1e0000
initializing machine state
setting affinity to the primary CPU
jumping to bootstrap code
```

```
OSF boot - Mon Aug 5 15:49:49 EDT 1993
```

You have completed booting your system. Continue the installation procedure with Chapter 5.

4.8.6 Booting from the Network

To boot your system over the network, make sure it is registered as a client on a RIS server. Refer to *Sharing Software on a Local Area Network* for information on registering a client. Note that the client must be on the same subnet as the server.

The `device` parameter is the network device from which you want to boot. The AlphaServer 2100 Series and Digital Alpha VME 2100 Series processors support two network adapters: `ewa0` and `ewb0`.

Set your device protocols to boot from either a Digital UNIX server or an ULTRIX server.

4.8.6.1 Booting from a Digital UNIX Server

Use the following command syntax to boot your system over the network:

```
set device_protocols bootp  
set device_inet_init bootp
```

For example, if the device you are booting from with the `bootp` protocol is `ewa0`, enter the following commands:

```
>>> set ewa0_protocols bootp  
>>> set ewa0_inet_init bootp  
>>> boot ewa0
```

You can override a previously set boot protocol. For example, if your system was previously set to use the `mop` boot protocol, you can overwrite it and use the `bootp` protocol by entering the following command:

```
>>> boot ewa0 -pro bootp
```

Some system information is displayed by the installation software followed by the memory and hardware configurations.

If your initial network boot fails, enter `init` at the console prompt. If you encounter other problems during the RIS installation, refer to *Sharing Software on a Local Area Network*.

You have completed booting your system. Continue the installation procedure with Chapter 5.

4.8.6.2 Booting from an ULTRIX Server

If you are booting from an ULTRIX server, use the following command syntax:

```
set device_protocols mop
```

For example, if the device you are booting from with the `mop` protocol is `ewa0`, enter the following commands:

```
>>> set ewa0_protocols mop  
>>> boot ewa0
```

If your initial network boot fails, enter `init` at the console prompt. If you encounter other problems during the RIS install, refer to *Sharing Software on a Local Area Network*.

Some system information is displayed by the installation software followed by the memory and hardware configurations.

You have completed booting your system. Continue the installation procedure with Chapter 5.

4.8.7 Prestoserve Option

These instructions apply to AlphaServer 2100 Series and Digital Alpha VME 2100 Series processors equipped with the Prestoserve option.

4.8.7.1 Firmware Requirements

The minimum firmware revision is Version 3.6. To determine which revision is on your system, enter the following command:

```
>>> show conf
```

The output will be similar to the following:

```
DEC 2100 (tm) console V3.9.....
```

4.8.7.2 The prcache Command

The AlphaServer 2100 Series and Digital Alpha VME 2100 Series system consoles provide the `prcache` command to support the Prestoserve option (NVRAM). Refer to hardware documentation for a description of this command.

You have completed booting your system. Continue the installation procedure with Chapter 5.

4.9 AlphaServer 8200 and AlphaServer 8400 Processors

The following sections describe how to boot AlphaServer 8200 and AlphaServer 8400 processors from a CD-ROM optical disc.

4.9.1 Running the EISA Configuration Utility (ECU) Before Installation

Before installing Digital UNIX Version 3.2C, complete the following steps to run the EISA Configuration Utility (ECU) on AlphaServer 8200 and AlphaServer 8400 processors:

1. Load the ECU diskette into the drive.

2. At the prompt, enter the following console firmware commands:

```
>>> set arc_enable ON
>>> initialize
```

3. After the system reinitializes, enter the following console firmware commands:

```
>>> set mode advanced
>>> runecu
```

A message is displayed while the ECU loads from the diskette. A second message indicates when control is passed to the ECU.

4.9.2 Setting the Console Flags

Before starting the boot procedure, complete the following steps:

1. Clear the `boot_osflags` variable. This ensures that the correct kernel file boots automatically.

```
>>> set boot_osflags ""
```

2. Set the `auto_action` variable to `halt`. This halts the system at the console prompt each time the system is turned on, when the system crashes, or when you press the Halt button.

```
>>> set auto_action halt
```

3. Set the `boot_reset` variable to `on`. This must be done if you need to reboot the generic kernel (`genvmunix`) at any time to reconfigure your system for additional peripherals.

```
>>> set boot_reset on
```

4.9.3 Booting from the CD-ROM Optical Disc Kit

If your CD-ROM optical disc is not already in a caddy, follow the instructions in Appendix A.

Use the following procedure to boot the system:

1. Insert the CD-ROM optical disc labeled *Digital UNIX V3.2C Operating System (formerly DEC OSF/1) Disc 1 of 2*.
2. Enter the following command to determine the unit number of the drive

for your device:

```
>>> show dev
```

A display appears showing information about the devices on your system. For example:

```
dka0.0.0.5.0      DKA0      RZ73
dkb4.4.1.14.0     DKB400     RRD43
```

The numbers in the middle column are the unit numbers assigned to each drive on your system:

- The letters DK refer to a SCSI CD-ROM or disk device.
 - The third letter (A, B, C, D, or E) refers to the SCSI bus designation. Refer to your hardware owner's guide for more details.
 - The numbers refer to the drive number.
3. Enter the `boot` command with the following syntax to boot from a CD-ROM:

boot *device-number*

For example, to boot the system from CD-ROM drive number 4, enter:

```
>>> boot dkb400
```

Output similar to the following is displayed:

Initializing...

```
F  E  D  C  B  A  9  8  7  6  5  4  3  2  1  0  NODE #
      A  M  M  .  .  .  .  .  P  TYP
      O  +  +  .  .  .  .  .  +  ST1
      .  .  .  .  .  .  .  .  B  BPD
      O  +  +  .  .  .  .  .  +  ST2
      .  .  .  .  .  .  .  .  B  BPD
      +  +  +  .  .  .  .  .  +  ST3
      .  .  .  .  .  .  .  .  B  BPD
```

```
+  .  +  .  +  .  +  .  .  +  .  .  .  .  C0 XMI +
```

```
      .  A0  B0  .  .  .  .  .  LV
      . 256  64  .  .  .  .  .  320Mb
```

```
Firmware Rev = V2.3  SROM Rev = V2.0  SYS SN = GA12345678
```

Booting...

Connecting to boot device dkb400

```
•
•
•
```

You have completed booting your system. Continue the installation procedure with Chapter 5.

4.9.4 Booting from the Network

Booting from the network is not supported for AlphaServer 8200 and AlphaServer 8400 processors.

4.10 AlphaStation 200 Series and AlphaStation 400 Series Processors

The following sections describe how to boot AlphaStation 200 Series and AlphaStation 400 Series processors from a CD-ROM optical disc and from the network.

4.10.1 Setting the Console Flags

Before starting the boot procedure on an AlphaStation 200 Series processor or an AlphaStation 400 Series processor, complete the following steps:

1. Enter the following command to clear the `boot_osflags` variable to ensure that the correct kernel file boots automatically:

```
>>> set boot_osflags ""
```

2. Set the `autoaction` variable to `halt`. This halts the system at the console prompt each time the system is turned on, when the system crashes, or when you press the `Halt` button.

```
>>> set auto_action halt
```

4.10.2 Booting from the CD-ROM Optical Disc Kit

If your CD-ROM optical disc is not already in a caddy, follow the instructions in Appendix A.

Follow this procedure to boot the system:

1. Insert the CD-ROM optical disc labeled *Digital UNIX V3.2C Operating System (formerly DEC OSF/1) Disc 1 of 2*.
2. Enter the following command to determine the unit number of the drive for your device:

```
>>> show dev
```

A device information table similar to the following is displayed:

dka0.0.0.6.0	DKA0	RZ25L 0003
dka100.1.0.6.0	DKA100	RZ26 T386
dka400.4.0.6.0	DKA400	RRD43 2893
dva0.0.0.0.1	DVA0	
ewa0.0.0.11.0	EWA0	08-00-2B-E2-74-32
pka0.7.0.6.0	PKA0	SCSI Bus ID 7

The second column shows the numbers assigned to each drive:

- The letters DK refer to a SCSI disk or CD-ROM device.
 - The letters MK refer to a SCSI magnetic tape device.
 - The third letter (A, B, C, D, or E) refers to the SCSI bus designation. Refer to your hardware owner's guide for more details.
 - The number refers to the drive number.
3. Enter the init command with the following syntax:

```
>>> init
```

4. Enter the boot command with the following syntax to boot from a CD-ROM:

boot *device*

For example, to boot the system from CD-ROM drive number 1, enter the following command:

```
>>> boot dka400
```

Output similar to the following is displayed:

```
(boot dka400.4.0.6.0)
block 0 of dka400.4.0.6.0 is a valid boot block
reading 16 blocks from dka400.4.0.6.0
bootstrap code read in
base = 11e000, imagestart = 0, imagebytes = 2000
initializing HWRPB at 2000
initializing page table at 110000
initializing machine state
setting affinity to the primary CPU
jumping to bootstrap code
```

```
OSF boot - Wed Jul 5 17:18:57 EDT 1995
```

You have completed booting your system. Continue the installation procedure with Chapter 5.

4.10.3 Booting from the Network

To boot your system over the network, make sure it is registered as a client on a RIS server. Refer to *Sharing Software on a Local Area Network* for information about registering a client. The client must be on the same subnet as the server.

The device parameter is the network device from which you want to boot. The AlphaStation 200 Series and AlphaStation 400 Series supports two network adapters: ewa0 and ena0.

Set your device protocols to let you boot from either a Digital UNIX server or an ULTRIX server.

4.10.3.1 Booting from a Digital UNIX Server

Use the following command syntax to boot your system over the network:

```
set device_protocols bootp  
set device_inet_init bootp
```

For example, if the device you are booting from with the `bootp` protocol is `ewa0`, enter the following commands:

```
>>> set ewa0_protocols bootp  
>>> set ewa0_inet_init bootp  
>>> boot ewa0
```

You can override a previously set boot protocol. For example, if your system was previously set to use the `mop` boot protocol, you can override it and use the `bootp` protocol by entering the following command:

```
>>> boot ewa0 -pro bootp
```

Some system information is displayed by the installation software followed by the memory and hardware configurations.

If your initial network boot fails, enter `init` at the console prompt. If you encounter other problems during the RIS installation, refer to *Sharing Software on a Local Area Network* for more information.

You have completed booting your system. Continue the installation procedure with Chapter 5.

4.10.3.2 Booting from an ULTRIX Server

If you are booting from an ULTRIX server, use the following command syntax:

```
set device_protocols mop
```

For example, if the device you are booting from with the `mop` protocol is `ewa0`, enter the following commands:

```
>>> set ewa0_protocols mop  
>>> boot ewa0
```

If your initial network boot fails, enter `init` at the console prompt. If you encounter other problems during the RIS installation, refer to *Sharing Software on a Local Area Network* for more information.

Some system information is displayed by the installation software followed by the memory and hardware configurations.

You have completed booting your system. Continue the installation procedure with Chapter 5.

4.11 AlphaStation 250 Series Processors

The following sections describe how to boot AlphaStation 250 Series processors from a CD-ROM optical disc and from the network.

4.11.1 Setting the Console Flags

Before starting the boot procedure on an AlphaStation 250 Series processor, complete the following steps:

1. Enter the following command to clear the `boot_osflags` variable to ensure that the correct kernel file boots automatically:

```
>>> set boot_osflags ""
```

2. Set the `autoaction` variable to `halt`. This halts the system at the console prompt each time the system is turned on, when the system crashes, or when you press the `Halt` button.

```
>>> set auto_action halt
```

4.11.2 Booting from the CD-ROM Optical Disc Kit

If your CD-ROM optical disc is not already in a caddy, follow the instructions in Appendix A.

Follow this procedure to boot the system:

1. Insert the CD-ROM optical disc labeled *Digital UNIX V3.2C Operating System (formerly DEC OSF/1) Disc 1 of 2*.
2. Enter the following command to determine the unit number of the drive for your device:

```
>>> show dev
```

A device information table similar to the following is displayed:

dka0.0.0.6.0	DKA0	RZ25L 0003
dka100.1.0.6.0	DKA100	RZ26 T386
dka400.4.0.6.0	DKA400	RRD43 2893
dva0.0.0.0.1	DVA0	
ewa0.0.0.11.0	EWA0	08-00-2B-E2-74-32
pka0.7.0.6.0	PKA0	SCSI Bus ID 7

The second column shows the numbers assigned to each drive:

- The letters DK refer to a SCSI disk or CD-ROM device.
- The letters MK refer to a SCSI magnetic tape device.
- The third letter (A, B, C, D, or E) refers to the SCSI bus designation. Refer to your hardware owner's guide for more details.

- The number refers to the drive number.
3. Enter the init command with the following syntax:

```
>>> init
```

4. Enter the boot command with the following syntax to boot from a CD-ROM:

boot device

For example, to boot the system from CD-ROM drive number 1, enter the following command:

```
>>> boot dka400
```

Output similar to the following is displayed:

```
(boot dka400.4.0.6.0)
block 0 of dka400.4.0.6.0 is a valid boot block
reading 16 blocks from dka400.4.0.6.0
bootstrap code read in
base = 11e000, imagestart = 0, imagebytes = 2000
initializing HWRPB at 2000
initializing page table at 110000
initializing machine state
setting affinity to the primary CPU
jumping to bootstrap code
```

```
OSF boot - Wed Jul 5 17:18:57 EDT 1995
```

You have completed booting your system. Continue the installation procedure with Chapter 5.

4.11.3 Booting from the Network

To boot your system over the network, make sure it is registered as a client on a RIS server. Refer to *Sharing Software on a Local Area Network* for information about registering a client. The client must be on the same subnet as the server.

The device parameter is the network device from which you want to boot. The AlphaStation 250 Series supports two network adapters: ewa0 and ena0.

Set your device protocols to let you boot from either a Digital UNIX server or an ULTRIX server.

4.11.3.1 Booting from a Digital UNIX Server

Use the following command syntax to boot your system over the network:

```
set device_protocols bootp
set device_inet_init bootp
```

For example, if the device you are booting from with the `bootp` protocol is `ewa0`, enter the following commands:

```
>>> set ewa0_protocols bootp
>>> set ewa0_inet_init bootp
>>> boot ewa0
```

You can override a previously set boot protocol. For example, if your system was previously set to use the `mop` boot protocol, you can override it and use the `bootp` protocol by entering the following command:

```
>>> boot ewa0 -pro bootp
```

Some system information is displayed by the installation software followed by the memory and hardware configurations.

If your initial network boot fails, enter `init` at the console prompt. If you encounter other problems during the RIS installation, refer to *Sharing Software on a Local Area Network* for more information.

You have completed booting your system. Continue the installation procedure with Chapter 5.

4.11.3.2 Booting from an ULTRIX Server

If you are booting from an ULTRIX server, use the following command syntax:

```
set device_protocols mop
```

For example, if the device you are booting from with the `mop` protocol is `ewa0`, enter the following commands:

```
>>> set ewa0_protocols mop
>>> boot ewa0
```

If your initial network boot fails, enter `init` at the console prompt. If you encounter other problems during the RIS installation, refer to *Sharing Software on a Local Area Network* for more information.

Some system information is displayed by the installation software followed by the memory and hardware configurations.

You have completed booting your system. Continue the installation procedure with Chapter 5.

4.12 AlphaStation 600 Series Processors

This section provides instructions for booting an AlphaStation 600 Series processor.

4.12.1 Determining the Firmware Revision

To determine the current firmware revision, enter the following console firmware command at the prompt:

```
>>> show version
```

A line similar to the following is displayed:

```
version      V3.7-15114
```

For more information about updating firmware on a AlphaStation 600 Series processor, refer to the *Alpha AXP Systems Firmware Update Release Notes Overview*.

4.12.2 Running the EISA Configuration Utility (ECU) Before Installation

Before installing Digital UNIX Version 3.2C you may need to run the EISA Configuration Utility (ECU) if the following conditions are true:

- This is a first-time installation of Digital UNIX
- You have changed the configuration of the machine by adding, removing, or relocating an EISA or ISA option card.
- You have upgraded your firmware.

Consult your hardware documentation for information on running the ECU.

Note

You should always boot the generic kernel and run `doconfig` whenever you change your system configuration by adding, removing, or moving an EISA option card.

4.12.3 Setting the Console Flags

Before starting the boot procedure on an AlphaStation 600 Series processor, complete the following steps:

1. Clear the `boot_osflags` variable. This ensures that the correct kernel file boots automatically.

```
>>> set boot_osflags
```
2. Set the `auto_action` variable to `halt`. This halts the system at the console prompt each time it is turned on, when it crashes, or when you

press the Halt button.

```
>>> set auto_action halt
```

3. Set the `boot_file` variable. This ensures that an alternate boot file is not set.

```
>>> set boot_file
```

4.12.4 Booting from the CD-ROM Optical Disc Kit

Follow these steps to boot the AlphaStation 600 Series processor from a CD-ROM optical disc:

1. Insert the CD-ROM optical disc labeled *Digital UNIX V3.2C Operating System (formerly DEC OSF/1) Disc 1 of 2*.
2. Enter the following command to determine the unit number of the drive for your device:

```
>>> show device
```

Output similar to the following is displayed by the `show device` command:

dka400.4.0.6.0	DKA400	RRD43	2893
dva0.0.0.0.1	DVA0		
ewa0.0.0.13.0	EWA0	08-00-2B-3E-B6-C8	
pka0.7.0.6.0	PKA0	SCSI Bus ID 7	

3. When the device table is displayed, look for the line with the CD-ROM device string `RRD43`. The device boot string for your system appears in that same line. The device boot string begins with the letters `DKA`.
4. Enter the `boot` command and the appropriate boot device string for your system. For example:

```
>>> boot DKA400
```

For more information about the `show device` and `boot` commands, see the hardware documentation that comes with your system.

4.12.5 Booting from the Network

To boot an AlphaStation 600 Series processor over the network, make sure it is registered as a client on a RIS server. Refer to the *Sharing Software on a Local Area Network* guide for information on registering a client. The client must be on the same subnet as the server.

Set your device protocols to boot from either a Digital UNIX server or an ULTRIX server.

To boot from a Digital UNIX Server, see Section 4.12.5.1. To boot from an ULTRIX server, see Section 4.12.5.2.

4.12.5.1 Booting from a Digital UNIX Server

Use the `show device` command to determine which network adapter (such as `ewa` or `era`) is in use:

```
>>> show device
```

Output similar to the following is displayed by the `show device` command:

dka400.4.0.6.0	DKA400	RRD43 2893
dva0.0.0.0.1	DVA0	
ewa0.0.0.13.0	EWA0	08-00-2B-3E-B6-C8
pka0.7.0.6.0	PKA0	SCSI Bus ID 7

Use the following command syntax to boot your system over the network:

```
set device_inet_init bootp
set device_protocols bootp
```

For example, if the device you are booting from with the `bootp` protocol is `ewa0`, enter the following commands:

```
>>> set ewa0_inet_init bootp
>>> set ewa0_protocols bootp
>>> boot -fi "" ewa0
```

You have completed booting your system. Continue the installation procedure with Chapter 5.

4.12.5.2 Booting from an ULTRIX Server

Use the `show device` command to determine which network adapter is in use. The network adapter has a value such as `ewa0` or `era0`.

```
>>> show device
```

Output similar to the following is displayed by the `show device` command:

dka400.4.0.6.0	DKA400	RRD43 2893
dva0.0.0.0.1	DVA0	
ewa0.0.0.13.0	EWA0	08-00-2B-3E-B6-C8
pka0.7.0.6.0	PKA0	SCSI Bus ID 7

Use the following command syntax to boot your system over the network:

```
set device_protocols mop
```

For example, if the device you are booting from with the `mop` protocol is

ewa0, enter the following command:

```
>>> set ewa0_protocols mop
>>> boot -fi "" ewa0
```

You have completed booting your system. Continue the installation procedure with Chapter 5.

4.13 AXPvme 64, AXPvme 100, AXPvme 160, AXPvme 166, and AXPvme 230 Single-Board Computers (SBCs)

This section provides instructions for booting AXPvme 64, AXPvme 100, AXPvme 160, AXPvme 166, and AXPvme 230 single-board computers.

4.13.1 Setting the Console Flags

Before starting the boot procedure, complete the following steps:

1. Clear the `boot_osflags` variable. This ensures that the correct kernel file boots automatically.

```
>>> set boot_osflags
```

2. Set the `auto_action` variable to `halt`. This halts the SBC at the console prompt each time the SBC is turned on, when the SBC crashes, or when you press the Halt button.

```
>>> set auto_action halt
```

3. Set the `boot_file` variable. This ensures that an alternate boot file is not set.

```
>>> set boot_file
```

4.13.2 Booting from the CD-ROM Optical Disc Kit

Follow these steps to boot the AXPvme 64, AXPvme 100, AXPvme 160, AXPvme 166, and AXPvme 230 single-board computers from a CD-ROM optical disc:

1. Insert the CD-ROM optical disc labeled *Digital UNIX V3.2C Operating System (formerly DEC OSF/1) Disc 1 of 2*.
2. Enter the following command to determine the unit number of the drive

for your device:

```
>>> show device
```

Output similar to the following is displayed by the `show device` command:

dka200.2.0.2.0	DKA200	RZ26 T392
dka400.4.0.2.0	DKA400	RRD42 4.5d
ewa0.0.0.1.0	EWA0	08-00-2B-39-88-3A
pka0.7.0.2.0	PKA0	SCSI Bus ID 7

3. When the device table is displayed, look for the line with the CD-ROM device string RRD43. The device boot string for your system appears in that same line. The device boot string begins with the letters DKA.
4. Enter the `boot` command and the appropriate boot device string for your system. For example:

```
>>> boot DKA400
```

For more information about the `show device` and `boot` commands, see the hardware documentation that comes with your system.

4.13.3 Booting from the Network

To boot your SBC over the network, make sure it is registered as a client on a RIS server. Refer to *Sharing Software on a Local Area Network* for information on registering a client. Note that the client must be on the same subnet as the server.

Set your device protocols to boot from either a Digital UNIX server or an ULTRIX server.

4.13.3.1 Booting from a Digital UNIX Server

Use the `show device` command to determine which network adapter is in use. The network adapter will have a value such as `ewa0` or `era0`.

```
>>> show device
```

Output similar to the following is displayed by the `show device` command:

dka200.2.0.2.0	DKA200	RZ26 T392
dka400.4.0.2.0	DKA400	RRD42 4.5d
ewa0.0.0.1.0	EWA0	08-00-2B-39-88-3A
pka0.7.0.2.0	PKA0	SCSI Bus ID 7

Use the following command syntax to boot your system over the network:

```
set device_inet_init bootp
set device_protocols bootp
```

For example, if the device you are booting from with the bootp protocol is

ewa0, enter the following commands:

```
>>> set ewa0_inet_init bootp
>>> set ewa0_protocols bootp
>>> boot ewa0
```

You have completed booting your system. Continue the installation procedure with Chapter 5.

4.13.3.2 Booting from an ULTRIX Server

Use the `show device` command to determine which network adapter is in use. The network adapter will have a value such as `ewa0` or `era0`.

```
>>> show device
```

Output similar to the following is displayed by the `show device` command:

dka200.2.0.2.0	DKA200	RZ26 T392
dka400.4.0.2.0	DKA400	RRD42 4.5d
ewa0.0.0.1.0	EWA0	08-00-2B-39-88-3A
pka0.7.0.2.0	PKA0	SCSI Bus ID 7

Use the following command syntax to boot your system over the network:

```
set device_protocols mop
```

For example, if the device you are booting from with the mop protocol is `ewa0`, enter the following command:

```
>>> set ewa0_protocols mop
>>> boot ewa0
```

You have completed booting your system. Continue the installation procedure with Chapter 5.

4.14 AXPpci 33 Single Board Computer (SBC)

This section provides instructions for booting an AXPpci 33 single-board computer.

4.14.1 Setting the Console Flags

Before starting the boot procedure on an AXPpci 33 single-board computer, complete the following steps:

1. Clear the `boot_osflags` variable. This ensures that the correct kernel

file boots automatically.

```
>>> set boot_osflags
```

2. Set the `auto_action` variable to `halt`. This halts the SBC at the console prompt each time it is turned on, when it crashes, or when you press the Halt button.

```
>>> set auto_action halt
```

3. Set the `boot_file` variable. This ensures that an alternate boot file is not set.

```
>>> set boot_file
```

4.14.2 Booting from the CD-ROM Optical Disc Kit

Follow these steps to boot the AXPpci 33 single-board computer from a CD-ROM optical disc:

1. Insert the CD-ROM optical disc labeled *Digital UNIX V3.2C Operating System (formerly DEC OSF/1) Disc 1 of 2*.
2. Enter the following command to determine the unit number of the drive for your device:

```
>>> show device
```

Output similar to the following is displayed by the `show device` command:

dka200.2.0.2.0	DKA200	RZ26 T392
dka400.4.0.2.0	DKA400	RRD42 4.5d
ewa0.0.0.1.0	EWA0	08-00-2B-39-88-3A
pka0.7.0.2.0	PKA0	SCSI Bus ID 7

3. When the device table is displayed, look for the line with the CD-ROM device string `RRD43`. The device boot string for your system appears in that same line. The device boot string begins with the letters `DKA`.
4. Enter the `boot` command and the appropriate boot device string for your system. For example:

```
>>> boot DKA400
```

For more information about the `show device` and `boot` commands, see the hardware documentation that comes with your system.

4.14.3 Booting from the Network

To boot your AXPpci 33 SBC over the network, make sure it is registered as a client on a RIS server. Refer to *Sharing Software on a Local Area Network* for information on registering a client. The client must be on the

same subnet as the server. Set your device protocols to boot from either a Digital UNIX server or an ULTRIX server.

4.14.3.1 Booting from a Digital UNIX Server

Use the `show device` command to determine which network adapter is in use. The network adapter will have a value such as `ewa0` or `era0`.

```
>>> show device
```

Output similar to the following is displayed by the `show device` command:

dka200.2.0.2.0	DKA200	RZ26 T392
dka400.4.0.2.0	DKA400	RRD42 4.5d
ewa0.0.0.1.0	EWA0	08-00-2B-39-88-3A
pka0.7.0.2.0	PKA0	SCSI Bus ID 7

Use the following command syntax to boot your system over the network:

```
set device_inet_init bootp
set device_protocols bootp
```

For example, if the device you are booting from with the bootp protocol is `ewa0`, enter the following commands:

```
>>> set ewa0_inet_init bootp
>>> set ewa0_protocols bootp
>>> boot ewa0
```

You have completed booting your system. Continue the installation procedure with Chapter 5.

4.14.3.2 Booting from an ULTRIX Server

Use the `show device` command to determine which network adapter is in use. The network adapter will have a value such as `ewa0` or `era0`.

```
>>> show device
```

Output similar to the following is displayed by the `show device` command:

dka200.2.0.2.0	DKA200	RZ26 T392
dka400.4.0.2.0	DKA400	RRD42 4.5d
ewa0.0.0.1.0	EWA0	08-00-2B-39-88-3A
pka0.7.0.2.0	PKA0	SCSI Bus ID 7

Use the following command syntax to boot your system over the network:

```
set device_protocols mop
```

For example, if the device you are booting from with the mop protocol is

ewa0, enter the following command:

```
>>> set ewa0_protocols mop
>>> boot ewa0
```

You have completed booting your system. Continue the installation procedure with Chapter 5.

4.14.4 Booting Considerations

Debugging information printed during the system boot phase may cause the internal ring message buffer to be overwritten. This results in not all messages being saved in the `/usr/var/adm/syslog.dated` directory.

4.14.5 Booting from a PCI Tulip or ISA LeMAC Ethernet Card

To boot over the DE435 (PCI TULIP) Ethernet card using `bootp` protocol, enter the following sequence of command after you have configured your boot server:

```
>>> set ewa0_inet_init bootp
>>> set ewa0_protocols bootp
>>> boot ewa0
```

Similarly, when using DE205 (ISA LeMAC) Ethernet card, enter the following sequence of commands:

```
>>> set ena0_inet_init bootp
>>> set ena0_protocols bootp
>>> boot ena0
```

4.15 AlphaPC64, EB64+, EB66+, and EB164 Single-Board Computers

This section provides instructions for booting AlphaPC64, EB64+, EB66+, and EB164 single-board computers (SBCs).

4.15.1 Setting the Console Flags

Before starting the boot procedure on AlphaPC64, EB64+, EB66+, and EB164 SBCs, complete the following steps:

1. Clear the `boot_osflags` variable. This ensures that the correct kernel

file boots automatically.

```
>>> set boot_osflags
```

2. Set the `auto_action` variable to `halt`. This halts the SBC at the console prompt each time it is turned on, when it crashes, or when you press the Halt button.

```
>>> set auto_action halt
```

3. Set the `boot_file` variable. This ensures that an alternate boot file is not set.

```
>>> set boot_file
```

4.15.2 Booting from the CD-ROM Optical Disc Kit

Follow these steps to boot AlphaPC64, EB64+, EB66+, and EB164 single-board computers from a CD-ROM optical disc:

1. Insert the CD-ROM optical disc labeled *Digital UNIX V3.2C Operating System (formerly DEC OSF/1) Disc 1 of 2*.
2. Enter the following command to determine the unit number of the drive for your device:

```
>>> show device
```

Output similar to the following is displayed by the `show device` command:

dka400.4.0.6.0	DKA400	RRD43	2893
dva0.0.0.0.1	DVA0		
ewa0.0.0.13.0	EWA0	08-00-2B-3E-B6-C8	
pka0.7.0.6.0	PKA0	SCSI Bus ID 7	

3. When the device table is displayed, look for the line with the CD-ROM device string `RRD43`. The device boot string for your system appears in that same line. The device boot string begins with the letters `DKA`.
4. Enter the `boot` command and the appropriate boot device string for your system. For example:

```
>>> boot DKA400
```

For more information about the `show device` and `boot` commands, see the hardware documentation that comes with your system.

4.15.3 Booting from the Network

To boot your AlphaPC64, EB64+, EB66+, and EB164 SBC over the network, make sure it is registered as a client on a RIS server. Refer to *Sharing Software on a Local Area Network* for information on registering a

client. The client must be on the same subnet as the server. Set your device protocols to boot from either a Digital UNIX server or an ULTRIX server.

4.15.3.1 Booting from a Digital UNIX Server

Use the `show device` command to determine which network adapter is in use. The network adapter will have a value such as `ewa0` or `era0`.

```
>>> show device
```

Output similar to the following is displayed by the `show device` command:

dka200.2.0.2.0	DKA200	RZ26 T392
dka400.4.0.2.0	DKA400	RRD42 4.5d
ewa0.0.0.1.0	EWA0	08-00-2B-39-88-3A
pka0.7.0.2.0	PKA0	SCSI Bus ID 7

Use the following command syntax to boot your system over the network:

```
set device_inet_init bootp
set device_protocols bootp
```

For example, if the device you are booting from with the bootp protocol is `ewa0`, enter the following commands:

```
>>> set ewa0_inet_init bootp
>>> set ewa0_protocols bootp
>>> boot ewa0
```

You have completed booting your system. Continue the installation procedure with Chapter 5.

4.15.3.2 Booting from an ULTRIX Server

Use the `show device` command to determine which network adapter is in use. The network adapter will have a value such as `ewa0` or `era0`.

```
>>> show device
```

Output similar to the following is displayed by the `show device` command:

dka200.2.0.2.0	DKA200	RZ26 T392
dka400.4.0.2.0	DKA400	RRD42 4.5d
ewa0.0.0.1.0	EWA0	08-00-2B-39-88-3A
pka0.7.0.2.0	PKA0	SCSI Bus ID 7

Use the following command syntax to boot your system over the network:

```
set device_protocols mop
```

For example, if the device you are booting from with the mop protocol is

ewa0, enter the following command:

```
>>> set ewa0_protocols mop
>>> boot ewa0
```

You have completed booting your system. Continue the installation procedure with Chapter 5.

4.16 DEC 2000 Series Processors

The following sections describe how to boot the DEC 2000 processor from a CD-ROM optical disc and from the network.

4.16.1 Firmware Requirements

The minimum required firmware revision for the DEC 2000 series processor is Version 1.6. You must also have the correct firmware for the Adaptec EISA cards on your system. For Digital UNIX to run correctly, the Adaptec AHA1742A and AHA1740A SCSI EISA cards must have firmware with a ROM revision of G.2 or later.

Using the SRM console to determine the correct firmware revision, enter the following command:

```
>>> show config
```

A message similar to the following will be displayed:

```
This 1MB Flash contains VERSION 1.4 DEC 2000 Model 300 AXP console code
```

To determine the Adaptec SCSI EISA card firmware revision, enter the following command:

```
>>> show device
```

The device listing on your screen will contain a line similar to the following:

```
Host A/7/0 PROC AHA1742A G.2
```

Refer to Section 4.1 if you need to obtain updated revisions of the firmware.

4.16.2 Running the EISA Configuration Utility

Before installing Digital UNIX Version 3.2C you may need to run the EISA Configuration Utility (ECU) if the following conditions are true:

- This is a first-time installation of Digital UNIX.
- You have changed the configuration of the machine by adding, removing, or relocating an EISA or ISA option card.
- You have upgraded your firmware.

Consult your hardware documentation for information on running the ECU.

4.16.3 Setting the Console Flags

Before starting the boot procedure, enter the following commands. Each command is echoed by the system when you press Return:

1. Clear the `boot_osflags` variable. This ensures that the correct kernel file boots automatically.

```
>>> set boot_osflags ""
```

2. Set the `auto_action` variable to `halt`. This halts the system at the console prompt each time the system is turned on, when the system crashes, or when you press the Halt button.

```
>>> set auto_action halt
```

3. Set the keyboard variable to match the keyboard type on the system.

```
>>> set keyboard <type>
```

Use the `help set` command to list the available keyboard types.

4.16.4 Booting from the CD-ROM Optical Disc Kit

Place the CD-ROM optical disc into a caddy as described in Appendix A.

Use this procedure to boot the system:

1. Insert the CD-ROM optical disc labeled *Digital UNIX V3.2C Operating System (formerly DEC OSF/1) Disc 1 of 2*.
2. Enter the following command to determine the unit number of the drive for your device:

```
>>> show dev
```

The following information is displayed about the devices on your system:

BOOTDEV	ADDR	DEVTYPE	RM/FX	DEVNAM	REV	NUMBYTES
-----	----	-----	-----	-----	---	-----
EZ0A	08-00-2B-38-A1-92					
FD0	PC Floppy	DISK	RM			
SCSI Devices..						
DKA200	A/2/0	DISK	FX	RZ25	0700	426.25MB
DKA400	A/4/0	RODISK	RM	RRD43	4.5d
DKA500	A/5/0	DISK	FX	RZ25L	0006	535.65MB
DKA600	A/6/0	DISK	FX	RZ28	435E	2.10GB
HOST	A/7/0	PROC		AHA1742A	G.2	

The numbers under `BOOTDEV` represent the unit number assigned to each drive on your system:

- The letters `DK` refer to a SCSI disk device.
- The letters `MK` refer to a SCSI magnetic tape device.

- The third letter (A or B) refers to the SCSI bus designation. Refer to your hardware owner's guide for more details.
 - The number refers to the drive number.
3. Enter the `boot` command with the following syntax to boot from a CD-ROM. In the previous display from the `show dev` command, the CD-ROM device is listed under the column `DEVNAM` as `RRD43` and under `BOOTDEV` as `DKA400`.

boot device

For example, to boot the system from CD-ROM drive number 4, enter the following command:

```
>>> b dka400
```

You have completed booting your system. Continue the installation procedure with Chapter 5.

4.16.5 Booting from the Network

To boot your system from the network, make sure it is registered as a client on a RIS server. Refer to *Sharing Software on a Local Area Network* for information on registering a client. The client must be on the same subnet as the server.

4.16.5.1 Booting from a Digital UNIX Server

When booting from a Digital UNIX server, the system uses the `bootp` protocol. Enter the following command to boot your system over the network:

```
>>> boot ez0
```

Some system information, the memory and hardware configurations, and the Installation menu from which you choose the type of installation to perform is displayed.

If your initial network boot fails, enter `init` at the console prompt. If you encounter other problems during the RIS install, refer to *Sharing Software on a Local Area Network*.

You have completed booting your system. Continue the installation procedure with Chapter 5.

4.16.5.2 Booting from an ULTRIX Server

If you are booting from an ULTRIX server, the network uses the mop protocol.

Enter the following command to boot your system over the network:

```
>>> boot era0
```

Some system information is displayed by the installation software followed by the memory and hardware configurations.

If your initial network boot fails, enter `init` at the console prompt. If you encounter other problems during the RIS installation, refer to *Sharing Software on a Local Area Network*.

You have completed booting your system. Continue the installation procedure with Chapter 5.

4.17 DEC 3000 Series Processors

The following sections describe how to boot the DEC 3000 series processor from a CD-ROM optical disc and from the network.

4.17.1 Setting the Console Flags

Before starting the boot procedure, enter the following commands. Each command is echoed by the system when you press Return:

1. Clear the `boot_osflags` variable. This ensures that the correct kernel file boots automatically.

```
>>> set boot_osflags ""
```

2. Set the `auto_action` variable to `halt`. This halts the system at the console prompt each time the system is turned on, when the system crashes, or when you press the Halt button.

```
>>> set auto_action halt
```

3. Set the `boot_reset` variable to `on`. This ensures that all devices are initialized prior to booting.

```
>>> set boot_reset on
```

4. Set the `scsi_reset` variable to 4. This ensures that all devices have adequate time to initialize during the boot sequence.

```
>>> set scsi_reset 4
```

4.17.2 Booting from the CD-ROM Optical Disc Kit

Place the CD-ROM optical disc into a caddy as described in Appendix A.

Use the following procedure to boot the system:

1. Insert the CD-ROM optical disc labeled *Digital UNIX V3.2C Operating System (formerly DEC OSF/1) Disc 1 of 2*.
2. Enter the following command to determine the unit number of the drive for your device:

```
>>> show dev
```

The output of the `show dev` command displays information about the devices on your system:

BOOTDEV	ADDR	DEVTYPE	NUMBYTES	RM/FX	WP	DEVNAM	REV
DKA0	A/0/0	DISK	426.25MB	FX		RZ25	0700
DKA200	A/2/0	DISK	426.25MB	FX		RZ25	0700
DKA400	A/4/0	DISK	RM	WP	RRD42	4.3d
MKA500	A/5/0	TAPE		RM		TZK10	01B4
MKB500	B/5/0	TAPE		RM		TLZ04	

The numbers under `BOOTDEV` represent the unit number assigned to each drive on your system:

- The letters `DK` refer to a SCSI disk device.
 - The letters `MK` refer to a SCSI magnetic tape device.
 - The third letter (`A` or `B`) refers to the SCSI bus designation. Refer to your hardware owner's guide for more details.
 - The number refers to the drive number.
3. Enter the `boot` command with the following syntax to boot from a CD-ROM. In the display from the previous `show dev` command entered, the CD-ROM device is listed under the column `DEVNAM` as `RRD42` and under the `BOOTDEV` column as `DKA400`.

boot device

For example, to boot the system from CD-ROM drive number 4, enter the following command:

```
>>> b dka400
```

You have completed booting your system. Continue the installation procedure with Chapter 5.

4.17.3 Booting from the Network

To boot your system from the network, make sure it is registered as a client on a RIS server. Refer to *Sharing Software on a Local Area Network* for information on registering a client. The client must be on the same subnet as the server.

4.17.3.1 Booting from a Digital UNIX Server

When booting from a Digital UNIX server, the system uses the `bootp` protocol. Enter the following command to boot your system over the network:

```
>>> boot ez0
```

Some system information is displayed by the installation software followed by the memory and hardware configurations.

If your initial network boot fails, enter `init` at the console prompt. If you encounter other problems during the RIS install, refer to *Sharing Software on a Local Area Network*.

You have completed booting your system. Continue the installation procedure with Chapter 5.

4.17.4 Booting from the SCSI TURBOchannel Option Card

To boot from the dual SCSI TURBOchannel option card (PMAZB or PMAZC), complete the following steps:

1. Determine which controllers and devices are configured on your system by entering the following command at the console prompt:

```
>>> show conf
```

Your system displays output similar to the following (the output differs depending on your system configuration):

```
DEC 3000 - M500
Digital Equipment Corporation
VPP PAL X5.37-82000101/OSF PAL X1.28-82000201 -
Built on 03-JAN-1995 13:39:58.02
```

TCINFO	DEVNAM	DEVSTAT
-----	-----	-----
CPU	OK KN15-AA	-V2.0-S1F4-I039-sV1.0-DECchip 21064
P3.0		
ASIC	OK	
MEM	OK	
8		
CXT	OK	
7		
NVR	OK	
SCC	OK	
NI	OK	

```

        ISDN    OK
6
        SCSI    OK
3-PMAF-AA    TC3
2-PMAZ-AA    TC2
1-PMAZB-AA   TC1
0-PMTNV-AA   TC0

```

The numbers under the TCINFO column (and the entries in the DEVNAM column) represent the unit number assigned to the PMAZB or PMAZC option card.

2. Determine the number of your boot device by entering a command with the following syntax:

t tc_slot_number cnfg

For example, to determine the device number of a disk on a PMAZB option card, enter the following command:

```
>> t tc1 cnfg
```

A table similar to the following is displayed:

DEC	PMAZB-AA	V1.0	(Dual SCSI [53C96])				
BOOTDEV	ADDR	DEVTYPE	NUMBYTES	RM/FX	WP	DEVNAM	REV
-----	----	-----	-----	-----	--	-----	----
DKA200 (rz200A)	A/2/0	DISK	426MB	FX		RZ25	0700
DKA400 (rz400A)	A/4/0	RODISK	409MB	RM	WP	RRD42	4.3d

To boot from the PMAZB (or PMAZC) option card, enter the `boot` command with the following syntax:

boot "slot_number/device_number"

For example, to boot from disk number 4 on the PMAZB option card located in slot 1, enter the following command:

```
>>> b "1/dka400"
```

You have completed booting your system. Continue the installation procedure with Chapter 5.

4.17.5 Booting from an FDDI Network Interface

Booting over an FDDI network interface is supported for DEFTA and CRE-DEFTA devices.

To boot from an FDDI network interface device, find the device names as described in Section 4.17.4. For example, a DEFTA device appears as "PMAF-FA" when you use the `show conf` command. Identify the slot number and use one of the following commands, depending on the type of server that is required:

1. To boot from a Digital UNIX server using the `bootp` protocol, enter the following command:

```
>>> b "1/ez0"
```

2. To boot from an ULTRIX server using the `mop` protocol, enter the following command:

```
>>> b "1/esa0"
```

You have completed booting your system. Continue the installation procedure with Chapter 5.

4.18 DEC 4000 Series Processors

The following sections describe how to boot the DEC 4000 processor from a CD-ROM optical disc and from the network.

4.18.1 Setting the Console Flags

Before starting the boot procedure, complete the following steps:

1. Clear the `boot_osflags` variable. This ensures that the correct kernel file boots automatically.

```
>>> set boot_osflags ""
```

2. Set the `auto_action` variable to `halt`. This halts the system at the console prompt each time the system is turned on, when the system crashes, or when you press the Halt button.

```
>>> set auto_action halt
```

4.18.2 Booting from the CD-ROM Optical Disc Kit

If your CD-ROM optical disc is not already in a caddy, follow the instructions in Appendix A.

Use the following procedure to boot the system:

1. Insert the CD-ROM optical disc labeled *Digital UNIX V3.2C Operating System (formerly DEC OSF/1) Disc 1 of 2*.
2. Enter the following command to determine the unit number of the drive for your device:

```
>>> show dev
```

A device information table similar to the following is displayed:

dka0.0.0.0.0	DKA0	RZ73
dkb0.0.0.1.0	DKB0	RZ73
dkc0.0.0.2.0	DKC0	RZ26
dkc100.1.0.2.0	DKC100	RZ26
dkc200.2.0.2.0	DKC200	RZ26
dkc300.3.0.2.0	DKC300	RZ26
dke100.1.0.4.0	DKE100	RRD42
mka500.0.0.0.0	MKA500	TLZ04
mke0.0.0.4.0	MKE0	TZ85
eza0.0.0.6.0	EZA0	08-00-2B-2C-CE-DE
ezb0.0.0.7.0	EZB0	08-00-2B-2C-CE-DF
p_d0.7.0.3.0		Bus ID 7
pka0.7.0.0.0	PKA0	SCSI Bus ID 7
pkb0.7.0.1.0	PKB0	SCSI Bus ID 7
pkc0.7.0.2.0	PKC0	SCSI Bus ID 7
pke0.7.0.4.0	PKE0	SCSI Bus ID 7

The middle column shows the numbers assigned to each drive:

- The letters DK refer to a SCSI disk or CD-ROM device.
- The letters MK refer to a SCSI magnetic tape device.
- The third letter (A, B, C, D, or E) refers to the SCSI or DSA bus designation. Refer to your hardware owner's guide for more details.
- The number refers to the drive number.

3. Enter the `init` command with the following syntax:

```
>>> init
```

4. Enter the `boot` command with the following syntax to boot from a CD-ROM:

boot device

For example, to boot the system from CD-ROM drive number 1, enter the following command:

```
>>> boot dke100
```

Output similar to the following is displayed:

```
(boot dke100.1.0.4.0)
block 0 of dke100.1.0.4.0 is a valid boot block
reading 16 blocks from dke100.1.0.4.0
bootstrap code read in
base = 1ee000, image_start = 0, image_bytes = 2000
initializing HWRPB at 2000
initializing page table at 1e0000
initializing machine state
setting affinity to the primary CPU
jumping to bootstrap code

OSF boot - Wed Jul  5 15:49:49 EDT 1995
```

You have completed booting your system. Continue the installation procedure with Chapter 5.

4.18.3 Booting from the Network

To boot your system over the network, make sure it is registered as a client on a RIS server. Refer to *Sharing Software on a Local Area Network* for information on registering a client. The client must be on the same subnet as the server.

The `device` parameter is the network device from which you want to boot. The DEC 4000 processor supports two network adapters: `eza0` and `ezb0`.

Set your device protocols to boot from either a Digital UNIX server or an ULTRIX server.

4.18.3.1 Booting from a Digital UNIX Server

Use the following command syntax to boot your system over the network:

set device_protocols bootp

For example, if the device you are booting from with the `bootp` protocol is `eza0`, enter the following commands:

```
>>> set eza0_protocols bootp
>>> boot eza0
```

You can override a previously set boot protocol. For example, if your system was previously set to use the `mop` boot protocol, you can overwrite it and use the `bootp` protocol by entering the following command:

```
>>> boot eza0 -pro bootp
```

Some system information is displayed by the installation software followed by the memory and hardware configurations.

If your initial network boot fails, enter `init` at the console prompt. If you encounter other problems during the RIS installation, refer to *Sharing Software on a Local Area Network*.

You have completed booting your system. Continue the installation procedure with Chapter 5.

4.18.3.2 Booting from an ULTRIX Server

If you are booting from an ULTRIX server, use the following command syntax:

set device_protocols mop

For example, if the device you are booting from with the `mop` protocol is

eza0, enter the following commands:

```
>>> set eza0_protocols mop
>>> boot eza0
```

If your initial network boot fails, enter `init` at the console prompt. If you encounter other problems during the RIS installation, refer to *Sharing Software on a Local Area Network*.

Some system information is displayed by the installation software followed by the memory and hardware configurations.

You have completed booting your system. Continue the installation procedure with Chapter 5.

4.18.4 Prestoserve Option

The following instructions apply to DEC 4000 systems equipped with the Prestoserve option.

4.18.4.1 Firmware Requirements

The minimum firmware revision is Version 3.5. To determine which revision is on your system, enter the following command:

```
>>> show conf
```

A display similar to the following will appear:

```
DEC 4000 (tm) console V3.5.....
```

4.18.4.2 The prcache Command

The DEC 4000 system console provides the `prcache` command to support the Prestoserve option (NVRAM). Refer to the hardware documentation for a description of this command.

You have completed booting your system. Continue the installation procedure with Chapter 5.

4.19 DEC 7000 and DEC 10000 Series Processors

The following sections describe how to boot the DEC 7000 processor and DEC 10000 processor from a CD-ROM optical disc.

4.19.1 Setting the Console Flags

Before starting the boot procedure, complete the following steps:

1. Clear the `boot_osflags` variable. This ensures that the correct kernel

file boots automatically.

```
>>> set boot_osflags ""
```

2. Set the `auto_action` variable to `halt`. This halts the system at the console prompt each time the system is turned on, when the system crashes, or when you press the Halt button.

```
>>> set auto_action halt
```

3. Set the `boot_reset` variable to `on`. This must be done if you need to reboot the generic kernel (`genvmunix`) at any time to reconfigure your system for additional peripherals.

```
>>> set boot_reset on
```

4.19.2 Booting from the CD-ROM Optical Disc Kit

If your CD-ROM optical disc is not already in a caddy, follow the instructions in Appendix A.

Use the following procedure to boot the system:

1. Insert the CD-ROM optical disc labeled *Digital UNIX V3.2C Operating System (formerly DEC OSF/1) Disc 1 of 2*.
2. Enter the following command to determine the unit number of the drive for your device:

```
>>> show dev
```

Output similar to the following is displayed:

dka0.0.0.5.0	DKA0	RZ73
dkb4.4.1.14.0	DKB400	RRD43

The numbers in the middle column are the unit numbers assigned to each drive on your system:

- The letters DK refer to a SCSI CD-ROM or disk device.
 - The third letter (A, B, C, D, or E) refers to the SCSI bus designation. Refer to your hardware owner's guide for more details.
 - The numbers refer to the drive number.
3. Enter the `boot` command with the following syntax to boot from a CD-ROM:

boot *device-number*

For example, to boot the system from CD-ROM drive number 4, enter:

```
>>> boot dkb400
```

Output similar to the following is displayed:

```
Initializing...

