ULTRIX and UWS

Guide to Installing ULTRIX and UWS

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This guide describes the basic and advanced installation procedures for ULTRIX and UWS on all supported processors. This guide also describes how to upgrade a system without performing an installation.

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About This Manual

This guide describes the basic and advanced installation procedures for ULTRIX and ULTRIX Worksystem Software (UWS) on all supported processors. It describes how to prepare your system for installation, boot the processor, and perform the installation procedure.

In addition, this guide discusses:

- An upgrade procedure for certain systems, which you use instead of the basic or advanced installation procedures to produce the new version of the product.

  The upgrade procedure can be run on all ULTRIX and UWS Version 4.2 or higher systems.

- Standalone system management procedures, which operate in a memory-resident environment to support limited system management activities.

Audience

The audience for this guide is anyone installing an ULTRIX system. The guide assumes that:

- You or a Digital Field Service representative has checked the hardware to ensure that it is working properly.
- You have read the documentation supplied with your hardware.
- You have read the current version of the *Release Notes*.
- You know the location and function of the controls and indicators on your hardware.
- You understand how to load and unload the installation media and know which disks are needed during the installation.
- You have a basic understanding of the ULTRIX file system and commands.

Organization

This guide has seven chapters, five appendixes, and an index:

Chapter 1	Describes the basic and advanced installation procedures and outlines the tasks you must complete before beginning an installation.
Chapter 2	Describes the tasks you should complete before beginning an advanced installation. This chapter contains a set of worksheets to help you plan your system.
Chapter 3	Describes how to boot each processor that can support the ULTRIX software.

Chapter 4	Describes how to complete the basic and advanced installations.
Chapter 5	Describes how to perform an upgrade procedure.
Chapter 6	Describes how to use the `setld` utility to add or delete subsets after the installation is complete.
Chapter 7	Describes a memory-resident environment that supports the initial phases of an installation and limited system management activities.
Appendix A	Describes each supported subset for RISC processors and lists any related subsets and system configuration file options.
Appendix B	Describes each supported subset for VAX processors and lists any related subsets and system configuration file options.
Appendix C	Describes each unsupported subset for RISC and VAX processors.
Appendix D	Provides a complete example of an advanced installation.
Appendix E	Provides notes about installation and upgrade issues occurring before Version 4.4. Read these notes to see if they pertain to your configuration.

Related Documentation

The following list suggests the order in which you should read the related documentation:

1. Hardware documentation

   This documentation shows you how to set up the processor and its additional devices, and supplies valuable troubleshooting guidelines.

2. *Release Notes*

   This document contains media labeling, subset sizes, and other installation-related notes, for the operating system and for layered products. Please read the release notes sections on installation, upgrades, and layered products before beginning the installation or upgrade procedures.

3. *ULTRIX and UWS System Notes*

   This document contains installation-related notes, for the operating system and for layered products. Please read the system notes sections on installation, upgrades, and layered products before beginning the installation or upgrade procedures.

4. *Guide to System and Network Setup*

   This document can help you determine what to do after you complete the advanced installation.

5. *Guide to Sharing Software on a Local Area Network*

   This documentation describes how to install software products over the network.

Conventions

`#`	A number sign represents the superuser prompt.
`% cat`	Boldface type in interactive examples indicates typed user input.
`file`	Italic (slanted) type indicates variable values, placeholders, and function argument names.
`. . .`	In syntax definitions, a horizontal ellipsis indicates that the preceding item can be repeated one or more times.
`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/*x*	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).

Preparing for the Installation 1

This chapter describes the basic and advanced installation procedures and discusses the tasks you must complete before beginning the installation.

Before you begin the installation, do the following:

- Read the *Release Notes* and the *ULTRIX and UWS System Notes*

  The *Release Notes* and the *ULTRIX and UWS System Notes* contain information about installing and upgrading the software. Included are hardware, boot, and general installation notes, such as outstanding problems and their workarounds. Additionally, the notes contain information about layered products that installers may need to know.

  The *Release Notes* also contain the subset sizes for the RISC, VAX, and unsupported software. You will use these subset sizes to help determine the characteristics of the systems you will install.

- Check to be sure you have the hardware needed for the installation
- Check the contents of the software distribution kit against the Bill of Materials
- Back up the system if you need to retain any information from your previous system
- Decide whether you must use the upgrade procedure for your installation

  Chapter 5 contains a procedure that allows you to upgrade to the current version of ULTRIX and UWS without performing a basic or advanced installation. The upgrade procedure is only for systems running ULTRIX and UWS Version 4.2 or higher.

- Decide whether to perform a basic or advanced installation

  For new installations and for systems running ULTRIX and UWS versions earlier than Version 4.2, Chapter 2 contains a set of worksheets designed to help you plan your system. Work through Chapter 2 before beginning the advanced installation to determine if you have enough disk space on your system.

1.1 Checking the Hardware Needed for Installation

To perform the installation, you need to understand how to operate your system. The documentation provided with your processor provides operating and troubleshooting instructions.

You may also need some or all of the following hardware:

- Software distribution device

  You need a distribution device that corresponds with the software distribution media. For example, if you have a TK50 software kit, you need a TK50 or TK70 tape drive. Load the media supplied with the software distribution kit on the

appropriate drive. See your hardware documentation for instructions on how to load media. If you are installing from a RIS area, see your server administrator for instructions.

- System disk

  The system disk is the disk from which you will boot your system. You should know how to load a disk pack (if it is removable) on your disk drive. You should also know how to get the disk ready for read/write operations. See your hardware documentation for information.

- Data disks

  A data disk is a device on which you can store data files. In most cases, you do not need any data disks to install the ULTRIX system. However, if you perform an advanced installation, you can allocate certain file systems to a disk other than the system disk. If you are going to perform an advanced installation and are going to use data disks, back up any data on the disks before you begin.

- Console terminal

  You use the console terminal to communicate with your system during the installation. Depending on your system and its configuration, you can perform the installation at either a hardcopy or a video terminal.

You may need to check with a Digital Field Service representative to ensure that your hardware is installed at the default control status register (CSR) addresses. If you have hardware installed in the floating address space and it does not adhere to the standard algorithm for address assignments, you should perform an advanced installation. The advanced installation lets you modify these address assignments in the system configuration file. After you modify these address assignments, the installation software should successfully build the kernel.

To perform an advanced installation, you should understand the format of the system configuration file and know how to use the `ed` editor. If you do not, then you should have a Digital Field Service representative install your hardware at the standard CSR addresses before you start the installation. See the *Guide to Configuration File Maintenance* for information about the configuration file.

Note

For UNIBUS and Q-bus controllers, the ULTRIX operating system must be installed on a system disk connected to a disk controller set at the primary CSR address. If you have a disk controller at a secondary CSR address, have a Digital Field Service representative switch the CSR address so that the system disk is connected to the primary CSR.

1.2 Checking the Software Distribution Kit

Use the Part Listing to check your software distribution kit. The software distribution kit includes this installation guide and one of the following:

- A TK50 for systems with TK50 or TK70 tape cartridge drives
- A CD-ROM optical disc kit for systems with RRD40 or RRD42 optical disc drives
- A MT9 magnetic tape kit for systems with magnetic tape drives

Systems that use a software distribution kit supplied by a remote server require the use of the network. If you plan to install software over the local area network, find out from your system administrator whether the network kit is set up and ready for use.

1.3 Backing Up the System

Whether you perform an upgrade or an installation, you should back up your system before starting the procedure.

1.3.1 Backups Before Upgrades

Before you begin an upgrade procedure, you should back up your system disk so you can restore your system to a known state should any errors occur during the upgrade procedure.

1.3.2 Backups Before Basic and Advanced Installations

When you perform a basic or an advanced installation, the installation software initializes the system disk, overwrites all files and data residing on the system disk, and may overwrite any changes to disk partition sizes you made using the `chpt` command. The installation software does not overwrite partition size changes you have made on data disks.

If you are currently running an operating system, back up your system disk before beginning the installation. The backup procedure is described in the *Guide to Backup and Restore*. If you plan to perform the advanced installation, you should also back up any data disks you plan to use.

Before you begin the installation, you may want to save certain files to retain information specific to your site. Some files are not meant to be restored after the installation, for example the `gettytab` file. Other files, for example your existing `hosts` file, can be restored so that you do not need to retype them.

Table 1-1 lists the directory name and the file name for the files that you may want to back up.

Table 1-1: Names of Directories and Files to Back Up

Directory	File		
/	.cshrc	.login	.mailrc
	.profile	.rhosts	
/etc	acucap	aliases	aliases.dir
	aliases.pag	automount.master	crontab
	dumpdates	exports	fstab
	gettytab	group	hosts
	hosts.equiv	hosts.lpd	passwd
	phones	printcap	rc.local
	remote	resolv.conf	sendmail.cf
	sendmail.fc	sendmail.hf	sendmail.st
	services	svc.conf	svcorder
	termcap	ttys	
/usr/var/adm	aculog	lastlog	lpd-errs
/usr/var/uucp	L.cmds	LIST.DAY	LIST.HOUR
	LIST.NIGHT	LIST.NOON	uucp.hour
	uucp.longhall	uucp.night	uucp.noon
	uucp.week	USERFILE	

You may also want to save the `syslog` file from the `/usr/var/spool/mqueue` directory.

In addition to your site-specific files, you need to save the following files and directories:

- If your system runs as a master or a slave Yellow Pages (YP) server, save the `/usr/var/yp/`*`domain-name`* directory for your domain.
- If your system runs as the master YP server and the master copies of the files used to create the YP maps are located in a separate directory, such as `/usr/var/yp/src`, save this directory as well.
- If your system runs as a BIND/Hesiod primary server, save the `named.boot` file in the `/usr/var/dss/namedb` default directory, all database files named in the `named.boot` file, and the `/usr/var/dss/namedb/src` directory, where the source files are located. Database files have `.db` extensions, source files have `.rev` extensions.

1.4 Deciding on the Type of Installation

ULTRIX software can be installed on your system in the following ways:

- From TK50 tape cartridges.
- From an RRD40 or RRD42 CD-ROM optical disc cartridge.
- From MT9 magnetic tapes.

- From the network. A Remote Installation Services (RIS) client and a Diskless Management System (DMS) client use the network to install software from a server that has been established with a RIS/DMS area containing the software subsets.
- If your system comes with Factory Installed Software (FIS), all of the ULTRIX supported software subsets are installed at the factory. If you have FIS, you do not need this guide. Refer to the FIS documentation included with your processor.

The installation procedure provides four paths for you to follow: the upgrade installation, the basic installation, the advanced installation, or the system managment option.