F  E  D  C  B  A  9  8  7  6  5  4  3  2  1  0  NODE #
      A  M  M  .  .  .  .  .  P  TYP
      O  +  +  .  .  .  .  .  +  ST1
      .  .  .  .  .  .  .  .  B  BPD
      O  +  +  .  .  .  .  .  +  ST2
      .  .  .  .  .  .  .  .  B  BPD
      +  +  +  .  .  .  .  .  +  ST3
      .  .  .  .  .  .  .  .  B  BPD

+  .  +  .  +  .  +  .  .  +  .  .  .  .  C0 XMI +

      .  A0  B0  .  .  .  .  .  LV
      . 256 64  .  .  .  .  . 320Mb

Firmware Rev = V2.3  SROM Rev = V2.0  SYS SN = GA12345678

Booting...
Connecting to boot device dkb400
.
.
.
```

You have completed booting your system. Continue the installation procedure with Chapter 5.

4.19.3 Booting from the Network

Booting from the network is not supported for the DEC 7000 and DEC 10000 processors.

Performing a Basic or Advanced Installation **5**

This chapter describes how to perform the basic and advanced full installations.

Whether you are performing a basic or an advanced installation, you need to complete the tasks described in Section 5.5 through Section 5.8. Up to that point, the basic and advanced installations follow similar paths by requiring you to specify a system disk and reboot the system. After Section 5.8, the installation procedures diverge.

Review Chapter 1 to understand what is offered with each type of installation. Remember that neither the basic nor advanced installation preserves system customizations (that is, user or data files) because the `root`, `usr`, and `var` file systems are destroyed (overwritten) during the process.

If you intend to perform the advanced installation, and want to select your own disk partitions, review Chapter 3 to verify that you have enough disk space and that the disk partitions meet your needs. Refer to Table 3-2 and Table 3-5 for this information. Refer to Appendix H for a sample basic installation log file and Appendix I for a sample advanced installation log file.

Throughout the installation procedure you are prompted for information about the installation. Some prompts have a default response that is shown by brackets surrounding a letter, for example, `[Y]`. Press the Return key to accept the default response or enter the letter that corresponds to the option you want. If there is no default response, enter the appropriate option number or letter at the prompt and press the Return key.

Note

The following messages are displayed when rebooting the kernel during the initial phase of the installation and can be ignored:

```
vm_swap_init: warning /sbin/swapdefault swap device not found
vm_swap_init: in swap over commitment mode
```

The Digital UNIX installation procedure checks for the amount of memory on a system, and if it is 24 MB, the recommended system configuration changes are made transparently. You can choose either the basic or advanced installation when installing on a low end workstation. Systems with less than

32 MB of memory are not provided with the option to select the Advanced File System (AdvFS) as the file system type for `/root`, `/usr` or `/var`.

The basic installation is recommended for systems with limited disk space and memory (less than 32 MB of memory). Optional subsets can be installed later by using the `setld` command.

5.1 Preparing for a Full Installation if Using LSM

Read this section only if your system is installed with and using the Logical Storage Manager (LSM) and you are performing a full installation.

The following steps should be performed to preserve the LSM configuration currently in use on a system. Steps 2 and 4 are not necessary when performing an update installation because the update preserves the LSM `volboot` file in the `root` file system.

1. Check the `/etc/vol/volboot` file to ensure that it contains valid LSM disks. Enter the following command to list the current disks in `/etc/vol/volboot`

```
# voldctl list
```
2. Create a backup copy of the `/etc/vol/volboot` file. The backup copy of `/etc/vol/volboot` must be restored after the installation is complete. The backup copy should be created on a separate file system that is not located in either the `root` `/usr` or `/var` file systems because a full installation destroys (overwrites) those three file systems. In the following example, `/backup` is a separate file system:

```
# mkdir /backup/lsm
# cp /etc/vol/volboot /backup/lsm/volboot
```

3. If the `root` file system and primary swap device were encapsulated to use LSM volumes `rootvol` and `swapvol` respectively, the volumes `rootvol` and `swapvol` should be removed before a full installation. If the `/usr` and `/var` file systems were encapsulated to LSM volumes, they should also be removed from the LSM configuration before a full installation. Unencapsulating volumes used for `root`, `swap`, `/usr` and `/var` is not necessary for update installations.

Consider the following LSM configuration with mirrored `rootvol` and `swapvol`. The `/usr` file system is also encapsulated to use the LSM volume `volrz10g`:

v	rootvol	root	ENABLED	ACTIVE	131072	ROUND	-	
pl	rootvol-01	rootvol	ENABLED	ACTIVE	131072	CONCAT	-	RW
sd	rz10-01	rootvol-01	0	131056	16	rz10	rz10	
sd	rz10-02	rootvol-01	16	0	131056	rz10	rz10	
pl	rootvol-02	rootvol	ENABLED	ACTIVE	131072	CONCAT	-	RW
sd	rz14-01	rootvol-02	0	131056	16	rz14	rz14	
sd	rz14-02	rootvol-02	16	0	131056	rz14	rz14	


```

v swapvol swap ENABLED ACTIVE 400880 ROUND
pl swapvol-01 swapvol ENABLED ACTIVE 400880 CONCAT - RW
sd rz10b-01 swapvol-01 0 0 400880 rz10b rz10b
pl swapvol-02 swapvol ENABLED ACTIVE 400880 CONCAT - RW
sd rz14b-01 swapvol-02 0 0 400880 rz14b rz14b

v volusr fsgen ENABLED ACTIVE 1787904 SELECT -
pl volusr-01 volusr ENABLED ACTIVE 1787904 CONCAT - RW
sd advfs_rz10g-01 volrz10g-01 0 0 1787904 advfs_rz10g rz10g
pl volusr-02 volusr ENABLED ACTIVE 1787904 CONCAT - RW
sd advfs_rz14g-01 volrz10g-02 0 0 1787904 advfs_rz14g rz14g

```

Perform the following steps to remove the use of the LSM volumes for root, swap, and /usr:

- a. Disassociate the second plex in rootvol and swapvol and remove them from the LSM configuration. In this example, the full installation will later be done on rz10:

```

# volplex dis rootvol-02
# volplex dis swapvol-02
# voledit -rf rm rootvol-02 swapvol-02
# voldg rmdisk rz14 rz14b
# voldisk rm rz14 rz14b

```

- b. Execute the /usr/sbin/volunroot command to unencapsulate rootvol and swapvol. This requires a system reboot for the changes to take effect:

```
# /usr/sbin/volunroot
```

Reboot the system at the next available opportunity.

- c. To remove the volumes used for /usr and /var, shut down the system to single-user mode and ensure that the /usr and /var file systems are unmounted. In the previous example, volume volrz10g was used for the /usr file system in the AdvFS domain usr_domain.

Remove the LSM volume volusr from the LSM configuration:

```

# voledit -rf rm volusr
# voldg rmdisk advfs_rz10g advfs_rz14g
# voldisk rm rz10g rz14g

```

Change the /etc/fdmns/usr_domain directory to use /dev/rz10g instead of the LSM volume:

```

# cd /etc/fdmns/usr_domain
# rm volusr
# ln -s /dev/rz10g rz10g

```

If UNIX file systems (UFS) were used instead of Advanced file systems (AdvFS), the /etc/fstab file should be modified to use /dev/rz10g for the /usr file system.

Similar steps for the /var file system are required if LSM volumes

were used.

4. Save the current LSM configuration information for added safety. Create a backup copy of the current LSM configuration. The backup copy should be created on a separate file system that is not located in either the root /usr or /var file systems because a full installation destroys (overwrites) those three file systems. In the following example, /backup is a separate file system:

- a. Save information regarding the disks currently being used with LSM:

```
# voldisk list > /backup/lsm/voldisk.out
```

- b. Save the LSM diskgroup configuration. For example, enter the following command for each LSM diskgroup in the configuration. The backslashes (\) in the following two command lines indicate line continuation and should not be included in the actual command line:

```
# volprint -g rootdg -mvps > \
/backup/lsm/volprint.rootdg.out
```

```
# volprint -g diskgroup-mvps > \
/backup/lsm/volprint.diskgroup.out
```

The backup files created in the previous steps should also be copied to a backup media (i.e., tape) before the installation is started for added safety. These configuration files do not need to be restored under normal circumstances; restoring the /etc/vol/volboot file from backup has sufficient information for the LSM configuration.

5. Perform the installation process as documented in this chapter.
6. After the full installation is complete, restore the backed copies of the LSM volboot file before starting LSM. For example, while in multi-user mode, enter commands similar to the following:

```
# cp /backup/lsm/volboot /etc/vol/volboot
# volinstall
# rm -f /etc/vol/reconfig.d/state.d/install-db
# vol-startup
```

After the full installation, the /usr and /var file systems reside on disk partitions. Separate steps are required to encapsulate the disk partitions to LSM volumes. Before the current /usr and /var file systems can be encapsulated to LSM volumes, a cleanup of the LSM configuration that existed before the full installation has to be done. If either the /usr or /var file systems resided on LSM volumes before the full installation, you will have to clean up these LSM volumes because the LSM volumes will no longer be in use.

Refer to Section 6.11.7 for more details about how to clean up unused LSM volumes. Refer to the *Logical Storage Manager* guide for more information about LSM.

5.2 Preparing for a Full Installation if Using LVM

Read this section only if your system is installed with and using the Logical Volume Manager (LVM) and you are performing a full installation.

The following steps should be performed to preserve the LVM configuration currently in use on a system:

1. Create a backup copy of the LVM configuration. The backup copy should be created on a separate file system that is not located in either the `root` `/usr` or `/var` file systems because a full installation destroys (overwrites) those three file systems. In the following example, `/backup` is a separate file system:

```
# mkdir /backup/lvm
# cp /etc/lvmtab /backup/lvm/lvmtab
```

2. Create a tar file of the LVM special device files. For example, if `vg1` and `vg2` are the two volume groups that are currently in use on the system, execute the following commands:

```
# cd /dev
# tar cf dev.vg1.tar vg1
# tar cf dev.vg2.tar vg2
# cp dev.vg1.tar /backup/lvm/dev.vg1.tar
# cp dev.vg2.tar /backup/lvm/dev.vg2.tar
```

3. Save the current LVM configuration for added safety as shown in the following steps:
 - a. For each LVM volume group in the configuration, enter the following command to back up the volume group information. In this example, `vg1` is the volume group:

```
# vgdisplay -v /dev/vg1 > /backup/lvm/vg1.out
```
 - b. For each logical volume in a volume group, execute the following command to back up the configuration information. In this example, `lv011` is the logical volume and `vg1` is the volume group:

```
# lvdisplay -v /dev/vg1/lv011 > /backup/lvm/vg1.lv011.out
```
 - c. For each physical volume in a volume group, execute the following command to back up the configuration information for each physical volume in the volume group. In this example, `/dev/rz8c` is the physical volume:

```
# pvdisplay -v /dev/rz8c > /backup/lvm/vg1.rz8c.out
```

4. Perform the full installation of Digital UNIX as described in this chapter.
5. After the full installation is complete, restore the copy of `/etc/lvmtab` from the backup media as shown in this example:

```
# cp /backup/lvm/lvmtab /etc/lvmtab
# cd /dev
# cp /backup/lvm/dev.vg1.tar /dev
# cp /backup/lvm/dev.vg2.tar /dev
# tar xvf dev.vg1.tar
# tar xvf dev.vg2.tar
```

Restoring the `/etc/lvmtab` file has sufficient information for a complete LVM configuration. The LVM configuration files that were backed up in Step 2 were backed for added safety and do not have to be restored. LVM volume groups can now be reenabled with the `vgchange` command.

5.3 Preparing for a Full Installation if Using Prestoserve

Read this section only if your system is using Prestoserve and you are performing a full installation.

You must save your current Prestoserve configuration before beginning a full installation because the `root` file system is overwritten during a full installation. To save and restore the Prestoserve configuration, follow these steps:

1. Create a backup copy of the `/etc/prestotab` file. The backup copy should be created on a separate file system that is not located in either the `root`, `/usr`, or `/var` file systems because a full installation destroys (overwrites) those three file systems. In the following example, `/backup` is a separate file system:

```
# mkdir /backup/presto
# cp /etc/prestotab /backup/presto/prestotab
```

2. Perform the full installation of Digital UNIX as described in this chapter.
3. After the full installation is complete, restore the copy of `/etc/prestotab` from the backup as shown in this example:

```
# cp /backup/presto/prestotab /etc/prestotab
```

To configure the prestoserve software, refer to `prestosetup(8)` or `setup(8)` for more information.

5.4 Preparing for a Full Installation if Using AdvFS

If your system is configured with AdvFS, a full installation overwrites the `/etc/fdmns` directory resulting in the loss of critical configuration data. Save a copy of the `/etc/fdmns` directory and all files under the directory before beginning the installation. After installation, restore the directory.

5.5 Choosing the Type of Installation

To begin an installation you must have shut down and booted your processor as described in Chapter 4.

The first step of the procedure is to specify which type of installation you want to perform. After your system boots, brief installation information and a menu similar to the following is displayed:

```
*** STANDALONE SYSTEM ENVIRONMENT ***

Select the BASIC option to install the mandatory
software subsets for your system configuration.

Select the ADVANCED option to display optional
software subsets from a menu and/or customize
system disks and partitions.

Select the SYSTEM MANAGEMENT option to customize disk
partitions on the system disk.

Select one of the following options:

    1) BASIC Installation
    2) ADVANCED Installation
    3) SYSTEM MANAGEMENT
```

Enter your choice:

Enter the option number of the installation type you want to perform and press Return.

If you chose the System Management option, refer to Chapter 7 for more information.

5.6 Choosing the System Disk

The installation procedure requires that you specify a system disk. The system disk contains the `root` file system. The following sections provide information you may need to consider when choosing your system disk. After reading these sections, go to Section 5.7 to choose your system disk from the system disk table.

5.6.1 Disks Used on ULTRIX Systems

Read this section if you intend to use a disk that was previously used on a system running ULTRIX.

During the installation the following message might appear:

```
rz $n$ : using ULTRIX partition info found on disk.
```

In the display, n in the string $rz $n$$ would be replaced by the SCSI drive identifier.

You can ignore this message. The message is informational and notes whether the disk being targeted has ULTRIX partition information.

5.6.2 Disk Labels on Existing System Disks

The disk selected to be the system disk always has a new disk label written to it, regardless of whether one already exists or not. This ensures that a valid bootstrap exists on the disk. Without one, the disk is not bootable.

Before writing a new disk label, the disk is checked for a preexisting disk label. If none is found (typical for a never before used disk), a disk label is written using the default partition information. If a disk label is found, several different scenarios can occur:

- During a basic installation, the default partition information is used and it does not matter if a disk label already exists or contains partition information different from the default partition information.
- During an advanced installation, if no disk label exists, a disk label containing the default partition information is used. If a disk label does exist, its partition information is compared to the default partition information. If they differ, the installer can choose one or the other.

If an existing disk label is selected, it is saved and rewritten to the disk. The new disk label is identical to the previous disk label. If the default disk label is selected, a disk label containing the default partition information is used. If it is determined that the existing disk label had partition information that matched the defaults, a new disk label that contains the default partition information is used.

5.6.2.1 Preserving Data on an Existing System Disk

During an advanced installation, you can choose the partitions on which `root`, `swap`, `usr`, and `var` will be located. If the partitions that contain data to be preserved are chosen during the installation for `root`, `swap`, `usr`, or `var`, the data will be lost. Selecting a partition that overlaps the partitions containing the data to be preserved has the same effect. Also, modifying the partition information in the disk label in such a way that the partitions

containing data have their size and/or offset modified will cause the data to be lost. However, if the partitions containing the data are undisturbed, the contents of them should be recoverable.

Assuming that the partitions to be preserved were undisturbed during the advanced installation, the partitions can be used on the newly installed system. If the partition contained a file system, it should be capable of being mounted and accessed. However, unless the installation used the custom partition information that existed on the disk prior to the installation, the disk label may not correctly show the existence of the preexisting file systems. In situations where the disk label used had the default partition information, the `fstype` field for all partitions is reset to `unused`. Only those partitions selected during the installation will have values different from `unused`. To avoid the confusion that the inaccurate disk label may create, use the following command to edit the disk label and modify the `fstype` field:

```
# disklabel -e
```

You might also need to modify the `fsize`, `bsize`, and `cpg` fields for the partitions. These fields vary depending on the type of file system built on the partition. If you have a copy of the disk label that existed before the installation, you can determine the value of the fields from that label.

5.6.3 Disk Size Restrictions

Disks that do not have partitions large enough to hold the `root` and `/usr` file systems and the `swap1` area are marked with an asterisk next to the entry under the `Software Name` header in the system disk table. This table is explained in Section 5.7. As an example, RZ55 and RZ24L disks have a partitions large enough to contain the root file system, but neither disk has a `g` (or other) partition large enough for the `/usr` file system. Neither disk type is able to hold all file systems and another disk is required.

This is not a problem during advanced installations because you have the opportunity to select different disks and partitions. If you choose to do an advanced installation, you can, for example, use RZ55 and RZ24L disks as required and allocate `/usr` (and other) file systems to other disks and disk partitions on your system. The basic installation uses only default partitions and puts all file systems on a single system disk. Therefore, disk types such as the RZ55 and RZ24L cannot be used for a basic installation.

If you are doing a basic installation, and you try to install on a disk that is too small to hold the root partition, you will see a message similar to the following:

You selected RZ55, device number 10. This device is not supported for BASIC installations.

Select one of the following courses of action:

- 1) Perform ADVANCED installation to rz10
- 2) Select another drive
- 3) Exit the Installation

Enter your choice:

If you select option 1, you can use the advanced installation procedure to allocate partitions on other disks for the `/usr` and other file systems. Review Chapter 1 and read Chapter 3 before you continue with the advanced installation.

Option 2 lets you choose a different disk. You must choose a disk large enough to contain root, swap, and `/usr` to continue the basic install or the same message is repeated. If you have another disk, and you are certain that it has a partition that is large enough to hold the root, swap, and `/usr`, you can choose this option and continue with the installation. Consult Appendix F and Appendix E to ensure that the disk you choose has enough space.

If you need to review the disks available on your system and do some disk planning, select option 3 to exit the installation at this time. Begin the installation again when you have collected the information that you need.

5.7 System Disk Table

The system disk table lists the disks connected and available to your processor. You must choose a disk on this table to be the system disk that will contain the `root` file system. The system disk table lists the following information about each disk:

- Selection number associated with each possible system disk
- Device name for each disk
- Software name for each disk
- Device number of each disk
- Controller name associated with each disk
- Controller number associated with each disk

Note

If a compact disc is present in the CD-ROM drive during a CD-ROM or RIS installation, the CD reader may be listed in the installation menu as a possible target disk. This can happen if the vendor model number does not begin with the letters RRD. All supported Digital CD-ROM drives have the RRD model designation, but other vendor drives may not and may be listed as an installation target. If you select a CD-ROM drive as the installation disk, the installation fails.

The system disk table display is similar to the following; enter the number of the disk where you want to locate the root file system:

```
*** SYSTEM DISK SELECTION ***
```

The Installation Guide explains the following table of system disk drives. Select one of the disks in the table to contain the root file system:

SYSTEM DISK TABLE

Selection	Device Name	Software Name	Device Number	Controller Name	Controller Number
1	RZ26L	rz0	0	SCSI	0
2	RZ26	rz3	3	SCSI	0
3	RZ58	rz8	8	SCSI	1

```
Enter your choice: 3
```

After you enter your selection number, you are asked to make sure the disk drive is on line and write enabled, and to confirm your choice.

```
You selected RZ58, device number 8. Make sure this disk drive
is online and write-enabled (if applicable to your disk drive),
then confirm your choice.
```

```
Use RZ58, rz8, for your system disk? (y/n) []: y
```

If you decide not to use the device you selected, enter n at the prompt. The system redisplays the table and you can reenter your choice.

5.7.1 Selecting File System Type for root

This section applies if you chose the advanced installation.

Note

On systems with only 24 MB of RAM and disk capacity of 510 MB (such as the AlphaStation 200 4/100 Series), you do not have the option to use the Advanced File System (AdvFS) as the file system type; the UNIX file system (UFS) is chosen automatically.

After you select the disk to be used for your system disk, you are asked to choose between the UNIX File System (UFS) or the POLYCENTER Advanced File System (AdvFS) as the file system type for the `root` file system. You also have this option for the `/usr` and `/var` file systems later on in the installation.

The POLYCENTER Advanced File System (AdvFS) is a journaled local file system that provides higher availability and greater flexibility than traditional UNIX file systems. Using transaction journaling, AdvFS recovers file domains in seconds rather than hours after an unexpected restart such as a power failure. AdvFS journaling also provides increased file system integrity. AdvFS provides greater flexibility by allowing filesets (file systems) to share a single storage pool and enabling hard and soft fileset quotas in addition to user and group quotas. AdvFS supports a maximum file size of 128 GB.

Refer to the *System Administration* guide or the *POLYCENTER Advanced File System Utilities Technical Summary* for more information about AdvFS.

UFS has a more rigid hierarchy than AdvFS. In a UFS file system, each disk (or disk partition) contains one separate file system. The UFS file system is characterized by a hierarchical structure, the ability to create and delete files, dynamic growth of files, the protection of file data, and the treatment of peripheral devices.

UFS is compatible with the Berkeley 4.3 Tahoe release. UFS allows a pathname component to be 255 bytes, with the fully qualified pathname length restriction of 1023 bytes. The Digital UNIX implementation of UFS supports a maximum file size equivalent to the largest supported file system (128 GB).

Refer to the *System Administration* guide for more information about UFS.

The following message lets you select either AdvFS or UFS as the file system type for `root`:

You can select to use the UNIX File System (`ufs`) or the Advanced File System (`advfs`) for the root file system. See the Installation Guide for further information.

```
Select the file system type for the root file system (advfs/ufs)
[ufs]: advfs
```

After you select the file system type for `root`, system disk initialization begins, and you will see output similar to the following:

```
Initializing the system disk RZ58, rz8...
Working...Wed Jul  5 21:20:49 GMT 1995
Working...Wed Jul  5 21:22:52 GMT 1995
```

5.7.2 ULTRIX Partition Tables

This section applies only if you chose the advanced installation. If the disk you choose to contain the root file system was previously used on an ULTRIX system, it will be formatted with ULTRIX partition tables. You will see a message similar to the following:

```
ULTRIX compatible partition data found.
This data may be different than the standard
partition layout information in /etc/disktab.
```

ULTRIX partition table layout is:

partition	bottom	top	size	overlap
a	0	40959	40960	c,h
b	40960	163839	122880	c
c	0	832526	832527	a,b,d,e,f,g,h
d	163840	386735	222896	c,g
e	386736	609631	222896	c,g
f	609632	832526	222895	c,g
g	163840	832526	668687	c,d,e,f
h	0	0	0	a,c

Use the ULTRIX-style partition data? [y]:

If you enter `y` to use the ULTRIX layout, a Digital UNIX disk label is created for the disk. This label corresponds to the existing ULTRIX partition table. If you enter `n`, the default partitions for Digital UNIX are created.

5.7.3 Selecting Disk Partitions

If you chose the advanced installation and you already have nonstandard disk partitions on the system disk, you are asked to choose either your nonstandard partitions or the system's default partitions.

Note

You will not see this information unless the existing disk label is different from the default disk label. Refer to Section 5.6.2 for more information about disk labels on system disks.

If you have carefully planned your partition layout and you want to keep the partitions you have on the disk, choose the existing partition table. Partition sizes are shown in blocks. Depending on your choice to the prompt shown in the following example, the partition table shows either the default partition

table or the existing partition table and asks you to confirm your choice:

Select one of the following partition tables to be displayed for the system disk rz0 RZ26:

- 1) Default Disk Label
- 2) Existing Disk Label

Enter your choice: 1

The following table shows the default disk partitions.

partition		start	size	end	overlap
a	----	0	131072	131072	c
b	----	131072	262144	393216	c
c	----	0	2050860	2050860	a, b, d, e, f, g, h
d	----	393216	552548	945764	c, g
e	----	945764	552548	1498312	c, g, h
f	----	1498312	552548	2050860	c, h
g	----	393216	819200	1212416	c, d, e
h	----	1212416	838444	2050860	c, e, f

Are these the partitions you want? (y/n) [y]:

Enter y at the prompt to use the partition table that is displayed or enter n at the prompt to display the alternate choice (depending upon your initial choice, either the default or existing disk label).

After you enter and confirm your choice, the system displays a message that it is initializing the system disk.

Your output will be similar to the following:

```
Working....Wed Jul  5 21:20:49 GMT 1995
Working....Wed Jul  5 21:22:48 GMT 1995
Working....Wed Jul  5 21:24:30 GMT 1995
```

5.8 Rebooting the System

After restoring the root file system to the a partition, the boot command sequence that you must enter to reboot your system is displayed. The `boot_osflags` variable, the `bootdef_dev` variable and the boot command that you must enter to reboot your system are displayed on the screen. At the console prompt (`>>>`), enter the boot command sequence exactly as shown on your screen.

The following example shows a remote installation (using Remote Installation Services [RIS]), so the name of the remote server (`system9`) is displayed. Your screen will look similar to the following (the actual boot commands are not included here to ensure that you do not enter the boot

commands shown in this guide):

```
*** BOOTSTRAP COMMAND SEQUENCE ***  
Distribution source is remote server ds9  
The system disk has been initialized.  
Issue the following console commands to set your default bootpath  
variable and to boot your system disk to multiuser:  
  
    >>>  
    >>>  
    >>>
```

Write down the boot commands shown on your screen in case you need them again:

- >>>
- >>>
- >>>

Informational messages, the memory and hardware configurations, and a message informing you that the Digital UNIX installation is continuing is displayed.

At this point, the basic and advanced installation procedures diverge. If you selected the advanced installation, continue with Section 5.9.

If you selected the basic installation, a message telling you the location of the /usr file system and the swap space is displayed. For example:

```
***** CREATING DEFAULT FILE SYSTEMS  
  
The default location for the /usr file system is rz8g  
The default location for the var area is rz8g (in /usr)  
The default location for the swap space is rz8b  
The default filesystem type for /usr is ufs (UNIX File System)  
  
Making the new file system for /usr on rrz8g RZ26  
Working...Wed Jul 5 21:25:35 GMT 1995
```

Go to Section 5.10 to continue the basic installation procedure.

5.9 Allocating File Systems for the Advanced Installation

This section applies only if you are performing an advanced installation.

The system disk you chose contains the root file system on partition a. A message is displayed telling you the default location for the /usr file system and swap space and you are asked if you want to use these defaults. If you choose the defaults, you do not have the opportunity to add a second swap space during the installation. To accept the defaults, enter *y* at the prompt.

For example:

```
*****  SELECT FILE SYSTEMS

The default location for the /usr file system is rz8g
The default location for the var area is rz8g (in /usr)
The default location for the swap space is rz8b
The default filesystem type for /usr is ufs (UNIX File System)
Would you like to use these defaults? (y/n): y

Making the new file system for /usr on rrz8g RZ26
Working...Wed Jul  5 21:25:35 GMT 1995
```

If you entered y to accept the defaults, continue with Section 5.10.

If you do not want to accept the defaults, enter n at the prompt and continue with Section 5.9.1.

5.9.1 Allocating the /usr File System

If you chose not to use the default file system layout, a table similar to the one in the following example is displayed. The table lists the disks connected to your processor. Enter the selection number of the disk on which you want to allocate the /usr file system. Refer to the file system worksheet, Table 3-5, for the disk name.

```
***          Allocate the /usr file system

You can allocate the /usr file system to one of the disks listed in
the table below.  See the Installation Guide for an
explanation of this table:

/usr file system ALLOCATION TABLE
```

Selection	Device Name	Software Name	Device Number	Controller Name	Controller Number
1	RZ26L	rz0	0	SCSI	0
2	RZ26	rz3	3	SCSI	0
3	RZ58	rz8	8	SCSI	1

```
-----
Enter your choice: 3

You selected RZ58, device number 8.  Make sure this disk is
online and write-enabled (if applicable), then confirm your choice.
Use RZ58, rz8 for /usr file system? (y/n) [: y
```

After you confirm your choice, you are asked to choose the partition on which you want to allocate the /usr file system. You are also asked to choose between UFS or AdvFS as the file system type for the /usr file system.

Note

On systems with only 24 MB of RAM and disk capacity of 510 MB (such as the AlphaStation 200 4/100 Series), you do not have the option to use the Advanced File System (AdvFS) as the file system type; the UNIX file system (UFS) is chosen automatically.

The following example shows partition and file system type selection for /usr:

Select the rz8 partition on which the /usr file system will be mounted:

partition		start	size	end	overlap
b	----	131072	262144	393216	
d	----	393216	768281	1161497	g
e	----	1161497	768282	1929779	g, h
f	----	1929779	768282	2698061	h
g	----	393216	819200	1212416	d, e
h	----	1212416	1485645	2698061	e, f

Enter the letter specifying which partition to use: **h**

Use rz8 partition 'h' for the /usr file system (y/n) []? **y**

You can select to use the UNIX File System (ufs) or the Advanced File System (advfs) for the /usr file system. See the Installation Guide for further information.

Select the file system type for the /usr file system (advfs/ufs) [ufs]: **advfs**

After you confirm your choice of which disk partition you want to use for /usr and enter the file system type for /usr, a message similar to the following is displayed:

Making the new file system for /usr on /dev/rrz8h RZ58

5.9.2 Allocating the Swap Space

Next, you must select the disk on which you want to allocate the swap1 space. Refer to Section 3.2 for guidelines about how much swap space to allocate.

Note

On systems with only 24 MB of RAM and disk capacity of 510 MB, such as the AlphaStation 200 4/100 Series, the swap strategy mode is *deferred* or *over commitment* (also known as lazy swap). This means that swap space is not allocated until the system needs to write a modified virtual page to swap space. To optimize performance on systems with limited capacity, swap space is not allocated until a process needs it, not when a process

starts up. Refer to *System Administration* for more information about swap allocation strategies.

A table similar to the one shown in the following example is displayed:

```
***                Allocate the SWAP1 space

You can allocate the swap1 space to one of the disks listed in the
table below. See the Installation Guide for an explanation of this
table:

swap1 space ALLOCATION TABLE
Selection  Device      Software  Device  Controller  Controller
          Name       Name      Number  Name        Number
-----
      1    RZ26L      rz0       0       SCSI        0
      2    RZ26       rz3       3       SCSI        0
      3    RZ58       rz8       8       SCSI        1
-----

Enter your choice: 2

You selected RZ26, device number 3. Make sure this disk is
online and write-enabled (if applicable), then confirm your choice.
Use RZ26, rz3 for swap1 space? (y/n) []: y
```

After you confirm your choice, you are asked to choose the partition on which you want to allocate the swap1 space. Only the available partitions are listed in the table. (The default choice if you chose to use default partitions, would be partition b of the system disk.)

Select the rz3 partition on which the swap1 space will be mounted:

partition	start	size	end	overlap	
a	----	0	131072	131072	c
b	----	131072	262144	393216	c
c	----	0	2050860	2050860	a, b, d, e, f, g, h
d	----	393216	552548	945764	c, g
e	----	945764	552548	1498312	c, g, h
f	----	1498312	552548	2050860	c, h
g	----	393216	819200	1212416	c, d, e
h	----	1212416	838444	2050860	c, e, f

```
Enter the letter specifying which partition to use: e
Use rz3 partition 'e' for the swap1 space (y/n) []: y
```

After you confirm your choice, you are asked if you want to allocate a second swap space. If you do not want to allocate a second swap space, enter n and continue with Section 5.9.3.

If you want to allocate a second swap space, enter y at the prompt. A table similar to the one shown in the following example is displayed. Choose the disk on which you want to allocate the swap2 space or enter 0 (zero) to

skip allocating a second swap space.

***** Allocate the SWAP2 Space

Do you want to allocate a second swap space? (y/n) []: **y**

You can allocate the swap2 space to one of the disks listed in the table below. See the Installation Guide for an explanation of this table:

swap2 space ALLOCATION TABLE

Selection	Device Name	Software Name	Device Number	Controller Name	Controller Number
1	RZ26L	rz0	0	SCSI	0
2	RZ26	rz3	3	SCSI	0
3	RZ58	rz8	8	SCSI	1

Enter your choice OR

Enter 0 to ABORT allocation: **1**

You selected RZ26L, device number 0. Make sure this disk is online and write-enabled (if applicable), then confirm your choice.

Use RZ26L, rz0 for swap2 space? (y/n) []: **y**

After you confirm your choice, you are asked to choose the partition on which you want to allocate the swap2 space. Then, you are asked to confirm your choice. For example:

Select the rz0 partition on which the swap2 space will be mounted:

partition		start	size	end	overlap
a	----	0	131072	131071	c
b	----	131072	262144	393215	c
c	----	0	2050860	2050859	a, b, d, e, f, g, h
d	----	393216	552548	945763	c, g
e	----	945764	552548	1498311	c, g, h
f	----	1498312	552548	2050859	c, h
g	----	393216	819200	1212415	c, d, e
h	----	1212416	838444	2050859	c, e, f

Enter the letter specifying which partition to use: **b**

Use rz0 partition 'b' for the swap2 space (y/n) []? **y**

5.9.3 Allocating the var Area

You can place the var area of your system either in the /usr file system or on a separate file system.

If the system you are installing is a Dataless Management Services (DMS) server, you should allocate a separate file system for /var because all dataless environments reside in /var/adm/dms on the server. Putting /var under /usr could mean that your system will run out of disk space when you create dataless environments. Refer to *Sharing Software on a Local Area Network* for more information about allocating the /var area and calculating disk space for DMS environments.

Your screen display will be similar to the following:

```
*****  ALLOCATE THE /var FILE SYSTEM

The /var area of your system can either be placed in the /usr
file system or on a separate file system.

Do you want to allocate a separate file system for /var? (y/n): y

Enter n at the prompt if you do not want to allocate a separate file system for
var and go to Section 5.10.2 to select the software subsets to install. If you
want to allocate a separate file system for var, enter y at the prompt. A
var allocation table similar to the one shown in the following example is
displayed. Choose the disk on which you want to allocate the var area or
enter 0 (zero) to skip allocating a separate var area:

You can allocate the /var file system to one of the disks listed in
the table below. See the Installation Guide for an
explanation of this table:

/var file system ALLOCATION TABLE
-----
Selection   Device      Software   Device   Controller  Controller
            Name       Name       Number   Name         Number
-----
      1     RZ26L        rz0         0       SCSI         0
      2     RZ26        rz3         3       SCSI         0
      3     RZ58        rz8         8       SCSI         1
-----

Enter your choice OR
Enter 0 to ABORT allocation: 1

You selected RZ26L, device number 0. Make sure this disk is
online and write-enabled (if applicable), then confirm your choice.
Use RZ26L, rz0 for /var file system? (y/n) [l]: y

After you confirm your choice about which disk you want to use for the var
file system, you are asked to choose the partition on which you want to
allocate the /var file system. You are also asked to choose between the
UFS or AdvFS as the file system type for var.
```

Note

On systems with only 24 MB of RAM and disk capacity of 510 MB (such as the AlphaStation 200 4/100 Series), you do not have the option to use the Advanced File System (AdvFS) as the file system type; the UNIX file system (UFS) is chosen automatically.

Select the rz0 partition on which the /var file system will be mounted:

partition		start	size	end	overlap
a	----	0	131072	131071	
d	----	393216	552548	945763	g
e	----	945764	552548	1498311	g, h
f	----	1498312	552548	2050859	h
g	----	393216	819200	1212415	d, e
h	----	1212416	838444	2050859	e, f

Enter the letter specifying which partition to use: **g**

Use rz0 partition 'g' for the /var file system (y/n) []? **y**

You can select to use the UNIX File System (ufs) or the Advanced File System (advfs) for the /var file system. See the Installation Guide for further Information.

Select the file system type for the /var file system (advfs/ufs) [ufs]: **advfs**

Making the new file system for /var on /dev/rrz0g RZ26L

5.10 Installing Software Subsets

At this point, you can install software subsets.

If you performed a basic installation, subset installation occurs automatically. Go to Section 5.10.1.

If you performed an advanced installation, you can choose the software subsets you want to install to customize your system. Go to Section 5.10.2.

5.10.1 Installing Software Subsets for the Basic Installation

If you chose the basic installation, the Digital UNIX mandatory subsets are installed automatically. A message similar to the following is displayed:

*** Loading the operating system software subsets

The installation procedure will now load the software on your disk partitions. This process will take anywhere between 20 minutes to an hour, depending on your distribution media and processor type.

You will be presented with a menu of software options in a few moments.

```
Working....Wed Jul  5 21:05:36 GMT 1995
Working....Wed Jul  5 21:07:37 GMT 1995
Working....Wed Jul  5 21:09:37 GMT 1995
Working....Wed Jul  5 21:11:37 GMT 1995
```

If you are performing the installation from CD-ROM, the software is loaded from the disc you used to begin the installation. You do not have to change CD-ROM discs.

If your system is a workstation, windowing software is considered mandatory. Copying, Working..., and Verifying messages similar to the following are displayed while the mandatory subsets are loaded:

The following subsets will be installed:

```
Base System
Base System - Hardware Support
Compiler Back End
Kernel Header and Common Files
Standard Kernel Objects
Hardware Kernel Objects
Hardware Kernel Header and Common Files
Basic Networking Services
NFS(tm) Utilities
```

The following software subsets are hardware specific. They are mandatory and are installed automatically if you have the hardware; they are optional otherwise:

```
X Servers
X Servers for Turbochannel, PCI, or QVision
Basic X Environment
Keyboard Support
X Fonts
DECwindows 100dpi Fonts
Adobe Fonts
```

```
Base System
  Copying from system9 (inet)
    Working....Wed Jul  5 16:50:04 GMT 1995
  Verifying
    Working....Wed Jul  5 16:52:31 GMT 1995
```

```
Base System - Hardware Support
  Copying from system9 (inet)
    Working....Wed Jul  5 16:53:08 GMT 1995
  Verifying
  .
  .
  .
```

```
Adobe Fonts
  Copying from system9 (inet)
  Verifying
```

```
NFS(tm) Utilities
  Copying from system9 (inet)
  Verifying
```

The installation procedure has successfully installed the software subsets.

System configuration occurs after the software subsets are installed. Go to Chapter 6 for information about configuring the system and setting up your system for general use.

5.10.2 Installing Software Subsets for the Advanced Installation

If you chose the advanced installation, Working... messages followed by a list of mandatory subsets are displayed. If your system is a workstation with windowing capabilities, the windowing subsets are installed automatically.

*** Loading the operating system software subsets

The installation procedure will now load the software on your disk partitions. This process will take anywhere between 20 minutes to an hour, depending on your distribution media and processor type.

You will be presented with a menu of software options in a few moments.

```
Working...Wed Jul  5 21:44:12 GMT 1995
Working...Wed Jul  5 21:46:12 GMT 1995
Working...Wed Jul  5 21:48:13 GMT 1995
```

*** Enter subset selections ***

The following subsets are mandatory and will be installed by default:

```
Base System
Base System - Hardware Support
Hardware Kernel Header and Common Files
Hardware Kernel Objects
Kernel Header and Common Files
POLYCTR advfs Kernel Objects
Standard Kernel Objects
Basic Networking Services
DECwindows Mail Interface
RAND Corp. Mail Handler (MH)
Local Printer Support
NFS(tm) Utilities
Compiler Back End
POLYCTR advfs
```

The following software subsets are hardware specific. They are mandatory and are installed automatically if you have the hardware; they are optional otherwise:

```
Adobe Fonts
Basic X Environment
DECwindows 100dpi Fonts
X Fonts
X Servers
Keyboard Support
X Servers for TurboChannel, PCI, or QVision
```

The POLYCTR subsets are mandatory only if AdvFS was chosen as the file system type for root, /usr, or /var. The Asynchronous Mode Transfer (ATM) Kernel Objects and ATM Commands subsets will become mandatory if ATM hardware is detected on your system.

A list of the optional subsets is displayed.

Note

All subset dependencies are listed in Appendix B. It is suggested that you review this appendix before choosing your subsets to make sure you install all dependent subsets. The *Release Notes* may also contain information about subset dependencies.

For full System V compatibility, you must install the Software Development Environment (OSFPGMR350) subset; otherwise the `./usr/lib/libsys5.a` symbolic link is not present.

At the prompt, enter the number or numbers associated with the subsets you want to install. The installation procedure prevents you from putting all subsets on a disk that is not large enough to hold them. To avoid this problem, install only those optional subsets that you actually need. Some optional subsets are hardware specific; that is they are optional only because you do not have the hardware necessary to make them mandatory. The Windowing Hardware Support category, which provides support for numerous keyboards, is the prime example of this situation. Therefore, it may not be prudent to select ALL software subsets because you will install hardware-specific software that you do not need.

When making software subset selections, separate multiple selections with a space (or a comma) and enter consecutive ranges with a hyphen between the two selections:

The subsets listed below are optional:

There may be more optional subsets than can be presented on a single screen. If this is the case, you can choose subsets screen by screen or all at once on the last screen. All of the choices you make will be collected for your confirmation before any subsets are installed.

- General Applications:
 - 1) Common Agent
 - 2) Computer Aided System Tutor
 - 3) GNU Emacs
 - 4) Local Area Transport (LAT)
 - 5) Logical Storage Manager
 - 6) Logical Storage Manager GUI
 - 7) Logical Volume Manager
 - 8) UNIX(tm) SVID2 Compatibility
 - 9) UNIX(tm) to UNIX(tm) Copy Facility
- Kernel Build Environment:
 - 10) Logical Storage Manager Kernel Header and Common Files
 - 11) Logical Storage Manager Kernel Objects
 - 12) POLYCTR advfs Kernel Objects
- Network-Server/Communications:
 - 13) ATM Commands
 - 14) ATM Kernel Objects
 - 15) Additional Networking Services

- 16) Dataless Management Services
- 17) Remote Installation Service

--- MORE TO FOLLOW ---

Enter your choices or press RETURN to display the next screen.

Choices (for example, 1 2 4-6): **15-17**

- Printing Environment:
 - 18) Adobe Font Metric Files
- Reference Pages:
 - 19) Ref Pages: Admin/User
 - 20) Ref Pages: Programming
 - 21) Ref Pages: Realtime
 - 22) Ref Pages: Windows Admin/User
 - 23) Ref Pages: Windows Programming
- Software Development:
 - 24) Additional Motif Demo Sources
 - 25) CDA(tm) Software Development
 - 26) CDA(tm) for X/Motif Development
 - 27) Compiler Extensions, Profilers and Libraries
 - 28) DEC C (cc -migrate)
 - 29) GNU Revision Control System
 - 30) LSM Software Development
 - 31) Realtime Software Development
 - 32) Software Development Environment
 - 33) Source Code Control System
 - 34) X Window Software Development
- Supplemental Documentation:
 - 35) XIE Version 5 Online Documentation
- System Administration:
 - 36) C2-Security
 - 37) C2-Security GUI
 - 38) Kernel Debugging Tools
 - 39) Obsolete Commands and Utilities
 - 40) Obsolete Locale databases
 - 41) POLYCTR advfs
 - 42) Single-Byte European Locales
 - 43) System Accounting Utilities
 - 44) System Exercisers
 - 45) Verifier/Exerciser GUI
 - 46) Verifier/Exerciser Tool
- Text Processing:
 - 47) Doc. Preparation Tools
 - 48) Doc. Preparation Tools Extensions
- Windowing Environment:
 - 49) DECwindows 75dpi Fonts
 - 50) X Customizations for OEM
- Windowing Hardware Support:
 - 51) LK201 Keyboard Support
 - 52) LK411 Keyboard Support
 - 53) LK421 Keyboard Support
 - 54) LK444 Keyboard Support

55) PCXAL Keyboard Support

--- MORE TO FOLLOW ---

Add to your choices or press RETURN to display the next screen.

Choices (for example, 1 2 4-6): 15-17 **18 47-48**

56) X Servers for PCI

57) X Servers for QVision

- Windows Applications:

58) Additional DECwindows Applications

59) Additional X Applications

The following choices override your previous selections:

60) ALL mandatory and all optional subsets

61) MANDATORY subsets only

62) CANCEL selections and redisplay menus

Add to your choices, choose an overriding action or press RETURN to confirm previous selections.

Choices (for example, 1 2 4-6): 15-18 47-48 Return

After entering your choices, the following confirmation message is displayed:

You are installing the following mandatory subsets:

Base System
Base System - Hardware Support
Hardware Kernel Header and Common Files
Hardware Kernel Objects
Kernel Header and Common Files
Standard Kernel Objects
DECwindows Mail Interface
RAND Corp. Mail Handler (MH)
Basic Networking Services
NFS(tm) Utilities
Local Printer Support
Compiler Back End
Adobe Fonts
Basic X Environment
DECwindows 100dpi Fonts
X Fonts
X Servers
LK401 Keyboard Support
X Servers for TurboChannel

Next, your choice of optional subsets is displayed and you are asked to confirm your choice. For example:

You are installing the following optional subsets:

- Network-Server/Communications:

Additional Networking Services

Dataless Management Services

Remote Installation Service

- Printing Environment:

Adobe Font Metric Files

- Text Processing:
 Doc. Preparation Tools
 Doc. Preparation Tools Extensions

Is this correct? (y/n): **y**

If the displayed subsets are not the subsets you want to install, enter n. The subset selection menu is redisplayed and you can reenter your choices. If the correct subsets are displayed, enter y. The installation process checks to make sure there is enough disk space to load the selected subsets. A message similar to the following is displayed:

Checking file system space required to install selected subsets:

File system space checked OK.

The installation procedure temporarily uses root space for logging purposes. This space is reflected in the file system space check. This space is made available after the installation procedure completes.

The subset name as well as Copying, Working, and verifying messages similar to the following are displayed:

Base System

 Copying from system9 (inet)
 Working....Wed Jul 5 21:50:46 GMT 1995
 Working....Wed Jul 5 21:52:48 GMT 1995
 Verifying
 Working....Wed Jul 5 21:54:13 GMT 1995

Base System - Hardware Support

 Copying from system9 (inet)
 Working....Wed Jul 5 21:54:52 GMT 1995
 Verifying

•
•
•

DECwindows Mail Interface

 Copying from system9 (inet)
 Verifying

Ref Pages: Programming

 Copying from system9 (inet)
 Verifying

Ref Pages: Admin/User

 Copying from system9 (inet)
 Working....Wed Jul 5 18:15:09 GMT 1995
 Verifying

The installation procedure has successfully installed the software subsets

The installation of the Digital UNIX software subsets is now complete. Go to Chapter 6 for information about configuring and setting up your system.

Configuring and Setting Up the System **6**

This chapter provides information about:

- System configuration
- Entering the system name, superuser password, and date and time
- Building the kernel
- Logging in for the first time
- Registering and loading software licenses
- Accessing online documentation
- Setting up your system for general use (the networking, mail, and print subsystems)
- Enabling realtime preemption

6.1 Configuring the System

System configuration refers to the process of tailoring the operating system software for use. After the basic or advanced installation is complete, you are asked whether or not you want to configure the system:

```
You can now choose to configure the system for use or you can
defer configuration.  If you choose to defer configuration, the
system will halt.  Configuration will happen next time the system
is booted.
```

```
If you choose to configure now, you will be asked a series
of questions.  The system will then generate a customized kernel,
reboot and be ready to use.
```

```
Would you like to configure the system for use at this
time? (y/n):
```

In almost all cases you should answer `y` to this prompt. After configuration is complete you must be prepared to answer system information questions (such as your system name, your superuser password, your time zone, and the current date and time).

Note

You will not be prompted to enter your system name, the time zone, and the current date and time if you performed a Remote Installation Services (RIS) installation.

If you enter `y`, the system configuration process begins. The name of each software subset is displayed as it is being configured. Your output depends upon the software subsets you chose to install and your processor type. Your display will be similar to the following:

```
** SYSTEM CONFIGURATION **
```

```
Configuring "Base System " (OSFBASE350)
```

```
Configuring "Base System - Hardware Support " (OSFHWBASE350)
```

```
·  
·  
·
```

```
Configuring "Adobe Fonts " (OSFDPSFONT350)
```

```
Configuring "Additional Networking Services " (OSFINET3500)
```

When subset configuration is complete you must enter the system information that is shown in Section 6.2. If you choose to defer configuration until a later time, enter `n` at the prompt. This halts the system and the console prompt (`>>>`) is displayed.

If you defer configuration, you need to boot the system to restart the system configuration process:

```
>>> b
```

After the system boots, the subsets installed during the installation procedure are configured. The name of each subset is displayed as it is being configured.

6.2 Entering System Information

The following information applies to basic and advanced installations. After the subsets are configured, a series of prompts that ask you to enter the following system information is displayed:

- Your system name
- Your superuser (root) password
- The time zone
- The current date and time

This information must be entered in the specified format. If you enter an inappropriate response, the prompt is redisplayed until you enter a valid response.

If you performed a Remote Installation Services (RIS) installation, the system attempts to obtain your system name, the time zone, and the current date and time from the network.

6.2.1 Entering the System Name

If the system name was not obtained from the network (during a RIS installation), you must give your system a name. The system name is used to identify your system on the network. You can use up to 64 alphanumeric characters (A-Z, a-z, and 0-9) in a system name; alphabetic characters can be upper or lower case, and the first character must be a letter. You can also use a period (.) in the system name.

Following are examples of correct and incorrect system names:

Correct: XYZ.sys.com Alpha.1995

Incorrect: XYZ-sys.com 1995.Alpha

You may want to consult your System Administrator before choosing your system name because your System Administrator may have defined site-specific restrictions (such as maximum length). *Do not* use the words generic or binary for your system name.

Your screen display will be similar to the following:

```
*** SYSTEM NAME SPECIFICATION ***
```

```
Select the name of your system using alphanumeric characters.  
The first character must be a letter. For example, tinkr.  
Enter your system name: jersey
```

```
You selected 'jersey' as the name of your system.  
Is this correct? (y/n) [y]:
```

6.2.2 Entering the Superuser (Root) Password

When you are prompted to enter your superuser password, enter the superuser password using a combination of upper and lower case letters. Passwords must contain a minimum of 5 to a maximum of 16 characters, but the Digital UNIX operating system only verifies the first 8 characters. Digital suggests using numbers and special characters such as the dollar sign (\$), the percent sign (%), the number sign (#), the period (.), the hyphen (-), the underscore (_), or the at sign (@) in your password.

When choosing a password, you should **not** use:

- Words found in any dictionary (in any language)
- Personal information about you or your family such as names, addresses, birthdays, social security numbers, telephone numbers, pet's name
- Any combination of the above

Do not choose a password that can be easily guessed by someone who knows you.

The following example shows correct and incorrect superuser passwords:

```
Correct:   U8one2too   wht%IZ_dne   DLwrks@8   9Pnt.9%
Incorrect: lowercase nonnumbers   Fido       7/6/58
```

Remember the password you choose because you need it to log in as `root` for the first time. You can change your superuser password later (using the `passwd` command). When you enter the password, it is not displayed on your screen for security reasons. You will be prompted to enter your new password again as validation.

Your screen display will be similar to the following:

```
*** SUPERUSER PASSWORD SPECIFICATION **
```

```
Changing password for root.
```

```
New password:
Retype new password:
```

6.2.3 Entering the Time Zone

If the time zone was not obtained from the network (during a RIS installation), a Time Zone menu lists the time zones that are available. You should select the time zone that best describes your location. If you do not select a time zone, the default is Greenwich Mean Time (GMT). If you choose the United States (US) time zone, a second menu displays the specific time zones in the United States. Table 6-1 describes the acronyms that appear in the Main Time Zone menu:

Table 6-1: Time Zone Menu Definitions

Time Zone Acronym	Description
CET	Central European Time
EET	Eastern European Time
Factory	Specifies No Time Zone
GB-Eire	Great Britain/Ireland

Table 6-1: (continued)

Time Zone Acronym	Description
GMT	Greenwich Mean Time
NZ	New Zealand
NZ-CHAT	New Zealand, Chatham Islands
MET	Middle European Time
PRC	Peoples Republic of China
ROC	Republic of China
ROK	Republic of Korea
SystemV	Specific to System V operating systems
UCT	Greenwich Mean Time
US	United States (displays secondary menu)
UTC	Greenwich Mean Time
Universal	Greenwich Time
W-SU	Middle European Time
WET	Western European Time
Zulu	Coordinated Universal Time

Your screen display will be similar to the following:

***** Main Timezone Menu *****

```
-----
 1) Australia    2) Brazil      3) CET          4) Canada
 5) Chile        6) Cuba        7) EET          8) Egypt
 9) Factory      10) GB-Eire    11) GMT         12) Greenwich
13) Hongkong    14) Iceland    15) Iran        16) Israel
17) Jamaica     18) Japan      19) Libya       20) MET
21) Mexico      22) NZ         23) NZ-CHAT     24) Navajo
25) PRC         26) Poland     27) ROC         28) ROK
29) Singapore   30) SystemV    31) Turkey      32) UCT
33) US          34) UTC        35) Universal   36) W-SU
37) WET         38) Zulu
-----
```

0) None of the above

Select the number above that best describes your location: **33**

***** US Timezone Menu *****

```
-----
 1) Alaska       2) Aleutian    3) Arizona     4) Central
 5) East-Indiana 6) Eastern     7) Hawaii      8) Indiana-Stark
 9) Michigan     10) Mountain  11) Pacific    12) Samoa
-----
```

0) None of the above

Select the number above that best describes your location: **6**

You selected US/Eastern as your time zone.
Is this correct? (y/n) [y]: **y**

6.2.4 Entering the Date and Time

If the date and time was not obtained from the network (during a RIS installation), you will be prompted to enter the current date and time. The system date and time is entered in the format `yymmddhhmm` where `yy` represents the year, `mm` represents the month, `dd` represents the day of the month, `hh` represents the current hour in 24-hour (military) time, and `mm` represents the minutes. For example, October 3, 1995, 4:30PM is entered as follows: `9510031630`.

To enter an accurate time, you are advised to type the minutes value one minute in the future, and when your wristwatch or clock reaches that minute value, press the Return key.

Your screen display will be similar to the following:

```
*** DATE AND TIME SPECIFICATION ***
```

The current date and time should be specified using the following format:

```
yymmddhhmm
```

Use two digits for year (`yy`), month (`mm`), day (`dd`), hour (`hh`), and minute (`mm`). Enter the time in 24-hour format. For example, 11:30 p.m. on July 25, 1993 would be entered as:

```
9307252330
```

Enter the date and time: **9507051630**

The date and time has been set to Wed Jul 5 16:30:09 EST 1995
Is this correct? (y/n) [y]:

If the current date and time was obtained from the network during a RIS installation, the following message is displayed automatically:

The date and time has been set to Wed Jul 5 16:30:09 EDT 1995

Note

The installation procedure includes the date and time in Greenwich Mean Time (GMT) in some displays. The date and time recorded by the installation procedure might be later or earlier than the date and time for your time zone. Although the absolute time displayed in the installation is incorrect, relative time elapsed is accurate. Therefore, you can still use time-stamping to determine how long the installation is taking.

6.3 Building the Kernel

If you performed a basic installation, the kernel is built automatically; go to Section 6.4. If you performed an advanced installation, you can select options to include in the kernel; go to Section 6.3.1.

6.3.1 Selecting Kernel Options

If you performed an advanced installation, the kernel options you see on your display depend on the subsets that were installed. The installation of certain base operating system products contain a kernel component, and the installation procedure gives you the option to include or exclude the product from the kernel.

If you do not select the kernel option for the product, you will not be able to use that product. For example, if you do not select the Logical Storage Manager (LSM) kernel option, even though you installed the LSM software subsets, you will not be able to use LSM. When you select a kernel option, additional code to support the option is loaded into the kernel. Therefore, selecting All of the above kernel options significantly increases the size of the kernel.

The following kernel subsystems are mandatory on all systems except those with only 24 MB of memory:

- /proc File System - required System V Environment and used by debuggers
- Quotas - UNIX File System (UFS) file quotas
- Serial Line Interface Protocol (SLIP)
- Network File System (NFS) Server
- STREAMS protocol

If your system has only 24 MB of random access memory (RAM) the kernel subsystems usually considered mandatory are not included in the kernel. If you choose any of these kernel options for your 24 MB system, you may adversely impact system performance.

The Kernel Option Selection menu has a Help option that displays online help about each kernel option. The menu is similar to the following:

```
*** KERNEL CONFIGURATION AND BUILD PROCEDURE ***
```

```
*** KERNEL OPTION SELECTION ***
```

```
Selection   Kernel Option
-----
1           Asynchronous Transfer Mode (ATM)
2           Advanced File System (ADVFS)
3           System V Devices
```

```

4    Logical Volume Manager (LVM)
5    Kernel Breakpoint Debugger (KDEBUG)
6    /proc Application Debugger (PROCFS)
7    Packetfilter driver (PACKETFILTER)
8    STREAMS pckt module (PCKT)
9    Data Link Bridge (DLPI V2.0 Service Class 1)
10   X/Open Transport Interface (XTISO, TIMOD, TIRDWR)
11   File on File File System (FFM)
12   ISO 9660 Compact Disc File System (CDFS)
13   Audit Subsystem
14   Local Area Transport Support (LAT)
15   Serial Line Interface Protocol
16   Quota
17   STREAMS protocol (STREAMS, STRKINFO, LDTTY, RPTY)
18   Logical Storage Manager (LSM)
29   NFS Server
20   All of the above
21   None of the above
22   Help

```

Enter the selection number for each kernel option you want.
For example, 1 3 [21]: **20**

The following is a description of each kernel option:

Asynchronous Transfer Mode (ATM)

The ATM option installs the kernel software and applications necessary to use an ATM network. ATM technology is a connection-oriented wide area/local area technology based on the high-speed switching of 53-byte cells across a network. ATM can traverse microwave, copper, and fiber and is not limited to one kind of data. The ATM optional subsets are installed automatically if the installation process detects ATM hardware on the system. The Digital UNIX ATM subsystem supports the ATM Forum User-Networking (UNI) Version 3.0 specification, including ILMI for registration of a single address, UNI signaling for point-to-point connections, and QOS class 0 with best effort delivery.

Advanced File System (AdvFS)

The Advanced File System is a log-based, local file system that allows modification and expansion of file systems by mounting on different devices or adding devices to that file system.

If you chose AdvFS as the file system type for /usr or /var the subset is not optional and will not be displayed in the menu; AdvFS is configured in the kernel automatically.

System V Devices

The System V Devices option includes kernel options for devices required for the System V environment product. These devices are /dev/prf (System V kernel profiler) and FFM_FS (File On File File System).

Logical Volume Manager

The Logical Volume Manager provides a virtual disk that enables you to store data without regard to the physical boundaries of individual disks. LVM will be retired and replaced by the Logical Storage Manager (LSM) in a future functional release of Digital UNIX.

Kernel Breakpoint Debugger (KDEBUG)

The Kernel Breakpoint Debugger loads the kernel debugger `kdebug` and provides physical memory space for debugging custom kernels.

/proc Application Debugger

The `/proc` file system enables running processes to be accessed and manipulated as files by the system calls `open`, `close`, `read`, `write`, `lseek`, and `ioctl`. While the `/proc` file system is most useful for debuggers, it enables any process with the correct permissions to control another running process. Thus, a parent/child relationship does not have to exist between a debugger and the process being debugged.

Packetfilter driver

The packetfilter is a software interface that lets an application send and receive packets directly to or from a local area network (Ethernet or FDDI). The packetfilter provides flexible demultiplexing (filtering) of incoming packets, so that many such applications may run simultaneously.

The Digital UNIX packetfilter supports two filtering models: the original CMU/Stanford model, as supported in ULTRIX, and the BSD Packet Filter (BPF), which provides more flexible and efficient filtering. (BPF was developed by the University of California, Lawrence Berkeley Laboratory.) Several public domain applications that use the packetfilter are integrated in Digital UNIX, including `rarpd`, `tcpdump`, `tcpdump`, `nfslogsum`, and `nfslogsum`. Refer to the `packetfilter(7)` reference page for more information.

STREAMS pkt module (PCKT)

The STREAMS `pkt` module provides emulation for the SVR4 `pty` packet module.

Data Link Bridge (DPLI V2.0 Service Class 1)

Provides a DLPI V2.0 (Service Class 1) interface to BSD IFNET based network interfaces that allows STREAMS based protocol stacks to utilize BSD IFNET based network interfaces.

This kernel option is mandatory for LAT (Local Area Transport). If you installed LAT, Data Link Bridge does not appear as a kernel option.

Serial Line Interface Protocol (SLIP)

Interface protocol support for a serial line so that users can transfer files or NFS-mount file systems across phone lines.

This functionality is mandatory on systems with greater than 24 MB of memory.

X/Open Transport Interface (XTISO)

The X/Open Transport Interface (XTISO) defines an application interface that is independent of any transport provider. Programs written to XTI can be run over a variety of transport providers, such as Transmission Control Protocol (TCP) or User Datagram Protocol (UDP). The application specifies which transport provider to use.

Selecting this kernel option lets DECnet/OSI load its kernel modules dynamically; you do not have to rebuild the kernel and reboot.

File on File File System (FFM)

File on File (FFM) is a file system that permits mounting a regular, character, or block special file on top of a regular file to support the STREAMS subsystem. This feature is used mainly by SVR4 compatible system calls. It can be viewed as a dynamic version of named pipes. The contents of the covered file are still available to any process that had the file open at the time of the FFM mount. FFM is required for the System V Environment.

ISO 9660 Compact Disc File System (CDFS)

CDFS provides the ability to mount CD-ROMs formatted to the ISO 9660 standard or the High Sierra Group (HSG) format.

Audit Subsystem

The Audit Subsystem provides a security audit system configurable through the `audit_setup` command. The subset provides additional security on system features such as passwords, account ownership, and remote access.

Local Area Transport Support

The LAT protocol provides an efficient means of logically connecting terminal servers to one or more nodes on the same local area network (LAN).

LAT software has the features required for a host to function as a service node so that requests for connections can be made by server users. LAT also permits host applications to initiate connections to the server's ports, designated as applications ports, to access remote devices such as printers. Digital UNIX supports 1500 logins using LAT.

If you chose the LAT subset when you made your subset selections, the option is not displayed in the kernel option menu and is configured automatically. If you add the LAT subset after the installation, you must reconfigure the kernel using the `doconfig` command.

Quota

UFS disk quotas provide users with the ability to establish a limit on the

number of blocks and inodes (or files) that a user or a group of users can allocate.

This functionality is mandatory on systems with greater than 24 MB of memory and optional for system with less than 24 MB of memory. Disk quotas for AdvFS are configured into the kernel by default on systems where the Advanced File System (AdvFS) is installed.

STREAMS protocol (STREAMS, STRKINFO, LDTTY, RPTY)

The STREAMS framework provides an alternative to sockets. The STREAMS interface was developed by AT&T and consists of system calls, kernel routines, and kernel utilities that are used to implement everything from networking protocol suites to device drivers. Applications in user space access the kernel portions of the STREAMS framework using system calls such as `open`, `close`, `putmsg`, `getmsg`, and `ioctl`. STREAMS from the DEC OSF/1 Version 1.2 code base, which provides support for the STREAMS terminal interface.

This functionality is mandatory on systems with greater than 24 MB of memory. The STREAMS framework is required by many of the personal computer protocols and DECnet/OSI.

Logical Storage Manager (LSM)

The Logical Storage Manager is an integrated, host-based disk storage management tool that protects against data loss and improves disk input/output (I/O) performance. Basic LSM functionality includes disk spanning and concatenation. System Administrators use LSM to perform disk management functions without disrupting users or applications accessing data on those disks.

NFS Server

The Network File System Server option allows systems to export various file systems to other nodes.

This functionality is mandatory on systems with greater than 24 MB of memory.

After entering your choice of kernel options, a list of options you selected is displayed and you are asked to verify your choice. For example:

You selected the following kernel options:

```
Asynchronous Transfer Mode (ATM)
System V Devices
Logical Volume Manager (LVM)
Kernel Breakpoint Debugger (KDEBUB)
Packetfilter driver (PACKETFILTER)
STREAMS pckt module (PCKT)
Data Link Bridge (DLPI V2.0 Service Class 1)
X/Open Transport Interface (XTISO, TIMOD, TIRDWR)
File on File File System (FFM)
ISO 9660 Compact Disc File System (CDFS)
Audit Subsystem
```

Local Area Transport Support
Logical Storage Manager (LSM)

Is that correct? (y/n) [y]:

If the displayed kernel options are not the ones you want, enter n at the prompt. If the displayed kernel options are the ones you want, enter y or press Return to accept the default response.

Next, you are asked if you want to edit the configuration file, for example:

Do you want to edit the configuration file? (y/n) [n]:

The reasons you may want to edit the configuration file are: when you want to add devices, when you want to add tuning parameters, or when you don't want to lose any customizations you may have previously made to the file.

- If you enter n or press Return (to enter the default response) to skip the edit of the configuration file, the kernel build process begins:

The system will now automatically build a kernel and then reboot. This will take approximately 15 minutes, depending on the processor type.

When the login prompt appears after the system has rebooted, use 'root' as the login name and the SUPERUSER password that was entered during this procedure, to log into the system.

When the subsets are configured and the configuration file is completed, the `doconfig` utility makes the special device files needed by the hardware and builds the kernel for your system. Messages similar to the following are displayed:

```
*** PERFORMING KERNEL BUILD ***
Working....Wed Jul  5 15:45:24 EST 1995
Working....Wed Jul  5 15:47:24 EST 1995
Working....Wed Jul  5 15:49:25 EST 1995
Working....Wed Jul  5 15:51:26 EST 1995
```

Note

If you did not set the `boot_osflags` variable, by default the system is in single-user mode when it reboots. The system reboots using the new kernel when `doconfig` completes. To bring the system to multiuser mode, press `Ctrl/d` at the prompt (`#`). You will be prompted to enter the run level. There are four basic run levels available: 0 specifies the halt state, S or s specifies single-user mode, 2 specifies multi-user mode without network services, and 3 specifies multi-user mode with network services.

- If you enter `y` to edit the configuration file, the following message is displayed:

Using 'ed' to edit the configuration file. Press return when ready, or type 'quit' to skip the editing session:

- Enter the word `quit` if you want to skip the editing session and start the kernel build process.
- Press the Return key if you want to edit the configuration file. The following example shows an editing session using the `ed` text editor where the value of `maxusers` is changed:

Using 'ed' to edit the configuration file. Press return when ready, or type 'quit' to skip the editing session:

```
Return
9787
/maxuser
maxusers      128
s/128/512
maxusers      512
w
9787
q
```

The kernel build begins when you write and quit the editing session.

The *Command and Shell User's Guide* contains a tutorial that teaches you how to use the `ed` text editor. Refer to *System Administration* for information about the contents of the configuration file and the entries that you may want to edit.

Refer to Section 6.13 if you want to enable realtime preemption.

6.4 Logging in to the System

What happens when you log in for the first time depends upon whether you have a graphics workstation or a character cell terminal:

- If you have a graphics workstation, a login window is displayed. Enter `root` as the login name and enter the superuser password you set up earlier when you entered your system information. When you correctly enter your system name and password, a setup message is displayed. You will only see this message the first time you log in. For subsequent logins, a Session Manager window and a DECTerm window appears. If you have a graphics workstation, go to Section 6.5 for an explanation of the setup message.
- If you do not have a graphics workstation, enter `root` at the login prompt (as the user name) and enter the superuser password you specified earlier when you entered your system information. Go to Section 6.7.1 for information about registering and loading software licenses.

6.5 The Setup Welcome Message

If you have a graphics workstation, the first time you log in as `root` after a system installation or the first time you log in to a FIS (Factory Installed Software) system, the Digital UNIX operating system displays a setup welcome message.

This message tells you how to prepare your operating system for general use. The topics in the welcome message contain information about Product Authorization Keys (PAKs), adding users, and reading online documentation.

If a topic contains more than one screen of information, a message similar to the following tells you how to go to the next screen, exit from the topic, or get help:

```
stdin[Press space to continue, q to quit, h for help]
```

A sample of the setup welcome message and topics follows:

```
Welcome to Digital UNIX Version 3.2C
```

```
To prepare this system for general use, the Product Authorization
Keys (PAKs) that were purchased with this system must be
installed to allow users to login and/or access licensed software
packages.  In addition, several Digital UNIX subsystems, such as
networking, mail, printing and others, must be configured.
```

```
This utility, in addition to allowing for the configuration of
Digital UNIX subsystems, provides information on other tasks that
you may want to do during or after this utility runs.  You can
access this information from the following menu.  If you wish to
view this information, do so before choosing option 5.  This
information is also available in the Installation Guide and the
FIS Quick Reference Card.
```

- 1) Read this first!
- 2) Information about loading license PAKs
- 3) Information about accessing online documentation
- 4) Information about adding users
- 5) Begin system configuration
- 6) Exit

```
Please enter your selection:
```

If you enter 6 and exit the setup welcome message, you still need to configure your Digital UNIX subsystems at a later time by entering `/usr/sbin/setup` or by selecting System Setup from the Session Manager's application menu when logged in as `root`. Section 6.7.1 through Section 6.11 also describe the topics presented in the setup welcome message.

The following examples show the contents of each topic in the welcome message:

1. Read This First:

This system should have included all of the software, hardware options, documentation, and product authorization keys (PAKs) that you ordered. In some cases, documentation sets and/or Digital UNIX distribution CD-ROMs may not have been purchased for each system ordered.

The configuration utilities invoked by this utility are designed to simplify the configuration process and have been made as self-explanatory as possible. Before configuring your system, Digital recommends that you refer to the following documents:

- o Installation Guide
- o Network Configuration
- o System Administration

You can view these guides online from the Online Documentation CD-ROM or you can read hard copy versions from the Startup Kit or from the hard copy documentation set you may have purchased.

In addition, read the Release Notes for your version of Digital UNIX because the Notes contain important information about the installation and about the operating system in general.

Press RETURN to continue

2. Information about loading license PAKs:

LOADING LICENSE PAKS

Product Authorization Keys (PAKs) are included with your distribution kit and are used to register a license for a product. To register and load the license PAKs for the Digital UNIX operating system and other products, you must use the License Management Facility (LMF).

The OSF-BASE PAK must be registered before you can use Digital UNIX. This PAK provides simultaneous login capacity for two users and allows you to access the online documentation. The user "root" does not count as an Interactive Operating System User.

The OSF-BASE PAK is an availability PAK (see the Software License Management guide for more information about PAK types). The OSF-BASE PAK comes in varying denominations corresponding to your system type. If you have upgraded your system by purchasing new or additional CPU modules, you may need to upgrade your OSF-BASE license. You do this by registering the OSF-BASE PAK provided with your original system purchase along with additional OSF-BASE PAKs provided with your system upgrade purchases.

OSF-USR PAKs provide simultaneous login capacity for additional users beyond those provided by the OSF-BASE PAK. NOTE: If you have an OSF-USR PAK with zero units, which allows an unlimited number of users, remove all other OSF-USR PAKs, including the

one automatically registered during the installation, before registering the unlimited OSF-USR PAK.

You may have purchased other PAKs or have other PAKs that were included with your system purchase that should also be registered using LMF.

If you have an existing PAK with an Availability Code of "H", refer to the following chart for the required license units. If you need additional license units, contact your sales representative.

AVAILABILITY "H" LICENSE REQUIREMENTS

Processor Name	Lic Units
AlphaServer 1000	1050
AlphaServer 2000	1100
AlphaServer 2100	1100
AlphaServer 8200	1150
AlphaServer 8400	1150
AlphaStation 200	1050
AlphaStation 250	1050
AlphaStation 400	1050
AlphaStation 600	1100
DEC 2000-300	1050
DEC 2000-500	1050
DEC 3000-300	1050
DEC 3000-400	1050
DEC 3000-500	1100
DEC 3000-600	1050
DEC 3000-700	1050
DEC 3000-800	1100
DEC 3000-900	1100
DEC 4000-610	1150
DEC 4000-620	1200
DEC 4000-710	1150
DEC 4000-720	1200
DEC 7000-610	1200
DEC 7000-620 thru 660	1250
DEC 7000-710 thru 760	1150
DEC 10000-610	1250
DEC 10000-620 thru 660	1300

When you begin the system configuration by choosing option 5 of this utility, PAKs can be registered by selecting License Management Facility (LMF). You may optionally execute LMF to manage PAKS (see lmf(8)) at a later time.

The Installation Guide provides additional information about registering the OSF-BASE and OSF-USR PAKS.

Press RETURN to continue

3. Information about accessing online documentation:

ACCESSING ON-LINE DOCUMENTATION

The Digital UNIX documentation is provided on the Online Documentation CD-ROM as files that can be displayed using Bookreader, a DECwindows application.

If your workstation has Factory Installed Software (FIS), three books are preinstalled on your system to aid in system set up. These three books are: Installation Guide, System Administration, and Network Configuration.

You can view these books online by selecting the Bookreader option from the Applications menu of the Session Manager without having to use the Bookreader instructions that follow.

If your workstation does not have FIS but you do have a CD-ROM drive and the Online Documentation CD-ROM, you can view the documentation on your system by following these steps:

1. Log in as root or become superuser.
2. Place the Online Documentation CD-ROM in the CD-ROM drive.
3. Mount the CD-ROM on /cdrom by entering the following commands:

```
# mkdir /cdrom

# mount -r /dev/rz<unit #>c /cdrom
```

(Replace <unit #> with the unit number of your CD-ROM drive.)

In almost all cases, the unit number of the CD-ROM drive on a new system will be 4 (/dev/rz4c). However, to ensure that you have the correct unit number for the drive, enter the following command as root:

```
# file /dev/rrz*c
```

The file command identifies the CD-ROM drive as an RRD disk. The unit number of the drive will be in the left-hand column (rrz4c in the following example):

```
/dev/rrz4c:  character special (8/4098) SCSI #0 RRD42 disk #32
            (SCSI ID #4)
```

4. Using the text editor of your choice, append the following SINGLE line to the file /usr/lib/dxbook/library.decw_bookshelf:

```
shelf\cdrom/DOCUMENTATION/BOOKREADER/dec\Digital UNIX Doc
```

5. To invoke Bookreader, do one of the following:

- o Enter the following command:

```
# /usr/bin/X11/dxbook &
```

OR

- o Select the Bookreader option from the Applications menu of the Session Manager.

For information on how to serve Bookreader files across NFS or to review these setup instructions, see the Installation Guide.

For additional information on using Bookreader, see the document Using Bookreader that is accessible on Bookreader itself.

Press RETURN to continue

4. Information about adding users:

ADDING USERS

The way to add users to your system varies depending on how your system is configured.

If your system has Enhanced Security, you should use the XSysAdmin utility to add users. The Security guide has more information.

If your system uses the Network Information Service (NIS), the local or distributed passwd file may need to be modified. To set passwords when NIS is in use, the yppasswd command is used. The Network Configuration guide has more information.

If this system uses neither Enhanced Security nor NIS, you can use the adduser command to create user accounts. The System Administration guide has more information.

Press RETURN to continue

5. Begin system configuration:

Use this menu to set up your system and network. When you select an item, you will be asked a series of questions.

For more information about the items on the menu and the questions you must answer, see the System Administration and Network Configuration guides.

- 1) Internet Networking
 -) Local Area Transport (LAT)
- 2) Berkeley Internet Name Domain Service (BIND)
- 3) Network Information Service (NIS)
- 4) Network File System (NFS)
 -) UNIX-to-UNIX Copy Program (UUCP)
- 5) Network Time Protocol (NTP)
- 6) Mail
 -) POLYCENTER Common SNMP Agent
- 7) Printers
- 8) Security (BSD/C2)
- 9) Security Auditing

```

10) License Management Facility (LMF)
11) Prestoserve I/O Acceleration
    ) Verifier/Exerciser Tool (VET)
12) Update Administration Utility
13) Exit

```

Enter the menu item number that you want:

The setup welcome message is displayed on your graphics workstation only the first time you log in as `root` or the first time you log in to a FIS system. If you do not choose to perform the necessary subsystem configuration at this time, you must do so later through the use of the `setup` utility. This utility is accessed by entering the following command (as superuser):

```
# /usr/sbin/setup
```

If you did not choose to use the setup welcome menu to set up your system, Section 6.7.1 contains more information about the License Management Facility and how to install your PAKs, Section 6.8 describes how to display online documentation, and Section 6.11 contains information about system setup in general. The first thing you should do is to register and load your license PAKs. Continue with Section 6.7.1 for information about registering your PAKs.

6.6 Files on Your System After the Installation

The installation procedure leaves the `init` file in the `/tmp` directory. This is an unnecessary file that you can delete.

Many files with the prefixes `.new..` and `.proto..` are left on the system. The Update Installation (documented in Chapter 2) requires the `.new..` files to retain customizations during the update installation process. The `.proto..` files are used for customizing Dataless Management Services (DMS) client systems. **Do not remove these files.**

6.6.1 Installation Log Files

A list of the log files created during the installation is displayed on the screen (or in the console log if you have a workstation) after you log in for the first time. The display is similar to the following:

```

Digital UNIX V3.2C (Rev. xxx); Wed Jul 5 10:38:04 EDT 1995
Digital UNIX V3.2C Worksystem Software (Rev. xxx.x)

```

The installation software has successfully installed your system.

There are logfiles that contain a record of your installation. These are:

```

/var/adm/smlogs/install.log      - general log file
/var/adm/smlogs/install.FS.log  - file system creation logs

```

```
/var/adm/smlogs/setld.log      - log for the setld(8) utility
/var/adm/smlogs/fverify.log    - verification log file
```

The previous message is also recorded in `/etc/motd` for your future reference. The `/etc/motd` file contains the *message of the day* that is displayed each time a user logs in. The installation log files are located in the `/var/adm/smlogs` directory and include the choices you made during the installation (such as the partitions you chose, the software subsets you installed, etc.).

6.7 Loading and Registering Software Licenses

Product Authorization Keys (PAKs) are used to register a license for a product. PAKs are registered and loaded after the Digital UNIX software subsets are installed during a basic or advanced installation. To register and load the license PAKs for the Digital UNIX operating system and other products, you must use the License Management Facility (LMF). Refer to *Software License Management* or Section 6.7.1 for information about using LMF to load your PAKs.

The OSF-BASE PAK must be registered before you can use Digital UNIX. This PAK provides simultaneous login capacity for two users and allows you to access the online documentation. The user `root` does not count as an interactive operating system user.

The OSF-BASE PAK is an availability PAK (refer to the LMF documentation for more information about PAK types). This PAK comes in varying denominations corresponding to your system type. If you have upgraded your system by purchasing new or additional CPU modules, you may need to upgrade your OSF-BASE license. This can be accomplished by registering the OSF-BASE PAK provided with your original system purchase along with additional OSF-BASE PAKs provided with your system upgrade purchases.

OSF-USR PAKs provide simultaneous login capacity for additional users above and beyond those provided by the OSF-BASE PAK.

Note

If you have an OSF-USR PAK having zero units, which allows an unlimited number of users, remove all other OSF-USR PAKs, including the one automatically registered during the installation, before registering the unlimited OSF-USR PAK. The automatic PAK has an authorization number of `OSF-BASE-IMPLICIT-USER`.

You may have purchased other PAKs, or have other PAKs that were included with your system purchase that should also be registered using LMF. Refer to Section 6.7.1 for instructions on registering and loading the OSF-BASE license.

6.7.1 Using the License Management Facility

The first thing you should do on a newly installed system is to register and load your licenses for the Digital UNIX operating system by using the License Management Facility (LMF). Before registering a license for a product, you need a Product Authorization Key (PAK). A PAK contains licensing information for the product and is included with your distribution kit. This information must be registered in the License Database (LDB) and loaded into the kernel cache to use the product.

This section describes how to register and load the Base System license. The Base System PAK provides simultaneous login capacity for two users and among other things allows you to access the online documentation. An example of a license PAK follows:

- - - - -	TM	
d i g i t a l	LICENSE SOFTWARE PRODUCT	DOCUMENT ISSUE DATE
	PRODUCT AUTHORIZATION KEY	30-JUL-1995
- - - - -		

Digital Equipment Corporation
Maynard, MA.

LICENSE ADMINISTRATION LOCATION:	ORDERED BY: USER
Digital Equipment Corporation	USER
Corporate Business Practices	USER
110 Spit Brook Road	
Nashua, N.H. 03062	

PAK ID:

 Issuer: DEC

 Authorization Number: BCPTMP011371

PRODUCT ID:

 Product Name: OSF-BASE

 Producer: DEC

NUMBER OF UNITS:

 Number of units: 50

KEY LEVEL:

 Version: 3.2C

 Product Release Date: 30-JUL-1995

KEY TERMINATION DATE:

 Key Termination Date: 30-JUN-1996

RATING:

 Availability Table Code: A

 Activity Table Code:

MISCELLANEOUS:

 Key Options: ALPHA

 Product Token:

 Hardware-Id:

 Checksum: 2-MNDK-CGNN-IOAI-DEOG

Use the lmfsetup (License Management Facility) program to install a PAK. Access this program as root either from the command line or through the Setup menu. Refer to Section 6.11.1 for information on using the Setup menu. In either case, the lmfsetup program prompts you for information and then registers the license data. Use the information provided in the paper PAK that is included with your distribution kit to answer the prompts. Some items in the PAK may not have an associated value; press Return at these prompts.

Note

Use the `lmf reset` command or reboot your system to enable PAKs that were loaded since the last system reboot.

Example 6-1 shows a sample `lmfsetup` session. Complete the following steps to register and load the Base System license:

1. To run the `lmfsetup` program, enter the following command:

```
# /usr/sbin/lmfsetup
```

The program displays the `lmfsetup` menu as shown in Example 6-1. Use the information provided in the paper PAK to answer the prompts.

Example 6-1: Sample `lmfsetup` Session

```
Register PAK (type q or quit to exit) [template]
      Issuer : DEC
Authorization Number : BCPTMP011371
      Product Name : OSF-BASE
      Producer : DEC
      Number of units : 50
      Version : 3.2C
Product Release Date : 01-JUL-1995
Key Termination Date : 30-JUN-1996
Availability Table Code : A
      Activity Table Code :
      Key Options : ALPHA
      Product Token :
      Hardware-Id :
      Checksum : 2-MNDK-CGNN-IOAI-DEOG
PAK registered for template successfully
Register PAK (type q or quit to exit) [template] q
Would you like an lmf reset to be performed at this time? [Yes]
```

2. To load the license into the kernel cache, enter the following command:

```
# /usr/sbin/lmf load 0 OSF-BASE
```

3. To display details of the registered products on your screen, enter the following command:

```
# /usr/sbin/lmf list
```

Information similar to the following is displayed on the screen:

Product	Status	Users: Total	Active
OSF-BASE	active	2	
OSF-USR	active	2	

An `active` status for a product indicates that it is registered and loaded into the kernel cache. An `enabled` status indicates that the product is registered, but not loaded.

If you purchased a Digital UNIX Server Extension PAK or the Digital UNIX C Developer's Extension PAK, they can be registered at this time as well.

6.8 Activating the Bookreader Application

The Digital UNIX documentation is located on the CD-ROM labeled *Digital UNIX V3.2C Online Documentation (formerly DEC OSF/1) Disc 2 of 2*. The documentation is provided as files that can be displayed by using Bookreader, a DECwindows application. You must install the OSF-BASE PAK provided with your kit to use Bookreader.

6.8.1 Accessing Online Documentation from a Workstation

To access the documentation on a workstation, follow these steps:

1. If you do not know the device name for the CD-ROM drive, use the `file` command to find it. Enter the following command as superuser:

```
# file /dev/rrz*c
```

The `file` command returns output similar to that shown in the following example. The entry shown below for the CD-ROM drive includes the words `RRD42 disk` (you may have an `RRD43` CD-ROM drive). On a DEC 3000 Model 500 processor, the CD-ROM is usually `rz4`. The backslashes in this example indicate line continuations and are not in the actual display.

```
/dev/rrz2c: character special (8/2050) SCSI \  
#0 RZ25 disk #16 (SCSI ID #2)  
/dev/rrz3c: character special (8/3074) SCSI \  
#0 RZ25 disk #24 (SCSI ID #3)  
/dev/rrz4c: character special (8/4098) SCSI \  
#0 RRD42 disk #32 (SCSI ID #4)  
/dev/rrz8c: character special (8/16386) SCSI \  
#1 RZ56 disk #64 (SCSI ID #0)  
/dev/rrz9c: character special (8/17410) SCSI \  
#1 RZ57 disk #72 (SCSI ID #1)
```

2. As superuser, use the `mkdir` command to make a directory to use as the mount point for the CD-ROM. Then use the `mount` command to mount the CD-ROM. As shown in the following example, substitute the unit number of your CD-ROM drive for the `unit_number`.

```
mount -r /dev/rz unit_numberc /cdrom
```

For example, to mount a directory named `cdrom` on `rz4c`, enter the following commands:

```
# mkdir /cdrom
# mount -r /dev/rz4c /cdrom
```

To ensure that the CD-ROM is remounted in the event that your system crashes or is rebooted, use the text editor of your choice and open the `/etc/fstab` file. Add the following line:

```
/dev/rz4c /cdrom ufs ro 0 0
```

When your edits are correct, write and quit the file.

The system will now mount the CD-ROM on `/cdrom` on every reboot.

3. Edit the `/usr/lib/dxbook/library.decw_bookshelf` file and append the following single line to the file:

```
shelf\cdrom\DOCUMENTATION\BOOKREADER\dec\Digital UNIX V3.2C Online Docs
```

Note

In the previous step, you can optionally change the file name `/dec` to anything that you want. By doing this, you prevent an extra level of documentation hierarchy in the Bookreader library window. The file `library.decw_bookshelf` in directory `/usr/lib/dxbook` also contains a `TITLE` line that displays the title of `dxbook`. You can change this title from *Sample Library* to something else for example, *Documentation Library*. Search for the following line:

```
TITLE\sample_lib\Sample Library
```

Replace the line in the previous example with the following line:

```
TITLE\usr/lib/dxbook\Documentation Library
```

4. Start Bookreader by entering the following command:

```
# /usr/bin/X11/dxbook &
```

Bookreader is run in the background by including an ampersand (&) after the command. Once Bookreader is running, you can use it to read the books on the documentation CD-ROM.

For more information, read the online book *Using Bookreader*.

6.8.2 Accessing Online Documentation from a Server

Because Bookreader does not support character cell terminals in the base product, to view the Digital UNIX Bookreader files you must export them to a workstation running either ULTRIX Version 4.2 (or higher) or DEC OSF/1 Version 1.3 (or higher).

The following steps assume that networking is set up on the server system. For further information on setting up the network, refer to `netsetup(8)` and `nfssetup(8)` or *Network Configuration*.

To export the Bookreader files to a workstation, follow these steps:

- On the server system:
 1. Log in as root or become superuser.
 2. Ensure that the Digital UNIX CD-ROM labeled *Digital UNIX V3.2C Online Documentation (formerly DEC OSF/1) Disc 2 of 2* is mounted or that the Bookreader files have been copied to disk. This example assumes that the server system has mounted the CD-ROM on `/cdrom`. For instructions on how to mount a CD-ROM, refer to Section 6.8.1.
 3. Using the text editor of your choice, place an entry in the `/etc/exports` file for the `/cdrom` directory and make sure that you specify the `-ro` option for a read-only export, as follows:
`/cdrom -ro`
- On the client system:
 1. Log in as root or become superuser.
 2. Run `nfssetup` and import the `/cdrom` directory from the server as a read-only file system.
 3. When `nfssetup` completes, mount the `/cdrom` directory by entering the following command:
`# mount /cdrom`
 4. Edit the `/usr/lib/dxbook/library.decw_bookshelf` file and append the following single line to the file:
`shelf\cdrom\DOCUMENTATION\BOOKREADER\dec\Digital UNIX V3.2C
Online Docs`

Note

A TITLE line that displays the title of .dxbook is contained in the file
`/usr/lib/dxbook/library.decw_bookshelf`.
You can optionally change this title from *Sample Library* to something else, for example,
Documentation Library. Search for the following line: `TITLE\sample_lib\Sample Library`
Replace the line in the previous example with the following line:
`TITLE\usr/lib/dxbook\Documentation Library`

5. Start Bookreader by entering the following command:

```
# /usr/bin/X11/dxbook &
```

Bookreader is run in the background by including an ampersand (&) after the command. Once Bookreader is running, use it to read the books on the compact disc. For more information, read the online book *Using Bookreader*.

6.9 Contents of the Digital UNIX Documentation CD-ROM

The *Digital UNIX V3.2C Online Documentation (formerly DEC OSF/1) Disc 2 of 2*. CD-ROM contains the Digital UNIX documentation in Bookreader (.DECW_BOOK) format. These files are located in the `/DOCUMENTATION/BOOKREADER` directory on the CD-ROM. Table 6-2 lists the bookshelves and titles that are available. The CD-ROM also contains bookshelf files, which Bookreader uses to organize the library of books. Once Bookreader is running, the book *Using Bookreader* and the bookshelf for the Digital UNIX operating system books appear in the library window. The Digital UNIX bookshelves are arranged as follows:

- Startup Documentation
- General User Documentation
- System and Network Administration Documentation
- Programming Documentation
 - Windows Programming Documentation
 - General Programming Documentation
- Writing Device Drivers Documentation

- Migration Documentation
- Security Documentation
- Reference Pages

Table 6-2: Bookreader Bookshelves and Titles

Bookshelf	Book Title
Startup	<i>Installation Guide</i>
	<i>New and Changed Features</i>
	<i>Release Notes</i>
	<i>Technical Overview</i>
General User	<i>Command and Shell User's Guide</i>
	<i>DECwindows User's Guide</i>
	<i>Documentation Overview and Glossary</i>
	<i>Security</i>
	<i>New and Changed Features</i>
	<i>Release Notes</i>
	<i>ULTRIX to DEC OSF/1 Migration Guide</i>
System and Network Administration	<i>DEC Verifier and Exerciser Tool User's Guide</i>
	<i>Security</i>
	<i>Guide to Prestoserve</i>
	<i>Kernel Debugging</i>
	<i>Logical Storage Manager</i>
	<i>Network Administration and Problem Solving</i>
	<i>Network Configuration</i>
	<i>New and Changed Features</i>
	<i>Release Notes</i>
	<i>Sharing Software on a Local Area Network</i>
	<i>Software License Management</i>
	<i>System Administration</i>
	<i>System Tuning and Performance Management</i>
	<i>ULTRIX to DEC OSF/1 Migration Guide</i>
	<i>X Window System Environment</i>

Bookshelf	Book Title
Windows Programming	<i>DECwindows Companion to the OSF/Motif Style Guide</i>
	<i>DECwindows Extensions to Motif</i>
	<i>DECwindows Motif Guide to Application Programming</i>
	<i>Developing Applications for the Display PostScript System</i>
	<i>New and Changed Features</i>
	<i>OSF/Motif Programmer's Guide</i>
	<i>OSF/Motif Style Guide</i>
	<i>Release Notes</i>
	<i>X Window System Environment</i>
	<i>Assembly Language Programmer's Guide</i>
General Programming	<i>DEC OSF/1 Calling Standard for AXP Systems Security</i>
	<i>Digital Portable Mathematics Library</i>
	<i>DECLadebug Debugger Manual: Command-Line Interface</i>
	<i>Guide to DECthreads</i>
	<i>Guide to Realtime Programming</i>
	<i>Network Programmer's Guide</i>
	<i>New and Changed Features</i>
	<i>Programmer's Guide</i>
	<i>Programming with ONC RPC</i>
	<i>Programming Support Tools</i>
	<i>Release Notes</i>
	<i>ULTRIX to DEC OSF/1 Migration Guide</i>
	<i>Writing Software for the International Market</i>
	<i>Writing Device Drivers: Tutorial</i>
Writing Device Drivers	<i>Writing Device Drivers: Reference</i>
	<i>Writing Device Drivers: Advanced Topics</i>
	<i>Writing Device Drivers for the SCSI/CAM Architecture Interfaces</i>
	<i>Writing EISA and ISA Bus Device Drivers</i>

Bookshelf	Book Title
	<i>Writing PCI Bus Device Drivers</i>
	<i>Writing TURBOchannel Device Drivers</i>
	<i>Writing VMEbus Device Drivers</i>
	<i>Release Notes</i>
	<i>New and Changed Features</i>
Migration	<i>ULTRIX to DEC OSF/1 Migration Guide</i>
Reference Pages	<i>Reference Pages Section 1</i>
	<i>Reference Pages Section 2</i>
	<i>Reference Pages Section 3</i>
	<i>Reference Pages Section 4</i>
	<i>Reference Pages Section 5</i>
	<i>Reference Pages Section 7</i>
	<i>Reference Pages Section 8</i>

6.10 Copying Bookreader Files From CD-ROM to Disk

Instead of reading the Bookreader documentation from CD-ROM, you can copy the documentation from the CD-ROM to a disk on your system. Copying the Bookreader files to disk eliminates the need to keep the *Digital UNIX V3.2C Online Documentation (formerly DEC OSF/1) Disc 2 of 2* permanently mounted to view Bookreader documentation. Refer to Section E.1.3 for the disk space required for the Bookreader files. Follow these steps to make the Bookreader version of the documentation accessible from a disk on your system:

1. Log in as root or become superuser.
2. Create a directory for the Bookreader files. This example creates a directory called `/usr/lib/dxbook/books`

```
# mkdir /usr/lib/dxbook/books
```
3. Ensure that the CD-ROM labeled *Digital UNIX V3.2C Online Documentation (formerly DEC OSF/1) Disc 2 of 2* is mounted. Refer to Appendix A if you do not know how to mount the CD-ROM.
4. Use commands similar to the following to copy the Bookreader documentation to the desired directory. This example assumes that the CD-ROM is mounted on the directory `/cdrom` and that the Bookreader

files are being copied to the directory created in Step 2:

```
# cd /cdrom/DOCUMENTATION/BOOKREADER
# tar chpvf - . | (cd /usr/lib/dxbook/books; tar xvpf -)
```

5. Modify the file `/usr/lib/dxbook/library.decw_bookshelf` so that it uses the new pathname to the Bookreader files:

```
shelf\usr/lib/dxbook/books/library\Bookreader Documents
```

6. Unmount the CD-ROM by using a command similar to the following:

```
# umount /dev/rr4c
```

Refer to Appendix A if you do not know how to unmount a CD-ROM.

If you copied the files to a directory on a server system, you must export the directory to a workstation as shown in Section 6.8.2.

To start the Bookreader application, either select the Bookreader option from the Applications menu of the Session Manager, or enter the following command:

```
# /usr/bin/X11/dxbook &
```

Once Bookreader is running, you can use it to read the books. For more information about using the Bookreader application, read the online book *Using Bookreader*.

6.11 Setting Up the System for General Use

This section describes the steps necessary to prepare your operating system for general use. If you have a workstation and you did not perform these steps from the Digital UNIX Welcome Screen the first time you logged in as `root` or the first time you logged into your FIS system, you must follow the instructions in this section to perform the required subsystem configurations.

This section explains how to do the following:

- Use setup scripts
There are programs (scripts) to help you perform tasks such as setting up the network or setting up mail.
- Add users and groups
- Run the SVID2 Habitat
- Verify the installation
- Set up security features

6.11.1 Using the Setup Programs

There are programs such as `lprsetup`, `netsetup`, and `bindsetup` to help you set up your printer and network. These programs are available from a menu and from the command line.

To use the Setup menu on a workstation, log in as `root` and choose `System Setup` from the Applications menu. You can also access the Setup menu from the command line by becoming `root` and entering the `setup` command. For example:

```
# su -
password:
# /usr/sbin/setup
```

In either case, a menu similar to the following is displayed:

You can use this menu to set up your system and network.
Select the item you want to set up and answer the questions.

For more information on the items in the menu see the "System Administration" and "Network Configuration" guides.

- 1) Internet Networking
- 2) Local Area Transport (LAT)
- 3) Berkeley Internet Name Domain Service (BIND)
- 4) Network Information Service (NIS)
- 5) Network File System (NFS)
- 6) UNIX-to-UNIX Copy Program (UUCP)
- 7) Network Time Protocol (NTP)
- 8) Mail
- 9) POLYCENTER Common SNMP Agent
- 10) Printers
- 11) Security (BSD/C2)
- 12) Security Auditing
- 13) License Management Facility (LMF)
- 14) Prestoserve I/O Acceleration
- 15) Verifier/Exerciser Tool (VET)
- 16) Update Administration Utility
- 17) Exit

Please enter your selection:

The options on this menu differ depending on the subsets that were chosen during the installation. In the previous example, all mandatory and optional subsets were chosen during the installation. If a subset was not installed, the option appears on the menu, but the number next to it will not be displayed. When a number is not displayed next to an option, you cannot choose that option.

When you choose an option, messages may be displayed that scroll off the top of the screen. Use the scroll bar at the left of the screen to review these messages. Each of the setup programs is a series of interactive prompts during which questions are displayed on the screen and you respond accordingly. Most questions provide you with default responses and in most

cases, you can choose the defaults. Any default parameters that you accept can always be changed at a later time.

You should read the relevant sections of the Digital UNIX documentation set before running a setup program or choosing an option from the Setup menu. The documentation will tell you what information you need to answer screen prompts. It will also tell you if there are any prerequisites to running a specific setup program.

The *Network Configuration* guide provides information that you will need to use the networking programs. The *System Administration* guide provides information on system administration tasks such as configuring printers.

6.11.2 Adding a User Account

This section describes how to add a user account by using the `adduser` program. The `adduser` program can be used if you are running the Berkeley Internet Name Domain (BIND) naming service. If you are running the Network Information Service (NIS) naming service, refer to *Network Configuration* for information on how to add a user on a networked system.

Note

If you have enhanced security installed on your system, you should use the `XSysAdmin` windowing interface to add users. Refer to *Security* and `XSysAdmin(8)` for more information.

Use the `adduser` command to add user accounts to the system. You can use the `addgroup` command to modify the `/etc/group` database file.

To use the `adduser` program, enter the following command:

```
# adduser
```

The program responds with a series of prompts and messages, as shown in the following examples. The brackets ([]) indicate a default response. Press Return to accept the default, or enter a different response and press Return.

```
Enter a login name for the new user (for example, john): chris
Enter a UID for (chris) [5006]: Return
Enter a full name for (chris): Christopher Ryan
Enter a login group for (chris) [users]: Return
Enter another group that (chris) should be a member of.
(<Return> only if none): Return
Enter a parent directory for (chris) [/usr/users]: Return
The shells are:
/usr/bin/sh      /usr/bin/ksh      /bin/csh          /bin/ksh
/usr/bin/csh     /bin/sh
Enter a login shell for (chris) [/bin/sh]: Return
```

Next, informational messages are displayed by the `adduser` program, and you are asked to enter a new password for the user. To ensure

confidentiality, the password is not displayed on your screen.

```
Adding new user ...
Rebuilding the password database...
10 password entries, maximum length 145
Creating home directory...
```

```
You must enter a new password for (chris).
Changing password for chris.
```

```
New password:
Retype new password:
```

If you mistype the password when you are asked to verify it, no password is set and the account is disabled. To enable the user account, enter the `passwd` command followed by the user name.

A hashed `passwd` database allows for faster searches of the `passwd` file. If a hashed `passwd` database did not exist previously, a message informing you that the hashed `passwd` database does not exist is displayed and you are asked if you want a database created. If you want a hashed `passwd` database, enter `yes` at the prompt and the `adduser` program will create one for you. If you do not want a hashed `passwd` database, enter `no` at the prompt. Refer to the `vipw(8)` reference page for information about editing the `/etc/passwd` file.

A `/var/spool/mail` directory is automatically created for the user by the `adduser` program. If the user plans to use the Network File System (NFS) to mount the mail file to a workstation, you might want to create the mail file for the user. Refer to *Network Configuration* for information on exporting a mail file to a workstation.

For more information on the `adduser` utility, refer to `adduser(8)`. For information on adding a group, refer to *System Administration* or `addgroup(8)`.

6.11.3 Setting Up Printers

Printers are set up with the `lprsetup` program.

You are prompted for the name and type of the printer by the `lprsetup` program. After answering these questions, you are prompted with a series of other questions, which you can answer by taking the default.

Note

Printing cannot take place unless the `lpd` daemon is running.

Refer to `lprsetup(8)` or *System Administration* for more information about setting up printers.

6.11.4 Running the SVID2 Habitat

If you have installed the SVID subsets and want to run the SVID2 Habitat, execute the following command (as superuser) after the system is booted.

```
# /usr/sbin/timezone
```

6.11.5 Verifying the Installation

If you installed the Verifier/Exerciser Tool (VET) subset, you can use VET to verify that the hardware and the operating system installed successfully. Refer to the *DEC Verifier and Exerciser Tool User's Guide* for information about VET.

6.11.6 Setting up Security

Refer to *Security* for information on setting up the enhanced security option. You must install the C2 security subsets before you can use this feature.

6.11.7 Setting Up the Logical Storage Manager (LSM)

Refer to *Logical Storage Manager* for information about setting up LSM. You must install the LSM subsets before you can use this feature.

The full installation process installs a new `/usr` and optionally the `/var` file systems into disk partitions. To enable use of LSM volumes for the `/usr` and `/var` file systems, the disk partitions need to be encapsulated into LSM volumes. Refer to the *Logical Storage Manager* for information about how to encapsulate disk partitions to LSM volumes.

If you performed a full installation and were previously running LSM with `/usr` and/or `/var` on an LSM volume, you will have to clean up (remove) these LSM volumes from your configuration since they are no longer in use. Before the current `/usr` and `/var` file systems can be encapsulated to LSM volumes, the LSM configuration that existed before the full installation must be cleaned up.

If for example, `vol-rz3g` was an LSM volume that previously contained the old `/usr` file system on a DEC OSF/1 Version 3.2 system and the system was installed with Digital UNIX Version 3.2C, `vol-rz3g` can be removed using the following steps:

1. Use the `volprint` command to obtain the current LSM configuration:

```
# volprint -htqA
dg rootdg      784247256.1025.lsm

dm disk01      rz14h      simple  512      1789584 /dev/rrz14h
dm rz3g        rz3g       nopriv  0        819200 /dev/rrz3g

v  vol-rz3g    fsgen      DISABLED CLEAN 819200 SELECT -
```

```
pl vol-rz3g-01 vol-rz3g      DISABLED  CLEAN  819200 CONCAT  -  RW
sd rz3g-01      vol-rz3g-01  0          0      819200 rz3g  rz3g
```

2. Remove the LSM volume `usrvol`:

```
# voledit -g rootdg -rf rm vol-rz3g
```
3. Remove the disk on which `usrvol` existed:

```
# voldg -g rootdg rmdisk rz3g
```
4. Remove the disk from the LSM configuration:

```
# voldisk rm rz3g
```

Steps similar to those performed for the LSM volume (if it exists) should be performed to the `/var` file system.

Refer to *Logical Storage Manager* for information about how to set up LSM volumes for `/usr` and `/var` after a full installation.

6.12 Monitoring Performance History Installation

The Monitoring Performance History (MPH) utility gathers timely and accurate information on the reliability and availability of the Digital UNIX operating system and associated platforms.

MPH is a suite of shell scripts that copy error log and crash dump information twice per week to Digital.

The information is automatically copied to Digital for analysis via Internet Mail. After analysis, reports are generated and distributed to the users of this information, namely Software and Hardware Engineering, Manufacturing, and Digital Services. This data is internally secure to Digital and is used exclusively for monitoring purposes.

The MPH process is automatic, requiring no human intervention and no training.

This software will not impact or degrade your system's performance. MPH runs as a background task, using very negligible CPU resources and is invisible to the user. The disk space required for the collected data and the application is approximately 300 blocks per system. This number could be slightly higher in the case of a high number of errors.

6.12.1 Running MPH

Before running MPH, review the following information:

- The Software Development Environment subset (OSFPGMR350) must be installed.

- The MPH software kit is contained in the mandatory base software subset OSFHWBASE350. This subset is installed automatically during the operating system installation.
- Disk space requirements for MPH is approximately 100 blocks after installation.
- If the operating system needs to be shut down for any reason, an orderly shutdown process must be followed.

To run MPH on your system, complete the following steps:

1. As root, enter the following command to run the MPH script:

```
# MPH_OSF_018.CSH
```

2. Enter the information requested by the script.

Running the MPH_OSF_018.CSH script does the following:

- Creates an MPH directory. The default directory location is /var/mph.
- Updates the system crontab files to execute the MPH files at the appropriate times. The binary error log extractor runs daily at 2:00 a.m. The data is mailed to Digital at 3:00 a.m. every Wednesday and Sunday.

6.13 Enabling Realtime Preemption

Digital UNIX provides a kernel option to enhance the performance of realtime applications conforming to POSIX 1003.1b-1993. These realtime kernel options make it possible for the operating system to guarantee that an application has access to resources in a timely and predictable manner.

The realtime kernel which supports kernel preemption was previously installed as an option during base system installation. Now, the POSIX 1003.1b portions are included in the kernel automatically and a separate kernel is not needed. Preemption capabilities are disabled by default, but can be selected and enabled when the kernel is configured and built.

There are two methods to obtain additional realtime capabilities:

- You can use the `setld` command to enable realtime preemption as shown in the following example:
 1. Issue the following command:


```
# setld -c OSFBIN350 RT_ON
```
 2. Run `doconfig` without any options to generate a new configuration file. After the RT_ON operation, the configuration file will contain the entry `options RT_PREEMPT_OPT` that causes preemption to be on by default (in the appropriate lockmode).

You can also:

- Use a text editor of your choice to edit the `/etc/sysconfigtab` file and set the `rt-preempt-opt` parameter equal to 1 as shown in the following example:

`rt-preempt-opt=1`

After setting this parameter, you must reboot your system. When the `rt-preempt-opt` parameter is set, the correct lockmode is chosen to support realtime preemption. On a uni-processor system, the lockmode is set to 1. On a multi-processor system, the lockmode is set to 3.

Working in the Standalone Environment 7

This chapter describes the standalone environment that is accessed from the System Management option on the Installation menu. This chapter describes how to:

- Invoke the standalone environment
- Access devices in the standalone environment
- Mount file systems in the standalone environment
- Restore file systems in the standalone environment
- Change the size of disk partitions in the standalone environment
- Access Logical Storage Manager (LSM) volumes in the standalone environment

7.1 What is the Standalone Environment?

The standalone environment is a combination of a virtual disk and file system environment. Part of the environment resides only in physical memory and part is mounted from a disk. This disk can be either the distribution media (CD-ROM) or a disk on a RIS server. The primary purpose of the standalone environment, which is also known as the standalone system (SAS), is to support the initial phases of an installation that includes selecting the distribution and system devices and restoring the root file system image to the target system disk.

The standalone environment also supports system management activities. These activities include:

- Restoring a damaged root file system
- Checking the consistency of the root file system
- Restoring the boot block image
- Performing disk maintenance operations such as changing the disk partition layout prior to performing an advanced installation
- Correcting errors in LSM volumes used for `root (/)` or `/usr` file systems or the primary swap

The standalone environment provides commands that help you recover from serious problems such as root file system corruption and enables you to

perform general file system and disk maintenance tasks when no other environment is available. The standalone environment is a primitive environment and does not perform like a full operating system environment. You should perform system management activities in the standalone environment only if you have extensive UNIX operating system experience and an operating system environment is not available.

7.2 Invoking the Standalone Environment

The type of processor that you have determines the media and the commands used to invoke the standalone environment. To summarize, you must shut down your system, then execute the *boot device* command specific to your hardware type to boot your system from CD-ROM or the network. These media and commands are identified and described in Chapter 4.

After you boot your processor, brief installation information and a menu similar to the following is displayed:

```
***  STANDALONE SYSTEM ENVIRONMENT  ***

Select the BASIC option to install the mandatory
software subsets for your system configuration.

Select the ADVANCED option to display optional
software subsets from a menu and/or customize
system disks and partitions.

Select the SYSTEM MANAGEMENT option to customize disk
partitions on the system disk.

Select one of the following options:

    1) BASIC Installation
    2) ADVANCED Installation
    3) SYSTEM MANAGEMENT
```

```
Enter your choice: 3
```

To invoke the standalone environment, choose the System Management option from the menu. When you choose the System Management option, the system is in single-user mode and the superuser prompt (#) is displayed.

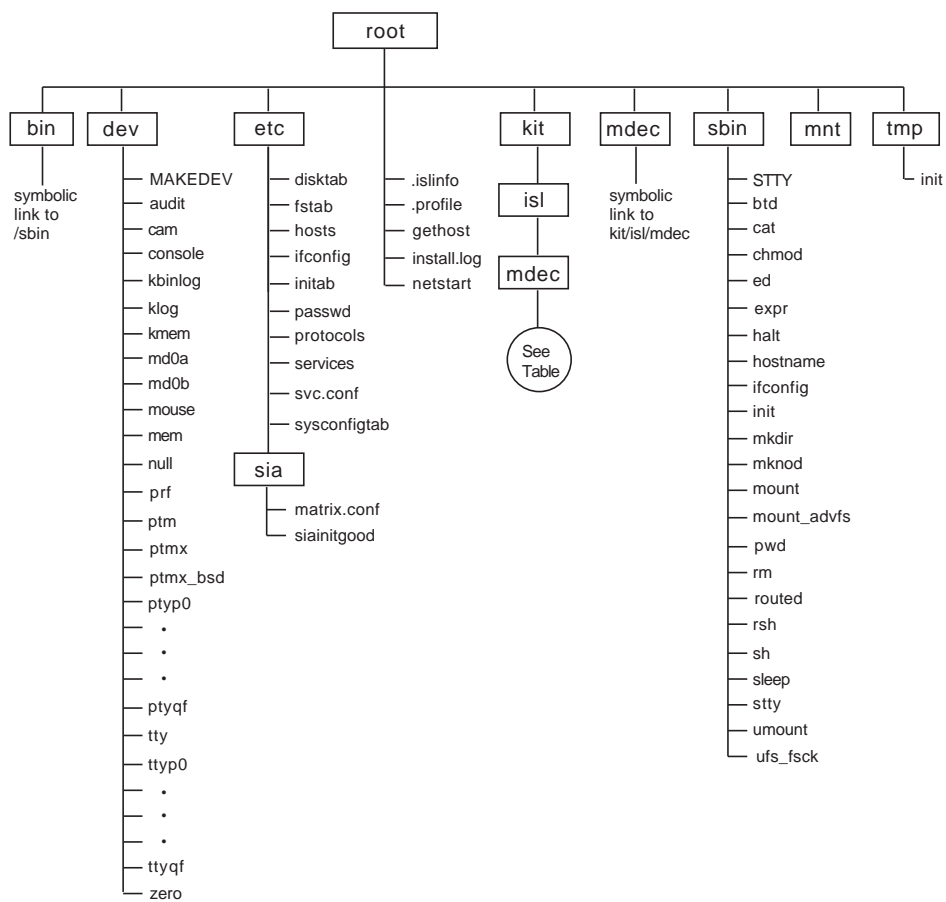
7.3 Standalone Environment File System Layout

Figure 7-1 shows the Digital UNIX SAS file system, including those commands you need to change disk partition layouts. The boxes in the diagram denote directories. Files shown under the directory boxes may be executable files (commands or scripts), special files, or ordinary files. An example of an executable file is `/kit/isl/disklabel` that is used to display or change disk partition tables.

The PATH shell variable is aware of the layout of the SAS file system that makes it unnecessary to specify the complete pathname when executing a

command. For example, `/kit/isl/disklabel` can be invoked simply by entering `disklabel`.

Figure 7-1: Partial Layout of the Standalone File System



ZK-0869U-R

Table 7-1 lists the commands and utilities available in the `/kit/isl` directory in the standalone environment.

Table 7-1: Contents of the `/kit/isl` Directory

Error	diff	log	rsh	updpblock.dat
Lists	disklabel	lpblocker	scu	updpinfo
Logging	disktab	ls	sed	updpnowarn.dat
Pwd	dump	machine	setld	updtypechg.dat
Ready	egrep	mdec	sifsync	vdump
Strings	finder	mkfdmn	sizer	vold
Ticker	fitset	mkfset	sleep	voldctl
Wait	fsck	mount_advfs	sort	voldg
awk	fverify	mt	stlmenu	voldisk
cat	getopt	mv	sync	voliod
cdl	install.1	newfs	tar	volmend
chgrp	install.osf	pickapart	tclear	volprint
compress	installupdate	pwd	udetect	volrecover
cp	kill	radisk	ufs_fsck	volume
date	libmrg	rcp	updadmin	vrestore
dd	libscp	restore	updeng	whoami
depord	ln	rm	updmore	

7.4 Standalone Environment Capabilities

The standalone environment is a primitive environment that lacks most of the capabilities of a full operating system environment. This environment works without a swap device and with very limited free disk space within the memory file system. These two factors mean that tasks requiring large amounts of memory that create the need to swap or tasks requiring large amounts of disk space (such as `/tmp` space) are likely to encounter failures in the standalone environment.

Use the standalone system to perform the following tasks:

- Edit a file with the `ed` text editor. On systems with VGA monitors, you can enable the `vi` text editor by entering:


```
# TERM=vt100
# export TERM
```
- Create new file systems with the `newfs` command for UNIX File Systems (UFS) or with the `mkfdmn` and `mkfset` commands for Advanced File Systems (AdvFS).

- Restore file systems with the `restore` command (for UFS) or the `vrestore` command (for AdvFS).
- Modify disk partition tables with the `disklabel` command before the advanced installation. Remember to use the `-t advfs` or `-t ufs` option with the `disklabel` command depending upon which file system type is in use (AdvFS or UFS). UFS boot blocks are installed by default if `-t advfs` is not specified. Refer to `disklabel(8)` for more information.
- Mount other disks and file systems with the `mount` command.
- Fix UFS file systems with the `fsck` command. The `fsck` command is not required for AdvFS file systems.

The commands in the `/kit` directory are exported read-only and reside in a read-only file system.

Note

The `root` file system in this environment is located on a virtual disk that is mounted with read-write permissions. However, any changes that you make on files that you create in `root` are volatile and are not saved when you exit the SAS.

7.5 Accessing Devices in the Standalone Environment

Device special files must be present in the `/dev` directory to access your system's disk and tape devices. Execute `ls -l /dev` to see if the required device special files exist. If these files do not exist, use the `MAKEDEV` command to create them.

For example, to create the device special file for a SCSI disk, unit number 0 (zero), execute the following commands:

1. Change to the `/dev` directory by entering:

```
# cd /dev
```
2. Use the `MAKEDEV` command to create the disk device special file for `rz0` by entering:

```
# ./MAKEDEV rz0
```

7.6 Mounting File Systems

The standalone environment can be used to perform maintenance operations on existing file systems. For instance, if the kernel (`vmunix`) on your `root` file system becomes damaged and you have a good backup, you can

mount your `root` file system and replace the damaged kernel. If you are using LSM volumes for the `root` file system, refer to Section 7.9 for information about how to start LSM in the standalone environment.

To mount an existing `root` file system located on `/dev/rz0a` in this environment, execute the following commands:

1. Create the device special files for the disk containing the root file system:

```
# cd /dev
# ./MAKEDEV rz0
```

2. Prepare to mount the file system:

- a. For UNIX file systems (UFS) enter:

```
# mount /dev/rz0a /mnt
```

- b. For Advanced File Systems (AdvFS) enter:

```
# mkdir -p /etc/fdmns/root_domain
# cd /etc/fdmns/root_domain
# ln -s /dev/rz0a
# mount root_domain#root /mnt
```

The existing root file system is accessible at `/mnt` and can be modified at this point.

7.7 Restoring File Systems

The standalone environment is ideal for restoring damaged root file systems. To restore your root file system, first create the device special files for the disk on which the root file system is to reside. Next create the device special files for the tape device that contains the dump of the root file system to be restored. Create these device special files using the `MAKEDEV` command as shown in Section 7.5.

7.7.1 Restoring UNIX File Systems (UFS)

The following procedure shows how to restore a UNIX file system in the standalone environment:

1. If the disk does not have a label, which could occur if the disk was physically damaged or replaced, write the default disk partition tables and bootstrap programs. The disk partitions and bootstrap programs should be operational. To determine if the disk has a valid label, use the `disklabel` command with the following syntax:

```
disklabel -r disk
```

Use the `disklabel` command with the following syntax to write the default disk partition table:

disklabel -rw *disk disk_type*

The *disk* parameter specifies the disk that includes the device mnemonic and unit number. The *disk_type* parameter specifies the type of disk associated with *disk* as described in the `/etc/disktab` file.

For example, to write the default disk partition tables on an RZ57 disk, unit 0, enter the following command:

```
# disklabel -rw rz0 rz57
```

Note

The `disklabel` command used in this procedure writes the default disk partition tables to the disk. Writing a label with customized partition table settings may affect the entire disk. If the disk you are restoring has customized partition table settings, invoke the editing option of the `disklabel` command. Refer to *System Administration* or to `disklabel(8)` for more information.

2. Create a new root file system by using the following command syntax:

newfs *raw_device*

The *raw_device* parameter specifies the full raw device pathname of the disk device on your system. For example, to create a new file system on an RZ57, unit 0, enter the following command:

```
# newfs /dev/rxz0a rz57
```

3. Mount the file system by using the following command syntax:

mount *block_device* /mnt

In the previous example, the `/mnt` directory must be created if it does not already exist (directories are created using the `mkdir` command). The *block_device* parameter specifies the full block device pathname of the disk device. For example, to mount the file system created in the previous step, enter the following command:

```
# mount /dev/rz0a /mnt
```

4. Next, restore the file system. If you are restoring dump files from a local file system, change to the `/mnt` directory, insert the medium containing the dump file, and enter the `restore` command with the following command syntax:

restore -Yrf *dumpfile*

The *dumpfile* parameter specifies the pathname of the file containing the dump data. For a tape, enter the following commands:

```
# cd /mnt
# restore -Yrf /dev/rmt0h
```

You can use the standalone environment to restore other file systems. However, the environment's limitations (refer to Section 7.4 for more information) may cause failures during the restore. Digital recommends performing file system restores from a full operating system environment. If such an environment is unavailable due to the need to restore */var* and/or */usr*, you should boot your system to single-user mode using your existing or restored root file system. In the single-user mode, more disk space is available, and swap space can be made available by issuing the following command:

```
# swapon -a
```

7.7.2 Restoring Advanced File Systems (AdvFS)

The following procedure shows how to restore AdvFS file systems in the standalone environment:

1. If the disk does not have a label, which could occur if the disk was physically damaged or replaced, write the default disk partition tables and bootstrap programs. The disk partitions and bootstrap programs should be operational. To determine if the disk has a valid label, use the *disklabel* command with the following syntax:

```
disklabel -r disk
```

Use the *disklabel* command with the following syntax to write the default disk partition table:

```
disklabel -rw -t advfs disk disk_type
```

The *-t advfs* option must be used when creating an AdvFS root fileset to ensure that the correct boot blocks are placed on the disk. The *disk* parameter specifies the disk that includes the device mnemonic and unit number. The *disk_type* parameter specifies the type of disk associated with *disk* as described in the */etc/disktab* file. For example, to write the default disk partition tables on an RZ57 disk, unit 0, enter the following command:

```
# disklabel -rw -t advfs rz0 rz57
```


Note

The `disklabel` command used in this procedure writes the default disk partition tables to the disk. Writing a label with customized partition table settings may affect the entire disk. If the disk you are restoring has customized partition table settings, invoke the editing option of the `disklabel` command. Refer to *System Administration* or to `disklabel(8)` for more information.

2. Create a new root file domain by using the following command syntax:

```
mkfdmn -t disk_type raw_device domain
```

The *raw_device* parameter specifies the full raw device pathname of the disk device on your system. For example, to create a new file system on an RZ57, unit 0, enter the following command:

```
# mkfdmn -t rz57 /dev/rrz0a root_domain
```

3. Create a root fileset in the `root_domain` file by using the following command:

```
# mkfset domain fileset
```

The *domain* parameter specifies the name of the root file domain. For example, to create the `root` fileset in the `root_domain` file domain, enter the following command:

```
# mkfset root_domain root
```

4. Mount the `root_domain` fileset by using the following command syntax:

```
mount domain#fileset mount_point
```

The *domain#fileset* parameter specifies the `root` file domain and the `root` fileset. The mount point must be created if it does not already exist. For example, to mount the fileset created in the previous steps, enter the following command:

```
# mount root_domain#root /mnt
```

5. Restore the fileset using the `vrestore` command. To restore files from a local file system, change to the `/mnt` directory, insert the medium containing the dump file, and enter the `vrestore` command using the following syntax:

```
vrestore -vxf dumpfile
```

The *dumpfile* parameter specifies the pathname of the file containing the dump data. Enter the following commands for a tape:

```
# cd /mnt
# vrestore -vxf /dev/rmt0h
```

Note

You can restore a UFS format dump tape onto AdvFS (for instance if you are converting a UFS root file system to AdvFS) and you can make a vdump tape on UFS. The restore command you use depends on the format of the tape (dump versus vdump). Use vrestore to restore AdvFS dumps performed with the vdump command and restore to restore dumps performed with the dump command. The corresponding restore command is used regardless of the target file system type.

Use the standalone environment to restore other file systems. However, the environment's limitations (refer to Section 7.4 for more information) may cause failures during the restore. Digital recommends performing file system restores from a full operating system environment. If such an environment is unavailable due to the need to restore either /var or /usr, you should boot your system to single-user mode by using your existing or restored root file system. In the single-user mode, more disk space is available, and swap space can be made available by issuing the following command:

```
# swapon -a
```

6. Verify the /etc/fstab and /etc/fdmns directories. The mkfdmn command added /etc/fdmns/root_domain to the root file system in the standalone environment that is deleted when you exit the standalone environment.

7.8 Changing the Size of the Disk Partition

Use the disklabel command to change the drive identification or the disk partitions on the drive or to replace a damaged label or bootstrap. Remember to use the -t advfs or -t ufs option with the disklabel command depending upon which file system type is in use (AdvFS or UFS). UFS boot blocks are installed by default if -t advfs is not specified. Refer to disklabel(8) for more information.

Note

You must be experienced with using the `ed` editor when using the `disklabel` command in the standalone environment.

To look at the existing disk partition layout, enter the `disklabel` command in the following format and replace the variable *n* with the unit number of the disk. For example, to look at the existing disk partition layout of an RZ disk, enter the following command:

```
# disklabel -r /dev/rzn
```

In the previous example, *n* is the unit number of the disk. The existing disk partition layout is displayed.

To change the size of the disk partition, complete the following steps. The following example uses an `rz26` disk, unit number 0. In this example, the size of the `b` partition is decreased and the size of the `g` partition is increased to include the space no longer being used by the `b` partition.

1. Change to the `/dev` directory:

```
# cd /dev
```

2. Use the `MAKEDEV` command to create the disk device special files for `rz0`:

```
# ./MAKEDEV rz0
```

3. Check the disk label information on `rz0`:

```
# disklabel -r rz0
```

If there is no label, the following message is displayed:

```
Bad pack magic number (label is damaged, or pack is unlabeled)
```

To label the disk with the default partitions, enter the following command:

```
# disklabel -rw rz0 rz26
```

Note

The kernel device drivers do not allow the size of a disk partition to be decreased or the offset of a partition to be changed while it is open. Some device drivers create a label containing only a single large partition if a disk is unlabeled; thus the label must be written to the `a` or `c` partition of the disk while it is open. This sometimes requires the desired label to be set in two steps, the first one creating at least one other partition, and the second setting the label on the new partition while shrinking the `a` partition.

4. Set the EDITOR environment variable to use the ed editor:

```
# EDITOR=ed
export EDITOR
```

5. Edit the disk label for rz0:

```
# disklabel -e rz0
```

6. Display the disk label by entering the following command:

```
1,$p
```

7. Search for the b partition by entering the following command:

```
/b:
```

Information similar to the following is displayed:

```
b: 262144 131072 unused 1024 8192 # (Cyl. 164*- 492*)
```

8. Change the size of the b partition from 262144 sectors to 131072 sectors by entering the following command:

```
s/262144/131072/p
```

This reduces the size of the b partition from 128 MB to 64 MB. The revised information is displayed:

```
b: 131072 131072 unused 1024 8192 # (Cyl. 164*- 402)
```

There is no need to modify cylinder information; cylinder information is automatically modified when you save and exit the file.

9. Search for the g partition by entering the following command:

```
/g:
```

Information similar to the following is displayed:

```
g: 819200 393216 unused 1024 8192 # (Cyl. 492*- 1519*)
```

10. Because the size of the b partition was reduced by 131072 sectors, the size of the g partition should be increased by 131072 sectors. Change the size of the g partition from 819200 sectors to 950272 sectors by entering the following command:

```
s/819200/950272/p
```

This increases the size of the g partition from 400 MB to 464 MB.

11. Change the offset of the g partition by entering the following command:

```
s/393216/262144/p
```

The revised information is displayed:

```
g: 950272 262144 unused 1024 8192 # (Cyl. 402*- 1519*)
```

12. To verify your changes, redisplay the disk label by entering the following command:

```
1,$p
```

13. Save your edits and quit the editor by entering the following command:

```
wq
```

You are asked if you want to write the new label. If you are satisfied with your changes, press Return to accept the default answer, y.

```
Write new label? [y] Return
```

14. Display the newly customized disk by entering the following command:

```
# disklabel -r rz0
```

15. Restart the installation by typing `restart`.

The Installation menu is displayed. Choose the Advanced Installation option by entering the number 2 at the prompt. If you choose the Basic Installation option, the changes you made to the disk label will be lost because the default partitions are always used on the disk selected as the system disk.

```
*** STANDALONE SYSTEM ENVIRONMENT ***
```

```
Select the BASIC option to install the mandatory
software subsets for your system configuration.
```

```
Select the ADVANCED option to display optional
software subsets from a menu and/or customize
system disks and partitions.
```

```
Select the SYSTEM MANAGEMENT option to customize disk
partitions on the system disk.
```

```
Select one of the following options:
```

- 1) BASIC Installation
- 2) ADVANCED Installation
- 3) SYSTEM MANAGEMENT

```
Enter your choice: 2
```

7.9 Starting the Logical Storage Manager

If the LSM daemons `vold` and `voliod` fail to restart when your system is rebooted or the LSM configuration database is corrupted, the LSM volume on which the `root` file system exists will not be accessible. Under such circumstances your system cannot be brought up to multi-user mode. To repair possible problems in `/etc/vol/volboot` or the `rootdg`

diskgroup, you can boot the SAS kernel and use the LSM commands in the SAS area to rectify the problem.

Use commands similar to the following to restart LSM in the standalone environment:

1. Create device special files for at least one disk that has a valid LSM configuration database:

```
# cd /dev
# ./MAKEDEV rz9 rz10
# cd /
```
2. Create LSM device special files:

```
# mknod /dev/volconfig c 41 0
# mknod /dev/volevent c 41 1
# mknod /dev/voliiod c 41 2
# mknod /dev/volinio c 41 3
```
3. Start the LSM error daemons, voliiod:

```
# voliiod set 2
# mkdir /etc/vol
```
4. Start the LSM configuration daemon in disable mode:

```
# vold -m disable
```
5. Initialize the /etc/vol/volboot file:

```
# voldctl init
```
6. Add one of the disks containing the LSM configuration database to the /etc/vol/volboot file:

```
# voldctl add disk rz9
```
7. Put vold in the enabled mode and import all LSM diskgroups:

```
# voldctl enable
```
8. Get a list of all disks known to LSM:

```
# voldisk list
```

Make sure that all disks have a device special files in /dev.
9. Execute the volprint command to obtain information about the LSM configuration:

```
# volprint -htA
```

10. Start the LSM volumes:

```
# volume -g diskgroup -U usetype start volume name
```

Refer to the *Logical Storage Manager* guide for more information about how to correct problems encountered while enabling LSM or starting LSM volumes.

7.10 Using a Disk that Contains ULTRIX Partition Information

Any disk that was in use under Digital's ULTRIX operating system will have a partition table. In such cases, the `disklabel` command displays the ULTRIX partition information and gives you the following options:

- To create a disk label based on the contents of the ULTRIX partition table
- To create a disk label based on the default Digital UNIX partition information found in `/etc/disktab`

The following is an example of the ULTRIX partition table display:

```
ULTRIX compatible partition data found.  
This data may be different than the standard  
partition layout information in /etc/disktab.
```

ULTRIX partition table layout is:

partition	bottom	top	size	overlap
a	0	32767	32768	c
b	32768	163839	131072	c
c	0	2050859	2050860	a,b,d,e,f,g,h
d	163840	792845	629006	c,g
e	792846	1421851	629006	c,g,h
f	1421852	2050859	629008	c,h
g	163840	983039	819200	c,d,e
h	983040	2050859	1067820	c,e,f

```
Use the ULTRIX-style partition data? [y]: n
```

If you want to preserve the ULTRIX partition data, enter `y` at the prompt; otherwise, enter `n`. If you changed the partition data, the installation procedure recognizes the changes to the disk label and prompts you to use the customized partition layout or the default layout. To preserve your changes, choose the customized partition layout.

7.11 Exiting the Standalone Environment

After performing preinstallation, system maintenance, or troubleshooting activities, you can return to the Installation menu and select the advanced or basic installation options by entering `restart` at the superuser prompt (`#`).

To exit from the standalone environment and log in to your already installed system, enter `halt` at the superuser prompt (`#`). When the console prompt (`>>>`) displays, enter `boot device`. Boot commands for all supported processors are described in Chapter 4.

Installing Software Subsets After the Installation 8

This chapter describes how to use the `setld` command to install additional software subsets after the initial operating system installation.

Use the `setld` command to perform the following software management tasks:

- Display an inventory of subsets or files within a subset
- Install or delete software subsets
- Verify subset installation

A detailed technical explanation of the `setld` command is located in the *Programming Support Tools* guide.

8.1 Using the setld Command

The syntax of the `setld` command is as follows:

```
setld [ -D root-path ] -c subset-id message  
setld [ -D root-path ] -d subset-id [ subset-id... ]  
setld [ -D root-path ] -i [ subset-id [ subset-id... ] ]  
setld [ -D root-path ] -l location [ subset-id [ subset-id... ] ]  
setld [ -D root-path ] -v subset-id [ subset-id... ]
```

Table 8-1 provides a brief description of the options for the `setld` command:

Table 8-1: Options for the setld Command

Option	Description
<code>-D</code>	In conjunction with any other option, specifies an alternative root directory. For example: <pre># setld -D /usr/doctools -i</pre>

Table 8-1: (continued)

Option	Description
	The directory specified must be the root directory of an entire system hierarchy. Do not attempt to use this option to place software in a directory that is not a system root.
-l	Loads the software kits that are in the specified location; if subsets are specified, only the named subsets are installed. For example: <pre># setld -l /mnt/ALPHA/BASE DNABASE100</pre>
-c	Runs the configuration phase of the named subset's subset control program. Refer to the document supplied by your software vendor for the command syntax. For example: <pre># setld -c DNABASE100 INSTALL</pre>
-i	Displays a list of subsets and their installation status. If a subset is named, displays a list of that subset's contents. For example: <pre># setld -i OSFMANOS350</pre>
-v	Runs the named subset's Installation Verification Procedure (IVP). For example: <pre># setld -v OSFMANOS350</pre>
-d	Deletes the named subset or subsets. For example: <pre># setld -d OSFMANOS350 OSFMANOP350</pre>

To list all the options available for the `setld` command, use the `-h` option:

```
# setld -h
```

8.2 Displaying Subset Inventories

You can use the `setld` command to display an inventory of the subsets recognized by your system, showing the status (installed or not installed) of each subset.

To display a subset inventory, use the `setld -i` command with the following syntax:

```
/usr/sbin/setld [-D root_path] -i [ subset-id subset-id... ]
```

The following command shows the status of the software subsets:

```
# /usr/sbin/setld -i
Subset      Status      Description
-----
OSFACCT350  incomplete  System Accounting Utilities (System Administration)
OSFAFM350   Adobe Font Metric Files (Printing Environment)
OSFBASE350  installed   Base System (- Required -)
OSFBIN350   installed   Standard Kernel Objects (Kernel Build Environment)
.
.
```

If you use the `-i` option to specify a subset, the `setld` command displays a list of the files in the specified subset. This is useful if you want to determine which subset you need to reload or delete if a particular file is damaged or deleted.

The following command displays the files in the OSFCLINET350 subset:

```
# /usr/sbin/setld -i OSFCLINET350
./etc/.new..acucap
./etc/.new..hosts
.
.
./usr/sbin/bindsetup
./usr/sbin/fddi_config
```

Use the `-D` option to specify a root directory other than the system root.

8.3 Installing a Software Subset

This section describes how to install software subsets from a specified location. To install a software subset, log in as root and use the `setld -l` command with the following syntax:

```
/usr/sbin/setld [ -D root_path ] -l location [ subset-id [ subset-id... ] ]
```

The *location* variable specifies the location of the software subset that you want to install. You can specify the following *location* variables:

hostname:

Specifies the name of the remote host.

directory

Specifies the disk distribution directory.

The *subset-id* variable specifies the name of the subset. If you do not specify a *subset-id* variable, a list of subsets is displayed, allowing you to choose the ones to install. If you specify one or more *subset-id* variables, only those subsets are installed.

To install subsets from CD-ROM, use the following procedure. The distribution path given in the following examples is for the Digital UNIX

base operating system CD-ROM. For other distribution kits, refer to the document supplied by your software vendor.

1. Place your CD-ROM optical disc in its caddy and insert the CD-ROM into the disc drive.
2. To determine what drive the CD-ROM device is located on, enter the following command as superuser:

```
# file /dev/rrz*c
```

Information from the `file` command is displayed. For example:

```
/dev/rrz1c: char special (8/1026) SCSI #0 RZ25 disk #2 (SCSI ID #1)
/dev/rrz2c: char special (8/2050) SCSI #0 RZ25 disk #4 (SCSI ID #2)
/dev/rrz3c: char special (8/3074) SCSI #0 RZ26 disk #7 (SCSI ID #3)
/dev/rrz4c: char special (8/4098) SCSI #0 RRD42 disk #9 (SCSI ID #4)
```

In this output from the `file` command, RRD indicates the CD-ROM device.

3. To mount the distribution media, enter the following command. The following example shows the CD-ROM device is located on the `c` partition of the `rz4` disk:

```
# mount -r /dev/rz4c /mnt
```

4. To install a Digital UNIX base subset, enter:

```
# setld -l /mnt/ALPHA/BASE
```

5. The `setld` command displays a numbered list of subset titles and prompts you to enter the number of the subsets you want to install. As shown in the following example, only the subsets not yet installed on your system are displayed in the list.

The subsets listed below are optional:

There may be more optional subsets than can be presented on a single screen. If this is the case, you can choose subsets screen by screen or all at once on the last screen. All of the choices you make will be collected for your confirmation before any subsets are installed.

- CDE Advanced Developers Kit:
 - 1) CDE Development Environment
 - 2) CDE Manual Pages
 - 3) CDE PostScript Documents
 - 4) CDE Run-time Environment
- Reference Pages:
 - 5) Ref Pages: Admin/User
 - 6) Ref Pages: Programming
 - 7) Ref Pages: Realtime
 - 8) Ref Pages: Windows Admin/User
 - 9) Ref Pages: Windows Programming

- Software Development:
 - 10) Additional Motif Demo Sources
 - 11) CDA(tm) for X/Motif Development
 - 12) DEC C (cc -migrate)
 - 13) GNU Revision Control System
 - 14) Realtime Software Development
- Other:
 - 15) DEC Ada runtime library

Or you may choose one of the following options:

- 16) ALL of the above
- 17) CANCEL selections and redisplay menus
- 18) EXIT without installing any subsets

Enter your choices or press RETURN to redisplay menus.

Choices (for example, 1 2 4-6): **5-9**

6. Enter the number or numbers associated with the subsets that you want to install. There may be more subsets presented in the menu than can be displayed on a single screen. You can either select subsets in each screen, or select them all together on the last screen. If you select subsets as each screen is displayed, all your choices are presented for you to confirm on the final screen. You can also change your choices or redisplay the subset options.
7. After you enter your choices, the following confirmation message is displayed:

You are installing the following optional subsets:

- Reference Pages:
 - Ref Pages: Admin/User
 - Ref Pages: Programming
 - Ref Pages: Realtime
 - Ref Pages: Windows Admin/User
 - Ref Pages: Windows Programming

Is this correct? (y/n):

8. After you confirm your choice, messages similar to the following display as the subsets are loaded and configured:

Checking file system space required to install selected subsets:

Working....Wed Jul 5 11:08:02 EDT 1995

File system space checked OK.

Ref Pages: Windows Programming
 Copying from /mnt/ALPHA/BASE (disk)
 Working....Wed Jul 5 11:08:36 EDT 1995

```

Verifying

Ref Pages: Windows Admin/User
  Copying from /mnt/ALPHA/BASE (disk)
  Verifying

Ref Pages: Programming
  Copying from /mnt/ALPHA/BASE (disk)
    Working....Wed Jul  5 11:10:06 EDT 1995
  Verifying

Ref Pages: Admin/User
  Copying from /mnt/ALPHA/BASE (disk)
    Working....Wed Jul  5 11:11:06 EDT 1995
  Verifying

Ref Pages: Realtime
  Copying from /mnt/ALPHA/BASE (disk)
  Verifying

Configuring "Ref Pages: Windows Programming " (OSFMANWOP350)

Configuring "Ref Pages: Windows Admin/User " (OSFMANWOS350)

Configuring "Ref Pages: Programming " (OSFMANOP350)

Configuring "Ref Pages: Admin/User " (OSFMANOS350)

Configuring "Ref Pages: Realtime " (OSFMANRT350)

```

9. After the subsets are installed, unmount the CD-ROM.

```
# umount /mnt
```

Note

If there are upgrades to the subsets you installed previously, you may need to install these upgrade subsets. To perform an upgrade, enter the following command:

```
# setld -l /mnt/ALPHA/UPDATE
```

To install Digital software subsets on Remote Installation Services (RIS) clients, refer to *Sharing Software on a Local Area Network*.

8.4 Rebuilding the Kernel After Installing Kernel Build Environment Subsets

Certain Digital UNIX base operating system products (such as the Logical Storage Manager, Logical Volume Manager, Advanced File System, and Local Area Transport) contain a kernel component. If you use `setld` to

install one of these subsets after the installation, you must run the `doconfig` utility to rebuild the kernel with the new kernel component; otherwise the option to use the product will not be available. After building a new kernel, reboot with the new kernel to make the product available for use.

Refer to Table B-3 in Appendix B for a list of the software subsets that contain kernel components for which you must run `doconfig` to build a new kernel. Refer to `doconfig(8)` for more information about the `doconfig` utility.

Performing a Worldwide Installation 9

Digital UNIX is an internationalized operating system. The worldwide language support software subsets provide support for various native languages and countries. Installing the worldwide language support software subsets enables software developers to develop internationalized software that can be used in different countries.

This chapter provides information about:

- Installing the Digital UNIX worldwide language support subsets from CD-ROM or remote installation services (RIS)
- Installing worldwide language support public domain program source and fonts
- Invoking `/usr/sbin/wwconfig` to tailor the Asian terminal options of the kernel
- Invoking `/usr/sbin/wwsetup` to set up the `sendmail` daemon and `wnn`
- Changes made to the default Digital UNIX operating system by the installation of worldwide support software
- The backup files created by a worldwide installation

9.1 Before Starting a Worldwide Installation

Before you start the worldwide installation procedure, perform the following tasks:

- Read Chapter 1 which describes the general preparation you should do before the installation.
- Make sure that the base Digital UNIX Version 3.2C operating system is already installed on your system.
- Review Section 9.2 to make sure all Digital UNIX base software subset dependencies are installed.
- Refer to the descriptions of the worldwide language support subsets in Appendix D to determine the subsets you want to install.

For more information about the terminals and printers supported for different languages, refer to the *Digital UNIX Version 3.2C Software Product Description* (SPD). The SPD is located on the CD-ROM labeled *Digital UNIX V3.2C Operating System (formerly DEC OSF/1) Disc 1 of 2* and is located in the /DOCUMENTATION/POSTSCRIPT or /DOCUMENTATION/TEXT directories.

9.2 Dependencies on Digital UNIX Base Software Subsets

Some of Digital UNIX worldwide support software subsets have dependencies on Digital UNIX base software as shown in the following list:

- Worldwide Base System (IOSWWBASE350) requires Base System (OSFBASE350)
- Worldwide Standard Kernel Objects (IOSWWBIN350) requires Standard Kernel Objects (OSFBIN350)
- Thai Standard Kernel Objects (IOSTHBIN350) requires Standard Kernel Objects (OSFBIN350)
- Worldwide Kernel Headers and Common Files (IOSWWBINCOM350) requires Kernel Header and Common Files (OSFBINCOM350)
- Worldwide Support English Reference Pages (IOSWWMANOS350) requires Doc. Preparation Tools (OSFDCMT350)
- Japanese Reference Pages (IOSJPMANOS350) requires Doc. Preparation Tools (OSFDCMT350)
- Japanese Reference Pages for Additional Software (IOSJPAMANOS350) requires Doc. Preparation Tools (OSFDCMT350)
- Japanese Windows Reference Pages (IOSJPMANWOS350) requires Doc. Preparation Tools (OSFDCMT350)
- Worldwide Additional DECwindows Applications (IOSWWDECW350) requires Additional DECwindows Applications (OSFDECW350)
- German Basic X Environment (IOSDEX11350) requires Single-Byte European Locales (OSFEURLOC350)
- French Basic X Environment (IOSFRX11350) requires Single-Byte European Locales (OSFEURLOC350)
- Italian Basic X Environment (IOSITX11350) requires Single-Byte European Locales (OSFEURLOC350)
- Swedish Basic X Environment (IOSSVX11350) requires Single-Byte European Locales (OSFEURLOC350)

- Spanish Basic X Environment (IOSESX11350) requires Single-Byte European Locales (OSFEURLOC350)
- Greek Basic X Environment (IOSELX11350) requires Single-Byte European Locales (OSFEURLOC350)
- Turkish Basic X Environment (IOSTRX11350) requires Single-Byte European Locales (OSFEURLOC350)
- Worldwide Basic X Environment (IOSWWX11350) requires Basic X Environment (OSFX11350)
- Worldwide X Window Software Development (IOSWWXDEV350) requires X Window Software Development (OSFXDEV350)

If you plan to install any of the worldwide subsets shown in the previous list, make sure the corresponding dependent base subsets are already installed by entering the following command:

```
# /usr/sbin/setld -i | grep OSF
```

Examine the screen display for the dependent base subset names. The word `installed` in the second column indicates that the subset is installed. A blank in the second column indicates that the base subset is not installed. Use the `setld` command to install all dependent base subsets before starting the worldwide installation. Refer to Chapter 8 for information about how to use the `setld` command.

9.3 Increasing Available Disk Space

The installation of the worldwide software subsets loads most files into the subdirectories subordinate to the `/usr/i18n` directory.

If the `/usr/i18n` directory does not exist, the installation procedure creates it. If the `/usr/i18n` directory does exist, the installation procedure uses it. If you find that there is insufficient disk space for the worldwide subsets, and you know that you have additional space on alternative disks or disk partitions on your system, follow these steps before beginning the installation process:

1. Log in as `root` or superuser.
2. If it does not exist, create the directory `/usr/i18n` as follows:

```
# mkdir /usr/i18n
```
3. Specify in the `/etc/fstab` file that the newly created directory is a mount point to a disk partition where there is additional space.
4. Enter the `mount -a` command to mount the new mount point of `/usr/i18n`.

9.4 Starting the Worldwide Installation

Start the installation procedure by logging in as the superuser login name `root`. Then, shut down the system to single-user mode and remount the disks specified in `/etc/fstab` by entering the following commands:

```
# shutdown now
# mount -a
```

There are two ways to perform a worldwide installation:

- From the CD-ROM distribution media labeled *Digital UNIX V3.2C Operating System (formerly DEC OSF/1) Disc 1 of 2*
- From a network connection to a remote installation services (RIS) server

The following two sections explain how to invoke the `wwinstall` script from CD-ROM and RIS.

During the installation procedure, you are asked some questions about configuring the system. If you need help, enter a question mark (?) to display online help.

9.4.1 Installing from a CD-ROM

The following steps describe how to invoke the `wwinstall` script from a CD-ROM:

1. Load the CD-ROM optical disc labeled *Digital UNIX V3.2C Operating System (formerly DEC OSF/1) Disc 1 of 2* into the CD-ROM drive.
2. Make a directory to be the mount point of the CD-ROM and then mount the CD-ROM by entering commands similar to the following:

```
# mkdir /cdrom
# mount -rd /dev/rz4c /cdrom
# cd /cdrom/ALPHA/WORLWIDE
```

In the previous example, `/dev/rz4c` is the name of the CD-ROM device. Refer to Appendix A if you do not know the device name of your CD-ROM device.

3. Invoke the `wwinstall` script to install Digital UNIX worldwide support subsets as shown in the following example:

```
# ./wwinstall
```

Go to Section 9.5 to continue the worldwide installation.

9.4.2 Installing from a RIS Server

You may install the worldwide support subsets from a RIS server. However, you have to make sure that your system is registered as a client on the RIS server. The RIS area must have the worldwide language support subsets

installed. Refer to *Sharing Software on a Local Area Network* for more information on how to set up a RIS server and RIS client. Enter the following command to mount the local file systems and install the subsets from a RIS server:

```
# /sbin/bcheckrc
# setld -l server:
```

Replace *server* with the name of your RIS server appended with a colon (:). Go to Section 9.5 to continue the worldwide installation.

9.5 Responding to the wwinstall Script

The prompts displayed by the `wwinstall` script apply to systems where all the prerequisite base subsets are installed. The screen displays are similar for installations performed from CD-ROM or RIS. If your system does not have the mandatory Digital UNIX base software subsets installed, the prompts and displays may be different.

The `wwinstall` script displays the disk space available in the `/usr/i18n` directory. You can quit now if there is insufficient disk space for the worldwide software. Refer to Section 9.3 for information about increasing disk space.

Most of subsets will be installed under the `/usr/i18n` directory. Depending on the number of subsets you choose to install, you may need more than 200 Mbytes of free disk space for installation.

You have the following amount of free disk space available in `/usr`:

```
df -k /usr
Filesystem      1024-blocks    Used    Avail Capacity Mounted on
usr_domain#usr      828816 200475    592768    25%    /usr
```

Two ways to set up the `/usr/i18n` directory :

- [1] Create the `/usr/i18n` directory
- [2] Set up a symbolic link to another partition that has enough free disk space for installation

Which way do you want ? [1] :

If you press the Return key or enter 1 to create the `/usr/i18n` directory, the following message is displayed:

Directory `/usr/i18n` has been created

If you enter 2 to create a symbolic link, the following message is displayed:

You have chosen to make a symbolic link to another partition.
Please enter the installation path:

You have the following amount of free disk space available in
/usr/il8n :

```
df -k /usr/il8n
Filesystem 1024-blocks    Used   Avail Capacity  Mounted on
/dev/rz3h      405476      372   364556      0%    /rz3h
```

Do you want to continue this installation procedure? (y/n) [y]:**y**

The installation script displays a list of countries to support:

```
*****
*
* Digital UNIX WORLDWIDE LANGUAGE SUPPORT INSTALLATION PROCEDURE *
*
*****
```

Please select the countries for which you want to install
support subsets:

- | | |
|-----------------------|------------------------------------|
| 1) Czech Republic | 2) France |
| 3) Germany | 4) Greece |
| 5) Hong Kong | 6) Hungary |
| 7) Israel | 8) Italy |
| 9) Japan | 10) Korea |
| 11) Poland | 12) Russia |
| 13) Slovakia | 14) Spain |
| 15) Sweden | 16) Taiwan |
| 17) Thailand | 18) The People's Republic of China |
| 19) Turkey | |
| 20) All of the above | |
| 21) None of the above | |

Choices (for example, 1 2 3) : **20**

If you specify more than one number at the prompt, separate each number
with a space.

If you enter 20 in response to the previous prompt to select all countries, the
display is similar to the following:

You are installing localized software for the following countries:

```
Czech Republic
France
Germany
Greece
Hong Kong
Hungary
Israel
Italy
Japan
```

```

Korea
Poland
Russia
Slovakia
Spain
Sweden
Taiwan
Thailand
The People's Republic of China
Turkey

```

Is this correct? [n]

If you enter n, the subset selection menu is displayed again, and you can reenter your choice.

If the countries displayed are the ones you want to support, enter y.

Depending upon the countries you selected, the following questions may be displayed:

- To install outline fonts:

```

Would you like to install outline fonts for printing
and display? [y] :

```

Enter y, to install outline fonts for better printing and displays. Outline fonts consume a considerable amount of disk space.

- To install public domain source files:

```

Would you like to install program sources of the public domain
software packaged in the Worldwide Language Support kit? [y] :

```

Enter y to install program sources of the public domain software packaged in the Digital UNIX worldwide language support software. The components NEMACS and Wnn are sourced from public domain and are shipped with their source code because of GNU license guidelines.

Next, a menu of available subsets is displayed. The menu first shows a list of mandatory subsets on which country-specific subsets depend. These subsets are loaded automatically. The installation procedure then displays a list of optional subsets that you can install depending on your needs. The display is similar to the following:

```

*****
*
* Installing Digital UNIX Worldwide Language Support Software *
*
*****

```

```

*** Enter subset selections ***

```

The following subsets are mandatory and will be installed automatically unless you choose to exit without installing any subsets:

- * Chinese Base System
- * Chinese Base System for China
- * Chinese Base System for Hong Kong
- * Chinese Base System for Taiwan
- * DEC Hanyu Character Set Support
- * DEC Hanzi Character Set Support
- * Base Chinese X Environment
- * Simplified Chinese Basic X Environment
- * Simplified Chinese DECwindows Mandatory Fonts
- * Traditional Chinese Basic X Environment
- * Traditional Chinese DECwindows Mandatory Fonts
- * Czech Basic X Environment
- * French Basic X Environment
- * German Basic X Environment
- * Greek Basic X Environment
- * Greek DECwindows 75dpi Mandatory Fonts
- * Hebrew Base System
- * Hebrew Basic X Environment
- * Hebrew DECwindows 75dpi Mandatory Fonts
- * Hungarian Basic X Environment
- * Italian Basic X Environment
- * Japanese Base System
- * Japanese Basic X Environment
- * Japanese DECwindows 75dpi Mandatory Fonts
- * Japanese DECwindows Mandatory Fonts
- * Korean Base System
- * Korean Basic X Environment
- * Korean DECwindows Mandatory Fonts
- * Polish Basic X Environment
- * Russian Basic X Environment
- * Slovak Basic X Environment
- * Spanish Basic X Environment
- * Swedish Basic X Environment
- * Thai Base System
- * Thai Standard Kernel Objects
- * Thai Basic X Environment
- * Thai DECwindows Mandatory Fonts
- * Turkish Basic X Environment
- * Turkish DECwindows 75dpi Mandatory Fonts
- * Worldwide Base System
- * Worldwide Kernel Headers and Common Files
- * Worldwide Standard Kernel Objects
- * Worldwide Basic X Environment
- * Worldwide DECwindows Mandatory Fonts
- * Worldwide ISO-LATIN Cyrillic DECwindows 75dpi Mandatory Fonts
- * Worldwide ISO-LATIN2 DECwindows 75dpi Mandatory Fonts

The subsets listed below are optional:

There may be more optional subsets than can be presented on a single screen. If this is the case, you can choose subsets screen by screen or all at once on the last screen. All of the choices you make will be collected for your confirmation before any subsets are installed.

- Chinese Support - Operating System:
 - 1) Additional Chinese Locales for China
 - 2) Additional Chinese Locales for Taiwan
 - 3) Big-5 Character Set Support
 - 4) Chinese Software Development
 - 5) Taiwanese EUC Character Set Support

- 6) Telecode Character Set Support
- 7) Traditional and Simplified Chinese Conversion

- Chinese Support - Outline Font:

- 8) Simplified Chinese Outline Fonts
- 9) Traditional Chinese Outline Fonts

- Chinese Support - Windowing Environment:

- 10) Simplified Chinese Additional DECwindows Applications
- 11) Simplified Chinese CDA(tm) Workstation Base Services
- 12) Simplified Chinese DECwindows Mail Interface

--- MORE TO FOLLOW ---

Enter your choices or press RETURN to display the next screen.

Choices (for example, 1 2 4-6):

- 13) Simplified Chinese DECwindows Optional Fonts
- 14) Simplified Chinese X Window Software Development
- 15) Traditional Chinese Additional DECwindows Applications
- 16) Traditional Chinese CDA(tm) Workstation Base Services
- 17) Traditional Chinese DECwindows Mail Interface
- 18) Traditional Chinese DECwindows Optional Fonts
- 19) Traditional Chinese X Window Software Development

- Czech Support - Windowing Environment:

- 20) Czech Additional DECwindows Applications
- 21) Czech CDA(tm) Workstation Base Services
- 22) Czech DECwindows Mail Interface
- 23) Czech X Window Software Development

- French Support - Windowing Environment:

- 24) French Additional DECwindows Applications
- 25) French CDA(tm) Workstation Base Services
- 26) French DECwindows Mail Interface
- 27) French X Window Software Development

- German Support - Windowing Environment:

- 28) German Additional DECwindows Applications
- 29) German CDA(tm) Workstation Base Services
- 30) German DECwindows Mail Interface
- 31) German X Window Software Development

- Greek Support - Outline Font:

- 32) Greek Outline Fonts

- Greek Support - Windowing Environment:

- 33) Greek Additional DECwindows Applications
- 34) Greek DECwindows 100dpi Mandatory Fonts
- 35) Greek DECwindows 100dpi Optional Fonts
- 36) Greek DECwindows 75dpi Optional Fonts
- 37) Greek DECwindows Mail Interface

--- MORE TO FOLLOW ---

Enter your choices or press RETURN to display the next screen.

Choices (for example, 1 2 4-6):

- Hebrew Support - Outline Font:

- 38) Hebrew Outline Fonts

- Hebrew Support - Windowing Environment:
 - 39) Hebrew DECwindows 100dpi Mandatory Fonts
 - 40) Hebrew DECwindows 100dpi Optional Fonts
 - 41) Hebrew DECwindows 75dpi Optional Fonts
 - 42) Hebrew X Window Software Development
- Hungarian Support - Windowing Environment:
 - 43) Hungarian Additional DECwindows Applications
 - 44) Hungarian CDA(tm) Workstation Base Services
 - 45) Hungarian DECwindows Mail Interface
 - 46) Hungarian X Window Software Development
- Italian Support - Windowing Environment:
 - 47) Italian Additional DECwindows Applications
 - 48) Italian CDA(tm) Workstation Base Services
 - 49) Italian DECwindows Mail Interface
 - 50) Italian X Window Software Development
- Japanese Support - Operating System:
 - 51) Additional Japanese Software
 - 52) Japanese (SJIS) Message Catalogs
 - 53) Japanese (SJIS) Ref. Pages for Additional Software
 - 54) Japanese (SJIS) Reference Pages
 - 55) Japanese Message Catalogs
 - 56) Japanese Nemacs
 - 57) Japanese Nemacs Source Files
 - 58) Japanese Ref. Pages for Additional Software
 - 59) Japanese Reference Pages
 - 60) Japanese Software Development
 - 61) Wnn Input Method
 - 62) Wnn Software Development
 - 63) Wnn Source Files

--- MORE TO FOLLOW ---

Enter your choices or press RETURN to display the next screen.

Choices (for example, 1 2 4-6):

- Japanese Support - Windowing Environment:
 - 64) Japanese Additional DECwindows Applications
 - 65) Japanese CDA(tm) Workstation Base Services
 - 66) Japanese DECwindows 100dpi Mandatory Fonts
 - 67) Japanese DECwindows 100dpi Optional Fonts
 - 68) Japanese DECwindows 75dpi Optional Fonts
 - 69) Japanese DECwindows Mail Interface
 - 70) Japanese Windows Reference Pages
 - 71) Japanese X Window Software Development
- Korean Support - Operating System:
 - 72) Korean Software Development
- Korean Support - Outline Font:
 - 73) Korean Outline Fonts
- Korean Support - Windowing Environment:
 - 74) Korean Additional DECwindows Applications
 - 75) Korean CDA(tm) Workstation Base Services
 - 76) Korean DECwindows Mail Interface
 - 77) Korean DECwindows Optional Fonts
 - 78) Korean X Window Software Development

- Latin 2 Support - Outline Font:
 - 79) Latin 2 Outline Fonts
- Latin Cyrillic Support - Outline Font:
 - 80) Latin Cyrillic Outline Fonts
- Polish Support - Windowing Environment:
 - 81) Polish Additional DECwindows Applications
 - 82) Polish CDA(tm) Workstation Base Services
 - 83) Polish DECwindows Mail Interface
 - 84) Polish X Window Software Development

--- MORE TO FOLLOW ---

Enter your choices or press RETURN to display the next screen.

Choices (for example, 1 2 4-6):

- Russian Support - Windowing Environment:
 - 85) Russian Additional DECwindows Applications
 - 86) Russian CDA(tm) Workstation Base Services
 - 87) Russian DECwindows Mail Interface
 - 88) Russian X Window Software Development
- Slovak Support - Windowing Environment:
 - 89) Slovak Additional DECwindows Applications
 - 90) Slovak CDA(tm) Workstation Base Services
 - 91) Slovak DECwindows Mail Interface
 - 92) Slovak X Window Software Development
- Spanish Support - Windowing Environment:
 - 93) Spanish Additional DECwindows Applications
 - 94) Spanish CDA(tm) Workstation Base Services
 - 95) Spanish DECwindows Mail Interface
 - 96) Spanish X Window Software Development
- Swedish Support - Windowing Environment:
 - 97) Swedish Additional DECwindows Applications
 - 98) Swedish CDA(tm) Workstation Base Services
 - 99) Swedish DECwindows Mail Interface
 - 100) Swedish X Window Software Development
- Thai Support - Operating System:
 - 101) Thai Printer Support
 - 102) Thai Software Development
- Thai Support - Outline Font:
 - 103) Thai Outline Fonts
- Thai Support - Windowing Environment:
 - 104) Thai Additional DECwindows Applications
 - 105) Thai CDA(tm) Workstation Base Services
 - 106) Thai DECwindows Mail Interface
 - 107) Thai X Window Software Development

--- MORE TO FOLLOW ---

Enter your choices or press RETURN to display the next screen.

Choices (for example, 1 2 4-6):

- Turkish Support - Outline Font:

- 108) Turkish Outline Fonts
 - Turkish Support - Windowing Environment:
 - 109) Turkish Additional DECwindows Applications
 - 110) Turkish DECwindows 100dpi Mandatory Fonts
 - 111) Turkish DECwindows 100dpi Optional Fonts
 - 112) Turkish DECwindows 75dpi Optional Fonts
 - 113) Turkish DECwindows Mail Interface
 - Worldwide Language Support - Operating System:
 - 114) Worldwide Mail Handler
 - 115) Worldwide Phrase Input Support
 - 116) Worldwide Printer Support
 - 117) Worldwide Software Development
 - 118) Worldwide Support English Reference Pages
 - 119) Worldwide User Defined Character Support
 - Worldwide Language Support - Windowing Environment:
 - 120) Worldwide Additional DECwindows Applications
 - 121) Worldwide DECwindows Mail Interface
 - 122) Worldwide ISO-LATIN Cyrillic DECwindows 100dpi Mandatory Fonts
 - 123) Worldwide ISO-LATIN Cyrillic DECwindows 100dpi Optional Fonts
 - 124) Worldwide ISO-LATIN Cyrillic DECwindows 75dpi Optional Fonts
 - 125) Worldwide ISO-LATIN2 DECwindows 100dpi Mandatory Fonts
 - 126) Worldwide ISO-LATIN2 DECwindows 100dpi Optional Fonts
 - 127) Worldwide ISO-LATIN2 DECwindows 75dpi Optional Fonts
 - 128) Worldwide User Defined Character Workstation Service
 - 129) Worldwide X Window Software Development
- Or you may choose one of the following options:
- 130) ALL mandatory and all optional subsets
 - 131) MANDATORY subsets only
 - 132) CANCEL selections and redisplay menus
 - 133) EXIT without installing any subsets

Enter your choices or press RETURN to redisplay menus.

Choices (for example, 1 2 4-6): **130**

If you specify more than one number at the prompt, separate each number with a space or a comma.

You have a chance to verify your choices. As shown in the following example, if you enter 130 in response to the previous prompt, the display is similar to the following:

You are installing the following mandatory subsets:

- Chinese Base System
- Chinese Base System for China
- Chinese Base System for Hong Kong
- Chinese Base System for Taiwan
- DEC Hanyu Character Set Support
- DEC Hanzi Character Set Support
- Base Chinese X Environment
- Simplified Chinese Basic X Environment
- Simplified Chinese DECwindows Mandatory Fonts
- Traditional Chinese Basic X Environment
- Traditional Chinese DECwindows Mandatory Fonts

Czech Basic X Environment
 French Basic X Environment
 German Basic X Environment
 Greek Basic X Environment
 Greek DECwindows 75dpi Mandatory Fonts
 Hebrew Base System
 Hebrew Basic X Environment
 Hebrew DECwindows 75dpi Mandatory Fonts
 Hungarian Basic X Environment
 Italian Basic X Environment
 Japanese Base System
 Japanese Basic X Environment
 Japanese DECwindows 75dpi Mandatory Fonts
 Japanese DECwindows Mandatory Fonts
 Korean Base System
 Korean Basic X Environment
 Korean DECwindows Mandatory Fonts
 Polish Basic X Environment
 Russian Basic X Environment
 Slovak Basic X Environment
 Spanish Basic X Environment
 Swedish Basic X Environment
 Thai Base System
 Thai Standard Kernel Objects
 Thai Basic X Environment
 Thai DECwindows Mandatory Fonts

Press RETURN to display the next screen:

Turkish Basic X Environment
 Turkish DECwindows 75dpi Mandatory Fonts
 Worldwide Base System
 Worldwide Kernel Headers and Common Files
 Worldwide Standard Kernel Objects
 Worldwide Basic X Environment
 Worldwide DECwindows Mandatory Fonts
 Worldwide ISO-LATIN Cyrillic DECwindows 75dpi Mandatory Fonts
 Worldwide ISO-LATIN2 DECwindows 75dpi Mandatory Fonts

You are installing the following optional subsets:

- Chinese Support - Operating System:
 - Additional Chinese Locales for China
 - Additional Chinese Locales for Taiwan
 - Big-5 Character Set Support
 - Chinese Software Development
 - Taiwanese EUC Character Set Support
 - Telecode Character Set Support
 - Traditional and Simplified Chinese Conversion
- Chinese Support - Outline Font:
 - Simplified Chinese Outline Fonts
 - Traditional Chinese Outline Fonts
- Chinese Support - Windowing Environment:
 - Simplified Chinese Additional DECwindows Applications
 - Simplified Chinese CDA(tm) Workstation Base Services
 - Simplified Chinese DECwindows Mail Interface
 - Simplified Chinese DECwindows Optional Fonts
 - Simplified Chinese X Window Software Development
 - Traditional Chinese Additional DECwindows Applications

Traditional Chinese CDA(tm) Workstation Base Services
Traditional Chinese DECwindows Mail Interface
Traditional Chinese DECwindows Optional Fonts
Traditional Chinese X Window Software Development

- Czech Support - Windowing Environment:
Czech Additional DECwindows Applications

Press RETURN to display the next screen:

Czech CDA(tm) Workstation Base Services
Czech DECwindows Mail Interface
Czech X Window Software Development

- French Support - Windowing Environment:
French Additional DECwindows Applications
French CDA(tm) Workstation Base Services
French DECwindows Mail Interface
French X Window Software Development

- German Support - Windowing Environment:
German Additional DECwindows Applications
German CDA(tm) Workstation Base Services
German DECwindows Mail Interface
German X Window Software Development

- Greek Support - Outline Font:
Greek Outline Fonts

- Greek Support - Windowing Environment:
Greek Additional DECwindows Applications
Greek DECwindows 100dpi Mandatory Fonts
Greek DECwindows 100dpi Optional Fonts
Greek DECwindows 75dpi Optional Fonts
Greek DECwindows Mail Interface

- Hebrew Support - Outline Font:
Hebrew Outline Fonts

- Hebrew Support - Windowing Environment:
Hebrew DECwindows 100dpi Mandatory Fonts
Hebrew DECwindows 100dpi Optional Fonts
Hebrew DECwindows 75dpi Optional Fonts
Hebrew X Window Software Development

- Hungarian Support - Windowing Environment:
Hungarian Additional DECwindows Applications
Hungarian CDA(tm) Workstation Base Services
Hungarian DECwindows Mail Interface

Press RETURN to display the next screen:

Hungarian X Window Software Development

- Italian Support - Windowing Environment:
Italian Additional DECwindows Applications
Italian CDA(tm) Workstation Base Services
Italian DECwindows Mail Interface
Italian X Window Software Development

- Japanese Support - Operating System:
Additional Japanese Software

Japanese (SJIS) Message Catalogs
Japanese (SJIS) Ref. Pages for Additional Software
Japanese (SJIS) Reference Pages
Japanese Message Catalogs
Japanese Nemacs
Japanese Nemacs Source Files
Japanese Ref. Pages for Additional Software
Japanese Reference Pages
Japanese Software Development
Wnn Input Method
Wnn Software Development
Wnn Source Files

- Japanese Support - Windowing Environment:
 - Japanese Additional DECwindows Applications
 - Japanese CDA(tm) Workstation Base Services
 - Japanese DECwindows 100dpi Mandatory Fonts
 - Japanese DECwindows 100dpi Optional Fonts
 - Japanese DECwindows 75dpi Optional Fonts
 - Japanese DECwindows Mail Interface
 - Japanese Windows Reference Pages
 - Japanese X Window Software Development
- Korean Support - Operating System:
 - Korean Software Development
- Korean Support - Outline Font:
 - Korean Outline Fonts

Press RETURN to display the next screen:

- Korean Support - Windowing Environment:
 - Korean Additional DECwindows Applications
 - Korean CDA(tm) Workstation Base Services
 - Korean DECwindows Mail Interface
 - Korean DECwindows Optional Fonts
 - Korean X Window Software Development
- Latin 2 Support - Outline Font:
 - Latin 2 Outline Fonts
- Latin Cyrillic Support - Outline Font:
 - Latin Cyrillic Outline Fonts
- Polish Support - Windowing Environment:
 - Polish Additional DECwindows Applications
 - Polish CDA(tm) Workstation Base Services
 - Polish DECwindows Mail Interface
 - Polish X Window Software Development
- Russian Support - Windowing Environment:
 - Russian Additional DECwindows Applications
 - Russian CDA(tm) Workstation Base Services
 - Russian DECwindows Mail Interface
 - Russian X Window Software Development
- Slovak Support - Windowing Environment:
 - Slovak Additional DECwindows Applications
 - Slovak CDA(tm) Workstation Base Services
 - Slovak DECwindows Mail Interface

Slovak X Window Software Development

- Spanish Support - Windowing Environment:
 - Spanish Additional DECwindows Applications
 - Spanish CDA(tm) Workstation Base Services
 - Spanish DECwindows Mail Interface
 - Spanish X Window Software Development

Press RETURN to display the next screen:

- Swedish Support - Windowing Environment:
 - Swedish Additional DECwindows Applications
 - Swedish CDA(tm) Workstation Base Services
 - Swedish DECwindows Mail Interface
 - Swedish X Window Software Development
- Thai Support - Operating System:
 - Thai Printer Support
 - Thai Software Development
- Thai Support - Outline Font:
 - Thai Outline Fonts
- Thai Support - Windowing Environment:
 - Thai Additional DECwindows Applications
 - Thai CDA(tm) Workstation Base Services
 - Thai DECwindows Mail Interface
 - Thai X Window Software Development
- Turkish Support - Outline Font:
 - Turkish Outline Fonts
- Turkish Support - Windowing Environment:
 - Turkish Additional DECwindows Applications
 - Turkish DECwindows 100dpi Mandatory Fonts
 - Turkish DECwindows 100dpi Optional Fonts
 - Turkish DECwindows 75dpi Optional Fonts
 - Turkish DECwindows Mail Interface
- Worldwide Language Support - Operating System:
 - Worldwide Mail Handler
 - Worldwide Phrase Input Support
 - Worldwide Printer Support
 - Worldwide Software Development
 - Worldwide Support English Reference Pages
 - Worldwide User Defined Character Support

Press RETURN to display the next screen:

- Worldwide Language Support - Windowing Environment:
 - Worldwide Additional DECwindows Applications
 - Worldwide DECwindows Mail Interface
 - Worldwide ISO-LATIN Cyrillic DECwindows 100dpi Mandatory Fonts
 - Worldwide ISO-LATIN Cyrillic DECwindows 100dpi Optional Fonts
 - Worldwide ISO-LATIN Cyrillic DECwindows 75dpi Optional Fonts
 - Worldwide ISO-LATIN2 DECwindows 100dpi Mandatory Fonts
 - Worldwide ISO-LATIN2 DECwindows 100dpi Optional Fonts
 - Worldwide ISO-LATIN2 DECwindows 75dpi Optional Fonts
 - Worldwide User Defined Character Workstation Service
 - Worldwide X Window Software Development

Is this correct? (y/n): **y**

Enter n if you want to begin the subset selection again. Enter y if the list is correct.

The installation process checks to make sure there is enough disk space to load the selected subsets. A message similar to the following is displayed:

```
Checking file system space required to install selected subsets:
Working....Wed Jul 19 18:10:38 HKT 1995
```

File system space checked OK.

If there is not enough disk space to hold all the subsets you selected, you must go back and select only those optional subsets you need.

Next, the installation process installs the software subsets onto your system. Messages similar to the following are displayed:

```
Worldwide Base System
  Copying from . (disk)
  Verifying
```

```
Worldwide Kernel Headers and Common Files
  Copying from . (disk)
  Verifying
```

```
Worldwide Standard Kernel Objects
  Copying from . (disk)
  Verifying
```

```
Worldwide Mail Handler
  Copying from . (disk)
  Verifying
```

```
Worldwide Printer Support
  Copying from . (disk)
  Verifying
```

```
.
.
.
```

```
Simplified Chinese Outline Fonts
  Copying from . (disk)
  Working....Wed Jul 19 19:40:38 HKT 1995
  Verifying
```

```
Korean Outline Fonts
  Copying from . (disk)
  Verifying
```

```
Thai Outline Fonts
  Copying from . (disk)
  Verifying
```

```
Latin 2 Outline Fonts
  Copying from . (disk)
  Verifying
```

```
Latin Cyrillic Outline Fonts
```

```

    Copying from . (disk)
    Verifying

Turkish Outline Fonts
    Copying from . (disk)
    Verifying

Greek Outline Fonts
    Copying from . (disk)
    Verifying

Hebrew Outline Fonts
    Copying from . (disk)
    Verifying

```

Subset configuration occurs next which is the process of tailoring the operating system software for use. Messages similar to the following are displayed. Review this screen output carefully; depending upon the subsets you installed, you may be instructed to run setup scripts. If you performed the installation from CD-ROM, after the installation is complete, review the log file, `/var/adm/smlogs/wwinstall.log` file for a record of the installation. No log file is created during RIS installations.

```

Configuring "Worldwide Base System " (IOSWWBASE350)
Configuring ./etc/csh.login ...
Configuring ./etc/profile ...

Configuring "Worldwide Kernel Headers and Common Files" (IOSWWBINCOM350)

Configuring "Worldwide Standard Kernel Objects " (IOSWWBIN350)

Configuring "Worldwide Mail Handler " (IOSWWMH350)

Configuring "Worldwide Printer Support " (IOSWWPRINT350)

.
.
.

Configuring "Wnn Input Method " (IOSJPWNN350)
Please invoke /usr/sbin/wwsetup to configure wnn.

.
.
.

Configuring "Korean Outline Fonts " (IOSKOOLFONT350)

Configuring "Thai Outline Fonts " (IOSTHOLFONT350)

Configuring "Latin 2 Outline Fonts " (IOSWWLAT2OLFONT350)

Configuring "Latin Cyrillic Outline Fonts " (IOSWWLATCOLFONT350)

Configuring "Turkish Outline Fonts " (IOSTROLFONT350)

Configuring "Greek Outline Fonts " (IOSELOLFONT350)

Configuring "Hebrew Outline Fonts " (IOSIWOLFONT350)

```

A kernel build begins automatically after subset configuration.

Note

If you performed a dataless installation, the kernel build does not happen automatically. Follow the instructions in Section 9.6 to build the kernel.

The kernel build screen display is similar to the following:

```
*****
*
* Rebuilding kernel to include incorporate Asian/Thai *
* tty drivers                                         *
*
*****

**** Adding Worldwide Support tty Features into Kernel
Configuration File ****

Starting kernel rebuild...

*** KERNEL CONFIGURATION AND BUILD PROCEDURE ***

Saving /sys/conf/HANDW3 as /sys/conf/HANDW3.bck

*** PERFORMING AUTO-EDIT OF CONFIGURATION FILE ***
Auto-editing /sys/conf/HANDW3 using /tmp/.script18679.....done.

*** PERFORMING KERNEL BUILD ***
    Working...Wed Jul 19 20:10:39 HKT 1995
    Working...Wed Jul 19 20:12:40 HKT 1995
    Working...Wed Jul 19 20:14:41 HKT 1995
    Working...Wed Jul 19 20:16:42 HKT 1995

The new kernel is /sys/HANDW3/vmunix

Saving /vmunix as /vmunix.IOS350.1
Copying /sys/HANDW3/vmunix to /vmunix

Reboot your system using the new kernel.

The installation software has completed the installation process.
The log file /var/adm/smlogs/wwinstall.log contains a record of
your installation.

If the kernel build fails, check the log file
/var/adm/smlogs/setld.log for information to diagnose the
problem. Refer to setld(8) for more information.
```

9.6 Building an Asian Kernel After the Installation

If you installed support subsets for Japan, China, Hong Kong, Korea, Taiwan, or Thailand, the worldwide installation process builds a kernel with all the installed Asian or Thai terminal supports. Afterwards, you reboot the system with the new kernel to enable Asian or Thai terminal support in the kernel.

If you want to enable or disable some of the Asian or Thai terminal supports from the kernel, Section 9.6.1 describes the procedure to rebuild an Asian kernel.

9.6.1 Reconfiguring the Kernel to Support the Asian Terminal Driver and Daemons

To reconfigure the kernel to support the Asian terminal driver and daemons, invoke the `wwconfig` script with the `-a` option:

```
# /usr/sbin/wwconfig -a
```

Refer to `wwconfig(8)` for more information.

If you installed `IOSWWBIN350` and installed at least one of the following subsets: `IOSWWUDCOS350` (`odld`), `IOSWWPHRASE350` (`simd`), or `IOSJPBASE350` (`kkcd`), a UTX configuration selection table similar to the following displays. UTX is the mechanism to support communication between the Asian terminal driver and daemons.

```
# /usr/sbin/wwconfig -a
```

```
*** UTX  CONFIGURATION SELECTION ***
```

Selection	Asian service Daemon
-----	-----
1	On Demand Font Loading (odld)
2	Software Input Method (simd)
3	Kana-Kanji Conversion (kkcd)
4	All of the above
5	None of the above
-----	-----

Enter the selection number for each daemon you want.
For example, 1 2 :

After you make your selection, the daemons are displayed for your confirmation. If you choose 4 (All of the above), the following

confirmation message is displayed:

You specified the following daemons:

```
On Demand Font Loading (odld)
Software Input Method  (simd)
Kana-Kanji Conversion  (kkcd)
```

Is this correct? (y/n) [n]:

Enter y if the list includes the daemons you want to set up.

The installation procedure then asks how many UTX devices you want to create.

How many UTX devices do you want to create? [default: 32] :

The number you enter is saved in the `/var/isl8n/sys/stanza.loadable` file. The actual creation of the UTX devices is done when you reboot your system.

There is one `utxd` master daemon that uses one UTX device. Each invocation of one of the `odld`, `simd`, and `kkcd` daemons uses one UTX device. Each user who turns on `odld` on a database not already served by another `odld` starts a new `odld` process. Refer to `stty(1)` and `ccedit(1)` for more information. Each user session that has the Software Phrase Input Method turned on requires one `simd`. Each user who turns on Kana-Kanji Conversion on a database (refer to `stty(1)` for more information) not already served by another `kkcd` starts a new `kkcd` process. Assuming that 10 users use all three functions, it requires 31 UTX devices to support 10 users.

If you installed the `IOSZHBIG5350`, `IOSZHMTELEX350`, and `IOSZHCONV350` subsets, the following selection menu is displayed:

*** ADDITIONAL TERMINAL CODESETS SELECTION ***

Selection	Terminal Codeset
1	BIG-5
2	Mitac Telex
3	Traditional & Simplified Chinese Conversion
4	All of the above
5	None of the above

Enter the selection number for each codeset you want.
For example, 1 2 :

Selecting a terminal codeset at this prompt means that you want to build support for that terminal codeset into the terminal driver. When codeset support is built into the terminal driver, users can select that codeset as their terminal code by using the `/usr/isl8n/bin/stty` command.

Choose 3 if you want to support the proper codeset conversion when the terminal code is set to a Simplified Chinese codeset and the application code is set to a Traditional Chinese codeset or vice versa.

If only two out of the three subsets are installed, the selection menu still appears but the uninstalled component is missing from the list.

If you installed just one of the subsets, a question is asked instead. As shown in the following example, if you installed the IOSTHBIN350 subset, the procedure asks if you want to add the Thai terminal driver to the kernel:

```
Do you want to install the Thai tty driver? (y/n) [y] :
```

The Thai terminal driver supports Thai terminal input/output (I/O). The other Asian languages are supported by the Asian terminal driver. If you have installed only the IOSTHBIN350 subset and not the IOSWWBIN350 subset, the previous question is the only question asked.

The installation procedure then asks if you want to rebuild the kernel.

If you wish, you may use an automated kernel build procedure by answering 'y' to the next question.

You will need about 10 Mb available in the /sys file system for the kernel build. If you do not have this much space, do not choose an automated build.

You have the following amount of free disk space available:

```
df -k /sys
Filesystem      kbytes      used      avail capacity  Mounted on
/dev/rz3g       825507       670890       72066      90%    /ufs/rz3g
```

```
Do you want this procedure to rebuild your kernel? (y/n):
```

If you enter y, the kernel build starts, and the display is similar to the following:

```
Starting kernel rebuild...
```

```
*** KERNEL CONFIGURATION AND BUILD PROCEDURE ***
```

```
Saving /sys/conf/ARUBA as /sys/conf/ARUBA.bck
```

```
Do you want to edit the configuration file? (y/n) [n]: n
```

```
*** PERFORMING KERNEL BUILD ***
```

```
Working...Mon May 22 16:05:35 EDT 1995
```

```
Working...Mon May 22 16:07:35 EDT 1995
```

```
Working...Mon May 22 16:09:36 EDT 1995
```

```
The new kernel is /sys/ARUBA/vmunix
```

```
Saving /vmunix as /vmunix.IOS350.3
```

```
Copying /sys/ARUBA/vmunix to /vmunix
```

Reboot your system using the new kernel.

In the previous example, ARUBA is the system name. If you want to enable or disable some of the terminal options, you must enter the following command to reconfigure and rebuild the kernel:

```
# /usr/sbin/wwconfig -a
```

Reboot your system after a kernel rebuild to include the newly selected features.

9.7 Setting up the sendmail Daemon and wnn

After you have loaded the worldwide subsets, invoke `/usr/sbin/wwsetup` to set up the sendmail daemon and to set up wnn if you have installed IOSJPWNN350.

When you invoke the `/usr/sbin/wwsetup` command, the following message is displayed:

```
=====
Worldwide setup for sendmail utility
=====
```

The current configuration of sendmail utility does not support 8 bit data.

Do you want to enable 8 bit data support? (y/n) [n]:

If you enter y, the sendmail daemon is reconfigured to send and receive 8-bit mail. However, this option violates the 7-bit SMTP mail transmission protocol used by sendmail over a TCP/IP network. You may enter n if you want strict conformance to the TCP/IP network protocol.

If you enabled the 8 bit data support of sendmail, you are asked if you want to restart the sendmail daemon; only then is your change in effect.

You have changed the sendmail configuration.

You should restart the sendmail utility by using the command

```
/sbin/init.d/sendmail restart
```

Do you want to restart the sendmail utility now? (y/n) [y]:

You can also use `/usr/sbin/wwsetup` command to disable the 8-bit data support of the sendmail daemon.

If you installed the IOSJPWNN350 subset, the following message may be displayed:

```
=====
Worldwide setup for wnn
=====
```

If you have never installed the Wnn subset before, the following message is displayed:

You can create the following symbolic links:

```
/usr/local/bin/Wnn4 -> /usr/i18n/bin/Wnn4
/usr/local/lib/wnn   -> /usr/i18n/lib/wnn
```

Do you want to create these links? (y/n) [y]:

If you enter y, symbolic links are created under the /usr/local directory to link to the corresponding Wnn directories under /usr/i18n. These links may be necessary if some of your existing applications assume that the Wnn binaries are located under /usr/local.

Cannot find a user account wnn in /etc/passwd. Jserver runs as a wnn process, and you need its user account on your system.

Before proceeding with the installation, you must supply the UID number for user "wnn". (If you have not yet decided on this UID number and want to quit the installation, enter "exit" in place of the UID number at the following prompt.)

```
Please Enter the UID for wnn [20]:
  UID for wnn is 20
```

```
Is this correct? (y/n) [n]: y
```

You may add the user wnn to /etc/passwd or to YP, BIND or Enhanced Security databases.

Add the user wnn to /etc/passwd? (y/n) [y]:

If the user wnn is already registered in the yp database, BIND database, or Enhanced Security database, you should enter n. Otherwise, enter y and add the user wnn to the /etc/passwd file.

The installation procedure for the IOSJPWNN350 subset also asks you to enter the password for creating dictionaries as shown in the following example:

Please input the dictionary password.

```
Enter Password :
Verify:
```

```
Dictionary set up .....
done.
```

If the /etc/services file does not have the entry wnn, the following

messages are displayed:

```
Do you want to add the Wnn service entry in /etc/services? (y/n) [y]:
```

```
*NOTICE*: If you want to communicate with Wnn V4.0.3 systems on
ULTRIX before V4.4 or Digital UNIX (formerly DEC OSF/1) before
V3.0, specify the old default port number 3403, or choose the default
and change other systems' port numbers to 22273 later. Otherwise
you will fail to connect them.
```

```
Please Enter the Port No. [22273]:
```

When you enter the appropriate port number for wnn, the following message is displayed:

```
You should start the wnn jserver daemon using the command
```

```
/sbin/init.d/jserver start
```

```
Do you want to start the wnn jserver daemon now? (y/n) [y]: y
```

```
Nihongo Multi Client Server (4.10)
Reading /usr/il8n/lib/wnn/ja_JP/dic/pubdic/kihon.dic      Fid = 1
Reading /usr/il8n/lib/wnn/ja_JP/dic/pubdic/setsuji.dic   Fid = 2
Reading /usr/il8n/lib/wnn/ja_JP/dic/pubdic/koyuu.dic     Fid = 3
Reading /usr/il8n/lib/wnn/ja_JP/dic/pubdic/chimei.dic    Fid = 4
Reading /usr/il8n/lib/wnn/ja_JP/dic/pubdic/jinmei.dic    Fid = 5
Reading /usr/il8n/lib/wnn/ja_JP/dic/pubdic/special.dic   Fid = 6
Reading /usr/il8n/lib/wnn/ja_JP/dic/pubdic/computer.dic  Fid = 7
Reading /usr/il8n/lib/wnn/ja_JP/dic/pubdic/symbol.dic    Fid = 8
Reading /usr/il8n/lib/wnn/ja_JP/dic/pubdic/tankan.dic    Fid = 9
Reading /usr/il8n/lib/wnn/ja_JP/dic/pubdic/bio.dic       Fid = 10
Reading /usr/il8n/lib/wnn/ja_JP/dic/pubdic/full.fzk      Fid = 11
Finished Reading Files
/sbin/init.d/jserver: jserver daemon started
done.
```

9.8 Backup Files Created by the Installation

During the installation of Digital UNIX worldwide support subsets, some backup files are created to save the contents of the original files that are replaced by the installation procedure. Table 9-1 lists the files replaced by the installation procedure.

The backup files have either the extension `.IOS350_sav.*` where the asterisk (*) is an integer, or have the extension `.IOS350_sav` (without the integer).

Table 9-1: Backup Files Created by Worldwide Installations

Files saved as:	
<file>.IOS350_sav.*	/etc/disktab /vmunix /usr/share/lib/termcap
.<file>.IOS350_sav	/ja_JP /usr/bin/X11/dxbook /usr/bin/X11/dxkeycaps /usr/bin/X11/dxmail /usr/bin/X11/dxnotepad /usr/bin/X11/dxterm /usr/lib/X11/app-defaults/DXMail /usr/lib/X11/app-defaults/DXnotepad /usr/lib/X11/uid/DXnotepad.uid /usr/lib/X11/uid/DXterm.uid /usr/lib/cda/defstyle.ddif /usr/shlib/libDXterm.so /usr/shlib/_null/libDXm.so /usr/shlib/_null/libMrm.so /usr/shlib/_null/libXm.so /usr/shlib/_null/libdvr.so
<file>.IOS350_sav	/sbin/init.d/lpd

Backup files with extension `IOS350_sav` are data or binary files that are not likely to be modified by the system manager. They are restored to the original files when Digital UNIX worldwide support subsets are deinstalled.

Do not delete files with the extension `IOS350_sav`. If you delete these files, the corresponding data and binary files cannot be restored during the deinstallation of worldwide support software.

Data files that might be modified by the system managers, depending on the system configuration, have the extension `.IOS350_sav.*` for their backup. You can delete files with the extension `.IOS350_sav.*` to save space. These files are not restored to the originals during deinstallation. Instead, the deinstallation procedure creates new `.IOS350_sav.*` files from files that are currently used.

Performing a Worldwide Update Installation 10

This chapter describes how to update a system running DEC OSF/1 Version 3.2, 3.2A, or 3.2B with worldwide support software to Digital UNIX Version 3.2C.

Refer to Chapter 2 for information about performing an update installation of the Digital UNIX base operating system.

10.1 What is an Update Installation of Worldwide Support Software?

An update installation means you are updating a DEC OSF/1 Version 3.2, 3.2A, or 3.2B system with worldwide support software to a system running Digital UNIX Version 3.2C. An update installation preserves disk partitions, file systems, file customizations, your print and network configuration, user accounts, user files, and any other system setup you may have done on a system already running the Digital UNIX operating system.

An update installation of worldwide support does the following:

1. Checks the current system status and saves system files
2. Deletes DEC OSF/1 Version 3.2, 3.2A, or 3.2B worldwide support subsets
3. Invokes the base system update installation command, `/sbin/installupdate` to update the base system from DEC OSF/1 Version 3.2, 3.2A, or 3.2B to Digital UNIX Version 3.2C
4. Installs worldwide support subsets and merges the saved system files

10.2 System Files Affected in an Update Installation of Worldwide Support

System files that are saved by an update installation of worldwide support subsets have the extension `.IOSUPD_sav`. Some of these files are merged back to the new system files automatically by the update installation procedure. User intervention is not needed for these merges. However, some system files cannot be merged automatically and must be merged back into the system manually.

The following system files are saved and merged automatically:

- `/etc/utxd.conf`
- `/etc/rc.config`
- `/sys/conf/SYSTEM_NAME`
- `/var/il8n/sys/config.file`
- `/var/il8n/sys/stanza.loadable`

The following system file is saved but must be merged manually:

- Application default files of X11/DECwindows applications

10.3 System Backup

Digital recommends that you back up your operating system before beginning an update installation of worldwide support. If there are any interruptions (including pressing `Ctrl/C`) after the update installation has started, it is unlikely that the update completes successfully. Should this happen, restore the original version of the DEC OSF/1 base system and the worldwide support that was previously installed on your system before you attempt another update installation.

10.4 If You Encounter Problems During the Update Installation of the Base System

If you encounter problems during the update installation of the base system such as file type conflicts or the existence of certain layered products that are not compatible with the new version of the operating system, the update installation of the base system is aborted. In this case, fix any file conflicts and then invoke the `installupdate` script again to continue the update install of the base system.

Do not reboot the machine or switch it to multi-user mode or delete files in `/tmp` and the `/usr/tmp` directories. This corrupts the system and the update installation cannot be continued.

10.5 Disk Space

Your system needs at least 10 MB of free disk space to perform an update installation of worldwide support software. Please check your current disk usage by using the `df` command. If the update installation fails due insufficient disk space, your system is in an indeterminate state. You must restore the original versions of the DEC OSF/1 software to your system before attempting another update installation.

10.6 Running wwinstallupdate from CD-ROM Media

Read this section if you are using CD-ROM media to perform an update installation of the worldwide support subsets:

1. Ensure that you backed up your system and that your system has sufficient disk space to perform an update installation.
2. Boot to single-user mode or shut down your system as follows:

```
# shutdown +10 preparing to update the system
```

In this example, +10 shuts down the system in ten minutes and sends the message `preparing to update the system` to all users.
3. Mount the local file systems:

```
# /sbin/bcheckrc
```
4. Mount the CD-ROM device. For example, if your CD-ROM device is device number 4 and you are mounting the CD-ROM on `/mnt`, enter a command similar to the following:

```
# mkdir /mnt
# mount -rd /dev/rz4c /mnt
```
5. Invoke the `wwinstallupdate` script to perform an update installation of worldwide support software:

```
# /mnt/ALPHA/WORLDWIDE/wwinstallupdate
```

Go to Section 10.8 to continue the worldwide update installation.

10.7 Running wwinstallupdate from an NFS Server System

Read this section if you are using NFS mounted media to perform an update installation of the worldwide support subsets.

The following steps assume that there is a CD-ROM mounted on an NFS server system `nfs_server` with mount point `/oskits`. The `/oskits` entry is added to the `/etc/exports` file of the NFS server system for other client systems to mount it for normal or update installations.

1. Ensure that you backed up your system and that your system has sufficient disk space for an update installation.
2. Ensure that the network is configured and that your system can communicate with the NFS server. Use the following command to test

the network connection to the server:

```
# ping -c2 nfs_server
```

Substitute *nfs_server* with the host name of your NFS server system.

3. Boot to single-user mode or shut down your system as shown in the following:

```
# shutdown +10 preparing to update the system
```

In this example, +10 shuts down the system in ten minutes and sends the message preparing to update the system to all users.

4. Mount the local file systems:

```
# /sbin/bcheckrc
```

5. Start the network and NFS services:

```
# /sbin/init.d/inet start
# /sbin/init.d/route start
# /sbin/init.d/gateway start
# /sbin/init.d/nis start
# /sbin/init.d/named start
# /sbin/init.d/nfs start
```

6. Mount the NFS server's mount point:

```
# mount nfs_server:/oskit /mnt
```

7. Invoke the *wwinstallupdate* script to perform an update installation of the Digital UNIX worldwide support software.

```
# /mnt/ALPHA/WORLDWIDE/wwinstallupdate
```

10.8 What Happens During the Worldwide Update Installation

After invoking the *wwinstallupdate* script, the following message appears:

```
Update installation of Worldwide Language Support from
Version 3.2, 3.2A, or 3.2B to Version 3.2C of Digital UNIX
(formerly DEC OSF/1)
```

Digital Equipment Corporation recommends that you perform complete system software backups before proceeding.

Messages of Update Installation of Worldwide Language Support are recorded in */var/adm/smlogs/wwupdate.log* and */var/adm/smlogs/it.log*

Press <RETURN> to review message again.

Do you want to continue the update installation? (y/n) []:

Enter `y` to proceed with the installation or enter `n` to abort.

If you enter `y`, system files are saved and worldwide support subsets are deleted. Then, the base `installupdate` script is invoked and performs an update installation of the Digital UNIX base operating system. Refer to Chapter 2 for more information about the base operating system update installation.

Messages from the update installation for worldwide support are recorded in the files `/var/adm/smlogs/wwupdate.log` and `/var/adm/smlogs/it.log`.

10.9 Installing Worldwide Subsets and Building the Asian Kernel

The last step in the update installation process is the kernel build. After the kernel build, the the worldwide support subsets are installed. Finally, the Asian kernel is built, if necessary, and then the system will reboot.

Compact Disc Overview A

The Digital UNIX software is distributed on two read-only compact discs (CD-ROM). The first CD-ROM is labeled *Digital UNIX V3.2C Operating System (formerly DEC OSF/1) Disc 1 of 2* and contains the operating system software subsets. The software subsets contained on this CD-ROM are documented in Appendix B and Appendix C.

The second CD-ROM is labeled *Digital UNIX V3.2C Online Documentation (formerly DEC OSF/1) Disc 2 of 2* and contains the Digital UNIX documentation set in Bookreader format. Section 6.8 describes how to activate the Bookreader application and lists the books that are available for viewing.

This appendix describes how to perform the following tasks:

- Load a CD-ROM into a caddy
- Insert and remove a CD-ROM
- Mount and unmount a CD-ROM

Before you insert a CD-ROM into its drive, make sure you know how to operate the disc drive. The *Optical Disc Drive Owner's Manual* contains instructions for using the disc drive.

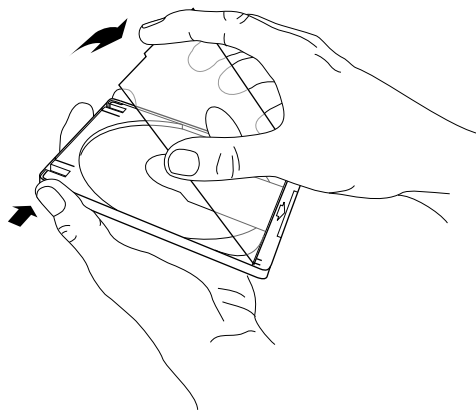
A.1 Loading a Disc into a Caddy

A Digital UNIX disc must be placed into a caddy before it can be inserted into an RRD42 or RRD44 disc drive. Caddies are not required for RRD43 disc drives. Follow these steps to load a CD-ROM into a caddy:

1. If a protective cellophane wrapper is on the caddy, remove the wrapper before using the caddy.
2. Press the tabs on both sides of the caddy and lift the lid.
3. Remove the CD-ROM from its packaging. Hold the CD-ROM by its edge.
4. Place the CD-ROM in the caddy, making sure that the labeled side faces up.
5. Close the lid of the caddy by pressing both corners down firmly.

Figure A-1 shows how to press the tabs of the caddy and lift the lid:

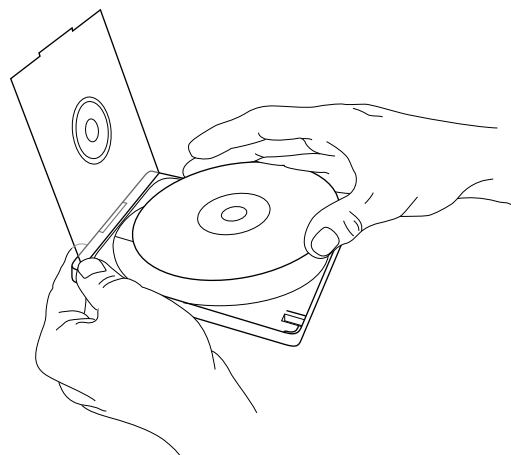
Figure A-1: Pressing Tabs and Lifting Lid of a CD-ROM Caddy



ZS-0443-MH

Figure A-2 shows how to place the disc in the caddy:

Figure A-2: Placing a Disc in a CD-ROM Caddy



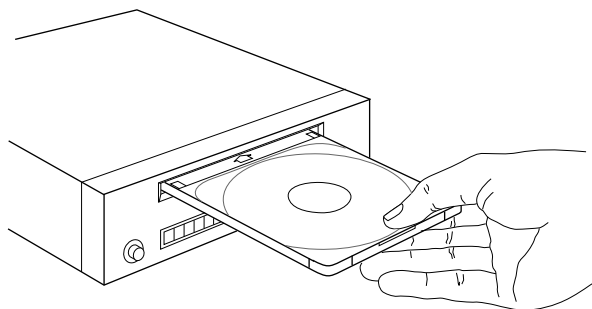
ZS-0444-MH

A.2 Inserting and Removing a Disc

After placing the CD-ROM in a caddy, follow these steps to insert the disc caddy into a disc drive:

1. Insert the caddy into the slot in the disc drive. The disc label should be facing up.
2. Push the caddy in until it stops.

Figure A-3 shows a disc (in its caddy) being inserted into a disc drive:



ZS-0445-MH

A.3 Mounting a CD-ROM

Before you can access the information on a CD-ROM, it must be mounted on the system. Follow these steps to mount a CD-ROM:

1. Log in as root or become superuser.
2. If you do not know the device name for the CD-ROM drive, use the following command to find it:

```
# file /dev/rrz*c
```

The `file` command returns output similar to that shown in the following example. The entry for the CD-ROM drive includes the letters RRD. On a DEC 3000 Model 500 processor, the logical unit number for the CD-ROM drive is usually rz4. In the example shown below, the CD-ROM drive is RRD42.

```

/dev/rrz2c: char special (8/2050) SCSI #0 RZ25 disk #16 (SCSI ID #2)
/dev/rrz3c: char special (8/3074) SCSI #0 RZ25 disk #24 (SCSI ID #3)
/dev/rrz4c: char special (8/4098) SCSI #0 RRD42 disk #32 (SCSI ID #4)
/dev/rrz8c: char special (8/16386) SCSI #1 RZ56 disk #64 (SCSI ID #0)
/dev/rrz9c: char special (8/17410) SCSI #1 RZ57 disk #72 (SCSI ID #1)

```

3. Make a directory that will be the mount point for the CD-ROM, using the `mkdir` command. Then mount the CD-ROM using the `mount` command with the following syntax, substituting the unit number of your CD-ROM drive for the *unit_number*.

```
mount -r /dev/rzunit_numberc /mount-point
```

For example, to mount the CD-ROM in drive `/dev/rz4c` on the directory `/cdrom`, enter the following commands:

```
# mkdir /cdrom
# mount -r /dev/rz4c /cdrom
```

4. To ensure that the CD-ROM is remounted in the event that your system crashes or is rebooted, use the text editor of your choice and open the `/etc/fstab` file. Add a line similar to the following:

```
/dev/rz4c      /cdrom  ufs    ro    0    0
```

When you have ensured that your edits are correct, write and quit the file. The system will now mount the CD-ROM on `/cdrom` on every reboot.

A.4 Unmounting a CD-ROM

Before you can eject a CD-ROM from the disc drive, you must first unmount it using the `umount` command. To unmount the CD-ROM, you must be superuser or `root` and you must be one directory above the mount point of the CD-ROM. Use a command similar to the following:

```
# umount /dev/rz4c
```

If you do not unmount the CD-ROM before trying to remove it, the CD will not eject from the drive when you press the EJECT button. If you are not one directory above the mount point of the CD-ROM when you execute the `umount` command, you will see the message `device busy`.

To remove the disc from the disc drive, press the EJECT button on the drive.

If the EJECT button is disabled by software or if the drive does not eject the caddy after you press the EJECT button, refer to the *Optical Disc Drive Owner's Manual* for instructions.

Software Subsets **B**

This appendix describes the Digital UNIX software subsets. The software subsets are divided into separate categories: mandatory and optional.

During the installation process, the mandatory subsets are installed automatically during the basic and the advanced installations. Optional subsets are not offered during the basic installation, but you can install them after the installation is complete by using the `setld` command. If you perform an advanced installation, you can install the optional subsets during the installation process or at a later time. See Chapter 8 for information about using the `setld` utility to install subsets after the installation.

B.1 Mandatory Subsets

The mandatory subsets are installed automatically for both the basic and advanced installations.

The Base System and the Base System–Hardware Support subsets cannot be deleted once they are installed.

The Standard Kernel Objects, the Kernel Header and Common Files, the Hardware Kernel Objects, the Compiler Back End, and Compiler Extension subsets contain object files needed to build the standard kernel. You can delete these subsets by using the `setld -d` command to reclaim disk space after the kernel is built. However, you will not be able to rebuild your kernel. If you need to rebuild your kernel for any reason, you must reinstall the subsets with the `setld -l` command.

Table B-1 describes the mandatory subsets.

Table B-1: Description of the Mandatory Subsets

Title and Contents	Subset Name	Dependencies
Adobe Fonts This subset contains the Type1 fonts and the Adobe font metrics files supplied by Adobe Systems Incorporated to be used by the DPS extension of the server. It also contains the .upr file, which defines these fonts and their location for the DPS extension of the server.	OSFDPSFONT350	
Base System This subset includes fundamental utilities and data files for the Digital UNIX base operating system. The base operating system includes the editors and many of the general-purpose programs.	OSFBASE350	Required for all subsets. This subset cannot be deleted.
Base System—Hardware Support This subset provides the hardware-dependent portion of the BASE subset.	OSFHWBASE350	Required for all subsets. This subset cannot be deleted.
Basic Networking Services This subset contains the software required to provide services over the network using the TCP/IP protocols. These services include remote login (rlogin) and Network Time Protocol (xntp).	OSFCLINET350	Required for Local Area Transport (LAT), NFS Utilities, and Additional Networking Services
Basic X Environment This subset provides programs required for X11/DECwindows and includes the Bookreader application.	OSFX11350	

Table B-1: (continued)

Title and Contents	Subset Name	Dependencies
<p>Compiler Back End</p> <p>C Language Compiler. This subset provides the minimum level of C language support required to build operating system kernels. This subset must be used in conjunction with the Software Development Environment subset for C language software development.</p>	OSFCMPLRS350	Required for Kernel Header and Common Files, Software Development Environment, and selected language layered products
<p>Compiler Extensions, Profilers, and Libraries</p> <p>This subset contains the components of the compilation environment that are not needed during the installation. This subset also contains all the profiling tools.</p>	OSFCMPLRSEXT350	
<p>DECwindows 100dpi Fonts</p> <p>This subset provides workstation font files for systems using either the VR160 15-inch monitor or higher resolution graphics (1280 x 1024).</p>	OSFFONT15350	
<p>Hardware Kernel Objects</p> <p>This subset provides hardware-dependent kernel object, header, and data files.</p>	OSFHWBIN350	Requires Kernel Header and Common Files
<p>Kernel Header and Common Files</p> <p>This subset provides the common kernel object header and data files that together with the Standard Kernel Objects and Hardware Kernel Objects subsets lets you configure and build the kernel. This subset is mandatory during the initial system installation, but can be removed if you do not intend to build kernels on your system.</p>	OSFBINCOM350	<p>Requires Compiler Back End and Compiler Extensions</p> <p>Required for Standard Kernel Objects, Hardware Kernel Objects, and Local Area Transport (LAT)</p>

Table B-1: (continued)

Title and Contents	Subset Name	Dependencies
Local Printer Support This subset provides printer commands such as <code>lpr</code> , <code>lpq</code> , and <code>lpd</code> ; print utilities; configuration files; filters; and PostScript printer support.	OSFPRINT350	
NFS(tm) Utilities This subset provides the software required to mount remote file systems using the Network File System (NFS).	OSFNFS350	Requires Basic Networking Services
Standard Kernel Objects This subset contains hardware-independent kernel object, header, and data files.	OSFBIN350	Required to build Digital UNIX kernels Requires Kernel Header and Common Files
X Fonts This subset provides X11 fonts from the X Consortium compiled for the DEC X server.	OSFMITFONT350	
X Servers This subset provides X11/DECwindows server support. A DECwindows server is the software that provides windowing on a workstation.	OSFSER350	
DECwindows Mail Interface This subset provides the DECwindows mail application for <code>dxmail</code> .	OSFXMAIL350	Requires RAND Corp. Mail Handler (MH) and OSFDECW300, Additional DECwindows Applications

Table B-1: (continued)

Title and Contents	Subset Name	Dependencies
RAND Corp. Mail Handler (MH) This subset provides programs that constitute the RAND Corporation MH mail reader interface.	OSFMH350	Required for DECwindows Mail Interface

B.2 Optional Subsets

The optional subsets contain software that supports a variety of applications. If you choose the basic installation procedure, these subsets are not available during the installation, but can be installed after the installation completes by using the `setld` command. If you choose the advanced installation, you can select these subsets at installation time.

The optional subsets can be deleted after they are installed. Be aware that some optional subsets are dependent upon other subsets. For example, the Doc. Preparation Tools Extensions subset requires the Doc. Preparation Tools subset; therefore, if you delete the Doc. Preparation Tools subset, the Doc. Preparation Tools Extensions subset will not work.

The following is a list of the optional subset categories. Locate the category you are interested in and refer to the corresponding table for subset descriptions.

- General Applications – Table B-2
- Kernel Build Environment– Table B-3
- Network-Server/Communications – Table B-4
- Printing Environment – Table B-5
- Reference Pages – Table B-6
- Software Development – Table B-7
- Supplemental Documentation – Table B-8
- System Administration – Table B-9
- Text Processing – Table B-10
- Windowing Environment – Table B-11
- Windows Applications – Table B-12

B.2.1 General Applications Subsets

Table B-2 describes the subsets in this category.

Table B-2: Description of the General Applications Subsets

Title and Contents	Subset Name	Dependencies
<p>Common Agent</p> <p>This subset contains the POLYCENTER Common Agent Utilities. This subset should be installed if you have the EDO layered products (POLYCENTER Common Agent Toolkit) installed or if you want to run the Simple Network Management Protocol (SNMP) Agents. The SNMP Agent allows management of the Internet, FDDI, system resources, and network resources using SNMP. This subset contains the SNMP protocol engine and its related managed object modules.</p> <p>Run the <code>/usr/sbin/snmpsetup</code> script to choose the POLYCENTER Common Agent as the default SNMP agent.</p>	OSFCOMAGENT350	
<p>Computer Aided System Tutorial</p> <p>This subset provides a simple, interactive online tutorial about subjects such as basic file handling, the <code>vi</code> text editor, the capabilities of the <code>ls</code> command, <code>ms</code> macros, editors in general, <code>eqn</code> (a language for typesetting mathematics), and the C Programming Language. The <code>learn(1)</code> reference page provides information about invoking the tutorial.</p>	OSFLEARN350	
<p>GNU Emacs</p> <p>The GNU Emacs editor is an advanced, self-documenting, extensible, real-time display text editor that can be customized.</p>	OSFEMACS350	

Table B-2: (continued)

Title and Contents	Subset Name	Dependencies
<p>Local Area Transport (LAT)</p> <p>Local Area Transport (LAT) is a protocol that provides a means of logically connecting terminal servers to one or more nodes on the same local area network (LAN).</p> <p>LAT software has the features required for a host to function as a service node, so requests for connections can be made by server users.</p>	OSFLAT350	Requires Kernel Header and Common Files and Basic Networking Services
<p>Logical Storage Manager</p> <p>This subset contains the LSM administrative commands and tools to manage an LSM configuration.</p>	OSFLSMBASE350	Requires LSM Kernel Build Objects (OSFLSMBIN350)
<p>Logical Storage Manager Graphical User Interface</p> <p>This subset contains the LSM Motif-based graphical user interface (GUI) management tool and related utilities.</p>	OSFLSMX11350	OSFLSMBASE350, OSFLSMBIN350, and OSFX11350
<p>Logical Volume Manager</p> <p>The Logical Volume Manager (LVM) is a subset that is composed of physical devices and logical (virtual) entities to offer you a mechanism for transparently and dynamically storing and retrieving files and file systems across multiple devices and in multiple copies.</p>	OSFLVM350	
<p>UNIX SVID2 Compatibility</p> <p>This subset brings the Digital UNIX system into compliance with the Base System and Kernel Extensions of the System V Interface Definition Issue 2 (SVID2). It also adds a higher degree of compatibility with the Basic Utilities Extensions of SVID2.</p>	OSFSVID2350	

Table B-2: (continued)

Title and Contents	Subset Name	Dependencies
UNIX to UNIX Copy Facility This subset provides programs and data files needed for a system to participate in a network of machines using the UUCP facility. This facility transmits files over serial communications lines.	OSFUUCP350	

B.2.2 Kernel Build Environment Subsets

Table B-3 describes the subsets in this category.

Table B-3: Description of the Kernel Build Environment Subsets

Title and Contents	Subset Name	Dependencies
POLYCTR AdvFS Kernel Objects This subset contains program and data files for the POLYCENTER Advanced File System (AdvFS). This subset supports uniprocessor, SMP, and realtime configurations.	OSFADVFSBIN350	
Hardware Kernel Header and Common Files This subset contains the binary common files that are hardware specific. This subset is required to build kernels and is mandatory during the installation (the kernel build process). If you do not plan to build kernels on your system, this subset can be removed. This subset supports uniprocessor, symmetric multiprocessing (SMP), and realtime configurations.	OSFHWBINCOM350	Requires Kernel Header and Common Files

Table B-3: (continued)

Title and Contents	Subset Name	Dependencies
Logical Storage Manager Kernel Header and Common Files This subset contains the LSM kernel include files to build LSM with the kernel. This subset supports uniprocessor, SMP, and realtime configurations.	OSFLSMBINCOM350	Requires Compiler Back End and Compiler Extensions
Logical Storage Manager Kernel Build Objects This subset provides the kernel objects to build the kernel with LSM drivers. This subset supports uniprocessor, SMP, and realtime configurations.	OSFLSMBIN350	Requires Kernel Header and Common Files and OSFLSMBINCOM350

B.2.3 Network-Server/Communications Subsets

Table B-4 describes the subsets in this category.

Table B-4: Description of the Network-Server/Communications Subsets

Title and Contents	Subset Name	Dependencies
ATM Commands This subset contains the software that provides the Asynchronous Transfer (ATM) mode commands. This subset is mandatory if ATM hardware is detected during the installation process.	OSFATMBASE350	

Table B-4: (continued)

Title and Contents	Subset Name	Dependencies
ATM Kernel Objects This subset contains the ATM kernel objects. This subset is mandatory if ATM hardware is detected during the installation process. ATM technology is a connection-oriented wide area/local area technology based on the high-speed switching of 53-byte cells across a network.	OSFATMBIN350	Kernel Header and Common Files
Additional Networking Services This subset contains the software that provides the networking services; Berkeley Internet Name Domain (BIND) and Network Information Services (NIS).	OSFINET350	Requires Basic Networking Services Required for Remote Installation Services (RIS) and Dataless Management Services (DMS)
Dataless Management Service This subset provides the software needed to run Dataless Management Services. The OSF-SVR PAK is required.	OSFDMS350	The server requires Hardware Kernel Objects, LSM Kernel Objects, Standard Kernel Objects, AdvFS Kernel Objects, and Additional Networking Services.
Remote Installation Services This subset provides services that allow installations of the operating system and applications over a network. The Product Authorization Key (PAK), OSF-SVR is required.	OSFRIS350	Requires Additional Networking Services

B.2.4 Printing Environment Subsets

Table B-5 describes the subsets in this category.

Table B-5: Description of the Printing Environment Subsets

Title and Contents	Subset Name	Dependencies
Adobe Font Metric Files This subset contains font metrics (character bounding box, width, name, ligature, kerning, and font properties) for PostScript outline fonts used by text formatting applications on PostScript output devices. This subset is needed to view files.	OSFAFM350	

B.2.5 Reference Pages Subsets

Table B-6 describes the subsets in this category.

Table B-6: Description of the Reference Pages Subsets

Title and Contents	Subset Name	Dependencies
Ref Pages: Admin/User This subset provides the online reference pages for system administrators and general users.	OSFMANOS350	Requires Doc. Preparation Tools
Ref Pages: Programming This subset provides the online reference pages for programmers.	OSFMANOP350	Requires Doc. Preparation Tools
Ref Pages: Realtime This subset provides the online reference pages for the Realtime kernel.	OSFMANRT350	Requires Doc. Preparation Tools

Table B-6: (continued)

Title and Contents	Subset Name	Dependencies
Ref Pages: Windows Admin/User This subset provides the online reference pages for windows administrators and users.	OSFMANWOS350	Requires Doc. Preparation Tools
Ref Pages: Windows Programming This subset provides the online reference pages for windows programmers.	OSFMANWOP350	Requires Doc. Preparation Tools

B.2.6 Software Development Subsets

Table B-7 describes the subsets in this category.

Table B-7: Description of the Software Development Subsets

Title and Contents	Subset Name	Dependencies
CDA Software Development The CDA Software Development environment provides C header files that enable programmer access to the CDA Base Services run-time libraries.	OSFCDAPGMR350	Requires Software Development Environment
DEC C Compiler This subset contains the DEC C compiler executable.	OSFDECC350	Requires Compiler Back End and Compiler Extensions
LSM Software Development This subset contains the LSM include files.	OSFLSMPGMR350	
CDA for X/Motif Development This subset provides a developer's environment for X11/DECwindows CDA architecture.	OSFXCDADEV350	Requires X Window Software Development

Table B-7: (continued)

Title and Contents	Subset Name	Dependencies
GNU Revision Control System This subset contains programs that make up the UNIX Revision Control System (RCS), which provides a regulation mechanism for large software projects.	OSFRCS350	
Realtime Software Development This subset provides libraries and utilities useful for real-time software development.	OSFRTDEV350	
Software Development Environment This subset provides libraries and utilities useful for software development. These include the libraries for linking programs to be analyzed with the dbx debugger, the lint program verifier, and the lex and yacc parser packages. This subset also contains the Monitoring Performance History (MPH) utility that gathers information on the reliability and availability of the Digital UNIX operating system and associated platforms.	OSFPGMR350	Required for CDA Software Development
Source Code Control System This subset contains programs that make up the UNIX Source Code Control System (SCCS), which provides a regulation mechanism for large software projects.	OSFSCCS350	

Table B-7: (continued)

Title and Contents	Subset Name	Dependencies
X Window Software Development This subset provides the library and data files needed to produce X/Motif Window System client applications. This subset also includes example programs demonstrating how to get started.	OSFXDEV350	Required for CDA for X/Motif Development
Additional Motif Demo Sources This subset provides demonstration programs for many Motif features and programming techniques. It contains sources from OSF/Motif V1.2 and sources that demonstrate the use of the extended Motif widget set supplied by Digital.	OSFMOTDEM350	

B.2.7 Supplemental Documentation Subset

Table B-8 describes the subset in this category.

Table B-8: Description of the Supplemental Documentation Subset

Title and Contents	Subset Name	Dependencies
XIE Version 5 Online Documentation This subset provides compressed PostScript files of documents for the X Window System Image Extension (XIE) Version 5.0 software.	OSFXIEDOC350	

B.2.8 System Administration Subsets

Table B-9 describes the subsets in this category.

Table B-9: Description of the System Administration Subsets

Title and Contents	Subset Name	Dependencies
C2-Security This subset provides additional configurable system security features such as identification, authentication and audit.	OSFC2SEC350	
Kernel Debugging Tools This subset provides tools for analyzing and debugging kernels.	OSFKTOOLS350	
Obsolete Commands and Utilities This subset contains the commands and utilities that are no longer supported for Digital UNIX Version 3.2C.	OSFOBSOLETE350	
POLYCTR advfs This subset contains the system administration commands required for creating and managing the Advanced File System (AdvFS).	OSFADVFS350	
Retired Locales This subset contains obsolete locale databases and should be installed only if you are running applications that require internationalization support and were built on DEC OSF/1 Version 1.2 or DEC OSF/1 Version 1.3 systems.	OSFCTABLOC350	
Single-Byte European Locales This subset provides basic internationalization and localization information for 21 Western European locales.	OSFEURLOC350	

Table B-9: (continued)

Title and Contents	Subset Name	Dependencies
System Accounting Utilities This subset provides programs and data files needed to perform system accounting. This subset contains log files that grow automatically.	OSFACCT350	
System Exercisers This subset provides programs that help to diagnose problems with hardware and peripheral devices.	OSFEXER350	
Verifier/Exerciser GUI This subset provides the graphical user interface for the Verifier/Exerciser Tool subset. This subset includes the DEC VET Motif interface.	OSFXVET350	Requires OSFVET350, Verifier/Exerciser
Verifier/Exerciser Tool This subset provides exercisers and utilities to enhance the serviceability of the Digital UNIX operating system and includes the Verifier and Exerciser Tool (VET). The exerciser is used to prove or disprove that hardware on a system is performing as anticipated. If sporadic disk or memory errors appear in the uerf system logs, VET exercises the failing hardware to provide more complete information to a field service representative.	OSFVET350	
C2-Security GUI This subset provides the graphical user interface for the C2 Security subset.	OSFXC2SEC350	C2-Security

B.2.9 Text-Processing Subsets

Table B-10 describes the subsets in this category.

Table B-10: Description of the Text Processing Subsets

Title and Contents	Subset Name	Dependencies
Doc. Preparation Tools This subset provides tools to format, manage, and display reference pages, including the <code>nroff</code> formatter and required macros.	OSFDCMT350	Required for all reference page subsets
Doc. Preparation Tools Extensions This subset contains additional <code>nroff</code> macro packages, bibliography tools, and <code>roff</code> tools.	OSFDCMTEXT350	Requires Doc. Preparation Tools

B.2.10 Windowing Environment Subsets

Table B-11 describes the subsets in this category.

Table B-11: Description of the Windowing Environment Subsets

Title and Contents	Subset Name	Dependencies
DECwindows 75dpi Fonts This subset provides fonts for X11/DECwindows and is needed for specific layered products and low resolution (1024 x 768) monitors.	OSFFONT350	
X Customizations for OEM This subset contains X Window customizations and special logo information for use by specific OEM's when they install Digital UNIX . This subset is not available for general use.	OSFXOEM350	

Table B-11: (continued)

Title and Contents	Subset Name	Dependencies
LK201 Keyboard Support This subset provides keyboard support for the Model LK201 Digital keyboard. A label affixed to the underside of your keyboard shows the model number of the keyboard.	OSFKBDLK201350	
LK401 Keyboard Support This subset provides support for the Model LK401 Digital keyboard. A label affixed to the underside of your keyboard shows the model number of the keyboard.	OSFKBDLK401350	
LK411 Keyboard Support This subset provides support for the Model LK411 Digital keyboard. A label affixed to the underside of your keyboard shows the model number of the keyboard.	OSFKBDLK411350	
LK421 Keyboard Support This subset provides support for the Model LK421 Digital keyboard. A label affixed to the underside of your keyboard shows the model number of the keyboard.	OSFKBDLK421350	
LK444 Keyboard Support This subset provides support for the Model LK444 Digital keyboard. A label affixed to the underside of your keyboard shows the model number of the keyboard.	OSFKBDLK444350	

Table B-11: (continued)

Title and Contents	Subset Name	Dependencies
PCXAL Keyboard Support This subset provides support for the Model PCXAL Digital keyboard. A label affixed to the underside of your keyboard shows the model number of the keyboard.	OSFKBDPCXAL350	
X Servers for PCI This subset provides graphics support for system using the PCI bus. This subset is automatically loaded when the installation process detects a PCI bus.	OSFSERPCI350	
X Servers for QVision This subset provides graphics support for EISA and PCI based systems that support QVision. This subset is automatically loaded when the installation detects QVision.	OSFSERQV350	
X Servers for TurboChannel This subset provides graphics support for systems with Turbochannel cards. This subset is automatically loaded with the installation detects a Turbochannel card.	OSFSERTC350350	

B.2.11 Windows Applications Subsets

Table B-12 describes the subsets in this category.

Table B-12: Description of the Windows Applications Subsets

Title and Contents	Subset Name	Dependencies
Additional DECwindows Applications This subset provides additional X11/DECwindows client applications such as <code>dxcalc</code> (a calculator), <code>dxcalendar</code> , <code>dxcardfiler</code> , <code>dxclock</code> , <code>dxdiff</code> (a visual differences program), <code>dxnotepad</code> , <code>dxpaint</code> (a bitmap editor), <code>dxpresto</code> (graphical display of Prestoserve state and statistics), and <code>dxprint</code> (capture and print screen images).	OSFDECW350	If your applications use the <code>DXmPrint</code> widget, you must install this subset because it contains a User Interface Definition (UID) file required by the print widget.
Additional X Applications This subset contains the additional X Consortium X11 R5 client applications such as: <code>appres</code> , <code>bitmap</code> , <code>bmtoa</code> , <code>atobm</code> , <code>bdftopcf</code> , <code>dxpaint</code> , <code>editres</code> , <code>ico</code> , <code>iconv</code> , <code>listres</code> , <code>lndir</code> , <code>maze</code> , <code>mkdirhier</code> , <code>oclock</code> , <code>puzzle</code> , <code>resize</code> , <code>showfont</code> , <code>showrgb</code> , <code>viewres</code> , <code>x11perf</code> , <code>x11perfcomp</code> , <code>x11perfcomp</code> , <code>xauth</code> , <code>xbiff</code> , <code>dxcalc</code> , <code>xcalc</code> , <code>xclipboard</code> , <code>dxclock</code> , <code>xclock</code> , <code>xcmsdb</code> , <code>xcmstest</code> , <code>xcutsel</code> , <code>xdpr</code> , <code>xdpyinfo</code> , <code>xedit</code> , <code>xev</code> , <code>xeyes</code> , (Continued on next page...)	OSFXMIT350	

Table B-12: (continued)

Title and Contents	Subset Name	Dependencies
<p data-bbox="279 734 639 797">Additional X Applications (Continued from previous page)</p> <p data-bbox="279 808 719 1128">xcalc, xclipboard, dxclock, xclock, xcmsdb, xcmstest, xcutsel, xdpr, xdpinfo, xedit, xev, xeyes, xfd, xfontsel, xgc, xkill, xload, xlogo, xlsatoms, xlsclients, xlsfonts, xmag, xman, xmh, xmkmf, xon, dxpresto, dxprint, xpr, xprop, xrefresh, xstdcmap, xwd, xwininfo, and xwud.</p> <p data-bbox="279 1162 719 1252">Refer to the reference page for each of these applications for more information.</p>	OSFXMIT350	

Additional Subsets **C**

This appendix describes the subsets that are shipped in addition to the Digital UNIX base operating system subsets. These additional subsets are included on the Digital UNIX CD-ROM labeled *Digital UNIX V3.2C Operating System (formerly DEC OSF/1) Disc 1 of 2*. Subset sizes are listed in Appendix E.

Table C-1 lists the additional subsets that can be installed from the /ALPHA directory on the CD-ROM:

Table C-1: Additional Software Subsets

Product Directory	Description	Subset Name
ATOM	ATOM Program Analysis Tools	ATMBASE340
CDE	CDE Additional Applications	CDEAPPS350
	CDE Software Development	CDEDEV350
	CDE Postscript Documents	CDEDOC350
	CDE Desktop Environment	CDEDT350
	CDE Mail Interface	CDEMAIL350
	CDE Development Reference Pages	CDEMANOP350
	CDE User Reference Pages	CDEMANOS350
	CDE Minimum Run-Time Environment	CDEMIN350
COMPILERS	Development Enhancements for Alpha Systems - Software Development	CMPDEVENH350
DECLADEBUG	DECLadebug Debugger	LDBBASE407
	DECLadebug Documentation	LDBDOC407
	DECLadebug Debugger Remote Server	LDBSRV407
DEC_Ada_RTL	DEC Ada Run-Time Support Library for Alpha Systems	ADALIB321

Table C-1: (continued)

Product Directory	Description	Subset Name
DEC_C++_RTL	DEC C++ RTL (shared libraries)	CXXSHRDA306
DEC_Cobol_RTL	DEC COBOL Run-Time Support Library for Alpha Systems	DCARTL220
	DEC Decimal Run-Time Support Library	O2ABASE210
DEC_Fortran_RTL	DEC Fortran for Alpha Systems Run-Time Support	DFARTL361
DEC_Pascal_RTL	DEC Pascal for Alpha Systems Run-Time Support	DPORTL524
DEC_Sort_RTL	DEC Sort Run Time Library	SORLIB201
GNUSRC	GNU awk Source	FSFGAWKSR350
	GNU Emacs Source	FSFEMACSSRC350
	GNU Revision Control System Source	FSFRCSSRC350
Networker_SingleServer	NetWorker SingleServer Save and Restore for Alpha Systems	BRXNSSALPHA310
	NetWorker SingleServer Reference Pages	BRXNSSMAN310
	NetWorker Postscript Documentation	BRXNSSDOC310
XR6	X11R6 X Server and Font Server	XR6SERVER320
	X11R6 Development Libraries	XR6PROG320
	X11R6 Documentation and Reference Pages	XR6DOC320

Worldwide Language Support subsets are located in /ALPHA/WORLDWIDE directory on the CD-ROM labeled *Digital UNIX V3.2C Operating System (formerly DEC OSF/1) Disc 1 of 2*. Appendix D lists the worldwide subsets that are available.

Note

The `apropos` and `what is` commands access reference page entries in the `what is` database. The `what is` database that is created in `/usr/share/man` when you initially install reference page subsets for the Digital UNIX product includes entries only for operating system reference pages.

The `what is` database provided as part of the operating system product is not automatically updated when layered product, third party, or site-specific reference pages are installed after the initial operating system installation. If the `what is` database exists on your system, you should update the database by executing the `catman -w` command. For information about using the `catman -w` command to rebuild the `what is` database, see the `catman(8)` reference page.

C.1 Atom Performance Analysis Tool (ATMBASE)

Atom is a performance analysis and debugging tool kit. This kit is being provided as an ADK (Advanced Developer's Kit). As such, the tools may be used to help diagnose application problems, but it is not a fully supported product at this time. It will be provided as a fully supported product in a future release.

Atom is an object modification tool. Users can develop customized debugging and performance analysis tools. The Atom kit supplies a set of tools which can be used to analyze programs and as references for developing new tools. The tools consist of two components: the instrumentation code and the analysis code. The instrumentation code controls the points at which the application is to be monitored. The analysis code controls what is monitored at those points. The reference pages, stored under `/usr/lib/atom/man`, describe the supplied tools and how to use Atom.

The software and documentation are installed in the directory `/usr/lib/atom`. The Atom utility is stored under `/usr/lib/cmplrs/cc/atom`. The file `/usr/lib/atom/README` contains information about the contents of `/usr/lib/atom`. There are two manpages included: `atom(1)` and `atomtools(5)`. The kit also includes postscript versions of Atom manuals.

The OSFCMPLRS350 subset should be installed before installing Atom. Follow these steps to install Atom:

1. Deinstall any previous version of the kit that may have been installed:

setld -d ATMBASE320

2. Install Atom:

setld -l *location* ATMBASE340

3. Enter 1 or 2 at the prompt which asks which subset you want to install. Atom consists of only one subset, so the answers (1 or 2) are equivalent.

When the installation completes, the verification script may optionally be run:

setld -v ATMBASE340

The verification process runs a set of confidence tests and stores the results under `/usr/lib/atom/confidence`.

C.2 Common Desktop Environment (CDE)

The Common Desktop Environment (CDE) was developed to provide common desktop services across all UNIX platforms, including a consistent user interface for end users and a consistent development environment for application developers across multiple platforms.

CDE is a graphical user interface that is based on the X Window System (X11) Release 5 and Motif Release 1.2.3.

The CDE Advanced Developer's Kit (ADK) is provided to give users early access to CDE functionality. However, be aware of the following limitations:

- No localization support in the CDE ADK
- No support for dataless environments
- The CDE ADK in this kit is not C2 secure

The CDE ADK is delivered with eight subsets. Refer to Appendix E to determine the amount of disk space that is required to install each of these subsets:

- CDEAPP350 - CDE additional applications
- CDEDEV350 - CDE development environment
- CDEDOC350 - CDE postscript documents
- CDEDT350 - CDE desktop environment (this subset must be installed to get the desktop)
- CDEMAIL350 - CDE mail interface
- CDEMANOP350 - CDE development reference pages

- CDEMANOS350 - CDE User Reference Pages
- CDEMIN350 - CDE minimum run-time environment (provides the infrastructure required for mail)

If you installed CDE from previous work-in-progress (WIP) kits from Digital, remove the `/usr/dt`, `/etc/dt`, and `/var/dt` files and any `autostart` changes that you made before you install this new CDE ADK kit.

The following table lists the subset dependencies for CDE:

CDE Subset Name	Depends on Subset:
CDEMIN350	OSFNFS350 OSFX11350 CXXSHRDA306
CDEDT350	CDEMIN350 OSFXMIT350
CDEMAIL350	CDEMIN350
CDEAPPS350	CDEDT350
CDEDEV350	CDEMIN350 CDEDT350 OSFXDEV350
CDEMANOS350	CDEMIN350 OSFDCMT350
CDEMANOP350	CDEMIN350 OSFDCMT350
CDEDOC350	CDEMIN350

CDE specific release notes are part of the CDEDOC350 subset and are located in `/usr/dt/CDE-ReleaseNotes`.

Use the `setld` command to install the CDE subsets and any other mandatory subsets required for CDE that are not already installed. If you are installing the CDE subsets from the Digital UNIX CD-ROM, mount the

CD-ROM, and as superuser or root enter the following command:

```
# setld -l /mnt/ALPHA/CDE subset_name
```

In the previous example, replace *subset_name* with the CDE subset(s) you want to install.

If you are performing a RIS installation of the CDE software subsets, enter the following command to begin the RIS installation:

```
# setld -l server:
```

Replace *server:* with the name of your RIS server appended with a colon (:). The *setld* command displays a numbered list of subsets available to install. Choose the Common Desktop Environment subsets from the menu.

During the installation and configuration of the CDEDT350 subset, you are prompted to configure the system to start up CDE automatically during the boot process thereby replacing DECwindow/xdm. The prompts displayed on your screen are similar to the following:

```
Do you want the system to run CDE (instead of DECwindow/xdm)
by default? (y/n) [y]:
```

After the installation, please use the following command to stop xdm

```
/sbin/init.d/xdm stop
```

Use the following command to start cde

```
/sbin/init.d/cde start
```

This procedure is reversed when CDEDT350 is deinstalled.

Note

TCP/IP, NFS, and NIS must be installed and configured to start dtlogin to use CDE.

You can manually turn off CDE by performing the following steps:

1. Use the *mv* command to move the CDE and XDM files:

```
# mv /sbin/rc3.d/S96cde /sbin/rc3.d/.S96cde
# mv /sbin/rc3.d/.S95xdm /sbin/rc3.d/S95xdm
```

2. Edit the */etc/inittab* file and comment out the following single line. The backslash (\) shown in the line indicates line continuation and is not included in the actual file.


```
# dt:3:once:/usr/dt/bin/dtlogin -daemon < /dev/console > \  
/dev/console 2>&1
```

CDEDT350 cannot be deinstalled while CDE is actively in use. To remove the subset, the request must come from one of the following:

- A remote session
- An ASCII Console
- A DECwindow/XDM Session

C.3 DEC Ada Run-Time Library Support for Digital UNIX Alpha Systems (ADALIB)

The Ada Run-Time Library subset is included on the Digital UNIX CD-ROM to facilitate deployment of applications built using DEC Ada.

The following table describes the contents of the DEC Ada Run-Time Library kit:

File Name	Description
<u>libada.so</u>	DEC Ada Run-Time Library, shared object
<u>libada.a</u>	DEC Ada Run-Time Library, archive library

Inclusion of the DEC Ada Run-Time Library in the base system allows end users to run applications that were linked with the DEC Ada (run-time) libraries without requiring the end user to purchase DEC Ada.

To install the DEC Ada Run-Time Library subset from the distribution CD-ROM, log in as root (or become superuser) and follow the steps described in Chapter 8 for installing software subsets or enter the following command:

```
# setld -l /mnt/ALPHA/DEC_Ada_RTL
```

Choose the DEC Ada Run-Time Library subset from the menu.

If you are performing a Remote Installation Services (RIS) installation of your software, choose the DEC Ada Run-Time Library subset from the RIS menu. Use the following command to install the subset:

```
# setld -l server:
```

Replace *server:* with the name of your RIS server appended with a colon (:).

C.4 Development Enhancements (Compiler) for Digital UNIX Alpha Systems (CMPDEVENH)

The following is a brief guide to the most important items in this subset. See the product documentation for a full description.

There are static and shared libraries which contain the `malloc()` system call as it was implemented in DEC OSF/1 Version 1.2 and Version 1.3. The libraries are shipped to ensure backwards compatibility with previous versions of Digital UNIX.

The file `mmap_32.c` is a C source file that provides a jacket for the `mmap()` system call. This is provided to support the Truncated Address Support Option (TASO) in DEC OSF/1 Version 1.3. refer to the TASO documentation for more information if your TASO code contains `mmap()` calls.

To install the Compiler Development Enhancements subset from CD-ROM, become superuser or root and follow the steps described in Chapter 8 for installing software subsets. Enter the command:

```
# setld -l /mnt/ALPHA/COMPILERS
```

Choose the Compiler Development Enhancements subset from the menu.

If you are doing a Remote Installation Services (RIS) installation of your software, choose the Compiler Development Enhancements subset from the RIS menu. Use the following command to install the subset:

```
# setld -l server:
```

Replace `server:` with the name of your RIS server appended with a colon (:).

C.5 DECladebug for Digital UNIX Alpha Systems (LDBBASE and LDBSRV)

The DECladebug Debugger is a symbolic source-level debugger that currently supports debugging of Ada, C/C++, Fortran, and Fortran 90 applications. DECladebug has a command line interface similar to `dbx` and a graphical user interface.

To install the DECladebug subsets from CD-ROM, become superuser or root and follow the steps described in Chapter 8 for installing software subsets. Enter the command:

```
# setld -l /mnt/ALPHA/DECLADEBUG
```

Choose the DECladebug subsets from the menu.

By using the `setld` utility you can install either the debugger subset, the documentation subset, or all subsets.

The online version of the *DECladebug Debugger Manual: Command-Line Interface* is located on the CD-ROM labeled *Digital UNIX V3.2C Online Documentation (formerly DEC OSF/1) Disc 2 of 2*. The book is located on the *Programming Documentation/General Programming* bookshelf of `DOCUMENTATION/BOOKREADER/decosf1.decw_bookshelf`. If you have not set up your workstation or server to access the Bookreader documentation, follow the instructions in Chapter 6.

If you are doing a RIS installation of your software, choose the DECladebug subset from the RIS menu. Use the following command to install the subset:

```
# setld -l server:
```

Replace *server:* with the name of your RIS server appended with a colon (:).

You must have the DEC C++ shared library kits installed before you can invoke DECladebug. For DEC OSF/1 Version 2.0, the kit is named CXXSHRDA131. For Digital UNIX Version 3.2C, the kit is named CXXSHRDA201.

C.6 DEC C++ RTL for Digital UNIX Alpha Systems (CXXSHRDA)

The C++ Run-Time Libraries subset is included on the Digital UNIX CD-ROM to facilitate deployment of applications built using DEC C++. The following table describes the contents of the DEC C++ Run-Time Libraries kit:

File Name	Description
<code>libcxx.so</code>	DEC C++ language support, iostream and miscellaneous class libraries
<code>libcomplex.so</code>	DEC C++ complex class
<code>libtask.so</code>	DEC C++ task classes
<code>cxx1.cat</code>	DEC C++ RTL message catalog

Inclusion of the DEC C++ Run-Time Libraries in the base system allows end users to run applications that were linked with the DEC C++ shared object (run-time) libraries, without requiring the end user to purchase DEC C++.

To install the DEC C++ Run-Time Libraries subset from CD-ROM, become superuser or root and follow the steps described in Chapter 8 for installing

software subsets. Enter the command:

```
# setld -l /mnt/ALPHA/DEC_C++_RTL
```

Choose the DEC C++ Run-Time Libraries subset from the menu.

If you are doing a RIS installation of your software, choose the DEC C++ Run-Time Libraries subset from the RIS menu. Use the following command to install the subset:

```
# setld -l server:
```

Replace *server*: with the name of your RIS server appended with a colon (:).

C.7 DEC COBOL Run-Time Support Library for Digital UNIX Systems (DCARTL)

DEC COBOL Run-Time Support Library for Digital UNIX Alpha Systems is a software library that provides compiled code support for file processing, format processing, I/O processing and other capabilities to the DEC COBOL programming language implementation. The DEC Fortran for Digital UNIX Alpha Run-Time Support subsets must be installed at the same time as the DEC COBOL Run-Time Support subsets.

This subset contains:

- DCARTL220 - DEC COBOL Run-Time Support Library
- O2ABASE220 - DEC Decimal Run-Time Support Library

Both subsets must be installed together. The following table lists the contents of the DCARTL210 subset:

File Name	Description
libcob.a	DEC COBOL Run Time (archive) library
libcob.so	DEC COBOL Run Time (shared) library
libisam_stub.a	DEC COBOL ISAM stub (archive) library
cob_msg.cat	DEC COBOL Run Time library message catalog

The following table lists the contents of the O2ABASE210 subset:

File Name	Description
libots2.a	DEC Decimal Support Run Time (archive) Library
libots2.so	DEC Decimal Support Run Time (shared) Library

To install the DEC COBOL Run-Time Support Library subset from CD-ROM, become superuser or root and follow the steps described in Chapter 8 for installing software subsets. Enter the command:

```
# setld -l /mnt/ALPHA/DEC_Cobol_RTL
```

Choose both subsets from the menu.

If you are doing a RIS installation of your software, choose the DCARTL210 subset from the RIS menu. Use the following command to install the subset:

```
# setld -l server:
```

Replace *server*: with the name of your RIS server appended with a colon (:).

C.8 DEC Fortran for Digital UNIX Alpha Run-Time Support (DFARTL)

This section discusses the DEC Fortran for Digital UNIX Alpha Run-Time Support subset.

The DEC Fortran for Digital UNIX Alpha Run-Time Support is a software library that provides compiled code support for file processing, format processing, I/O processing and other capabilities to the DEC Fortran programming language implementation. The following table lists the contents of the DEC Fortran for Digital UNIX Alpha Run-Time Support kit:

File Name	Description
libFutil.a	DEC Convert RTL
libUfor.a	DEC Fortran Unsupported RTL
libfor.a	DEC Fortran RTL
libFutil.so	DEC Convert RTL
libUfor.so	DEC Fortran Unsupported RTL
libfor.so	DEC Fortran RTL
for_msg.cat	DEC Fortran RTL Message Catalog

To install the DEC Fortran for Digital UNIX Alpha Run-Time Support subset from CD-ROM become superuser or root and follow the steps described in Chapter 8 for installing software subsets. Enter the command:

```
# setld -l /mnt/ALPHA/DEC_Fortran_RTL
```

Choose the DEC Fortran for Digital UNIX Alpha Run-Time Support subset from the menu.

If you are doing a RIS installation of your software, choose the DEC Fortran Run-Time Support subset from the RIS menu. Use the following command

to install the subset:

```
# setld -l server:
```

Replace *server*: with the name of your RIS server appended with a colon (:).

C.9 DEC Pascal for Digital UNIX Alpha Run-Time Support (DPORTL)

The DEC Pascal for Digital UNIX Alpha Run-Time Support is a software library that provides compiled code support for file processing, format processing, I/O processing and other capabilities to the DEC Pascal programming language implementation. The DEC Fortran for Digital UNIX Alpha Run-Time Support subsets must be installed at the same time as the DEC Pascal for Digital UNIX Alpha Run-Time Support Library subset.

File Name	Description
libpas.a	DEC Pascal RTL
libpas.so	
libpas_msg.cat	
libpas_msg.cat	DEC Pascal RTL message catalog

To install the DEC Pascal for Digital UNIX Alpha Run-Time Support subset from CD-ROM, become superuser or root and follow the steps described in Chapter 8 for installing software subsets. Enter the command:

```
# setld -l /mnt/ALPHA/DEC_Pascal_RTL
```

Choose the DEC Pascal for Digital UNIX Alpha Run-Time Support subset from the menu.

If you are doing a RIS installation of your software, choose the DEC Pascal for Digital UNIX Alpha Run-Time Support subset from the RIS menu. Use the following command to install the subset:

```
# setld -l server:
```

Replace *server*: with the name of your RIS server appended with a colon (:).

C.10 GNU awk Source (FSFGAWKSRC)

The GNU awk Source subset contains source files for the GNU awk programming language.

To install the GNU awk Source subset from CD-ROM, become superuser or root and follow the steps described in Chapter 8 for installing software

subsets. Enter the command:

```
# setld -l /mnt/ALPHA/GNUSRC
```

Choose the GNU awk Source subset from the menu.

If you are doing a RIS installation of your software, choose the GNU awk Source subset from the RIS menu. Use the following command to install the subset:

```
# setld -l server:
```

Replace *server*: with the name of your RIS server appended with a colon (:).

C.11 GNU Emacs Source (FSFEMACSSRC)

The GNU Emacs Source subset contains the source files for the GNU Emacs editor. The subset OSFBASE350 must be installed.

To install the GNU Emacs Source subset from CD-ROM become superuser or root and follow the steps described in Chapter 8 for installing software subsets. Enter the command:

```
# setld -l /mnt/ALPHA/GNUSRC
```

Choose the GNU Emacs Source subset from the menu.

If you are doing a RIS (Remote Installation Services) installation of your software, choose the GNU Emacs Source subset from the RIS menu. Use the following command to install the subset:

```
# setld -l server:
```

Replace *server*: with the name of your RIS server appended with a colon (:).

C.12 GNU Revision Control System Source (FSFRCSSRC)

GNU Revision Control System Source subset contains source files for the GNU Revision Control System (RCS).

To install the GNU Revision Control System Source subset from CD-ROM, become superuser or root and follow the steps described in Chapter 8 for installing software subsets. Enter the command:

```
# setld -l /mnt/ALPHA/GNUSRC
```

Choose the GNU Revision Control System Source subset from the menu.

If you are doing a RIS installation of your software, choose the GNU Revision Control System Source subset from the RIS menu. Use the

following command to install the subset:

```
# setld -l server:
```

Replace *server:* with the name of your RIS server appended with a colon (:).

C.13 NetWorker SingleServer Save and Restore (BRXNSSALPHA)

NetWorker SingleServer Save and Restore, also known as NetWorker SingleServer, is a graphical utility that backs up and restores local files on a single local system to a local tape or loader. Currently, a Digital UNIX user must know what utility (*tar*, *cpio*, *dump/restore*, or *vdump/vrestore*) was used to perform a backup in order to do a restore.

NetWorker SingleServer is a subset of Digital's POLYCENTER NetWorker Save and Restore product and is licensed free of charge with the Digital UNIX base operating system.

The OSF-BASE Product Authorization Key (PAK) gives you a license to install and use SingleServer; you do not need to load and register a special PAK.

NetWorker SingleServer consists of three software subsets:

- BRXNSSALPHA310 contains the NetWorker SingleServer graphical user interface and utilities.
- BRXNSSDOC310 contains the NetWorker Save and Restore and NetWorker SingleServer documentation and Release Notes.
- BRXNSSMAN310 contains the NetWorker Save and Restore reference pages.

After you install the NetWorker SingleServer subset BRXNSSDOC310, postscript files containing the following documents are automatically loaded into `/usr/opt/BRX310/usr/doc`:

- *NetWorker SingleServer Save and Restore for Digital UNIX Alpha Systems*
- *NetWorker User's Guide UNIX Version*
- *NetWorker Administrator's Guide UNIX Version*
- *NetWorker User's Guide Windows Product Family*
- *NetWorker Archive Guide*
- *POLYCENTER NetWorker Save and Restore Addendum*
- *POLYCENTER NetWorker Save and Restore Release Notes*

- *Read This First for POLYCENTER NetWorker Save and Restore*

If you are installing NetWorker SingleServer software subsets from the Digital UNIX CD-ROM, mount the CD-ROM, and as superuser or root enter the following command:

```
# setld -l /mnt/ALPHA/NetWorker_SingleServer BRXNSSALPHA310
```

To install the reference pages associated with NetWorker SingleServer, use the previous command and replace the subset name with BRXNSSMAN310. To install the documentation for NetWorker SingleServer, use the previous command and replace the subset name with BRXNSSDOC310.

If you are performing a RIS installation of the SingleServer software subsets, enter the following command to begin the RIS installation:

```
# setld -l server:
```

Replace *server:* with the name of your RIS server appended with a colon (:). By using the setld command a numbered list of subsets available to install is displayed. Choose the NetWorker SingleServer subsets from the menu.

During the installation, you are asked if you want to start the NetWorker daemons. If you enter no, the daemons will be started when the system is rebooted. To start the daemons manually without rebooting, refer to nsrd(8). To access this reference page you must have installed the BRXNSSMAN310 subset and must have run the catman -w command to update the whatis database.

C.14 Sort Library (SORLIB)

The Sort subset provides a run-time library of sort routines that provide applications programming interface compatibility with a subset of the OpenVMS sort utility. This functionality is provided to assist in the migration to Digital UNIX of several OpenVMS products that depend on OpenVMS SORT. It also provides a high performance sort package that takes advantage of the Alpha architecture for better performance.

The following table lists the contents of the SORLIB201 subset.

File Name	Description
libsort.so	Shareable object of Sort RTL routines
libsort.a	Library of Sort RTL routines
libsort.cat	Sort message catalog

To install the Sort subset from CD-ROM, become superuser or root and follow the steps described in Chapter 8 for installing software subsets. Enter

the command:

```
# setld -l /mnt/ALPHA/DEC_Sort_RTL
```

Choose the SORLIB201 subset from the menu.

If you are doing a RIS installation of your software, choose the Sort subset from the RIS menu. Use the following command to install the subset:

```
# setld -l server:
```

Replace *server*: with the name of your RIS server appended with a colon (:).

C.15 X11R6 Advanced Developer's Kit

The X11R6 Advanced Developers Kit gives developers an advanced start at using the new features provided by the sixth release of the X Window System.

This kit is provided in three subsets. All subsets may be used independently. All files in these kits will be installed under `/usr/opt/XR6320`, with symbolic links from `/usr/X11R6` and `/var/X11R6`. The three subsets in the X11R6 kit are:

- XR6SERVER320

Provides an R6 X Server and Font server. Refer to the `/usr/X11R6/README.server` file for a summary of new features and known limitations. Approximate disk requirements are 9 MB.

- XR6PROG320

Provides for X Window System library development based on the R6 version of the X Consortium libraries. Also included in this set are OSF/Motif libraries based on Version 1.2.3. These development libraries are binarily incompatible with the X11R5 libraries that are provided (the default X development libraries for Digital UNIX) and are also incompatible with those in the Common Desktop Environment (CDE) ADK. Refer to the `/usr/X11R6/README.programming` file for a summary of new features and known limitations. Approximate disk requirements are 40 MB.

- XR6DOC320

Contains documentation that is available for new features of the R6 release and man pages. Approximate disk requirements are 12 MB. Refer to the file `/usr/X11R6/README.documents` for more information.

Use the `setld` command to install the X11R6 subsets. If you are installing the X11R6 subsets from the Digital UNIX CD-ROM, mount the CD-ROM,

and as superuser or `root` enter the following command:

```
# setld -l /mnt/ALPHA/XR6 XR6SERVER320 XR6PROG320 XR6DOC320
```

If you are performing a RIS installation of the X11R6 software subsets, enter the following command to begin the RIS installation:

```
# setld -l server:
```

Replace *server:* with the name of your RIS server appended with a colon (:). The `setld` command displays a numbered list of subsets available to install. Choose the X11R6 subsets from the menu.

If insufficient space exists in the partition containing `/usr/opt`, mount a new partition at `/usr/opt/XR6320` or create `/usr/opt/XR6320` as a symbolic link to a directory in a partition that has sufficient space.

Worldwide Language Support Software Descriptions

D

This appendix describes the Digital UNIX worldwide language support software subsets. Worldwide language subsets are located on the CD-ROM labeled *Digital UNIX V3.2C Operating System (formerly DEC OSF/1) Disc 1 of 2* in the /ALPHA/WORLDWIDE directory. The following languages are supported:

- Worldwide Language Support
- Czech
- German
- Greek
- Spanish
- French
- Hungarian
- Italian
- Hebrew
- Japanese
- Korean
- Polish
- Russian
- Slovak
- Swedish
- Thai
- Turkish
- Chinese

Invoke /ALPHA/WORLDWIDE/wwinstall to start the worldwide installation script.

There is no special license registration required for the international subsets.

D.1 Digital UNIX Worldwide Support Software Descriptions

Digital UNIX worldwide support provides the following subsets:

- **IOSWWBASE350** Worldwide Base System (Operating System)
This subset is mandatory for all languages. It requires the presence of the OSFBASE350 subset of the base operating system.
- **IOSWWBIN350** Worldwide Standard Kernel Objects (Operating System)
This subset contains the standard kernel objects for the Asian terminal drivers and services. It is mandatory for Asian languages. It requires the IOSWWBINCOM350 and OSFBIN350 and OSFBINCOM350 subsets.
- **IOSWWBINCOM350** Worldwide Kernel Headers and Common Files (Operating System)
This subset is mandatory for Asian languages. It contains kernel header and other common files for building standard kernel or extended kernel which contains Asian/Thai terminal drivers and services.
- **IOSWWDECW350** Worldwide Additional DECwindows Applications (Windowing Environment)
This subset contains additional X11/DECwindows client applications, such as notepad. It is optional and requires the IOSWWX11350 and OSFDECW350 subsets
- **IOSWWFONTM350** Worldwide DECwindows Mandatory Fonts (Windowing Environment)
This subset contains the workstation font files.
- **IOSWWLAT2FONT100M350** Worldwide ISO-LATIN2 DECwindows 100dpi Mandatory Fonts (Windowing Environment)
This subset contains workstation ISO-LATIN2 100dpi mandatory font files. It is mandatory for systems using either a VR160 15-inch monitor or a higher resolution graphics monitor. This subset is optional for systems using a low resolution graphics monitor.
- **IOSWWLAT2FONT100P350** Worldwide ISO-LATIN2 DECwindows 100dpi Optional Fonts (Windowing Environment)
This optional subset contains Workstation ISO-LATIN2 100dpi optional font files.
- **IOSWWLAT2FONT75M350** Worldwide ISO-LATIN2 DECwindows 75dpi Mandatory Fonts (Windowing Environment)
This subset contains Workstation ISO-LATIN2 75dpi mandatory font files. It is mandatory for systems using low resolution graphics monitor and is optional for systems using either the VR160 15-inch monitor or a higher resolution graphics monitor.

- **IOSWWLAT2FONT75P350** Worldwide ISO-LATIN2 DECwindows 75dpi Optional Fonts (Windowing Environment)
This optional subset contains Workstation ISO-LATIN2 75dpi optional font files.
- **IOSWWLATCFONT100M350** Worldwide ISO-LATIN Cyrillic DECwindows 100dpi Mandatory Fonts (Windowing Environment)
This subset contains Workstation ISO-LATIN Cyrillic 100dpi mandatory font files. It is mandatory for systems using either a VR160 15-inch monitor or a higher resolution graphics monitor. This subset is optional for systems using a low resolution graphics monitor.
- **IOSWWLATCFONT100P350** Worldwide ISO-LATIN Cyrillic DECwindows 100dpi Optional Fonts (Windowing Environment)
This optional subset contains Workstation ISO-LATIN Cyrillic 100dpi optional font files.
- **IOSWWLATCFONT75M350** Worldwide ISO-LATIN Cyrillic DECwindows 75dpi Mandatory Fonts (Windowing Environment)
This subset contains Workstation ISO-LATIN Cyrillic 75dpi mandatory font files. It is mandatory for systems using a low resolution graphics monitor and is optional for systems using either the VR160 15-inch monitor or a higher resolution graphics monitor.
- **IOSWWLATCFONT75P350** Worldwide ISO-LATIN Cyrillic DECwindows 75dpi Optional Fonts (Windowing Environment)
This optional subset contains Workstation ISO-LATIN Cyrillic 75dpi optional font files.
- **IOSWWLAT2OLFONT350** Worldwide ISO-LATIN 2 Outline Fonts (Windowing Environment)
This optional subset contains ISO-LATIN 2 outline font files.
- **IOSWWLATCOLFONT350** Worldwide ISO-LATIN Cyrillic Outline Fonts (Windowing Environment)
This optional subset contains ISO-LATIN Cyrillic outline font files.
- **IOSWWMANOS350** Worldwide Support English Reference Pages (Operating System)
This subset contains all the English reference pages for the worldwide support software. Japanese reference pages translations are in a separate subset. Currently, reference pages are not available in languages other than Japanese and English.
It is optional and requires the OSFDCMT1350 subset.
- **IOSWWMH350** Worldwide Mail Handler (Operating System)
This subset contains the mail binaries and libraries. It is optional and requires the IOSWWBASE350 subset.
- **IOSWWPHRASE350** Worldwide Phrase Input Support (Operating System)

This subset contains binary files for the phrase input methods and daemons. It is optional and requires the IOSWWBASE350 subset.

- **IOSWWPRINT350** Worldwide Printer Support (Operating System)
This subset contains the lp* commands. It also contains common print filters for all Asian language variants. It is optional and requires the OSFPRINT350 subset.
- **IOSWWUDCOS350** Worldwide User Defined Character Support (Operating System)
This subset contains tools to create User-defined Characters in OS level. It also contains kernel objects for on demand loading font for terminal drivers.
- **IOSWWUDCWOS350** Worldwide User Defined Character Workstation Service (Windowing Environment)
This subset contains a tool to create User-defined Character fonts for X11/DECwindows. It is optional and requires the IOSWWX11350 subset.
- **IOSWWX11350** Worldwide Basic X Environment (Windowing Environment)
This subset contains the X11/DECwindows required programs. It is mandatory and requires the OSFX11350 subset.
- **IOSWWXDEV350** Worldwide X Window Software Development (Windowing Environment)
This subset contains libraries and data files needed to produce X/Motif Window System Client applications. It also includes example programs demonstrating how to get started using the client applications. It is optional and requires the IOSWWX11350 and OSFXDEV350 subsets.
- **IOSWWXMAIL350** Worldwide DECwindows Mail Interface (Windowing Environment)
This subset contains the DECwindows Mail Interface. It is optional and requires the IOSWWX11350 and OSFXMAIL350 subsets.

D.2 Czech Support

Digital UNIX Czech Support Version 3.2C contains the following subsets:

- **IOSCSDECW350** Czech Additional DECwindows Applications (Windowing Environment)
This subset contains additional X11/DECwindows client applications, such as notepad. It also provides Czech resource files and UID files. It is optional and requires the IOSWWDECW350 and IOSCSX11350 subsets.
- **IOSCSX11350** Czech Basic X Environment (Windowing Environment)
This mandatory subset contains Czech X11/DECwindows required programs and shared libraries and provides Czech resource and UID files.

This subset requires IOSWWX11350.

- **IOSCSXCDA350** Czech CDA Workstation Base Services (Windowing Environment)
This subset contains the Czech DECwindows CDA Viewer UID file. It is optional and requires the IOSCSX11350 subset.
- **IOSCSXDEV350** Czech X Window Software Development (Windowing Environment)
This subset contains libraries and data files needed to produce Czech X/Motif window system client applications. It is optional and requires the IOSWWXDEV350 and IOSCSX11350 subsets.
- **IOSCSXMAIL350** Czech DECwindows Mail Interface (Windowing Environment)
This subset contains the Czech DECwindows mail interface. It is optional and requires the IOSWWXMAIL350 and IOSCSX11350 subsets.

D.3 German Support

Digital UNIX German Support Version 3.2C contains the following subsets:

- **IOSDEDECW350** German Additional DECwindows Applications (Windowing Environment)
This subset contains additional X11/DECwindows client applications, such as notepad. It also provides German resource files and UID files. It is optional and requires the IOSWWDECW350 and IOSDEX11350 subsets.
- **IOSDEX11350** German Basic X Environment (Windowing Environment)
This mandatory subset contains German X11/DECwindows required programs and shared libraries. It also provides German resource files and UID files. This subset requires IOSWWX11350 and OSFEURLOC350.
- **IOSDEXCDA350** German CDA Workstation Base Services (Windowing Environment)
This subset contains the German DECwindows CDA Viewer UID file. It is optional and requires the IOSDEX11350 subset.
- **IOSDEXDEV350** German X Window Software Development (Windowing Environment)
This subset contains libraries and data files needed to produce German X/Motif window system client applications. It is optional and requires the IOSWWXDEV350 and IOSDEX11350 subsets.
- **IOSDEXMAIL350** German DECwindows Mail Interface (Windowing Environment)
This subset contains the German DECwindows mail interface. It is optional and requires the IOSWWXMAIL350 and IOSDEX11350 subsets.

D.4 Greek Support

Digital UNIX Greek Support Version 3.2C provides the following subsets:

- **IOSELDECW350** Greek Additional DECwindows Applications (Windowing Environment)
This subset contains additional X11/DECwindows client applications, such as notepad. It also provides Greek resource files and UID files. It is optional and requires the IOSWWDECW350 and IOSELX11350 subsets
- **IOSELFONT100M350** Greek DECwindows 100dpi Mandatory Fonts (Windowing Environment)
This subset contains workstation Greek 100dpi mandatory font files. It is mandatory for systems using either the VR160 15-inch monitor or a higher resolution graphics monitor. It is optional for systems using a low resolution graphics monitor.
- **IOSELFONT100P350** Greek DECwindows 100dpi Optional Fonts (Windowing Environment)
This optional subset contains workstation Greek 100dpi optional font files.
- **IOSELFONT75M350** Greek DECwindows 75dpi Mandatory Fonts (Windowing Environment)
This subset contains workstation Greek 75dpi mandatory font files. It is mandatory for systems using a low resolution graphics monitor and is optional for systems using either the VR160 15-inch monitor or a higher resolution graphics monitor.
- **IOSELFONT75P350** Greek DECwindows 75dpi Optional Fonts (Windowing Environment)
This optional subset contains workstation Greek 75dpi optional font files.
- **IOSELX11350** Greek Basic X Environment (Windowing Environment)
This subset contains Greek X11/DECwindows required programs and shared libraries. It also provides Greek resource files and UID files. It is mandatory and requires the IOSWWX11350 and OSFEURLOC350 subsets.
- **IOSELXMAIL350** Greek DECwindows Mail Interface (Windowing Environment)
This subset contains the Greek DECwindows mail interface. It is optional and requires the IOSWWXMAIL350 and IOSELX11350 subsets.
- **IOSELOLFONT350** Greek Outline Fonts (Outline Fonts)
This subset contains Greek outline font files and it is optional.

D.5 Spanish Support

Digital UNIX Spanish Support Version 3.2C contains the following subsets:

- **IOSESEDECW350** Spanish Additional DECwindows Applications (Windowing Environment)
This subset contains additional X11/DECwindows client applications, such as notepad. It also provides Spanish resource files and UID files. It is optional and requires the IOSWWDECW350 and IOSESX11350 subsets.
- **IOSESX11350** Spanish Basic X Environment (Windowing Environment)
This subset contains Spanish X11/DECwindows required programs and shared libraries. It also provides Spanish resource files and UID files. It is mandatory and requires the IOSWWX11350 and OSFEURLOC350 subsets.
- **IOSESXCDA350** Spanish CDA Workstation Base Services (Windowing Environment)
This subset contains the Spanish DECwindows CDA Viewer UID file. It is optional and requires the IOSESX11350 subset.
- **IOSESXDEV350** Spanish X Window Software Development (Windowing Environment)
This subset contains libraries and data files needed to produce Spanish X/Motif window system client applications. It is optional and requires the IOSWWXDEV350 and IOSESX11350 subsets.
- **IOSESXMAIL350** Spanish DECwindows Mail Interface (Windowing Environment)
This subset contains the Spanish DECwindows mail interface. It is optional and requires the IOSWWXMAIL350 and IOSESX11350 subsets.

D.6 French Support

Digital UNIX French Support Version 3.2C contains the following subsets:

- **IOSFRDECW350** French Additional DECwindows Applications (Windowing Environment)
This subset contains additional X11/DECwindows client applications, such as notepad. It also provides French resource files and UID files. It is optional and requires the IOSWWDECW350 and IOSFRX11350 subsets.
- **IOSFRX11350** French Basic X Environment (Windowing Environment)
This subset contains French X11/DECwindows required programs and shared libraries. It also provides French resource files and UID files. It is mandatory and requires the IOSWWX11350 and OSFEURLOC350 subsets.

- **IOSFRXCDA350** French CDA Workstation Base Services (Windowing Environment)
This subset contains the French DECwindows CDA Viewer UID file. It is optional and requires the IOSFRX11350 subset.
- **IOSFRXDEV350** French X Window Software Development (Windowing Environment)
This subset contains libraries and data files needed to produce French X/Motif window system client applications. It is optional and requires the IOSWWXDEV350 and IOSFRX11Version 3.2C subsets.
- **IOSFRXMAIL350** French DECwindows Mail Interface (Windowing Environment)
This subset contains the French DECwindows mail interface. It is optional and requires the IOSWWXMAIL350 and IOSFRX11350 subsets.

D.7 Hungarian Support

Digital UNIX Hungarian Support Version 3.2C contains the following subsets:

- **IOSHUDECW350** Hungarian Additional DECwindows Applications (Windowing Environment)
This subset contains additional X11/DECwindows client applications, such as notepad. It also provides Hungarian resource files and UID files. It is optional and requires the IOSWWDECW350 and IOSHUX11350 subsets.
- **IOSHUX11350** Hungarian Basic X Environment (Windowing Environment)
This subset contains Hungarian X11/DECwindows required programs and shared libraries. It also provides Hungarian resource files and UID files. It is mandatory and requires the IOSWWX11350 subset.
- **IOSHUXCDA350** Hungarian CDA Workstation Base Services (Windowing Environment)
This subset contains the Hungarian DECwindows CDA Viewer UID file. It is optional and requires the IOSHUX11350 subset.
- **IOSHUXDEV350** Hungarian X Window Software Development (Windowing Environment)
This subset contains libraries and data files needed to produce Hungarian X/Motif window system client applications. It is optional and requires the IOSWWXDEV350 and IOSHUX11350 subsets.
- **IOSHUXMAIL350** Hungarian DECwindows Mail Interface (Windowing Environment)
This optional subset contains the Hungarian DECwindows mail interface and requires the IOSWWXMAIL350 and IOSHUX11350 subsets.

D.8 Italian Support

Digital UNIX Italian Support Version 3.2C contains the following subsets:

- **IOSITDECW350** Italian Additional DECwindows Applications (Windowing Environment)
This subset contains additional X11/DECwindows client applications, such as notepad. It also provides Italian resource files and UID files. It is optional and requires the IOSWWDECW350 and IOSITX11350 subsets.
- **IOSITX11350** Italian Basic X Environment (Windowing Environment)
This subset contains Italian X11/DECwindows required programs and shared libraries. It also provides Italian resource files and UID files. It is mandatory and requires the IOSWWX11350 and OSFEURLOC350 subsets.
- **IOSITXCDA350** Italian CDA Workstation Base Services (Windowing Environment)
This subset contains the Italian DECwindows CDA Viewer UID file. It is optional and requires the IOSITX11350 subset.
- **IOSITXDEV350** Italian X Window Software Development (Windowing Environment)
This subset contains libraries and data files needed to produce Italian X/Motif window system client applications. It is optional and requires the IOSWWXDEV350 and IOSITX11350 subsets.
- **IOSITXMAIL350** Italian DECwindows Mail Interface (Windowing Environment)
This subset contains the Italian DECwindows mail interface. It is optional and requires the IOSWWXMAIL350 and IOSITX11350 subsets.

D.9 Hebrew Support

Digital UNIX Hebrew Support Version 3.2C contains the following subsets:

- **IOSIWBASE350** Hebrew Base System (Operating System)
This subset contains the Hebrew locale iw_IL.ISO8859-8. It is mandatory and requires the IOSWWBASE350 subset.
- **IOSIWFONT100M350** Hebrew DECwindows 100dpi Mandatory Fonts (Windowing Environment)
This subset contains workstation Hebrew 100dpi mandatory font files. It is mandatory for systems using either a VR160 15-inch monitor or higher resolution graphics monitor. It is optional for systems using low resolution graphics monitors.
- **IOSIWFONT100P350** Hebrew DECwindows 100dpi Optional Fonts (Windowing Environment)

This optional subset contains workstation Hebrew 100dpi font files.

- **IOSIWFONT75M350** Hebrew DECwindows 75dpi Mandatory Fonts (Windowing Environment)
This subset contains workstation Hebrew 75dpi mandatory font files. It is mandatory for systems using a low resolution graphics monitor and is optional for systems using either the VR160 15-inch monitor or a higher resolution graphics monitor.
- **IOSIWFONT75P350** Hebrew DECwindows 75dpi Optional Fonts
This subset contains workstation Hebrew 75dpi optional font files.
- **IOSIWX11350** Hebrew Basic X Environment (Windowing Environment)
This subset contains Hebrew X11/DECwindows required programs and shared libraries. It also provides Hebrew resource files and UID files. It is mandatory and requires the IOSWWX11Version 3.2C subset.
- **IOSIWXDEV350** Hebrew X Window Software Development (Windowing Environment)
This subset contains libraries and data files needed to produce Hebrew X/Motif window system client applications. It is optional and requires the IOSWWXDEV350 subset and IOSIWX11350 subsets.
- **IOSIWOLFONT350** Hebrew Outline Fonts (Outline Fonts)
This optional subset contains Hebrew outline font files.

D.10 Japanese Support

Digital UNIX Japanese Support Version 3.2C provides the following subsets:

- **IOSJPABASE350** Additional Japanese Software (Operating System)
This subset contains the jvi and mtools binaries. It is optional and requires the IOSJPBASE350 subset.
- **IOSJPAMANOS350** Japanese Reference Pages for Additional Software (Operating System)
This subset contains the reference pages for the Japanese software in IOSJPABASE350. It is optional and requires the OSFDCMT350 subset.
- **IOSJPAMANOSSJIS350** Japanese SJIS Reference Pages for Additional Software (Operating System)
This subset contains the same set of man pages in IOSJPAMANOS350 but in SJIS format. It is optional and requires the OSFDCMT350 subset.
- **IOSJPBASE350** Japanese Base System (Operating System)
This subset contains the Japanese-specific locales, methods, termcap files, shared libraries, terminal files and services. It is mandatory and requires the IOSWWBASE350 subset.
- **IOSJPDECW350** Japanese Additional DECwindows Applications (Windowing Environment)

This subset contains additional X11/DECwindows client applications, such as notepad. It also provides Japanese resource files and UID files. It is optional and requires the IOSWWDECW350 subset and IOSJPX11350.

- **IOSJPFONT100M350** Japanese DECwindows 100dpi Mandatory Fonts (Windowing Environment)
This subset contains workstation Japanese 100dpi mandatory font files. It is mandatory for systems using either a VR160 15-inch monitor or higher resolution graphics monitor. This subset is optional for systems using a low resolution graphics monitor.
- **IOSJPFONT100P350** Japanese DECwindows 100dpi Optional Fonts (Windowing Environment)
This optional subset contains workstation Japanese 100dpi font files.
- **IOSJPFONTM350** Japanese DECwindows 75dpi Mandatory Fonts (Windowing Environment)
This subset contains workstation Japanese mandatory font files for 75dpi and 100dpi displays.
- **IOSJPFONT75M350** Japanese DECwindows 75dpi Mandatory Fonts (Windowing Environment)
This subset contains workstation Japanese 75dpi font files. It is mandatory for systems using a low resolution graphics monitor and is optional for systems using either the VR160 15-inch monitor or a higher resolution graphics monitor.
- **IOSJPFONT75P350** Japanese DECwindows 75dpi Fonts
This subset contains workstation Japanese 75dpi optional font files. It is optional.
- **IOSJPMANOS350** Japanese Reference Pages (Operating System)
This subset contains the Japanese reference pages. It is optional and requires the OSFDCMT350 subset.
- **IOSJPMANOSSJIS350** Japanese (SJIS) Reference Pages (Operating System)
This subset contains the same set of reference pages as IOSJPMANOS350, but in SJIS format. It is optional and requires the OSFDCMT350 subset.
- **IOSJPMANWOS350** Japanese Windows Reference Pages (Windowing Environment)
This subset contains Japanese Windows reference pages. It is optional and requires the OSFDCMT350 subset.
- **IOSJPMSG350** Japanese Message Catalogs (Operating System)
This subset contains the Japanese message catalogs for Japanese commands. It is optional and requires the IOSJPBASE350 subset.

- **IOSJPMSGSJIS350** Formatted SJIS Japanese Message Catalogs (Operating System)
This subset contains the same message catalogs as IOSJPMSG350, but in SJIS format. It is optional and requires the IOSJPBASE350 subset.
- **IOSJPNEMACS350** Japanese Nemacs (Operating System)
This subset supports the Nemacs editor. It is optional and requires the IOSJPBASE350 subset.
- **IOSJPNEMACSSRCS350** Japanese Nemacs Source Files (Operating System)
This optional subset contains the source files for Japanese Nemacs.
- **IOSJPPGMR350** Japanese Software Development (Operating System)
This subset contains the header files and libraries for the Japanese software in the IOSJPBASE350 subset. It is optional and requires the IOSJPBASE350 subset.
- **IOSJPWNN350** Wnn Input Method (Operating System)
This subset supports the Wnn input method. It is optional and requires the IOSJPBASE350 subset.
- **IOSJPWNNPGMR350** Wnn Software Development (Operating System)
This subset contains the header files and libraries for Wnn input method development. It is optional and requires the IOSJPBASE350 subset.
- **IOSJPWNNSRC350** Wnn Source Files (Operating System)
This subset contains the source file for the Wnn input method. It is optional and has no subset dependency.
- **IOSJPX11350** Japanese Basic X Environment (Windowing Environment)
This subset contains Japanese X11/DECwindows required programs and shared libraries. It also provides Japanese resource files and UID files. It is mandatory and requires the IOSWWX11350 subset.
- **IOSJPPXCDA350** Japanese CDA Workstation Base Services (Windowing Environment)
This subset contains the Japanese DECwindows CDA Viewer UID and Help files. It is optional and requires the IOSJPX11350 subset.
- **IOSJPXDEV350** Japanese X Window Software Development (Windowing Environment)
This subset contains libraries and data files needed to produce Japanese X/Motif window system client applications. It is optional and requires the IOSWWXDEV350 and IOSJPX11350 subsets.
- **IOSJPXMAIL350** Japanese DECwindows Mail Interface (Windowing Environment)
This subset contains the Japanese DECwindows Mail Interface. It is optional and requires the IOSWWXMAIL350 and IOSJPX11350 subsets.

D.11 Korean Support

Digital UNIX Korean Support Version 3.2C provides the following subsets:

- **IOSKOBASE350** Korean Base System (Operating System)
This subset contains the Korean specific locales, methods, termcaps, shared libraries, terminal files and services. It is mandatory and requires the IOSWWBASE350 subset.
- **IOSKODECW350** Korean Additional DECwindows Applications (Windowing Environment)
This subset contains additional X11/DECwindows client applications, such as notepad. It also provides Korean resource files and UID files. It is optional and requires the IOSWWDECW350 and IOSKOX11350 subsets.
- **IOSKOFONTM350** Korean DECwindows Mandatory Fonts (Windowing Environment)
This subset contains workstation Korean mandatory font files for 75dpi and 100dpi displays.
- **IOSKOFONTP350** Korean DECwindows Optional Fonts (Windowing Environment)
This optional subset contains workstation Korean optional font files for 75dpi and 100dpi displays.
- **IOSKOX11350** Korean Basic X Environment (Windowing Environment)
This subset contains programs and shared libraries required for Korean X/11 DECwindows. It also provides Korean resource files and UID files. It is mandatory and requires the IOSWWX11350 subset.
- **IOSKOXCDA350** Korean CDA Workstation Base Services (Windowing Environment)
This subset contains the Korean DECwindows CDA Viewer UID file. It is optional and requires the IOSKOX11350 subset.
- **IOSKOXDEV350** Korean X Window Software Development (Windowing Environment)
This subset contains libraries and data files needed to produce Korean X/Motif window system client applications. It is optional and requires the IOSWWXDEV350 and IOSKOX11350 subsets.
- **IOSKOXMAIL350** Korean DECwindows Mail Interface (Windowing Environment)
This subset contains the Korean DECwindows mail interface. It is optional and requires the IOSWWXMAIL350 and IOSKOX11350 subsets.
- **IOSKOOLFONT350** Korean Outline Fonts (Outline Fonts)
This subset contains the Korean outline font files. It is optional.

D.12 Polish Support

Digital UNIX Polish Support Version 3.2C provides the following subsets:

- **IOSPLDECW350** Polish Additional DECwindows Applications (Windowing Environment)
This subset contains additional X11/DECwindows client applications, such as notepad. It also provides Polish resource files and UID files. It is optional and requires the IOSWWDECW350 and IOSPLX11350 subsets.
- **IOSPLX11350** Polish Basic X Environment (Windowing Environment)
This subset contains Polish X11/DECwindows required programs and shared libraries. It also provides Polish resource files and UID files. It is mandatory and requires the IOSWWX11350 subset.
- **IOSPLXCDA350** Polish CDA Workstation Base Services (Windowing Environment)
This subset contains the Polish DECwindows CDA Viewer UID file. It is optional and requires the IOSPLX11350 subset.
- **IOSPLXDEV350** Polish X Window Software Development (Windowing Environment)
This subset contains libraries and data files needed to produce Polish X/Motif window system client applications. It is optional and requires the IOSWWXDEV350 and IOSPLX11350 subsets.
- **IOSPLXMAIL350** Polish DECwindows Mail Interface (Windowing Environment)
This subset contains the Polish DECwindows mail interface. It is optional and requires the IOSWWXMAIL350 and IOSPLX11350 subsets.

D.13 Russian Support

Digital UNIX Russian Support Version 3.2C provides the following subsets:

- **IOSRUDECW350** Russian Additional DECwindows Applications (Windowing Environment)
This subset contains additional X11/DECwindows client applications, such as notepad. It also provides Russian resource files and UID files. It is optional and requires the IOSWWDECW350 and IOSRUX11350 subsets.
- **IOSRUX11350** Russian Basic X Environment (Windowing Environment)
This subset contains Russian X11/DECwindows required programs and shared libraries. It also provides Russian resource files and UID files. It is mandatory and requires the IOSWWX11350 subset.
- **IOSRUXCDA350** Russian CDA Workstation Base Services (Windowing Environment)

This subset contains the Russian DECwindows CDA Viewer UID file. It is optional and requires the IOSRUX11350 subset.

- **IOSRUXDEV350** Russian X Window Software Development (Windowing Environment)
This subset contains libraries and data files needed to produce Russian X/Motif window system client applications. It is optional and requires the IOSWWXDEV350 and IOSRUX11350 subsets.
- **IOSRUXMAIL350** Russian DECwindows Mail Interface (Windowing Environment)
This subset contains the Russian DECwindows mail interface. It is optional and requires the IOSWWXMAIL350 and IOSRUX11350 subsets.

D.14 Slovak Support

Digital UNIX Slovak Support Version 3.2C provides the following subsets:

- **IOSSKDECW350** Slovak Additional DECwindows Applications (Windowing Environment)
This subset contains additional X11/DECwindows client applications, such as notepad. It also provides Slovak resource files and UID files. It is optional and requires the IOSWWDECW350 and IOSSKX11350 subsets.
- **IOSSKX11350** Slovak Basic X Environment (Windowing Environment)
This subset contains Slovak X11/DECwindows required programs and shared libraries. It also provides Slovak resource files and UID files. It is mandatory and requires the IOSWWX11350 subset.
- **IOSSKXCDA350** Slovak CDA Workstation Base Services (Windowing Environment)
This subset contains the Slovak DECwindows CDA Viewer UID file. It is optional and requires the IOSSKX11350 subset.
- **IOSSKXDEV350** Slovak X Window Software Development (Windowing Environment)
This subset contains libraries and data files needed to produce Slovak X/Motif window system client applications. It is optional and requires the IOSWWXDEV350 and IOSSKX11350 subsets.
- **IOSSKXMAIL350** Slovak DECwindows Mail Interface (Windowing Environment)
This subset contains libraries and data files needed to produce Slovak X/Motif window system client applications. It is optional and requires the IOSWWXDEV350 and IOSSKX11350 subsets.

D.15 Swedish Support

Digital UNIX Swedish Support Version 3.2C provides the following subsets:

- **IOSSVDECW350** Swedish Additional DECwindows Applications (Windowing Environment)
This subset contains additional X11/DECwindows client applications, such as notepad. It also provides Swedish resource files and UID files. It is optional and requires the IOSWWDECW350 and IOSSVX11350 subsets.
- **IOSSVX11350** Swedish Basic X Environment (Windowing Environment)
This subset contains Swedish X11/DECwindows required programs and shared libraries. It also provides Swedish resource files and UID files. It is mandatory and requires the IOSWWX11350 and OSFEURLOC350 subsets.
- **IOSSVXCDA350** Swedish CDA Workstation Base Services (Windowing Environment)
This subset contains the Swedish DECwindows CDA Viewer UID file. It is optional and requires the IOSSVX11350 subset.
- **IOSSVXDEV350** Swedish X Window Software Development (Windowing Environment)
This subset contains libraries and data files needed to produce Swedish X/Motif window system client applications. It is optional and requires the IOSWWXDEV350 and IOSSVX11350 subsets.
- **IOSSVXMAIL350** Swedish DECwindows Mail Interface (Windowing Environment)
This subset contains the Swedish DECwindows mail interface. It is optional and requires the IOSWWXMAIL350 and IOSSVX11350 subsets.

D.16 Thai Support

Digital UNIX Thai Support Version 3.2C provides the following subsets:

- **IOSTHBASE350** Thai Base System (Operating System)
This subset contains the Thai specific locales, methods, termcaps, shared libraries, terminal files and services. It is mandatory and requires the IOSWWBASE350 subset. IOSIBASE350 Internationalized Base System is required for this subset.
- **IOSIBIN350** Standard Kernel Objects (Operating System)
This subset contains the kernel object for the Thai terminal driver. It is mandatory if the machine contains only one CPU. It requires the IOSWWBINCOM350 and OSFBIN350 subsets.

- **IOSTHDECW350** Thai Additional DECwindows Applications (Windowing Environment)
This subset contains additional X11/DECwindows client applications, such as notepad. It also provides Thai resource files and UID files. It is optional and requires the IOSWWDECW350 and IOSTHX11350 subsets.
- **IOSTHFONTM350** Thai DECwindows Mandatory Fonts (Windowing Environment)
This subset contains workstation Thai mandatory font files for 75dpi and 100dpi displays.
- **IOSTHPRINT350** Thai Printer Support Environment (Operating System)
This subset contains the printer filters for Thai printers. It is optional and requires the IOSWWPRINT350 subset.
- **IOSTHX11350** Thai Basic X Environment (Windowing Environment)
This subset contains Thai X11/DECwindows required programs and shared libraries. It also provides Thai resource files and UID files. It is mandatory and requires the IOSWWX11350 subset.
- **IOSTHXDEV350** Thai X Window Software Development (Windowing Environment)
This subset contains libraries and data files needed to produce Thai X/Motif window system client applications. It is optional and requires the IOSWWXDEV350 and IOSWWX11350 subsets.
- **IOSTHXMAIL350** Thai DECwindows Mail Interface (Windowing Environment)
This subset contains the Thai DECwindows mail interface. It is optional and requires the IOSWWXMAIL350 and IOSTHX11350 subsets.
- **IOSTHOLFONT350** Thai Outline Fonts (Outline Fonts)
This subset contains Thai outline font files and it is optional.

D.17 Turkish Support

Digital UNIX Turkish Support Version 3.2C provides the following subsets:

- **IOSTRDECW350** Turkish Additional DECwindows Applications (Windowing Environment)
This subset contains additional X11/DECwindows client applications, such as notepad. It also provides Turkish resource files and UID files. It is optional and requires the IOSWWDECW350 and IOSTRX11350 subsets.

- **IOSTRFONT100M350** Turkish DECwindows 100dpi Mandatory Fonts (Windowing Environment)
This subset contains workstation Turkish 100dpi mandatory font files. It is mandatory for systems using either the VR160 15-inch monitor or a higher resolution graphics monitor. It is optional for systems using a low resolution graphics monitor.
- **IOSTRFONT100P350** Turkish DECwindows 100dpi Optional Fonts (Windowing Environment)
This subset contains workstation Turkish 100dpi optional font files. It is optional.
- **IOSTRFONT75M350** Turkish DECwindows 75dpi Mandatory Fonts (Windowing Environment)
This subset contains workstation Turkish mandatory 75dpi font files. It is mandatory for systems using a low resolution graphics monitor and is optional for systems using either the VR160 15-inch monitor or a higher resolution graphics monitor.
- **IOSTRFONT75P350** Turkish DECwindows 75dpi Optional Fonts (Windowing Environment)
This subset contains workstation Turkish 75dpi optional font files.
- **IOSTRX11350** Turkish Basic X Environment (Windowing Environment)
This subset contains Turkish X11/DECwindows required programs and shared libraries. It also provides Turkish resource files and UID files. It is mandatory and requires the IOSWWX11350 and OSFEURLOC350 subsets.
- **IOSTRXMAIL350** Turkish DECwindows Mail Interface (Windowing Environment)
This subset contains the Turkish DECwindows mail interface. It is optional and requires the IOSWWXMAIL350 and IOSTRX11350 subsets.
- **IOSTROLFONT350** Turkish Outline Fonts (Outline Fonts)
This subset contains Turkish outline font files and it is optional.

D.18 Chinese Support

Digital UNIX Chinese Support Version 3.2C provides the following subsets:

- **IOSZHBASE350** Chinese Base System (Operating System)
This subset contains the Traditional Chinese and Simplified Chinese terminal files. It is mandatory and requires the IOSWWBASE350 subset.
- **IOSZHBIG5350** Big-5 Character Set Support (Operating System)
This subset contains all the BIG5 related libraries, charmaps, methods and terminal drivers. It is optional and requires the IOSZHTWBASE350 subset.

- **IOSZHCNBASE350** Chinese Base System for China (Operating System)
This subset contains the China specific locales and methods shared libraries. It is mandatory and requires the IOSZHBASE350 subset.
- **IOSZHCNLOC350** Additional Chinese Locales for China (Operating System)
This subset contains the "@" variant locales that have different collating rules. It is optional and requires the IOSZHCNBASE350 subset.
- **IOSZHCONV350** Traditional and Simplified Chinese Conversion (Operating System)
This subset contains the terminal drivers, kernel objects and services for Traditional and Simplified Chinese conversion. It is mandatory and requires the IOSZHBASE350 subset.
- **IOSZHEUCTW350** Taiwanese EUC Character Set Support (Operating System)
This subset contains methods, shared libraries and services for Taiwanese EUC character set. It is optional and requires the IOSZHTWBASE350 subset.
- **IOSZHHANYU350** DEC Hanyu Character Set Support (Operating System)
This subset contains methods, shared libraries and services for the DEC Hanyu character set. It is optional and requires the IOSZHTWBASE350 subset.
- **IOSZHHANZI350** DEC Hanzi Character Set Support (Operating System)
This subset contains methods and shared libraries for the DEC Hanzi character set. It is optional and requires the IOSZHBASE350 subset.
- **IOSZHHKBASE350** Chinese Base System for Hong Kong (Operating System)
This subset contains the Hong Kong's specific locales, methods, shared libraries, messages catalogs and services. It is mandatory and requires the IOSZHBASE350 subset.
- **IOSZHTELEX350** Telecode Character Set Support (Operating System)
This subset contains all Telecode related methods and terminal drivers. It is optional and requires the IOSZHTWBASE350 subset.
- **IOSZHSDECW350** Simplified Chinese Additional DECwindows Applications (Windowing Environment)
This subset contains additional X11/DECwindows client applications, such as notepad. It also provides Simplified Chinese resource files and UID files. It is optional and requires the IOSWWDECW350 and IOSZHSX11350 subsets.
- **IOSZHSFONTM350** Simplified Chinese DECwindows Mandatory Fonts (Windowing Environment)

This subset contains workstation Simplified Chinese mandatory font files for 75dpi and 100dpi displays. It is mandatory.

- **IOSZHSFONTP350** Simplified Chinese DECwindows Optional Fonts (Windowing Environment)
This optional subset contains workstation Simplified Chinese screen optional font files for 75dpi and 100dpi displays.
- **IOSZHSX11350** Simplified Chinese Basic X Environment (Windowing Environment)
This subset contains Simplified Chinese X11/DECwindows required programs and shared libraries. It also provides Simplified Chinese resource files and UID files. It is mandatory and requires the IOSWWX11350 subset.
- **IOSZHSCDA350** Simplified Chinese CDA Workstation Base Services (Windowing Environment)
This subset contains the Simplified Chinese DECwindows CDA Viewer UID file. It is optional and requires the IOSZHSX11350 subset.
- **IOSZHSXDEV350** Simplified Chinese X Window Software Development (Windowing Environment)
This subset contains libraries and data files needed to produce Simplified Chinese X/Motif window system client applications. It is optional and requires the IOSWWXDEV350 and IOSZHSX11350 subsets.
- **IOSZHSXMAIL350** Simplified Chinese DECwindows Mail Interface (Windowing Environment)
This subset contains the Simplified Chinese DECwindows mail interface. It is optional and requires the IOSWWXMAIL350 and IOSZHSX11350 subsets.
- **IOSZHTDECW350** Traditional Chinese Additional DECwindows Applications (Windowing Environment)
This subset contains additional X11/DECwindows client applications, such as notepad. It also provides Hanyu resource files and UID files. It is optional and requires the IOSWWDECW350 and IOSZHTX11350 subsets.
- **IOSZHTFONTM350** Traditional Chinese DECwindows Fonts
This subset contains workstation Traditional Chinese mandatory font files for 75dpi and 100dpi displays. It is mandatory.
- **IOSZHTFONTP350** Traditional Chinese DECwindows Fonts
This optional subset contains workstation Traditional Chinese optional font files for 75dpi and 100dpi displays.

- **IOSZHTWBASE350** Chinese Base System for Taiwan (Operating System)
This subset contains the Taiwan specific locales, methods libraries, messages catalogs and collating tables for Asian sorting. It is mandatory and requires OSFBASE350.
- **IOSZHTWLOC350** Additional Chinese Locales for Taiwan (Operating System)
This subset contains the "@" variant locales which have different collating rules. It is optional and requires the IOSZHTWBASE350 subset.
- **IOSZHTX11350** Traditional Chinese Basic X Environment (Windowing Environment)
This subset contains Traditional Chinese X11/DECwindows required programs and shared libraries. It also provides Hanyu resource files and UID files. It is mandatory and requires the IOSWWX11350 subset.
- **IOSZHTXCDA350** Traditional Chinese CDA Workstation Base Services (Windowing Environment)
This subset contains the Traditional Chinese DECwindows CDA Viewer UID file. It is optional and requires the IOSZHTX11350 subset.
- **IOSZHTXDEV350** Traditional Chinese X Window Software Development (Windowing Environment)
This subset contains libraries and data files needed to produce Traditional Chinese X/Motif window system client applications. It is optional and requires the IOSWWXDEV350 and IOSZHTX11350 subsets.
- **IOSZHTXMAIL350** Traditional Chinese DECwindows Mail Interface (Windowing Environment)
This subset contains the Traditional Chinese DECwindows mail interface. It is optional and requires the IOSWWXMAIL350 and IOSZHTX11350 subsets.
- **IOSZHX11350** Base Chinese X Environment (Windowing Environment)
This subset contains required programs that are common to both Traditional Chinese/DECwindows and Simplified Chinese/DECwindows. It also provides Chinese input methods. It is mandatory and requires the IOSWWDECW350 subset.
- **IOSZHSOLFONT350** Simplified Chinese Outline Fonts (Outline Fonts)
This optional subset contains the Simplified Chinese outline font files.
- **IOSZHTOLFONT350** Traditional Chinese Outline Fonts (Outline Fonts)
This subset contains the Traditional Chinese outline font files. It is optional.

Software Subset Sizes **E**

This appendix provides the sizes of all Digital UNIX software subsets for full, update, and RIS installations. Space requirements for the online documentation are also included in this appendix.

E.1 Disk Space for Full Installations

Table E-1 shows disk space in as the number of 512-byte blocks required in the `root`, `/usr`, and `/var` file systems to install each Digital UNIX software subset. The figures for each group of files within a subset have been rounded up to the next higher 512-byte increment; this means that the total space requirements listed are slightly greater than the space that the software actually requires.

For information on the contents of each subset, refer to Appendix B and Appendix C. If you want to add optional subsets after you install Digital UNIX Version 3.2C, use the `df` command to determine free disk space in blocks.

Table E-1: Digital UNIX Software Subset Sizes

ATOM Program Analysis Tools				
Subset	root	/usr	/var	Total
ATMBASE340	—	8065.92	—	8065.92
Total	—	8065.92	—	8065.92
Digital UNIX Version 3.2C Operating System				
Subset	root	/usr	/var	Total
OSFACCT350	9.67	1077.41	91.03	1178.11
OSFADVFS350	5406.00	7778.02	—	13184.02
OSFADVFSBIN350	—	3734.64	—	3734.64
OSFAFM350	—	2160.73	—	2160.73
OSFATMBASE350	431.76	134.00	—	565.76
OSFATMBIN350	—	10952.80	—	10952.80
OSFBASE350	29617.40	68984.80	595.55	99197.76
OSFBIN350	—	18232.50	—	18232.50

Digital UNIX Version 3.2C Operating System

Subset	root	/usr	/var	Total
OSFBINCOM350	6.06	21219.10	—	21225.16
OSFC2SEC350	1513.77	830.69	874.00	3218.46
OSFCDAPGMR350	—	3527.06	—	3527.06
OSFCLINET350	2490.94	7749.53	22.00	10262.47
OSFCMPLRS350	—	14921.10	—	14921.10
OSFCMPLRSEXT350	—	11702.60	—	11702.60
OSFCOMAGENT350	182.79	4165.80	—	4348.59
OSFCTABLOC350	34.25	367.35	—	401.60
OSFDCMT350	—	1297.18	—	1297.18
OSFDCMTEXT350	—	3105.76	—	3105.76
OSFDECC350	—	7859.00	—	7859.00
OSFDECW350	—	12894.20	—	12894.20
OSFDMS350	—	641.96	73.00	714.96
OSFDPSFONT350	—	5077.78	—	5077.78
OSFEMACS350	—	29114.30	—	29114.30
OSFEURLOC350	—	1584.22	—	1584.22
OSFEXER350	—	2907.00	—	2907.00
OSFFONT15350	—	3547.23	—	3547.23
OSFFONT350	—	2837.69	—	2837.69
OSFHWBASE350	17752.10	2619.45	34.40	20405.95
OSFHWBIN350	—	15545.40	—	15545.40
OSFHWBINCOM350	—	1865.79	—	1865.79
OSFINET350	933.94	4393.27	463.18	5790.39
OSFKBDLK201350	—	361.70	—	361.70
OSFKBDLK401350	—	248.44	—	248.44
OSFKBDLK411350	—	133.90	—	133.90
OSFKBDLK421350	—	16.42	—	16.42
OSFKBDLK444350	—	126.52	—	126.52
OSFKBDPCXAL350	—	135.76	—	135.76
OSFKTOOLS350	—	1123.06	8367.57	9490.63
OSFLAT350	27.52	1382.29	—	1409.81
OSFLEARN350	—	3114.39	—	3114.39
OSFLSMBASE350	10025.10	3406.69	48.21	13480.00
OSFLSMBIN350	—	613.01	—	613.01
OSFLSMBINCOM350	—	470.78	—	470.78
OSFLSMPGMR350	—	288.61	—	288.61
OSFLSMX11350	—	2453.18	—	2453.18
OSFLVM350	—	7701.42	—	7701.42
OSFMANOP350	—	11589.10	—	11589.10
OSFMANOS350	—	17981.00	—	17981.00
OSFMANRT350	—	425.38	—	425.38
OSFMANWOP350	—	11342.70	—	11342.70
OSFMANWOS350	—	2620.40	—	2620.40
OSFMH350	—	14589.10	—	14589.10
OSFMITFONT350	—	16317.20	104.01	16421.21
OSFMOTDEM350	—	6639.80	—	6639.80

Digital UNIX Version 3.2C Operating System

Subset	root	/usr	/var	Total
OSFNFS350	48.84	1074.59	46.82	1170.25
OSFOBSOLETE350	—	1851.00	—	1851.00
OSFPGMR350	—	24885.00	—	24885.00
OSFPRINT350	57.52	5581.31	19.00	5657.83
OSFRCS350	—	1961.54	—	1961.54
OSFRIS350	—	73.78	108.00	181.78
OSFRTDEV350	—	345.62	—	345.62
OSFSCCS350	—	6344.55	—	6344.55
OSFSER350	—	15688.40	81.18	15769.58
OSFSERPCI350	—	1977.00	—	1977.00
OSFSERQV350	—	924.00	—	924.00
OSFSERTC350	—	27911.00	—	27911.00
OSFSVID2350	31.59	672.83	—	704.42
OSFUUCP350	100.82	7973.52	266.00	8340.34
OSFVET350	—	3112.41	—	3112.41
OSFX11350	—	52611.00	350.63	52961.64
OSFXC2SEC350	—	2736.50	63.60	2800.10
OSFXCDADEV350	—	896.37	—	896.37
OSFXDEV350	—	39594.90	—	39594.90
OSFXIEDOC350	—	2250.59	—	2250.59
OSFXMAIL350	—	1125.90	—	1125.90
OSFXMIT350	—	4696.87	—	4696.87
OSFXOEM350	—	0.00	965.85	965.85
OSFXVET350	—	834.34	—	834.34
Total	68670.06	581032.22	12574.04	662276.32

Digital UNIX V3.2C CDE ADK Software

Subset	root	/usr	/var	Total
CDEAPPS350	—	6571.44	—	6571.44
CDEDEV350	—	30099.20	—	30099.20
CDEDOC350	—	30734.50	—	30734.50
CDEDT350	32.00	40000.20	—	40032.20
CDEMAIL350	—	2675.84	—	2675.84
CDEMANOP350	—	3049.25	—	3049.25
CDEMANOS350	—	2403.12	—	2403.12
CDEMIN350	16.00	15428.20	16.00	15460.20
Total	48.00	130961.75	16.00	131025.75

Development Enhancements for Digital UNIX Version 3.2C				
Subset	root	/usr	/var	Total
CMPDEVENH350	—	2799.82	—	2799.82
Total	—	2799.82	—	2799.82
DECladebug Debugger Version 4.0-7, for Digital UNIX				
Subset	root	/usr	/var	Total
LDBBASE407	—	10840.00	—	10840.00
LDBDOC407	—	36.80	—	36.80
LDBSRV407	—	162.50	—	162.50
Total	—	11039.31	—	11039.31
DEC Ada Runtime Library				
Subset	root	/usr	/var	Total
ADALIB321	—	1531.25	—	1531.25
Total	—	1531.25	—	1531.25
DEC C++ RTL Version 3.0-6 for Digital UNIX Systems				
Subset	root	/usr	/var	Total
CXXSHRDA306	—	1477.56	—	1477.56
Total	—	1477.56	—	1477.56
DEC COBOL RTL V2.2 for Digital UNIX Systems				
Subset	root	/usr	/var	Total
DCARTL220	—	3844.21	—	3844.21
O2ABASE220	—	2901.28	—	2901.28
Total	—	6745.49	—	6745.49
DEC Fortran for Digital UNIX Alpha Runtime Support				
Subset	root	/usr	/var	Total
DFARTL361	—	5076.25	—	5076.25
Total	—	5076.25	—	5076.25

DEC Pascal for Digital UNIX AXP Runtime Support

Subset	root	/usr	/var	Total
DPORTL524	—	2023.89	—	2023.89
Total	—	2023.89	—	2023.89

Sort Runtime Library

Subset	root	/usr	/var	Total
SORLIB201	—	651.84	—	651.84
Total	—	651.84	—	651.84

Free Software Foundation GNU Source for Digital UNIX Version 3.2C

Subset	root	/usr	/var	Total
FSFEMACSSRC350	—	14795.80	—	14795.80
FSFGAWKSRC350	—	1221.38	—	1221.38
FSFRCSSRC350	—	1821.79	—	1821.79
Total	—	17838.97	—	17838.97

NetWorker SingleServer Kit

Subset	root	/usr	/var	Total
BRXNSSALPHA310	—	65894.40	—	65894.40
BRXNSSDOC310	—	14975.90	—	14975.90
BRXNSSMAN310	—	1160.19	—	1160.19
Total	—	82030.49	—	82030.49

Digital UNIX Worldwide Language Support Version 3.2C

Subset	root	/usr	/var	Total
IOSAACMENU350	—	0.00	—	—
IOSCSDECW350	—	4618.25	—	4618.25
IOSCSX11350	—	7123.09	—	7123.09
IOSCSXCDA350	—	281.35	—	281.35
IOSCSXDEV350	—	159.27	—	159.27
IOSCSXMAIL350	—	335.87	—	335.87
IOSDEDECW350	—	4711.01	—	4711.01
IOSDEX11350	—	6660.31	—	6660.31
IOSDEXCDA350	—	291.54	—	291.54
IOSDEXDEV350	—	159.40	—	159.40
IOSDEXMAIL350	—	390.95	—	390.95
IOSELDECW350	—	129.96	—	129.96

Digital UNIX Worldwide Language Support Version 3.2C

Subset	root	/usr	/var	Total
IOSELFONT100M350	—	964.84	—	964.84
IOSELFONT100P350	—	1009.28	—	1009.28
IOSELFONT75M350	—	815.08	—	815.08
IOSELFONT75P350	—	857.91	—	857.91
IOSELOLFONT350	—	1945.64	—	1945.64
IOSELX11350	—	441.84	—	441.84
IOSELXMAIL350	—	68.34	—	68.34
IOSESDWC350	—	4713.01	—	4713.01
IOESX11350	—	6652.74	—	6652.74
IOESXCDA350	—	280.79	—	280.79
IOESXDEV350	—	159.74	—	159.74
IOESXMAIL350	—	348.05	—	348.05
IOSFRDECW350	—	4680.59	—	4680.59
IOSFRX11350	—	6660.93	—	6660.93
IOSFRXCDA350	—	281.97	—	281.97
IOSFRXDEV350	—	159.49	—	159.49
IOSFRXMAIL350	—	364.87	—	364.87
IOSHUDECW350	—	4689.49	—	4689.49
IOSHUX11350	—	6943.75	—	6943.75
IOSHUXCDA350	—	283.17	—	283.17
IOSHUXDEV350	—	159.37	—	159.37
IOSHUXMAIL350	—	347.59	—	347.59
IOSITDECW350	—	4708.82	—	4708.82
IOSITX11350	—	6736.16	—	6736.16
IOSITXCDA350	—	287.76	—	287.76
IOSITXDEV350	—	159.52	—	159.52
IOSITXMAIL350	—	365.04	—	365.04
IOSIWBASE350	—	151.09	—	151.09
IOSIWFONT100M350	—	577.76	—	577.76
IOSIWFONT100P350	—	2152.32	—	2152.32
IOSIWFONT75M350	—	360.69	—	360.69
IOSIWFONT75P350	—	1898.87	—	1898.87
IOSIWOLFONT350	—	2937.08	—	2937.08
IOSIWX11350	—	1814.25	—	1814.25
IOSIWXDEV350	—	918.51	—	918.51
IOSJPABASE350	—	4880.40	—	4880.40
IOSJPAMANOS350	—	219.21	—	219.21
IOSJPAMANOSSJIS350	—	219.21	—	219.21
IOSJPBASE350	—	12169.00	—	12169.00
IOSJPDECW350	—	6830.79	—	6830.79
IOSJPFONT100M350	—	11560.80	—	11560.80
IOSJPFONT100P350	—	11479.30	—	11479.30
IOSJPFONT75M350	—	7948.39	—	7948.39
IOSJPFONT75P350	—	7878.80	—	7878.80
IOSJPFONTM350	—	12827.40	—	12827.40
IOSJPMANOS350	—	5924.52	—	5924.52

Digital UNIX Worldwide Language Support Version 3.2C

Subset	root	/usr	/var	Total
IOSJPMANOSSJIS350	—	5915.44	—	5915.44
IOSJPMANWOS350	—	1032.02	—	1032.02
IOSJPMSG350	—	1624.92	—	1624.92
IOSJPMSGSJIS350	—	541.59	—	541.59
IOSJPNEMACS350	76.00	23273.70	—	23349.70
IOSJPNEMACSSRC350	—	10353.00	—	10353.00
IOSJPPGMR350	—	3758.35	—	3758.35
IOSJPWNN350	104.97	20376.10	—	20481.07
IOSJPWNNPGMR350	—	2040.53	—	2040.53
IOSJPWNNSRC350	—	10797.20	—	10797.20
IOSJPX11350	—	7346.94	—	7346.94
IOSJPXCDA350	—	406.14	—	406.14
IOSJPXDEV350	—	232.78	—	232.78
IOSJPXMAIL350	—	751.83	—	751.83
IOSKOBASE350	—	1426.61	—	1426.61
IOSKODECW350	—	2282.52	—	2282.52
IOSKOFONTM350	—	3603.20	—	3603.20
IOSKOFONTP350	—	9166.83	—	9166.83
IOSKOOLFONT350	—	5841.90	—	5841.90
IOSKOPGMR350	—	277.33	—	277.33
IOSKOX11350	—	4997.58	—	4997.58
IOSKOXCDA350	—	179.00	—	179.00
IOSKOXDEV350	—	169.14	—	169.14
IOSKOXMAIL350	—	76.16	—	76.16
IOSPLDECW350	—	4630.61	—	4630.61
IOSPLX11350	—	7163.23	—	7163.23
IOSPLXCDA350	—	279.48	—	279.48
IOSPLXDEV350	—	159.37	—	159.37
IOSPLXMAIL350	—	348.00	—	348.00
IOSRUDECW350	—	4707.49	—	4707.49
IOSRUX11350	—	6931.87	—	6931.87
IOSRUXCDA350	—	283.45	—	283.45
IOSRUXDEV350	—	159.40	—	159.40
IOSRUXMAIL350	—	333.35	—	333.35
IOSSKDECW350	—	4558.16	—	4558.16
IOSSKX11350	—	6554.07	—	6554.07
IOSSKXCDA350	—	276.54	—	276.54
IOSSKXDEV350	—	159.15	—	159.15
IOSSKXMAIL350	—	325.71	—	325.71
IOSSVDECW350	—	4422.11	—	4422.11
IOSSVX11350	—	6285.70	—	6285.70
IOSSVXCDA350	—	274.53	—	274.53
IOSSVXDEV350	—	159.18	—	159.18
IOSSVXMAIL350	—	325.90	—	325.90
IOSTHBASE350	—	283.51	—	283.51
IOSTHBIN350	—	160.44	—	160.44

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Subset	root	/usr	/var	Total
IOSTHDECW350	—	2132.15	—	2132.15
IOSTHFONTM350	—	105.02	—	105.02
IOSTHOLFONT350	—	7219.19	—	7219.19
IOSTHPGMR350	—	118.26	—	118.26
IOSTHPRINT350	—	178.93	—	178.93
IOSTHX11350	—	5870.78	—	5870.78
IOSTHXCDA350	—	147.00	—	147.00
IOSTHXDEV350	—	189.15	—	189.15
IOSTHXMAIL350	—	74.14	—	74.14
IOSTRDECW350	—	129.96	—	129.96
IOSTRFONT100M350	—	963.06	—	963.06
IOSTRFONT100P350	—	3841.14	—	3841.14
IOSTRFONT75M350	—	819.22	—	819.22
IOSTRFONT75P350	—	3212.79	—	3212.79
IOSTROLFONT350	—	5354.26	—	5354.26
IOSTRX11350	—	479.98	—	479.98
IOSTRXMAIL350	—	68.33	—	68.33
IOSWWBASE350	186.50	942.54	—	1129.04
IOSWWBIN350	15.32	1133.55	—	1148.87
IOSWWBINCOM350	25.70	400.48	—	426.18
IOSWWDECW350	—	4631.85	—	4631.85
IOSWWFONTM350	—	824.02	—	824.02
IOSWWLAT2FONT100M350	—	1167.29	—	1167.29
IOSWWLAT2FONT100P350	—	4379.70	—	4379.70
IOSWWLAT2FONT75M350	—	998.40	—	998.40
IOSWWLAT2FONT75P350	—	3576.84	—	3576.84
IOSWWLAT2OLFONT350	—	5479.32	—	5479.32
IOSWWLATCFONT100M350	—	1148.59	—	1148.59
IOSWWLATCFONT100P350	—	2432.35	—	2432.35
IOSWWLATCFONT75M350	—	975.94	—	975.94
IOSWWLATCFONT75P350	—	2040.60	—	2040.60
IOSWWLATCOLFONT350	—	3570.53	—	3570.53
IOSWWMANOS350	—	2226.55	—	2226.55
IOSWWMH350	—	17261.20	—	17261.20
IOSWWPGMR350	—	252.03	—	252.03
IOSWWPHRASE350	—	1641.46	—	1641.46
IOSWWPRINT350	67.20	4330.03	—	4397.23
IOSWWUDCOS350	—	2140.83	—	2140.83
IOSWWUDCWOS350	—	116.45	—	116.45
IOSWWX11350	—	13788.50	—	13788.50
IOSWWXDEV350	—	2375.69	—	2375.69
IOSWWXMAIL350	—	871.38	—	871.38
IOSZHBASE350	—	473.56	—	473.56
IOSZHBIG5350	—	1541.60	—	1541.60
IOSZHCNBASE350	—	386.26	—	386.26
IOSZHCNLOC350	—	1122.28	—	1122.28

Digital UNIX Worldwide Language Support Version 3.2C				
Subset	root	/usr	/var	Total
IOSZHCONV350	—	1322.05	—	1322.05
IOSZHEUCTW350	—	641.20	—	641.20
IOSZHHANYU350	—	705.06	—	705.06
IOSZHHANZI350	—	235.32	—	235.32
IOSZHHKBASE350	—	3630.39	—	3630.39
IOSZHPGMR350	—	4189.54	—	4189.54
IOSZHSDECW350	—	2194.95	—	2194.95
IOSZHSFONTM350	—	3169.28	—	3169.28
IOSZHSFONTP350	—	26867.20	—	26867.20
IOSZHSOLFONT350	—	14465.00	—	14465.00
IOSZHSX11350	—	3371.41	—	3371.41
IOSZHSXCDA350	—	155.00	—	155.00
IOSZHSXDEV350	—	341.74	—	341.74
IOSZHSXMAIL350	—	74.85	—	74.85
IOSZHTDECW350	—	6462.27	—	6462.27
IOSZHTELEX350	—	2301.47	—	2301.47
IOSZHTFONTM350	—	8544.73	—	8544.73
IOSZHTFONTP350	—	18978.40	—	18978.40
IOSZHTOLFONT350	—	27073.20	—	27073.20
IOSZHTWBASE350	—	3262.40	—	3262.40
IOSZHTWLOC350	—	9750.79	—	9750.79
IOSZHTX11350	—	8580.73	—	8580.73
IOSZHTXCDA350	—	449.00	—	449.00
IOSZHTXDEV350	—	1498.48	—	1498.48
IOSZHTXMAIL350	—	232.51	—	232.51
IOSZHX11350	—	8636.76	—	8636.76
Total	475.69	608214.12	—	608689.81
X11R6 Advanced Development Kit				
Subset	root	/usr	/var	Total
XR6DOC320	—	23766.60	—	23766.60
XR6PROG320	—	83439.60	—	83439.60
XR6SERVER320	23.33	26461.60	—	26484.93
Total	23.33	133667.80	—	133691.13
Grand Totals	root	/usr	/var	Total
	69217.08	1593156.68	12590.04	1674963.80

E.1.1 Update Installation

For update installations, the `installupdate` script automatically computes and reports the difference between the amount of disk space used and that required. Depending on the software currently installed on the system and how the disk partitions are defined, the Update Installation procedure from DEC OSF/1 Version 3.2, 3.2A, or 3.2B to Digital UNIX Version 3.2C requires the following minimum amounts of disk space in megabytes (MB):

- Disk space (in MB) needed to update only the Version 3.2 and Version 3.2A mandatory subsets to Digital UNIX Version 3.2C:

root	0
usr	0
var	.1
Total	.1

- Disk space (in MB) needed to update only the Version 3.2B mandatory subsets to Digital UNIX Version 3.2C:

root	0
usr	0
var	.1
Total	.1

- Disk space (in MB) needed to update all mandatory and optional Version 3.2 and Version 3.2A subsets to Digital UNIX Version 3.2C:

root	0
usr	0
var	.7
Total	.7

- Disk space needed to update all mandatory and optional Version 3.2B subsets to Digital UNIX Version 3.2C:

root	0
usr	0
var	.1
Total	.1

Systems with more subsets installed than those included by a basic installation, but fewer subsets than a full installation, will have varying minimum disk space requirements for an update installation.

E.1.2 RIS Area

The RIS area for Digital UNIX Version 3.2C requires approximately 238 MB of disk space. The space requirements are broken down as follows:

Product Area	512-Byte Blocks
./ALPHA/ATOM	3324
./ALPHA/BASE	418370
./ALPHA/CDE	86562
./ALPHA/COMPILERS	1692
./ALPHA/DECLADEBUG	5302
./ALPHA/DEC_Ada_RTL	1552
./ALPHA/DEC_C++_RTL	736
./ALPHA/DEC_Cobol_RTL	2704
./ALPHA/DEC_Fortran_RTL	2440
./ALPHA/DEC_Pascal_RTL	836
./ALPHA/SORT	332
./ALPHA/GNUSRC	6986
./ALPHA/NetWorker_SingleServer	40098
./ALPHA/WORLDWIDE/BASE	332214
./ALPHA/XR6	69114

E.1.3 Documentation

The Bookreader files for the Digital UNIX documentation set and the Worldwide support documentation are contained on the CD-ROM labeled *Digital UNIX V3.2C Online Documentation (formerly DEC OSF/1) Disc 2 of 2*. These files require the following amounts of disk space if moved from the CD-ROM onto a local disk:

- Digital UNIX operating system documentation – 130 MB
- Worldwide support documentation – 20 MB

Disk Partition Information **F**

This appendix provides disk partition information for the supported Digital Storage Architecture (DSA) and Small Computer System Interface (SCSI) disk drives. This information will help you complete the tables in Chapter 3.

See Section F.1 for a list of the supported DSA disk drives. See Section F.2 for a list of the supported SCSI disk drives.

F.1 DSA Disk Drives

The following `ra` disks are supported:

- RA60
- RA71, RA72, RA73
- RA81, RA82
- RA90, RA92

This section includes partition information for each of these disks.

RA60 Partitions

Partition	Start	End	Block Size	MB	Overlap
a	0	40959	40960	20	c
b	40960	82927	41968	20	c
c	0	400175	400176	195	a, b, d, e, f, g, h
d	242928	295343	52416	26	c, h
e	295344	347759	52416	26	c, h
f	347760	400175	52416	26	c, h
g	82928	242927	160000	78	c
h	242928	400175	157248	77	c, d, e, f

RA71 Partitions

Partition	Start	End	Block Size	MB	Overlap
a	0	131071	131072	64	c
b	131072	393215	262144	128	c
c	0	1367309	1367310	668	a, b, d, e, f, g, h
d	393216	717913	324698	159	c, g
e	717914	1042611	324698	159	c, g
f	1042612	1367309	324698	159	c, g, h
g	393216	1212415	819200	400	c, d, e, f
h	1212416	1367309	154894	76	c, f

RA72 Partitions

Partition	Start	End	Block Size	MB	Overlap
a	0	131071	131072	64	c
b	131072	393215	262144	128	c
c	0	1953299	1953300	954	a, b, d, e, f, g, h
d	393216	913243	520028	254	c, g
e	913244	1433271	520028	254	c, g, h
f	1433272	1953299	520028	254	c, h
g	393216	1212415	819200	400	c, d, e
h	1212416	1953299	740884	362	c, e, f

RA73 Partitions

Partition	Start	End	Block Size	MB	Overlap
a	0	131071	131072	64	c
b	131072	393215	262144	128	c
c	0	3920489	3920490	1914	a, b, d, e, f, g, h
d	393216	1568767	1175552	574	c, g, h
e	1568768	2744319	1175552	574	c, h
f	2744320	3920489	1176170	574	c, h
g	393216	1212415	819200	400	c, d
h	1212416	3920489	2708074	1322	c, d, e, f

RA81 Partitions

Partition	Start	End	Block Size	MB	Overlap
a	0	81919	81920	40	c
b	81920	344063	262144	128	c
c	0	891071	891072	435	a, b, d, e, f, g
d	344064	526399	182336	89	c, g
e	526400	708735	182336	89	c, g
f	708736	891071	182336	89	c, g
g	344064	891071	547008	267	c, d, e, f
h	0	0	0	0	

RA82 Partitions

Partition	Start	End	Block Size	MB	Overlap
a	0	131071	131072	64	c
b	131072	393215	262144	128	c
c	0	1216664	1216665	594	a, b, d, e, f, g
d	393216	667698	274483	134	c, g
e	667699	942181	274483	134	c, g
f	942182	1216664	274483	134	c, g
g	393216	1216664	823449	402	c, d, e, f
h	0	0	0	0	

RA90 Partitions

Partition	Start	End	Block Size	MB	Overlap
a	0	131071	131072	64	c
b	131072	393215	262144	128	c
c	0	2376152	2376153	1160	a, b, d, e, f, g, h
d	393216	1054194	660979	323	c, g
e	1054195	1715173	660979	323	c, g, h
f	1715174	2376152	660979	323	c, h
g	393216	1212415	819200	400	c, d, e
h	1212416	2376152	1163737	568	c, e, f

RA92 Partitions

Partition	Start	End	Block Size	MB	Overlap
a	0	131071	131072	64	c
b	131072	393215	262144	128	c
c	0	2940950	2940951	1436	a, b, d, e, f, g, h
d	393216	1054194	660979	323	c, g
e	1054195	1715173	660979	323	c, g, h
f	1715174	2376152	660979	323	c, h
g	393216	1212415	819200	400	c, d, e
h	1212416	2940950	1728535	844	c, e, f

F.2 SCSI Disk Drives

The following `rz` disks are supported:

- RZ24L
- RZ25, RZ25L, RZ25M
- RZ26, RZ26L, RZ26N
- RZ28, RZ28B, RZ28M
- RZ29B
- RZ55, RZ56, RZ58
- RZ73, RZ74
- HSZ10, HSZ40

This section includes partition information for each of these disks.

RZ24L Partitions

Partition	Start	End	Block Size	MB	Overlap
a	0	40959	40960	20	c
b	40960	163839	122880	60	c
c	0	479349	479350	234	a, b, d, e, f, g
d	163840	269009	105170	51	c, g
e	269010	374179	105170	51	c, g
f	374180	479349	105170	51	c, g
g	163840	479349	315510	154	c, d, e, f
h	0	0	0	0	

RZ25 Partitions

Partition	Start	End	Block Size	MB	Overlap
a	0	131071	131072	64	c
b	131072	393215	262144	128	c
c	0	832526	832527	407	a, b, d, e, f, g
d	393216	539652	146437	72	c, g
e	539653	686089	146437	72	c, g
f	686090	832526	146437	72	c, g
g	393216	832526	439311	215	c, d, e, f
h	0	0	0	0	

RZ25L Partitions

Partition	Start	End	Block Size	MB	Overlap
a	0	131071	131072	64	c
b	131072	393215	262144	128	c
c	0	1046205	1046205	510	a, b, d, e, f, g
d	393216	610878	217663	106	c, g
e	610879	828541	217663	106	c, g
f	828542	1046205	146437	72	c, g
g	393216	1046205	439311	215	c, d, e, f
h	0	0	0	0	

RZ25M Partitions

Partition	Start	End	Block Size	MB	Overlap
a	0	131071	131072	64	c
b	131072	393215	262144	128	c
c	0	1046205	1046205	510	a, b, d, e, f, g
d	393216	610878	217663	106	c, g
e	610879	828541	217663	106	c, g
f	828542	1046205	146437	72	c, g
g	393216	1046205	439311	215	c, d, e, f
h	0	0	0	0	

RZ26, RZ26L, and RZ26N Partitions

Partition	Start	End	Block Size	MB	Overlap
a	0	131071	131072	64	c
b	131072	393215	262144	128	c
c	0	2050859	2050860	1001	a, b, d, e, f, g, h
d	393216	945763	552548	270	c, g
e	945764	1498311	552548	270	c, g, h
f	1498312	2050859	552548	270	c, h
g	393216	1212415	819200	400	c, d, e
h	1212416	2050859	838444	409	c, e, f

RZ28, RZ28B, and RZ28M Partitions

Partition	Start	End	Block Size	MB	Overlap
a	0	131071	131072	64	c
b	131072	532479	401408	196	c
c	0	4110480	4110480	2007	a, b, d, e, f, g, h
d	532480	1724415	1191936	581	c, g
e	1724416	2916351	1191936	581	c, g, h
f	2916352	4110480	1194129	583	c, h
g	532480	2320383	1787904	873	c, d, e
h	2320384	4110480	1790097	874	c, ,e, f

RZ29B Partitions

Partition	Start	End	Block Size	MB	Overlap
a	0	131071	131072	64	c
b	131072	532479	401408	196	c
c	0	8380080	8380080	4091	a, b, d, e, f, g, h
d	532480	3155967	2623488	1281	c, g
e	3155968	5779455	2623488	1281	c, g, h
f	5779456	8380080	2600625	1269	c, h
g	532480	4468735	3936255	1922	c, d, e
h	4468736	8380080	3911345	1909	c, e, f

RZ55 Partitions

Partition	Start	End	Block Size	MB	Overlap
a	0	131071	131072	64	c
b	131072	393215	262144	128	c
c	0	649039	649040	317	a, b, g
d	0	0	0	0	
e	0	0	0	0	
f	0	0	0	0	
g	393216	649039	255824	125	c
h	0	0	0	0	

RZ56 Partitions

Partition	Start	End	Block Size	MB	Overlap
a	0	131071	131072	64	c
b	131072	393215	262144	128	c
c	0	1299173	1299174	634	a, b, d, e, f, g, h
d	393216	695201	301986	147	c, g
e	695202	997187	301986	147	c, g
f	997188	1299173	301986	147	c, g, h
g	393216	1212415	819200	400	c, d, e, f
h	1212416	1299173	86758	42	c, f

RZ58 Partitions

Partition	Start	End	Block Size	MB	Overlap
a	0	131071	131072	64	c
b	131072	393215	262144	128	c
c	0	2698060	2698061	1317	a, b, d, e, f, g, h
d	393216	1161496	768281	375	c, g
e	1161497	1929778	768282	375	c, g, h
f	1929779	2698060	768282	375	c, h
g	393216	1212415	819200	400	c, d, e
h	1212416	2698060	1485645	725	c, e, f

RZ73 Partitions

Partition	Start	End	Block Size	MB	Overlap
a	0	131071	131072	64	c
b	131072	393215	262144	128	c
c	0	3907910	3907911	1908	a, b, d, e, f, g, h
d	393216	1564780	1171565	572	c, g, h
e	1564781	2736345	1171565	572	c, h
f	2736346	3907910	1171565	572	c, h
g	393216	1212415	819200	400	c, d
h	1212416	3907910	2695495	1316	c, d, e, f

RZ74 Partitions

Partition	Start	End	Block Size	MB	Overlap
a	0	131071	131072	64	c
b	131072	524287	393216	192	c
c	0	6976374	6976375	3406	a, b, d, e, f, g, h
d	524288	2674687	2150400	1050	c, g
e	2674688	4825087	2150400	1050	c, g, h
f	4285088	6976374	2691287	1414	c,h
g	524287	3749887	3225600	1575	c, d, e
h	3749888	6976374	3226486	1575	c, e, f

HSZ10 Partitions

Partition	Start	End	Block Size	MB	Overlap
a	0	131071	131072	64	n/a
b	131072	393215	262144	128	n/a
c	0	end of media	n/a	n/a	a, b, g
d	0	0	n/a	n/a	n/a
e	0	0	n/a	n/a	n/a
f	0	0	n/a	n/a	n/a
g	393216	end of media	n/a	n/a	n/a
h	0	0	n/a	n/a	n/a

HSZ40 Partitions

Partition	Start	End	Block Size	MB	Overlap
a	0	131071	131072	64	n/a
b	131072	393215	262144	128	n/a
c	0	end of media	n/a	n/a	a, b, g
d	0	0	n/a	n/a	n/a
e	0	0	n/a	n/a	n/a
f	0	0	n/a	n/a	n/a
g	393216	end of media	n/a	n/a	n/a
h	0	0	n/a	n/a	n/a

HSZ10 and HSZ40 are SCSI disk arrays employing RAID technology. The default disk partition on a disk attached to an EISA RAID (SWXCR-En) or PCI (SWXCR-Pn) disk controller is correct for the *re* disk. Disk partition sizes depend on the number of disk devices in the array and how they have been configured.

Installation Error Messages G

This appendix explains some of the error messages that you might encounter if there is a problem during an installation.

`<string>: unknown machine type`

The program used to determine the type of machine being installed has not found the expected Alpha architecture. The value of *string* is the value returned from the program.

The system installation cannot continue and you must contact your field service representative.

Do you want to quit the installation? (y/n) []:

For some special installation cases, the *Release Notes* may instruct you to press `Ctrl/c` and enter commands. In these cases, there will also be instructions on how to restart or continue the installation procedure.

If you answer `y`, it means that you want to terminate the installation and restart at the beginning. If you answer `n`, the installation procedure will continue.

No valid device is found. Contact a DIGITAL field service representative.

A device that is supported by the operating system as a valid distribution device cannot be found on the system.

Contact your Digital field service representative.

The MAKEDEV command could not make the special files on device `<device name>`. This error causes the installation procedure to stop. One possible cause for the error is a corrupt system disk. You may want to replace or use another system disk, and begin the installation again. If this error message appears a second time, contact a DIGITAL representative.

The system is unable to create the device special file for the load device. The in-memory file system might not be mounted read-write. The MAKEDEV command might not understand how to create special files for the device.

Verify that the file system is read-write by using the mount command. Restart the installation by pressing `Ctrl/d`. If the problem persists, contact your Digital field service representative.

No valid device is found. Contact a DIGITAL field service representative.

There are no disks on the system that are supported for the purpose of storing the root file system.

Consult the *Software Product Description* (SPD) and Appendix F for a list of supported disks.

If you have disks that are listed as supported for use as system disks connected to your system, use the following steps to check the cables:

1. Turn off the system and all connected expansion cabinets.
2. Check the cabling to all disks and expansion cabinets.
3. Turn on all expansion cabinets.
4. Turn on the system box.
5. Start the installation again by booting the standalone (SAS) environment.

You attempted to allocate the root file system on `rz?a`, which contains your distribution medium. Select another disk device from the table.

You tried to use the distribution device as the system disk. This situation will not occur if you are installing from a CD-ROM drive, but it might occur if you copied your CD-ROM onto a magnetic disk and attempted to use the magnetic disk as the distribution device.

The system disk selection menu will reappear. Select a different drive.

Basic Installation Log H

This appendix shows a record of a BASIC Installation from a remote installation services (RIS) server, system9. During a RIS installation, your system name and the current date and time are obtained from the server.

*** STANDALONE SYSTEM ENVIRONMENT ***

Select the BASIC option to install the mandatory software subsets for your system configuration.

Select the ADVANCED option to display optional software subsets from a menu and/or customize system disks and partitions.

Select the SYSTEM MANAGEMENT option to customize disk partitions on the system disk.

Select one of the following options:

- 1) BASIC Installation
- 2) ADVANCED Installation
- 3) SYSTEM Management

Enter your choice: 1

*** SYSTEM DISK SELECTION ***

The Installation Guide explains the following table of system disk drives. Select one of the disks in the table to contain the root file system:

SYSTEM DISK TABLE

Selection	Device Name	Software Name	Device Number	Controller Name	Controller Number
1	RZ26L	rz0	0	SCSI	0
2	RZ26	rz3	3	SCSI	0
3	RZ58	rz8	8	SCSI	1

Enter your choice: 1

You selected RZ26L, device number 0. Make sure this disk drive is online and write-enabled (if applicable to your disk drive), then confirm your choice.

Use RZ26L, rz0, for your system disk? (y/n) []: y

Initializing the system disk RZ26L, rz0...
Working...Thu Jun 22 14:16:32 GMT 1995
Working...Thu Jun 22 14:18:34 GMT 1995

*** BOOTSTRAP COMMAND SEQUENCE ***

Distribution source is remote server system9
The system disk has been initialized.

Issue the following console commands to set your default bootpath variable
and to boot your system disk to multiuser:

```
>>> set boot_osflags A
>>> set bootdef_dev "DKA0"
>>> boot
```

***** Continuing Digital UNIX installation

***** CREATING DEFAULT FILE SYSTEMS

The default location for the /usr file system is rz0g
The default location for the var area is rz0g (in /usr)
The default location for the swap space is rz0b
The default filesystem type for /usr is ufs (UNIX File System)

Making the new file system for /usr on /dev/rrz0g RZ26L
Working...Thu Jun 22 14:20:34 GMT 1995

*** Loading the operating system software subsets

The installation procedure will now load the software on your
disk partitions. This process will take anywhere between
20 minutes to an hour, depending on your distribution media
and processor type.

Working...Thu Jun 22 14:21:11 GMT 1995

The following subsets will be installed:

- Base System
- Base System - Hardware Support
- Compiler Back End
- Kernel Header and Common Files
- Standard Kernel Objects
- Hardware Kernel Objects
- Hardware Kernel Header and Common Files
- Basic Networking Services
- X Servers
- X Servers for TurboChannel

- Basic X Environment
- LK401 Keyboard Support
- X Fonts
- DECwindows 100dpi Fonts
- Adobe Fonts
- NFS(tm) Utilities
- RAND Corp. Mail Handler (MH)
- Local Printer Support

DECwindows Mail Interface

Base System

Copying from system9 (inet)
Working....Thu Jun 22 14:23:31 GMT 1995
Verifying
Working....Thu Jun 22 14:25:25 GMT 1995

Base System - Hardware Support

Copying from system9 (inet)
Working....Thu Jun 22 14:25:54 GMT 1995
Verifying

Compiler Back End

Copying from system9 (inet)
Verifying

Kernel Header and Common Files

Copying from system9 (inet)
Working....Thu Jun 22 14:27:06 GMT 1995
Verifying

Standard Kernel Objects

Copying from system9 (inet)
Working....Thu Jun 22 14:28:06 GMT 1995
Verifying

Hardware Kernel Objects

Copying from system9 (inet)
Working....Thu Jun 22 14:28:56 GMT 1995
Verifying

Hardware Kernel Header and Common Files

Copying from system9 (inet)
Verifying

Basic Networking Services

Copying from system9 (inet)
Verifying

X Servers

Copying from system9 (inet)
Verifying

X Servers for TurboChannel

Copying from system9 (inet)
Working....Thu Jun 22 14:31:21 GMT 1995
Verifying

Basic X Environment

Copying from system9 (inet)
Working....Thu Jun 22 14:31:59 GMT 1995
Verifying

LK401 Keyboard Support

Copying from system9 (inet)
Verifying

X Fonts

Copying from system9 (inet)

```
Working....Thu Jun 22 14:33:38 GMT 1995
Verifying

DECwindows 100dpi Fonts
  Copying from system9 (inet)
  Verifying

Adobe Fonts
  Copying from system9 (inet)
  Verifying

NFS(tm) Utilities
  Copying from system9 (inet)
  Verifying

RAND Corp. Mail Handler (MH)
  Copying from system9 (inet)
  Verifying

Local Printer Support
  Copying from system9 (inet)
  Verifying

DECwindows Mail Interface
  Copying from system9 (inet)
  Verifying

The installation procedure has successfully installed the
software subsets
```

*** SYSTEM CONFIGURATION ***

```
Configuring "Base System " (OSFBASE350)
Configuring "Base System - Hardware Support " (OSFHWBASE350)
Configuring "Compiler Back End " (OSFCMPLRS350)
Configuring "Kernel Header and Common Files " (OSFBINCOM350)
Configuring "Standard Kernel Objects " (OSFBIN350)
Configuring "Hardware Kernel Objects " (OSFHWBIN350)
Configuring "Hardware Kernel Header and Common Files" (OSFHWBINCOM350)
Configuring "Basic Networking Services " (OSFCLINET350)
Configuring "X Servers " (OSFSER350)
Configuring "X Servers for TurboChannel " (OSFSERTC350)
Configuring "Basic X Environment " (OSFX11350)
Configuring "LK401 Keyboard Support " (OSFKBDLK401350)
Configuring "X Fonts " (OSFMITFONT350)
```

Configuring "DECwindows 100dpi Fonts " (OSFFONT15350)

Configuring "Adobe Fonts " (OSFDPSFONT350)

Configuring "NFS(tm) Utilities " (OSFNFS350)

Configuring "RAND Corp. Mail Handler (MH) " (OSFMH350)

Configuring "Local Printer Support " (OSFPRINT350)

Configuring "DECwindows Mail Interface " (OSFXMAIL350)

The system name assigned to your machine is 'jersey'.

The date and time has been set to Fri Jun 30 14:43:12 EDT 1995

The system will now automatically build a kernel
and then reboot. This will take approximately 15
minutes, depending on the processor type.

When the login prompt appears after the system
has rebooted, use 'root' as the login name and
the SUPERUSER password that was entered during
this procedure, to log into the system.

*** PERFORMING KERNEL BUILD ***

Working....Fri Jun 30 14:43:54 EDT 1995

Working....Fri Jun 30 14:45:55 EDT 1995

Advanced Installation Log

This appendix shows a sample advanced installation. The exact text displayed by the installation software depends on the type of system you have and the type of media you are using, but the installation procedure for all systems and media is similar.

*** STANDALONE SYSTEM ENVIRONMENT ***

Select the BASIC option to install the mandatory software subsets for your system configuration.

Select the ADVANCED option to display optional software subsets from a menu and/or customize system disks and partitions.

Select the SYSTEM MANAGEMENT option to customize disk partitions on the system disk.

Select one of the following options:

- 1) BASIC Installation
- 2) ADVANCED Installation
- 3) SYSTEM Management

Enter your choice: 2

*** SYSTEM DISK SELECTION ***

The Installation Guide explains the following table of system disk drives. Select one of the disks in the table to contain the root file system:

SYSTEM DISK TABLE

Selection	Device Name	Software Name	Device Number	Controller Name	Controller Number
1	RZ26L	rz0	0	SCSI	0
2	RZ26	rz3	3	SCSI	0
3	RZ58	rz8	8	SCSI	1

Enter your choice: 3

You selected RZ58, device number 8. Make sure this disk drive is online and write-enabled (if applicable to your disk drive), then confirm your choice.

```

Use RZ58, rz8, for your system disk? (y/n) []: y

You can select to use the UNIX File System (ufs) or the Advanced File
System (advfs) for the root file system. See the Installation
Guide for further information.

Select the file system type for the root file system
(advfs/ufs) [ufs]:

Initializing the system disk RZ58, rz8...
Working....Fri Jul  7 17:35:02 GMT 1995
Working....Fri Jul  7 17:37:03 GMT 1995
Working....Fri Jul  7 17:39:05 GMT 1995

*** BOOTSTRAP COMMAND SEQUENCE ***

Distribution source is remote server system9

Issue the following console commands to set your
default bootpath variable and to boot your system disk to multiuser:

>>> set boot_osflags A
>>> set bootdef_dev "DKB0"
>>> boot

***** Continuing DEC OSF/1 installation

***** SELECT FILE SYSTEMS

The default location for the /usr file system is rz8g
The default location for the var area is rz8g (in /usr)
The default location for the swap space is rz8b
The default filesystem type for /usr is ufs (UNIX File System)

Would you like to use these defaults? (y/n): y

Making the new file system for /usr on /dev/rrz8g RZ58
Working....Fri Jul  7 17:43:34 GMT 1995

*** Loading the operating system software subsets

The installation procedure will now load the software on your
disk partitions. This process will take anywhere between
20 minutes to an hour, depending on your distribution media
and processor type.

You will be presented with a menu of software options in a
few moments.
Working....Fri Jul  7 17:44:12 GMT 1995
Working....Fri Jul  7 17:46:12 GMT 1995
Working....Fri Jul  7 17:48:13 GMT 1995

*** Enter subset selections ***

The following subsets are mandatory and will be installed by default:

* Base System
* Base System - Hardware Support

```

- * Hardware Kernel Header and Common Files
- * Hardware Kernel Objects
- * Kernel Header and Common Files
- * Standard Kernel Objects
- * DECwindows Mail Interface
- * RAND Corp. Mail Handler (MH)
- * Basic Networking Services
- * NFS(tm) Utilities
- * Local Printer Support
- * Compiler Back End
- * Adobe Fonts
- * Basic X Environment
- * DECwindows 100dpi Fonts
- * X Fonts
- * X Servers
- * LK401 Keyboard Support
- * X Servers for TurboChannel

The subsets listed below are optional:

There may be more optional subsets than can be presented on a single screen. If this is the case, you can choose subsets screen by screen or all at once on the last screen. All of the choices you make will be collected for your confirmation before any subsets are installed.

- General Applications:
 - 1) Common Agent
 - 2) Computer Aided System Tutor
 - 3) GNU Emacs
 - 4) Local Area Transport (LAT)
 - 5) Logical Storage Manager
 - 6) Logical Storage Manager GUI
 - 7) Logical Volume Manager
 - 8) UNIX(tm) SVID2 Compatibility
 - 9) UNIX(tm) to UNIX(tm) Copy Facility
- Kernel Build Environment:
 - 10) Logical Storage Manager Kernel Header and Common Files
 - 11) Logical Storage Manager Kernel Objects
 - 12) POLYCTR advfs Kernel Objects
- Network-Server/Communications:
 - 13) ATM Commands
 - 14) ATM Kernel Objects
 - 15) Additional Networking Services
 - 16) Dataless Management Services
 - 17) Remote Installation Service

--- MORE TO FOLLOW ---

Enter your choices or press RETURN to display the next screen.

Choices (for example, 1 2 4-6): 15 17

- Printing Environment:
 - 18) Adobe Font Metric Files
- Reference Pages:
 - 19) Ref Pages: Admin/User

- 20) Ref Pages: Programming
- 21) Ref Pages: Realtime
- 22) Ref Pages: Windows Admin/User
- 23) Ref Pages: Windows Programming
- Software Development:
 - 24) Additional Motif Demo Sources
 - 25) CDA(tm) Software Development
 - 26) CDA(tm) for X/Motif Development
 - 27) Compiler Extensions, Profilers and Libraries
 - 28) DEC C (cc -migrate)
 - 29) GNU Revision Control System
 - 30) LSM Software Development
 - 31) Realtime Software Development
 - 32) Software Development Environment
 - 33) Source Code Control System
 - 34) X Window Software Development
- Supplemental Documentation:
 - 35) XIE Version 5 Online Documentation
- System Administration:
 - 36) C2-Security
 - 37) C2-Security GUI
 - 38) Kernel Debugging Tools
 - 39) Obsolete Commands and Utilities
 - 40) Obsolete Locale databases
 - 41) POLYCTR advfs
 - 42) Single-Byte European Locales
 - 43) System Accounting Utilities
 - 44) System Exercisers
 - 45) Verifier/Exerciser GUI
 - 46) Verifier/Exerciser Tool
- Text Processing:
 - 47) Doc. Preparation Tools
 - 48) Doc. Preparation Tools Extensions
- Windowing Environment:
 - 49) DECwindows 75dpi Fonts
 - 50) X Customizations for OEM
- Windowing Hardware Support:
 - 51) LK201 Keyboard Support
 - 52) LK411 Keyboard Support
 - 53) LK421 Keyboard Support
 - 54) LK444 Keyboard Support
 - 55) PCXAL Keyboard Support

--- MORE TO FOLLOW ---

Add to your choices or press RETURN to display the next screen.

Choices (for example, 1 2 4-6): 15 17 19 20 47-48

- 56) X Servers for PCI
- 57) X Servers for QVision
- Windows Applications:
 - 58) Additional DECwindows Applications
 - 59) Additional X Applications

The following choices override your previous selections:

- 60) ALL mandatory and all optional subsets
- 61) MANDATORY subsets only
- 62) CANCEL selections and redisplay menus

Add to your choices, choose an overriding action or
press RETURN to confirm previous selections.

Choices (for example, 1 2 4-6): 15 17 19-20 47-48

You are installing the following mandatory subsets:

- Base System
- Base System - Hardware Support
- Hardware Kernel Header and Common Files
- Hardware Kernel Objects
- Kernel Header and Common Files
- Standard Kernel Objects
- DECwindows Mail Interface
- RAND Corp. Mail Handler (MH)
- Basic Networking Services
- NFS(tm) Utilities
- Local Printer Support
- Compiler Back End
- Adobe Fonts
- Basic X Environment
- DECwindows 100dpi Fonts
- X Fonts
- X Servers
- LK401 Keyboard Support
- X Servers for TurboChannel

You are installing the following optional subsets:

- Network-Server/Communications:
 - Additional Networking Services
 - Remote Installation Service
- Reference Pages:
 - Ref Pages: Admin/User
 - Ref Pages: Programming
- Text Processing:
 - Doc. Preparation Tools
 - Doc. Preparation Tools Extensions

Is this correct? (y/n): y

Checking file system space required to install selected subsets:

File system space checked OK.

Base System

- Copying from system9 (inet)
 - Working....Fri Jul 7 17:50:46 GMT 1995
 - Working....Fri Jul 7 17:52:48 GMT 1995
- Verifying
 - Working....Fri Jul 7 17:54:13 GMT 1995

Base System - Hardware Support
Copying from system9 (inet)
Working....Fri Jul 7 17:54:52 GMT 1995
Verifying

Compiler Back End
Copying from system9 (inet)
Working....Fri Jul 7 17:55:56 GMT 1995
Verifying

Kernel Header and Common Files
Copying from system9 (inet)
Working....Fri Jul 7 17:56:48 GMT 1995
Verifying

Standard Kernel Objects
Copying from system9 (inet)
Working....Fri Jul 7 17:58:07 GMT 1995
Verifying

Hardware Kernel Objects
Copying from system9 (inet)
Working....Fri Jul 7 17:59:26 GMT 1995
Verifying

Hardware Kernel Header and Common Files
Copying from system9 (inet)
Verifying

Basic Networking Services
Copying from system9 (inet)
Working....Fri Jul 7 18:01:08 GMT 1995
Verifying

X Servers
Copying from system9 (inet)
Working....Fri Jul 7 18:01:50 GMT 1995
Verifying

X Servers for TurboChannel
Copying from system9 (inet)
Working....Fri Jul 7 18:02:41 GMT 1995
Verifying

Basic X Environment
Copying from system9 (inet)
Working....Fri Jul 7 18:03:44 GMT 1995
Verifying

LK401 Keyboard Support
Copying from system9 (inet)
Verifying

X Fonts
Copying from system9 (inet)
Working....Fri Jul 7 18:06:15 GMT 1995
Verifying

DECwindows 100dpi Fonts
Copying from system9 (inet)

```

        Working....Fri Jul  7 18:07:47 GMT 1995
    Verifying

Adobe Fonts
    Copying from system9 (inet)
    Verifying

Additional Networking Services
    Copying from system9 (inet)
    Verifying

NFS(tm) Utilities
    Copying from system9 (inet)
    Verifying

RAND Corp. Mail Handler (MH)
    Copying from system9 (inet)
        Working....Fri Jul  7 18:10:08 GMT 1995
    Verifying

Local Printer Support
    Copying from system9 (inet)
    Verifying

Doc. Preparation Tools
    Copying from system9 (inet)
    Verifying

Doc. Preparation Tools Extensions
    Copying from system9 (inet)
    Verifying

Remote Installation Service
    Copying from system9 (inet)
    Verifying

DECwindows Mail Interface
    Copying from system9 (inet)
    Verifying

Ref Pages: Programming
    Copying from system9 (inet)
        Working....Fri Jul  7 18:13:33 GMT 1995
    Verifying

Ref Pages: Admin/User
    Copying from system9 (inet)
        Working....Fri Jul  7 18:15:09 GMT 1995
    Verifying

The installation procedure has successfully installed the
software subsets

```


System Configuration Log File J

This appendix contains a sample configuration log file. This log file is the same for basic and advanced installations. The file contains a log of subset configuration messages; the system name, time zone, and date and time specification (if performing the installation from a CD-ROM); kernel options (for advanced installations); and a record of the kernel build process. The configuration log file from your installation is contained in `/var/adm/smlogs/it.log`.

*** SYSTEM CONFIGURATION ***

```
Configuring "Base System " (OSFBASE350)

Configuring "Base System - Hardware Support " (OSFHWBASE350)

Configuring "Compiler Back End " (OSFCMPLRS350)

Configuring "Kernel Header and Common Files " (OSFBINCOM350)

Configuring "Standard Kernel Objects " (OSFBIN350)
Option M already set for NFS Server
Option M already set for STREAMS protocol
Option M already set for Serial Line Interface Protocol

Configuring "Hardware Kernel Objects " (OSFHWBIN350)

Configuring "Hardware Kernel Header and Common Files"
(OSFHWBINCOM350)

Configuring "Basic Networking Services " (OSFCLINET350)

Configuring "X Servers " (OSFSER350)

Configuring "X Servers for TurboChannel " (OSFSERTC350)

Configuring "Basic X Environment " (OSFX11350)

Configuring "LK401 Keyboard Support " (OSFKBDLK401350)

Configuring "X Fonts " (OSFMITFONT350)

Configuring "DECwindows 100dpi Fonts " (OSFFONT15350)

Configuring "Adobe Fonts " (OSFDPSFONT350)

Configuring "NFS(tm) Utilities " (OSFNFS350)

Configuring "RAND Corp. Mail Handler (MH) " (OSFMH350)
```

Configuring "Local Printer Support " (OSFPRINT350)
Configuring "Doc. Preparation Tools " (OSFDCMT350)
Configuring "Doc. Preparation Tools Extensions " (OSFDCMTEXT350)
Configuring "DECwindows Mail Interface " (OSFXMAIL350)
Configuring "Ref Pages: Windows Programming " (OSFMANWOP350)
Configuring "Ref Pages: Windows Admin/User " (OSFMANWOS350)
Configuring "Ref Pages: Programming " (OSFMANOP350)
Configuring "Ref Pages: Admin/User " (OSFMANOS350)
Configuring "Ref Pages: Realtime " (OSFMANRT350)

*** SYSTEM NAME SPECIFICATION ***

Select the name of your system using alphanumeric characters.
The first character must be a letter. For example, tinkr.
Enter your system name: jersey

You selected 'jersey' as the name of your system.
Is this correct? (y/n) [y]: y

*** TIME ZONE SPECIFICATION ***

***** Main Timezone Menu *****

-
- | | | | |
|---------------|-------------|---------------|---------------|
| 1) Australia | 2) Brazil | 3) CET | 4) Canada |
| 5) Chile | 6) Cuba | 7) EET | 8) Egypt |
| 9) Factory | 10) GB-Eire | 11) GMT | 12) Greenwich |
| 13) Hongkong | 14) Iceland | 15) Iran | 16) Israel |
| 17) Jamaica | 18) Japan | 19) Libya | 20) MET |
| 21) Mexico | 22) NZ | 23) NZ-CHAT | 24) Navajo |
| 25) PRC | 26) Poland | 27) ROC | 28) ROK |
| 29) Singapore | 30) SystemV | 31) Turkey | 32) UCT |
| 33) US | 34) UTC | 35) Universal | 36) W-SU |
| 37) WET | 38) Zulu | | |
- 0) None of the above
-

Select the number above that best describes your location: 33

***** US Timezone Menu *****

-
- | | | | |
|-----------------|--------------|-------------|------------------|
| 1) Alaska | 2) Aleutian | 3) Arizona | 4) Central |
| 5) East-Indiana | 6) Eastern | 7) Hawaii | 8) Indiana-Stark |
| 9) Michigan | 10) Mountain | 11) Pacific | 12) Samoa |
- 0) None of the above

Select the number above that best describes your location: 6

You selected US/Eastern as your time zone.
Is this correct? (y/n) [y]: y

*** DATE AND TIME SPECIFICATION ***

The current date and time should be specified using the following
format:

yyymmddhhmm

Use two digits for year (yy), month (mm), day (dd), hour (hh), and
minute (mm). Enter the time in 24-hour format. For example, 11:30
p.m. on July 25, 1993 would be entered as:

9307252330

Enter the date and time: 9507051150

The date and time has been set to Wed Jul 5 11:50:20 EDT 1995
Is this correct? (y/n) [y]: y

*** KERNEL CONFIGURATION AND BUILD PROCEDURE ***

*** KERNEL OPTION SELECTION ***

-
- | | |
|----|---|
| 1 | Asynchronous Transfer Mode (ATM) |
| 2 | System V Devices |
| 3 | Logical Volume Manager (LVM) |
| 4 | Kernel Breakpoint Debugger (KDEBUG) |
| 5 | Packetfilter driver (PACKETFILTER) |
| 6 | STREAMS pckt module (PCKT) |
| 7 | Data Link Bridge (DLPI V2.0 Service Class 1) |
| 8 | X/Open Transport Interface (XTISO, TIMOD, TIRDWR) |
| 9 | File on File File System (FFM) |
| 10 | ISO 9660 Compact Disc File System (CDFS) |
| 11 | Audit Subsystem |
| 12 | Local Area Transport Support (LAT) |
| 13 | All of the above |
| 14 | None of the above |
| 15 | Help |

Enter the selection number for each kernel option you want.
For example, 1 3 : 13

You selected the following kernel options:

Asynchronous Transfer Mode (ATM)
System V Devices
Logical Volume Manager (LVM)
Kernel Breakpoint Debugger (KDEBUG)
Packetfilter driver (PACKETFILTER)

STREAMS pkt module (PKT)
Data Link Bridge (DLPI V2.0 Service Class 1)
X/Open Transport Interface (XTISO, TIMOD, TIRDWR)
File on File File System (FFM)
ISO 9660 Compact Disc File System (CDFS)
Audit Subsystem
Local Area Transport Support

Is that correct? (y/n) [y]: y

Do you want to edit the configuration file? (y/n) [n]: n

The system will now automatically build a kernel
and then reboot. This will take approximately 15
minutes, depending on the processor type.

When the login prompt appears after the system
has rebooted, use 'root' as the login name and
the SUPERUSER password that was entered during
this procedure, to log into the system.

*** PERFORMING KERNEL BUILD ***
Working....Wed Jul 5 11:51:35 EDT 1995
Working....Wed Jul 5 11:53:36 EDT 1995
Working....Wed Jul 5 11:55:36 EDT 1995

Update Installation Log **K**

The following is a sample of an update installation log. The number of files processed in an update installation can be greater than shown in this example and may take longer to process. A *Working...* message is printed every two minutes to indicate that the update is proceeding. Do not press `Ctrl/C` to exit the installation unless you are certain that the installation has stalled for some reason.

The Digital UNIX 3.2C (Rev. xx) Update Installation will update the following Digital UNIX products:

- Digital UNIX V3.2 (Formerly DEC OSF/1)
- Digital UNIX V3.2A (Formerly DEC OSF/1)
- Digital UNIX V3.2B (Formerly DEC OSF/1)

Digital Equipment Corporation recommends that you perform complete system software backups before proceeding.

Press `<RETURN>` to review message again.

Do you want to continue the update installation? (y/n) []: y

***** Checking current state of system

Depending on the system configuration, this may take up to 20 minutes...

- Working...Wed Jul 5 12:10:27 EDT 1995
- Working...Wed Jul 5 12:11:52 EDT 1995
- Working...Wed Jul 5 12:13:59 EDT 1995
- Working...Wed Jul 5 12:16:11 EDT 1995
- Working...Wed Jul 5 12:18:21 EDT 1995
- Working...Wed Jul 5 12:20:30 EDT 1995
- Working...Wed Jul 5 12:22:40 EDT 1995
- Working...Wed Jul 5 12:23:53 EDT 1995

Unprotected customized system files have been found on this system and have been saved to 'filename.PreUPD'. A listing of the files has been logged in `/var/adm/smlogs/upd_custom_files`.

After the update installation has completed, use the Update Administration Utility (`/usr/sbin/updadmin`) to perform system administration tasks on these files.

***** Updating system to Digital UNIX 3.2C (Rev. xx)
Working...Wed Jul 5 12:26:02 EDT 1995

Base System
Copying from burnit.dec.com (inet)
Working...Wed Jul 5 12:27:20 EDT 1995
Working...Wed Jul 5 12:29:21 EDT 1995
Verifying
Working...Wed Jul 5 12:31:27 EDT 1995

Base System - Hardware Support
Copying from burnit.dec.com (inet)
Working...Wed Jul 5 12:32:09 EDT 1995
Verifying

Compiler Back End
Copying from burnit.dec.com (inet)
Working...Wed Jul 5 12:33:38 EDT 1995
Verifying

Kernel Header and Common Files
Copying from burnit.dec.com (inet)
Working...Wed Jul 5 12:34:30 EDT 1995
Verifying

Standard Kernel Objects
Copying from burnit.dec.com (inet)
Working...Wed Jul 5 12:36:14 EDT 1995
Verifying

Hardware Kernel Objects
Copying from burnit.dec.com (inet)
Working...Wed Jul 5 12:37:35 EDT 1995
Verifying

Hardware Kernel Header and Common Files
Copying from burnit.dec.com (inet)
Verifying

Logical Storage Manager Kernel Header and Common Files
Copying from burnit.dec.com (inet)
Verifying

Basic Networking Services
Copying from burnit.dec.com (inet)
Working...Wed Jul 5 12:39:51 EDT 1995
Verifying

X Servers
Copying from burnit.dec.com (inet)
Working...Wed Jul 5 12:40:38 EDT 1995
Verifying

X Servers for TurboChannel
Copying from burnit.dec.com (inet)
Working...Wed Jul 5 12:41:23 EDT 1995
Verifying

Basic X Environment
Copying from burnit.dec.com (inet)

```

        Working....Wed Jul  5 12:42:32 EDT 1995
    Verifying

LK401 Keyboard Support
    Copying from burnit.dec.com (inet)
    Verifying

X Fonts
    Copying from burnit.dec.com (inet)
        Working....Wed Jul  5 12:45:13 EDT 1995
    Verifying

DECwindows 100dpi Fonts
    Copying from burnit.dec.com (inet)
        Working....Wed Jul  5 12:46:55 EDT 1995
    Verifying

DECwindows 75dpi Fonts
    Copying from burnit.dec.com (inet)
    Verifying

Adobe Fonts
    Copying from burnit.dec.com (inet)
    Verifying

Additional Networking Services
    Copying from burnit.dec.com (inet)
    Verifying

NFS(tm) Utilities
    Copying from burnit.dec.com (inet)
    Verifying

Logical Storage Manager
    Copying from burnit.dec.com (inet)
        Working....Wed Jul  5 12:49:48 EDT 1995
    Verifying

ATM Commands
    Copying from burnit.dec.com (inet)
    Verifying

POLYCTR advfs Kernel Objects
    Copying from burnit.dec.com (inet)
    Verifying

Logical Storage Manager Kernel Objects
    Copying from burnit.dec.com (inet)
    Verifying

ATM Kernel Objects
    Copying from burnit.dec.com (inet)
        Working....Wed Jul  5 12:52:20 EDT 1995
    Verifying

Common Agent
    Copying from burnit.dec.com (inet)
    Verifying

System Accounting Utilities

```

```

    Copying from burnit.dec.com (inet)
    Verifying

Single-Byte European Locales
    Copying from burnit.dec.com (inet)
    Verifying

Obsolete Locale databases
    Copying from burnit.dec.com (inet)
    Verifying

System Exercisers
    Copying from burnit.dec.com (inet)
    Verifying

RAND Corp. Mail Handler (MH)
    Copying from burnit.dec.com (inet)
    Working...Wed Jul  5 12:56:00 EDT 1995
    Verifying

Kernel Debugging Tools
    Copying from burnit.dec.com (inet)
    Working...Wed Jul  5 12:56:45 EDT 1995
    Verifying

Local Printer Support
    Copying from burnit.dec.com (inet)
    Verifying

Adobe Font Metric Files
    Copying from burnit.dec.com (inet)
    Verifying

LSM Software Development
    Copying from burnit.dec.com (inet)
    Verifying

Source Code Control System
    Copying from burnit.dec.com (inet)
    Working...Wed Jul  5 12:59:00 EDT 1995
    Verifying

Doc. Preparation Tools
    Copying from burnit.dec.com (inet)
    Verifying

Doc. Preparation Tools Extensions
    Copying from burnit.dec.com (inet)
    Verifying

UNIX(tm) SVID2 Compatibility
    Copying from burnit.dec.com (inet)
    Verifying

Local Area Transport (LAT)
    Copying from burnit.dec.com (inet)
    Verifying

Logical Volume Manager
    Copying from burnit.dec.com (inet)

```

```

        Working....Wed Jul  5 13:02:05 EDT 1995
    Verifying

POLYCTR advfs
    Copying from burnit.dec.com (inet)
        Working....Wed Jul  5 13:02:56 EDT 1995
    Verifying

Remote Installation Service
    Copying from burnit.dec.com (inet)
    Verifying

GNU Revision Control System
    Copying from burnit.dec.com (inet)
    Verifying

UNIX(tm) to UNIX(tm) Copy Facility
    Copying from burnit.dec.com (inet)
        Working....Wed Jul  5 13:05:01 EDT 1995
    Verifying

Additional X Applications
    Copying from burnit.dec.com (inet)
    Verifying

Additional DECwindows Applications
    Copying from burnit.dec.com (inet)
        Working....Wed Jul  5 13:06:12 EDT 1995
    Verifying

X Window Software Development
    Copying from burnit.dec.com (inet)
        Working....Wed Jul  5 13:06:57 EDT 1995
    Verifying

DECwindows Mail Interface
    Copying from burnit.dec.com (inet)
    Verifying

CDA(tm) for X/Motif Development
    Copying from burnit.dec.com (inet)
    Verifying

Additional Motif Demo Sources
    Copying from burnit.dec.com (inet)
    Verifying

Verifier/Exerciser Tool
    Copying from burnit.dec.com (inet)
    Verifying

Verifier/Exerciser GUI
    Copying from burnit.dec.com (inet)
    Verifying

GNU Emacs
    Copying from burnit.dec.com (inet)
        Working....Wed Jul  5 13:11:14 EDT 1995
    Verifying

```

Computer Aided System Tutor
 Copying from burnit.dec.com (inet)
 Working...Wed Jul 5 13:12:23 EDT 1995
 Verifying

Realtime Software Development
 Copying from burnit.dec.com (inet)
 Verifying

C2-Security
 Copying from burnit.dec.com (inet)
 Verifying

Dataless Management Services
 Copying from burnit.dec.com (inet)
 Verifying

Obsolete Commands and Utilities
 Copying from burnit.dec.com (inet)
 Verifying

C2-Security GUI
 Copying from burnit.dec.com (inet)
 Verifying

Logical Storage Manager GUI
 Copying from burnit.dec.com (inet)
 Verifying

X Customizations for OEM
 Copying from burnit.dec.com (inet)
 Verifying

XIE Version 5 Online Documentation
 Copying from burnit.dec.com (inet)
 Verifying

Ref Pages: Windows Programming
 Copying from burnit.dec.com (inet)
 Working...Wed Jul 5 13:17:32 EDT 1995
 Verifying

Ref Pages: Windows Admin/User
 Copying from burnit.dec.com (inet)
 Verifying

Ref Pages: Programming
 Copying from burnit.dec.com (inet)
 Working...Wed Jul 5 13:20:43 EDT 1995
 Working...Wed Jul 5 13:22:44 EDT 1995
 Verifying

Ref Pages: Admin/User
 Copying from burnit.dec.com (inet)
 Working...Wed Jul 5 13:23:42 EDT 1995
 Verifying

Ref Pages: Realtime
 Copying from burnit.dec.com (inet)
 Verifying

```

*** Merging new file ./new..DXsession into
    existing ./proto..DXsession

Resources *applications, *AppMenu, and *num_AppMenu
in /DXssion have been updated!

Merge completed successfully.

*** Merging new file ./etc/.new..strsetup.conf into
    existing ./etc/.proto..strsetup.conf

changing kinfo entry to strkinfo in strsetup.conf

Merge completed successfully.

*** Merging new file ./usr/share/lib/kernel_options/
    .new..kernel_options.db into
existing ./usr/share/lib/kernel_options/.proto..kernel_options.db

    removing Strpush option
    Modifying SLIP option
    adding SNMPINFO option
    adding NFSERVER option
    adding PROCFS option
    Updating pseudo-device rpty to an option
    Removing STREAMS protocol entry
    Adding STREAMS module entry
    Fixing pseudo-device rpty to an option entry
    adding makeoptions CCOMPRESS

Merge completed successfully.

*** Merging new file ./usr/sys/conf/.new..files into
    existing ./usr/sys/conf/.proto..files

Replacing /usr/sys/conf/.proto..files with
/usr/sys/conf/.new..files. The original file has
been saved to /usr/sys/conf/.proto..files.PreMRG.

This file has been found to be customized, which most
likely is the result of one or more kernel layered products
that have been installed in a non-recommended fashion.

If this file has been modified due to kernel layered
product installation, you can either re-install the
affected kernel layered product(s), or manually merge
the customizations from /usr/sys/conf/.proto..files.PreMRG
into the newly delivered /usr/sys/conf/.proto..files.
Customizations made to /usr/sys/conf/.proto..files.PreMRG
can be found by executing the following commands:

# cd /usr/sys/conf
# diff .proto..files.PreMRG .proto..files.V32

A copy of this message has been saved to

Merge completed successfully.

*** Merging new file ./usr/sys/conf/.new..param.c into
    existing ./usr/sys/conf/.proto..param.c

```

```

Merge completed successfully.

*** Merging new file ./usr/sys/conf/alpha/.new..files into
    existing ./usr/sys/conf/alpha/.proto..files

Replacing /usr/sys/conf/alpha/.proto..files with
/usr/sys/conf/alpha/.new..files. The original file has
been saved to /usr/sys/conf/alpha/.proto..files.PreMRG.

This file has been found to be customized, which most
likely is the result of one or more kernel layered products
that have been installed in a non-recommended fashion.

If this file has been modified due to kernel layered
product installation, you can either re-install the
affected kernel layered product(s), or manually merge
the customizations from /usr/sys/conf/alpha/.proto..files.PreMRG
into the newly delivered /usr/sys/conf/alpha/.proto..files.
Customizations made to /usr/sys/conf/alpha/.proto..files.PreMRG
can be found by executing the following commands:

    # cd /usr/sys/conf/alpha
    # diff .proto..files.PreMRG .proto..files.V32

A copy of this message has been saved to
./var/adm/smlogs/update.log.

Merge completed successfully.

*** Merging new file ./usr/sys/io/common/.new..conf.c into
    existing ./usr/sys/io/common/.proto..conf.c

Merge completed successfully.

*** Merging new file ./usr/var/X11/.new..Xserver.conf into
    existing ./usr/var/X11/.proto..Xserver.conf

Merge completed successfully.

*** Merging new file ./usr/var/X11/xdm/.new..Xresources into
    existing ./usr/var/X11/xdm/.proto..Xresources

Merge completed successfully.

*** Merging new file ./usr/lib/X11/app-defaults/.new..DXMail into
    existing ./usr/lib/X11/app-defaults/.proto..DXMail

Merge completed successfully.

Update installation complete with loading of subsets.
Rebooting system with Digital UNIX 3.2C (Rev. xx)
generic kernel for configuration phase...

Exiting Update Installation...
```


Sample File Logs from Update Installations



L.1 List of Protected (.new..) Files

```
./usr/var/adm/.new...login
./usr/var/adm/.new...profile
./usr/var/adm/.new...utmp
./new...cshrc
./new...login
./new..DXsession
./etc/.new..TIMEZONE
./etc/.new..autopush.conf
./etc/.new..binlog.conf
./etc/.new..fstab
./etc/.new..gettydefs
./etc/.new..group
./etc/.new..inittab
./etc/.new..magic
./etc/.new..motd
./etc/.new..passwd
./etc/.new..profile
./etc/.new..rc.config
./etc/.new..securettys
./etc/.new..setup.conf
./etc/.new..shells
./etc/.new..strsetup.conf
./etc/.new..svc.conf
./etc/.new..sysconfigtab
./etc/.new..syslog.conf
./etc/.new..ultrix_login
./etc/.new..ultrix_path
./etc/.new..ultrix_profile
./etc/sec/.new..audit_events
./etc/sec/.new..event_aliases
./etc/sia/.new..bsd_matrix.conf
./etc/sia/.new..matrix.conf
./sbin/.new..bcheckrc
./sbin/.new..rc0
./sbin/.new..rc2
./sbin/.new..rc3
./sbin/init.d/.new..rmtmpfiles
./usr/share/lib/.new..Mail.rc
./usr/share/lib/.new..termcap
./usr/share/lib/terminfo/.new..dec.ti
./usr/shlib/.new..so_locations
./usr/var/adm/.new..wtmp
./usr/var/adm/cron/.new...proto
./usr/var/adm/cron/.new..at.deny
./usr/var/adm/cron/.new..cron.deny
```

```

./usr/var/adm/cron/.new..log
./usr/var/adm/cron/.new..queuedefs
./usr/var/adm/sendmail/.new..aliases
./usr/var/adm/sendmail/.new..sendmail.cf
./usr/var/adm/sendmail/.new..sendmail.st
./usr/var/shlib/.new..so_locations
./usr/var/spool/cron/crontabs/.new..adm
./usr/var/spool/cron/crontabs/.new..root
./usr/var/spool/cron/crontabs/.new..sys
./usr/share/lib/kernel_options/.new..kernel_options.db
./usr/sys/conf/.new..files
./usr/sys/conf/.new..param.c
./usr/sys/conf/alpha/.new..files
./usr/sys/io/common/.new..conf.c
./usr/sys/streams/.new..str_config.c
./etc/auth/subsystems/.new..users
./etc/auth/system/.new..authorize
./etc/auth/system/.new..default
./etc/auth/system/.new..devassign
./etc/auth/system/.new..files
./etc/auth/system/.new..subsystems
./etc/auth/system/.new..ttys
./tcb/files/auth/a/.new..adm
./tcb/files/auth/a/.new..auth
./tcb/files/auth/b/.new..bin
./tcb/files/auth/c/.new..cron
./tcb/files/auth/d/.new..daemon
./tcb/files/auth/l/.new..lp
./tcb/files/auth/r/.new..ris
./tcb/files/auth/r/.new..root
./tcb/files/auth/t/.new..tcb
./tcb/files/auth/u/.new..uucp
./tcb/files/auth/u/.new..uucpa
./etc/.new..acucap
./etc/.new..ftputers
./etc/.new..hosts
./etc/.new..hosts.equiv
./etc/.new..inetd.conf
./etc/.new..networks
./etc/.new..ntp.conf
./etc/.new..phones
./etc/.new..protocols
./etc/.new..remote
./etc/.new..rpc
./etc/.new..services
./usr/lib/X11/app-defaults/.new..DXcalc
./usr/lib/X11/app-defaults/.new..DXcalendar
./usr/lib/X11/app-defaults/.new..DXcardfiler
./usr/lib/X11/app-defaults/.new..DXclock
./usr/lib/X11/app-defaults/.new..DXnotepad
./usr/lib/X11/app-defaults/.new..DXpaint
./usr/lib/X11/app-defaults/.new..DXpresto
./usr/lib/X11/app-defaults/.new..DXprint
./usr/lib/X11/app-defaults/.new..DxDiff
./usr/lib/X11/app-defaults/.new..dxcalendar_prolog.ps
./etc/.new..disktab
./usr/var/yp/.new..Makefile
./usr/var/yp/.new..ypxfr_lperday
./usr/var/yp/.new..ypxfr_lperhour
./usr/var/yp/.new..ypxfr_2perday

```

```

./usr/lib/X11/app-defaults/.new..DXlsm
./etc/.new..exports
./etc/.new..lprsetup.dat
./usr/var/X11/.new..Xserver.conf
./usr/lib/X11/.new..system.mwmrc
./usr/lib/X11/app-defaults/.new..Chooser
./usr/lib/X11/app-defaults/.new..DXBookreader
./usr/lib/X11/app-defaults/.new..DXBookreader_prolog.ps
./usr/lib/X11/app-defaults/.new..DXConsole
./usr/lib/X11/app-defaults/.new..DXpause
./usr/lib/X11/app-defaults/.new..DXsession
./usr/lib/X11/app-defaults/.new..DXterm
./usr/lib/X11/app-defaults/.new..FontSelect
./usr/lib/X11/app-defaults/.new..Mwm
./usr/lib/X11/app-defaults/.new..Mwm_bw
./usr/lib/X11/app-defaults/.new..Mwm_gray
./usr/lib/X11/app-defaults/.new..XConsole
./usr/lib/X11/app-defaults/.new..XTerm
./usr/lib/X11/app-defaults/.new..Xdefaults
./usr/lib/X11/twm/.new..system.twmrc
./usr/var/X11/fs/.new..config
./usr/var/X11/xdm/.new..GiveConsole
./usr/var/X11/xdm/.new..TakeConsole
./usr/var/X11/xdm/.new..Xaccess
./usr/var/X11/xdm/.new..Xkeymaps
./usr/var/X11/xdm/.new..Xresources
./usr/var/X11/xdm/.new..Xservers
./usr/var/X11/xdm/.new..Xservers.fs
./usr/var/X11/xdm/.new..Xsession
./usr/var/X11/xdm/.new..Xsetup_0
./usr/var/X11/xdm/.new..xdm-config
./usr/var/X11/xdm/.new..xdm-config.fs
./usr/lib/X11/app-defaults/.new..XIsso
./usr/lib/X11/app-defaults/.new..XSysAdmin
./usr/lib/X11/config/.new..osf1.cf
./usr/lib/X11/config/.new..site.def
./usr/lib/X11/app-defaults/.new..DXMail
./usr/lib/X11/app-defaults/.new..MailScanFormat
./usr/lib/X11/app-defaults/.new..Bitmap
./usr/lib/X11/app-defaults/.new..Bitmap-color
./usr/lib/X11/app-defaults/.new..Clock-color
./usr/lib/X11/app-defaults/.new..Editres
./usr/lib/X11/app-defaults/.new..Editres-color
./usr/lib/X11/app-defaults/.new..Viewres
./usr/lib/X11/app-defaults/.new..XCalc
./usr/lib/X11/app-defaults/.new..XCalc-color
./usr/lib/X11/app-defaults/.new..XClipboard
./usr/lib/X11/app-defaults/.new..XClock
./usr/lib/X11/app-defaults/.new..XFontSel
./usr/lib/X11/app-defaults/.new..XLoad
./usr/lib/X11/app-defaults/.new..XLogo
./usr/lib/X11/app-defaults/.new..XLogo-color
./usr/lib/X11/app-defaults/.new..Xedit
./usr/lib/X11/app-defaults/.new..Xfd
./usr/lib/X11/app-defaults/.new..Xgc
./usr/lib/X11/app-defaults/.new..Xmag
./usr/lib/X11/app-defaults/.new..Xman
./usr/lib/X11/app-defaults/.new..Xmh

```

L.2 Sample Unprotected Customized File List

```
=====
= Unprotected Customized OSFFONT15 Files
=====
./usr/lib/X11/fonts/decwin/100dpi/fonts.dir.PreUPD

=====
= Unprotected Customized OSFMITFONT Files
=====
./usr/lib/X11/fonts/75dpi/fonts.dir.PreUPD
./usr/lib/X11/fonts/100dpi/fonts.dir.PreUPD
```

L.3 Sample Obsolete File List - Update from Version 3.2 to Version 3.2C

```
=====
= Files no longer shipped in OSFBASE
=====

=====
= Files no longer shipped in OSFBIN
=====
./usr/sys/BINARY/strtty_gen.o
./usr/sys/BINARY/nd.o
./usr/sys/BINARY/mi.o
./usr/sys/BINARY/heap_kmem.o

=====
= Files no longer shipped in OSFBINCOM
=====
./usr/sys/include/vm/heap_kmem.h
./usr/sys/data/pty_data.c

=====
= Files no longer shipped in OSFCMPLRS
=====
./usr/ccs/lib/cmplrs/cc/kprofile

=====
= Files no longer shipped in OSFHWBASE
=====

=====
= Files no longer shipped in OSFHWBIN
=====
./usr/sys/BINARY/rm_spur.o

=====
= Files no longer shipped in OSFHWBINCOM
=====
./usr/sys/include/io/dec/pci/rm_spur_reg.h
./usr/sys/data/rm_data.c

=====
= Files no longer shipped in OSFMANOP
```

```

=====
./usr/share/man/man3/setnetent.3n
./usr/share/man/man3/getnetent.3n
./usr/share/man/man3/getnetbyname.3n
./usr/share/man/man3/getnetbyaddr.3n
./usr/share/man/man3/endnetent.3n
./usr/share/man/.OSFMANOP320.whatis

=====
= Files no longer shipped in OSFMANOS
=====
./usr/share/man/man8/extendfs.8
./usr/share/man/.OSFMANOS320.whatis

=====
= Files no longer shipped in OSFMANRT
=====
./usr/share/man/.OSFMANRT320.whatis

=====
= Files no longer shipped in OSFMANWOP
=====
./usr/share/man/.OSFMANWOP320.whatis

=====
= Files no longer shipped in OSFMANWOS
=====
./usr/share/man/.OSFMANWOS320.whatis

=====
= Files no longer shipped in OSFSEER
=====

=====
= Files no longer shipped in OSFX11
=====
./sbin/init.PreUPD
./sbin/sh.PreUPD

```

L.4 Sample Obsolete File List - Update from Version 3.2B to Version 3.2C

```

=====
= Files no longer shipped in OSFBASE
=====

=====
= Files no longer shipped in OSFBIN
=====
./usr/sys/BINARY/strtty_gen.o
./usr/sys/BINARY/nd.o
./usr/sys/BINARY/mi.o
./usr/sys/BINARY/heap_kmem.o

=====
= Files no longer shipped in OSFBINCOM
=====

```

```

./usr/sys/include/vm/heap_kmem.h
./usr/sys/data/pty_data.c

=====
= Files no longer shipped in OSFCMPLRS
=====
./usr/ccs/lib/cmplrs/cc/kprofile

=====
= Files no longer shipped in OSFHWBASE
=====
./usr/field/mph/USER_GUIDE.TXT
./usr/field/mph/USER_GUIDE.PS

=====
= Files no longer shipped in OSFHWBIN
=====
./usr/sys/BINARY/rm_spur.o

=====
= Files no longer shipped in OSFHWBINCOM
=====
./usr/sys/include/io/dec/pci/rm_spur_reg.h
./usr/sys/data/rm_data.c

=====
= Files no longer shipped in OSFMANOP
=====
./usr/share/man/man3/setnetent.3n
./usr/share/man/man3/getnetent.3n
./usr/share/man/man3/getnetbyname.3n
./usr/share/man/man3/getnetbyaddr.3n
./usr/share/man/man3/endnetent.3n
./usr/share/man/.OSFMANOP320.whatis

=====
= Files no longer shipped in OSFMANOS
=====
./usr/share/man/man8/extendfs.8
./usr/share/man/.OSFMANOS320.whatis

=====
= Files no longer shipped in OSFMANRT
=====
./usr/share/man/.OSFMANRT320.whatis

=====
= Files no longer shipped in OSFMANWOP
=====
./usr/share/man/.OSFMANWOP320.whatis

=====
= Files no longer shipped in OSFMANWOS
=====
./usr/share/man/.OSFMANWOS320.whatis

=====
= Files no longer shipped in OSFSER
=====

```

```
=====
= Files no longer shipped in OSFX11
=====
./sbin/init.PreUPD
./sbin/sh.PreUPD
```


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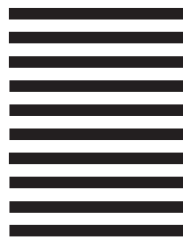
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