1.4.1 Upgrade Installation

The upgrade installation allows you to preserve your current ULTRIX and UWS environment while upgrading to the new system. You do not have to perform a basic or advanced installation and you do not have to save and restore your customizable system files.

The upgrade procedure saves all your customizable system files before it copies and verifies the subsets from the distribution medium. Then, the upgrade is applied to your current system. Finally, you rebuild your system's kernel to complete the upgrade to the new system version.

There is one restriction: any customizable files that you have modified and that are from the unsupported subsets will be replaced when the unsupported subsets are installed. The procedure does not save the customizable files in any unsupported subset. See Chapter 5 for more information.

1.4.2 Basic Installation

The basic installation installs a default system with a minimum of prompts. The basic installation procedure creates file systems on default partitions on your system disk and loads the required software subsets. You should choose this path if you are new to the ULTRIX operating system or if you want to install a basic system.

There are some postinstallation procedures that you will not perform if you choose the basic installation. For example, printer services are not available with the basic installation. See Table 4-1 for further information.

The basic installation creates the following areas on default partitions on the system disk:

- The root file system
- The `/usr` file system
- The crash dump space and the swap space

The `var` area is created as a directory under the `/usr` file system.

The basic installation loads the following required supported software subsets:

- Base System
- Kernel Configuration Files
- Generic Kernel

- TCP/IP Networking Utilities
- Network File System Utilities
- Extended (Berkeley) Mailer

If your system is licensed to install ULTRIX Worksystem Software, the following supported software subsets are also loaded during the basic installation:

- X11/DECwindows User Environment (when the X11/DECwindows (XUI) user environment is chosen as the preferred windowing interface)
- OSF/Motif User Environment (when the DECwindows for OSF/Motif user environment is chosen as the preferred windowing interface)
- X11/DECwindows 100 dpi fonts or 75 dpi fonts, depending on the user environment
- X11/DECwindows Servers
  - B&W, Color, or PX Server
  - True Color Server
  - PXG Server

The basic installation performs the following tasks:

- Builds the kernel
- Reboots the ULTRIX operating system

If after completing the installation you decide that you want additional subsets, you can install these subsets using the `setld` utility. See the `setld`(8) reference page for further information.

1.4.3 Advanced Installation

If you choose the advanced installation you can select the default disk partitions and the default file system layout, or you can decide on which disks you want the file systems to reside. The advanced installation also lets you select and install some or all of the optional subsets. You should choose this path only if you are experienced with ULTRIX file systems or if you require the ability to perform tasks such as the following:

- Preserving customized partitions
- Selecting file system layouts other than the default layouts
- Allocating the `/usr` file system to any disk partition on your system
- Allocating up to two swap areas to any disk partition on your system
- Allocating the crash dump space to the same disk partition as one of the swap areas or allocating it to a different disk partition
- Allocating the `var` area to the same disk partition as `/usr` or allocating it to a different disk partition
- Selecting optional subsets
- Adding options to the kernel configuration file

Performing these tasks during the advanced installation has the following advantages:

- It allows for greater flexibility in allocating the file systems to the most appropriate disk partition.
- It lets you tailor the ULTRIX operating system to suit the needs of your site. For example, if your system has multiple disks, you may want to place some of the mandatory file systems on disks other than the system disk. This may improve your system's performance.

Before you begin an advanced installation, you must know the size and location of the areas you are going to allocate and which subsets you are going to select. Chapter 2 contains a set of worksheets to help you plan your system. Fill out these worksheets before you begin an advanced installation.

Note

Advanced installations are required for VAXstation 3520 and 3540 systems.

1.4.4 System Management Option

The system management option creates a standalone ULTRIX environment. The standalone environment supports the initial phases of an installation as well as limited system management activities.

The standalone ULTRIX environment includes commands that assist in recovering from root file system corruption and help perform general file system and disk maintenance tasks. You should perform system management tasks in the standalone ULTRIX environment only if you have extensive ULTRIX or UNIX operating system experience.

1.4.5 Next Step

If you are performing an upgrade, continue the procedure with Chapter 5. If you are performing a basic installation, continue the installation procedure with Chapter 3. If you are performing an advanced installation, continue the installation procedure with Chapter 2. If you are performing system management tasks, continue with Chapter 7.

Planning Your Disk Space 2

You need to complete the following tasks before starting the advanced installation:

- Identify available disks
- Plan the swap space
- Plan the crash dump space
- Plan the `var` area
- Plan the `/usr` file system
- Plan the kernel configuration file items
- Decide whether to use the default disk partition layout or the existing disk partition layout if you have modified the default disk partitions, and change the partition layout if necessary

This chapter provides a summary of what you need to consider before determining which disk partition is suitable for the file systems, swap space, and crash dump space. It assumes that you know the contents of the file systems and understand the concepts associated with allocating a file system to a disk partition. If you are unsure of these concepts, see the following guides for more detailed conceptual information:

- *Guide to Disk Maintenance*
- *Guide to System Crash Recovery*
- *Guide to Configuration File Maintenance*

In several sections of this chapter, you will need to complete worksheets that pertain to the size of the file system being discussed. Many of the ULTRIX commands that you may use before and after the installation give disk space size in different units. For example, the `chpt` command gives the size of partitions in blocks or sectors. However, the `df` command measures the space in kilobytes. The subset sizes are also given in kilobytes. To aid you in determining disk space requirements, keep in mind the following equations:

- One kilobyte (kB) equals 1024 bytes.
- One block equals 1/2 kB (512 bytes); a sector is the same as a block.
- One megabyte (MB) equals 1024 kB (1,048,576 bytes), or 2048 blocks.

For example, to determine the size in MB of the default disk partitions for an RA70 disk, divide the length in blocks (as shown in `ra`(4)) or the size in blocks (as displayed by the `chpt` command) by 2048, as shown in the following table:

Partition	Size in Blocks	Size in MB
a	32768	16
b	131072	64
c	547041	267
d	163840	80
e	471041	230
f	76001	37
g	383201	187

When you examine disk partitions with the `chpt` command or look in the *ULTRIX Reference Pages* you are looking at the partitions as if they were unformatted. To account for the ULTRIX file system when determining the size your disk partitions need to be, subtract 16 percent of the size of the partition to give you the total available space.

The information presented in Section 2.1 through Section 2.5 will enable you to complete the file system worksheet in Section 2.6. When complete, this worksheet will give you the complete layout of the file systems that you will be asked about during the advanced installation.

2.1 Identifying Supported System Disks

Your system disk must be a supported bootable device. Table 2-1 lists possible system disks and their associated ULTRIX mnemonics. If you are installing a system for the first time, you will need to refer to the reference page for your system disk in Section 4 of the *ULTRIX Reference Pages* for information on the default disk partition layout.

Table 2-1: Supported System Disks

ULTRIX Mnemonic	Device Name
hp	RM05
ra	RA60, RA70, RA71, RA72, RA73, RA80, RA81, RA82, RA90, RA92, RD53, RD54, RF30, RF31, RF71, RF72
rd	RD53 (MicroVAX 2000 and VAXstation 2000 only), RD54 (MicroVAX 2000 and VAXstation 2000 only)
rz	RZ23, RZ23L, RZ24, RZ24L, RZ25, RZ25L, RZ26, RZ28, RZ55, RZ56, RZ57, RZ58, RZ73, RZ74

Note

RD53, RZ23, and RZ23L disks are not supported as single-system disks. You will need a second suitably sized disk to perform the installation.

The system disk contains the root file system and the swap1 space. The unit number for the system disk must be in the range 0 to 254 for ra-type devices or in the range 0 to 31 for the other types of devices.

Complete the worksheet in Table 2-2 to identify what disks are in your system's configuration. Though the worksheet shows only four devices, you can configure a maximum of 96 ra-type devices and 32 devices of other types into your system. Using the hardware documentation that came with your system and the associated reference page for your disks, write in the disk type, the mnemonic for that disk, and the size of each partition in MB. You will need to refer back to this worksheet when completing the worksheets in the following sections.

If you are upgrading from an existing ULTRIX system or installing a new system on a disk currently being used, use the `chpt` command with the `-q` option to look at the existing disk partition layout on the disk or disks you intend to use. For example, if the disk on which you want to install the system is an RA70 on unit 0, issue the following command:

```
# chpt -q /dev/rra0a
```

The existing disk partition layout is displayed.

Table 2-2: Disk Configuration Worksheet

Disk Number	Device Name	ULTRIX Name	Partition	Partition Size in MB
0	_____	_____	a	_____
			b	_____
			c	_____
			d	_____
			e	_____
			f	_____
			g	_____
			h	_____
1	_____	_____	a	_____
			b	_____
			c	_____
			d	_____
			e	_____
			f	_____
			g	_____
			h	_____
2	_____	_____	a	_____

Table 2-2: (continued)

Disk Number	Device Name	ULTRIX Name	Partition	Partition Size in MB
			b	_____
			c	_____
			d	_____
			e	_____
			f	_____
			g	_____
			h	_____
3	_____	_____	a	_____
			b	_____
			c	_____
			d	_____
			e	_____
			f	_____
			g	_____
			h	_____

2.2 Planning the Swap Space

The swap space is the area on a disk used by the kernel to transfer processes into and out of physical memory. The advanced installation lets you allocate two swap areas: swap1 and swap2. (You can allocate additional swap space during day-to-day system management. See the *Guide to Configuration File Maintenance* for instructions on how to do this.)

Allocate the swap1 space either by accepting the default or by specifying another partition. If you choose the default allocation, the installation software allocates the swap1 space to the `b` partition of the system disk. There is no default allocation for swap2 space.

Note

If you choose a partition that overlaps the `a` partition, where customized partition information resides, you will overwrite any customized partition table that describes the disk you selected and overwrite the superblock. For this reason the installation software does not include the `a` partition in the list of partitions available for the swap area.

The size of the swap space should be at least three to four times the processor's physical memory size. If your system is devoted to users that might be running numerous large programs, your swap space will need to be more than three times the size of physical memory.

If you plan to allocate a second swap space, you can divide the required size between the two. For example, if you need 100 MB of swap space, you could allocate 50 MB

to the swap1 space and 50 MB to the swap2 space. Dividing the swap space will improve swapping performance.

Note

If you plan to allocate the crash dump space (see Section 2.3) to the same disk partition as the swap space, the swap space must be on a disk connected to the same controller as the system disk.

To determine the size and record the location of the swap space areas, fill in the following blanks:

1. The memory in MB for your processor is _____.
2. Therefore, you need _____ MB (two or three times main memory, depending on the number and size of processes running) to accommodate your swap space.
3. Refer to the worksheet in Table 2-2 to identify partitions that are large enough for your swap spaces.
4. Record the location of the swap space as follows:

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

2.3 Planning the Crash Dump Space

The crash dump space is the area on the disk where the kernel writes the memory contents in the event of a system crash.

Allocate the crash dump space by accepting the default or by specifying another partition. You can allocate the crash dump space either to the same partition as swap1 or swap2, or to another partition. If you choose the default allocation, the installation software allocates the crash dump space to the `b` partition of the system disk.

The ULTRIX operating system provides two types of crash dumps: partial and full. You can use either partial or full crash dumps, but not both.

Partial crash dumps, the default, write only part of the memory's contents to the crash dump space. This minimizes the amount of disk space needed to hold crash dumps. Use Table 2-3 to help determine the space needed for partial crash dumps based on physical memory size of your system and its maximum number of users.

Full crash dumps write the entire contents of memory to the crash dump space. For full crash dumps, the size of crash dump space needed must be at least equal to the size of memory *plus* the size of the kernel, `vmunix`. The size of the kernel can be up to approximately 4.1 MB. See the *Guide to System Crash Recovery* for more information about calculating crash dump space.

Note

The crash dump space must be on a disk connected to the same controller as the system disk.

Table 2-3: Partial Crash Dump Space Requirements

Physical Memory in MB	Maximum Number of Users	Space Needed for RISC (MB)	Space Needed for VAX (MB)
6	2	not applicable	6
8	2	8	8
16	16	14	10
32	32	20	12
64	64	28	16
128	128	40	26
256	128	40	26
512	256	48	34

To determine the size and record the location of the crash dump space, fill in the following blanks:

1. The memory in MB for your system is _____.
2. The maximum number of users allowed on your system is _____.
3. You need _____ MB to accommodate your crash dump space. For partial dumps, select a value from Table 2-3. For full dumps, this value must be at least equal to the amount of memory.
4. Refer to the worksheet in Table 2-2 to identify partitions that are large enough for your crash dump space.
5. Record the ULTRIX name, disk number, and partition where you plan to allocate the crash dump space. See Table 2-2 to identify partitions that are large enough to allocate the crash dump space.

ULTRIX Name	Disk Number	Partition
_____	_____	_____

2.4 Planning the var Area

The `var` area contains volatile, machine-specific directories and files, like `tmp`, `spool`, 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. If you choose the default allocation, the installation software allocates the `var` area as the directory `/usr/var`.

In determining the size of the `var` area, you need to consider the following:

- The crash dump space

- The error logger
- System accounting
- The size of the `var/adm/ris` directory, if appropriate for your system

The following sections briefly describe how these items affect the size of `var`. Complete the worksheet in Section 2.4.5 as you work through the sections.

2.4.1 Size of the var/adm/crash Directory

The file system requires room to accommodate the crash dump space. When the system crashes, the `savecore` utility writes a partial copy (for partial dumps) or a complete copy (for full dumps) of main memory (`vmcore`) and the `vmunix` image located in the root file system into the swap space. When the system comes back up, `savecore` writes these copies of `vmcore` and `vmunix` to files located in the `var/adm/crash` directory.

The `var/adm/crash` directory should have at least the amount of space you recorded in Section 2.3. This should give you enough space for one crash dump. See the *Guide to System Crash Recovery* for more information about calculating crash dump space.

Fill in the first item of the worksheet in Table 2-4 with the size of the crash dump space.

2.4.2 Error Logger

The `var` file system requires room to accommodate the error log. The error log is a record of system- and hardware-related errors in a binary file. If you are creating a new system and have never had an error log file, then estimate your requirements using the following guidelines:

- The error logger records about 1 MB per week on a processor that has 25 MB of memory and is connected to two tape drives, 10 disk drives, 1 DMB serial port, and 1 Ethernet interface. If you back up or remove the error log file once a month, then you need to plan for an error log file that is about 4 MB.
- Increase this recommended number if you have a processor with more memory, a greater number of peripheral devices, or peripheral devices that experience numerous errors. You should also increase the recommended number to accommodate any remote processors that log in to the local processor.
- Increase this recommended number if your system is connected to a Computer Interconnect (CI) network. The error logger records errors for all systems and devices attached to the CI. Applying the first guideline in this list for each system attached to the CI, you can estimate the amount of error logging each system generates. Then add together the total for each system to give you the total error logging space your system needs.
- Decrease this recommended number if you have a processor with less memory or a smaller number of peripheral devices.

The *Guide to the Error Logger* provides more information on the error logger.

Fill in the second item of the worksheet in Table 2-4 with the amount of space needed for the error logger.

2.4.3 System Accounting

The adm directory in the var area contains data files generated by administrative programs such as acct, aculog, and wtmp. The data that these programs generate can vary widely from system to system and over time. For example, the file adm/acct in the var area can easily grow by 50 kB a day for a large system and by 5 kB 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, then you need to plan for accounting files that occupy about 300 kB for workstations and 3 MB for large systems. See the *Guide to Disk Maintenance* for more information on the space requirements for system accounting.

Fill in the third item of the worksheet in Table 2-4 with the amount of space needed for system accounting.

2.4.4 Size of the var/adm/ris Directory

If you are going to set up a network kit on your system, you can choose to transfer software subsets from distribution media to the adm/ris directory in the var area. Anyone with a processor from the VAXstation, MicroVAX, DECstation, or certain DECsystem series of processors can then install the software subsets residing in this directory using the Ethernet. See the *Guide to Sharing Software on a Local Area Network* for more information on setting up the network kit.

You must reserve enough space in the adm/ris directory in the var area for the software you want to install. See Appendix A (for RISC processors) or Appendix B (for VAX processors) for a brief description of each software subset and the names of any other subsets or kernel configuration file options related to its operation and the *Release Notes* for the subset sizes.

Fill in the fourth item of the worksheet in Table 2-4 with the amount of space needed for the adm/ris directory in the var area.

2.4.5 Completing the var Worksheet

Complete the worksheet in Table 2-4 to determine the space requirements for the var area.

Table 2-4: var Worksheet

Item	Obtain number from ...	Total for var
Crash dump space	Section 2.4.1	_____
Error logger	Section 2.4.2	_____
System accounting	Section 2.4.3	_____
Size of the var/adm/ris directory	Section 2.4.4	_____
	TOTAL	_____

If you plan on using a separate partition for the var area, record the ULTRIX name, disk number, and partition where you plan to allocate the var file system.

ULTRIX Name	Disk Number	Partition
_____	_____	_____

2.5 Planning the /usr File System

The `/usr` file system is the directory structure that contains such directories as `/usr/sys`, `/usr/adm`, and `/usr/bin`.

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

In determining the size of the `/usr` file system, you need to consider the following:

- The software subsets you plan to install on `/usr`
- The amount of user space needed
- The size of the `var` area if it is on the same partition as `/usr`

The following sections briefly describe how these items affect the size of `/usr`. Table 2-5 contains a worksheet that you will complete by working through the sections.

2.5.1 Software Subsets Within the /usr File System

The `/usr` file system requires room 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 provide a particular class of services. For example, the Document Preparation Extensions provide tools for the online reference pages, such as `nroff` and `catman`.

Use the tables in the *Release Notes* that list RISC and VAX subset sizes to determine the amount of space to allocate for the subsets you plan to install. 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. Select the subsets that you want to install and add their sizes together. Record the totals in the spaces provided.

See Table A-1 (for RISC processors), or Table B-1 (for VAX processors) for descriptions of the software subsets and a list of other subsets and kernel configuration file options related to each subset.

Fill in the first item of the worksheet in Table 2-5 with the amount of space needed for all the subsets you plan to install.

2.5.2 User Area

The advanced installation does not provide an area for user files. You need to set up this area after the installation. However, you should still take this amount of space into consideration when planning your system. As a guideline, 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 user space. See the *Guide to Disk*

Maintenance for information on disk quotas.

Fill in the second item of the worksheet in Table 2-5 with the amount of space needed for the users directory.

2.5.3 var Area

If you plan to place the `var` area on the same partition as `/usr`, you must add the size of the `var` area that you determined with the worksheet in Table 2-4 to the total of `/usr`.

If appropriate for your system, fill in the third item of the worksheet in Table 2-5 with the amount of space needed for `var`.

2.5.4 Completing the /usr Worksheet

Complete the worksheet in Table 2-5 to determine the space requirements for the `/usr` area.

Table 2-5: /usr Worksheet

Item	Obtain Number From ...	Total for /usr
Software subsets	The *Release Notes*	_____
Size of the user area	Section 2.5.2	_____
Size of the `var` area	Table 2-4 for the `var` total	_____
	TOTAL	_____

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

Record the ULTRIX name, disk number, and partition where you plan to allocate the `/usr` file system:

ULTRIX Name	Disk Number	Partition
_____	_____	_____

2.6 Determining the Disk Partition Layout

After you determine how much space your system requires for each file system, you need to determine whether you can accept the default disk partition layouts or whether you want to modify the disks with the `chpt` command to use a customized partition layout.

If you modify the partition tables for the system disk, the partitions for root and swap1 must meet the following minimum space requirements:

- The root or `a` partition must be at least 32,768 blocks (16 MB).
- The swap or `b` partition must be at least 12,288 blocks (6 MB). This assumes that you plan to add a second swap device.

If the modified partitions do not meet these requirements, then the advanced installation imposes the default partition table for the system disk. No other disks on the system are affected.

Complete the worksheet in Table 2-6 by entering the values that you determined in the previous sections. This table will give you the complete file system layout and space requirements for your system.

Table 2-6: File System Worksheet

Items	Approximate Size	Disk	Partition
Root (from Table 2-2)	_____	_____	_____
swap1 (from Section 2.2)	_____	_____	_____
swap2 (from Section 2.2)	_____	_____	_____
Crash dump space (from Section 2.3)	_____	_____	_____
`/var` (from Table 2-4; fill in disk and partition lines if applicable)	_____	(_____)	(_____)
`/usr` Total:	_____	_____	_____

After completing the worksheet, you need to ensure that the disk partitions are laid out the way you want them. If you are installing a system for the first time, refer to Table 2-2 and to Section 4 of the *ULTRIX Reference Pages* for the default partition layout for your disk or disks.

Compare the disk partition layout with the total values in Table 2-6. If a file system (excluding swap) is immediately going to consume more than 75 percent of its intended disk partition not including the 16 percent of the partition that the ULTRIX file system consumes, you may want to expand the disk partition, if possible.

Assuming that you have a valid backup of your current system (if appropriate) and that you are experienced with ULTRIX file systems, you can modify disk partitions by choosing the System Management option of the installation procedure to enter the standalone ULTRIX environment. This environment loads a memory-resident ULTRIX kernel on your system and gives you access to the commands you need to change the partitions. See Chapter 7 for information on the standalone ULTRIX environment.

2.7 Planning the Configuration File Entries

Certain layered products require that an entry be added to your system's configuration file for that product to work. For example, Ethernet or `lat` drivers require entries in the configuration file.

When you choose the kernel option corresponding to each configuration file entry, the advanced installation procedure updates the configuration file before it builds the kernel, `vmunix`.

If you plan to use any of the features listed in Table 2-7 now or in the future, add the relevant entry during the advanced installation. If you include them during the installation, the products that use these features will function immediately after they are installed. Otherwise, when you are ready to install a product, you will need to add

the necessary entry in the configuration file and then rebuild the kernel.

Note that including the entry in the configuration file does not mean that the product is installed.

Table 2-7: Configuration File Entries

Kernel Option	Description	Add?
Local Area Transport (LAT)	Gives you the kernel options and devices required to facilitate communications with Digital's Ethernet local area terminal server.	_____
Bisynchronous Communication protocol (VAX only)	Gives you access to the 2780 and 3780 remote job entry terminals.	_____
Computer interconnect (CI) network	Gives you kernel options and devices required to use the internet protocols on the CI wires.	_____
Diagnostic utilities protocol (DUP)	Provides a method of communication between a host class driver and a server in the controller. DUP defines the communications between a host control program and a remote program in the controller. DUP requires one of the following devices to be configured on the system: bvpssp, ci, msi, or uq.	_____
ISO9660 File System Support (CDFS)	Allows you to access an ISO9660 formatted CD-ROM as a local, read-only file system.	_____
Ethernet packet filter	Allows you to implement networking protocols without modifying the kernel, and allows you to monitor the network by receiving packets destined for machines other than your own.	_____
Enhanced security features	Gives you audit, additional identification and authentication mechanisms, and trusted path. Note that adding the audit and the additional identification and authentication mechanisms at installation time will not activate these options. See the *Security Guide for Administrators* for further information.	_____
All of the configuration options listed		_____
None of the configuration options listed		_____

Depending on your hardware configuration, you may need to edit your system's configuration file even if you choose to add kernel options during the advanced installation. You will need to edit the configuration file in the following situations:

- Your system's configuration does not conform to control status register (CSR) address assignment rules.
- You have disk controllers in floating address space.
- You have multiple MSCP controllers, such as KDA50, RQDX, RC25, RRD50, or KFQSA, on the Q-bus.

For more information on editing your system's configuration file, see the *Guide to Configuration File Maintenance*.

Now you are ready to begin the installation.

Booting the System 3

Before you can install the ULTRIX software, you must prepare the hardware for the installation and then boot the system from the installation media. How you do this depends on which processor you have.

If you are using a TK50 tape kit to boot your system, or are booting the standalone kernel for system management tasks, follow the instructions included with the kit. If you are using a CD-ROM optical disc to boot your system, follow the instructions in the hardware manual included with the CD-ROM.

You are booting your system from the network when you are:

- Initiating an installation from a remote server
- Booting a diskless system
- Booting a standalone kernel from a remote server to perform system management tasks

To boot your system from the network, you must be registered as a client on a DMS or RIS server. See the *Guide to Sharing Software on a Local Area Network* for information on registering your system.

Look for your processor in Table 3-1 and find the section in this chapter that gives booting instructions for your processor. Follow the instructions in that section and then continue the installation procedure with Chapter 4 if you are performing a basic or an advanced installation, or Chapter 5 if you are performing an upgrade.

Table 3-1: Location of Processor-Specific Boot Instructions

Processor	Section
DECstation 2100	Section 3.1
DECstation 3100	Section 3.1
DECstation 3100S	Section 3.1
DECstation 5000, Model 100 series	Section 3.2
DECstation 5000, Model 200 series	Section 3.2
DECstation/DECsystem 5000, Model 150	Section 3.2
DECstation/DECsystem 5000, Model 260	Section 3.2
DECsystem 5900 Model 260	Section 3.2
Personal DECstation/DECsystem Model 50	Section 3.2
Personal DECstation 5000, Model 20, 25, 33	Section 3.2
DECsystem 3100	Section 3.1
DECsystem 5000, Model 25	Section 3.2
DECsystem 5000, Model 200 series	Section 3.2

Table 3-1: (continued)

Processor	Section
DECsystem 5100	Section 3.3
DECsystem 5400	Section 3.4
DECsystem 5500	Section 3.5
DECsystem 5810	Section 3.6
DECsystem 5820	Section 3.6
DECsystem 5830	Section 3.6
DECsystem 5840	Section 3.6
DECsystem 5900	Section 3.2
MicroVAX II	Section 3.10
MicroVAX 2000	Section 3.7
MicroVAX 3100	Section 3.8
MicroVAX 3300	Section 3.9
MicroVAX 3400	Section 3.9
MicroVAX 3500	Section 3.10
MicroVAX 3600	Section 3.10
MicroVAX 3800	Section 3.10
MicroVAX 3900	Section 3.10
VAXserver 100	Section 3.10
VAXserver 2000	Section 3.7
VAXserver 3100	Section 3.8
VAXserver 3300	Section 3.9
VAXserver 3400	Section 3.9
VAXserver 3500	Section 3.10
VAXserver 3600	Section 3.10
VAXserver 3800	Section 3.10
VAXserver 3900	Section 3.10
VAXserver 6000-nnn series	Section 3.14
VAXstation II	Section 3.10
VAXstation II/GPX	Section 3.10
VAXstation 2000	Section 3.7
VAXstation 3100	Section 3.8
VAXstation 3200	Section 3.10
VAXstation 3500	Section 3.10
VAXstation 3520	Section 3.11
VAXstation 3540	Section 3.11
VAX–11/750	Section 3.12
VAX–11/780	Section 3.13
VAX–11/785	Section 3.13
VAX 6000-nnn series	Section 3.14

Table 3-1: (continued)

Processor	Section
VAX 6210	Section 3.14
VAX 6220	Section 3.14
VAX 6230	Section 3.14
VAX 6240	Section 3.14
VAX 6310	Section 3.14
VAX 6320	Section 3.14
VAX 6330	Section 3.14
VAX 6340	Section 3.14
VAX 6350	Section 3.14
VAX 6360	Section 3.14
VAX 6410	Section 3.14
VAX 6420	Section 3.14
VAX 6430	Section 3.14
VAX 6440	Section 3.14
VAX 6450	Section 3.14
VAX 6460	Section 3.14
VAX 6510	Section 3.14
VAX 6520	Section 3.14
VAX 6530	Section 3.14
VAX 6540	Section 3.14
VAX 6550	Section 3.14
VAX 6560	Section 3.14
VAX 8200	Section 3.15
VAX 8250	Section 3.15
VAX 8300	Section 3.15
VAX 8350	Section 3.15
VAX 8500	Section 3.16
VAX 8530	Section 3.16
VAX 8550	Section 3.16
VAX 8600	Section 3.17
VAX 8650	Section 3.17
VAX 8700	Section 3.16
VAX 8800	Section 3.16
VAX 8810	Section 3.16
VAX 8820	Section 3.18
VAX 8830	Section 3.18
VAX 8840	Section 3.18
VAX 9000	Section 3.19

3.1 DECstation 2100/3100/3100S or DECsystem 3100 Processor

To prepare the DECstation 2100/3100/3100S or DECsystem 3100 hardware:

1. Turn on the power to the console terminal and all additional peripheral devices.
2. Turn on the power to the processor.
3. Remove any TK50 tape cartridges and CD-ROM optical discs from their associated drives.

The console subsystem now prints an initial display and ends with the console mode prompt:

```
>>
```

The boot command you type depends on the software distribution kit: TK50, CD-ROM, or network. The boot command for each distribution kit is described in this section.

3.1.1 Booting from the TK50 Tape Cartridge Kit

Follow the instructions included with your TK50 tape kit for inserting the tape into the tape drive.

Follow this procedure to boot the system:

1. Make sure that your tape cartridges are write-protected.
2. Load the tape cartridge labeled ULTRIX/UWS V4.4 (RISC) BOOT/UPGRADE into the tape drive. Ensure the tape is online and ready to use.
3. Use the following command to determine the unit number of the drive for your device:

   ```
   >> test -c
   ```

   A display appears that shows what is assigned to each unit number on your system.
4. Use a command with the following syntax to boot your system:

   boot -f tz(0, *unit-number*)

   Replace *unit-number* with the unit number of your tape drive.

   The following example shows the command to boot the system from tape drive number 5.

   ```
   >> boot -f tz(0,5)
   ```

Next, the installation software displays some system information, followed by the memory and hardware configurations.

You have completed booting your system. Continue the installation procedure with Chapter 4.

3.1.2 Booting from the CD-ROM Optical Disc Kit

If your CD-ROM optical disc is not already in its caddy, follow the instructions in the hardware manual for inserting the optical disc into the caddy.

Follow this procedure to boot the system:

1. Load the CD-ROM optical disc with the label ULTRIX/UWS V4.4 (RISC) SUPPORTED into the drive. Wait for the drive to be on line and ready.
2. Use the following command to determine the unit number of the drive for your device:

   ```
   >> test -c
   ```

   A display appears that shows what is assigned to each unit number on your system.
3. Use a command with the following syntax to boot your system:

   boot -f rz(0, *unit-number*,0)vmunix

   Replace *unit-number* with the unit number of your optical disc drive.

   The following example shows the command to boot the system from optical disc drive number 4:

   ```
   >> boot -f rz(0,4,0)vmunix
   ```

Next, the installation software displays some system information, followed by the memory and hardware configurations.

You have completed booting your system. Continue the installation procedure with Chapter 4.

3.1.3 Booting from the Network

To boot the system over the network, type a command with the following syntax at the console mode prompt:

boot -f mop(*net-interface*)

If you have more than one network interface, replace *net-interface* with the number of the interface you want to use. If you have only one network interface, replace *net-interface* with zero (0).

Next, the installation software displays some system information, followed by the memory and hardware configurations.

You have completed booting your system. Continue the installation procedure with Chapter 4.

3.2 DECstation 5000 Series, DECsystem 5000 Series, Personal DECstation 5000 Series, and the DECsystem 5900 Processors

To prepare these processors:

1. Turn on the power to the console terminal and all additional peripheral devices.
2. Turn on the power to the processor.
3. Remove any TK50 tape cartridges and CD-ROM optical discs from their associated drives.

The console subsystem now prints an initial display and ends with the console mode prompt:

```
>>
```

The boot command you type depends on the software distribution kit: TK50, CD-ROM, or network. Before beginning, you must determine the slot and device numbers of your boot device.

3.2.1 Determining the Slot and Device Numbers of Your Boot Device

The instructions in this section assume that if you have multiple disk drives, CD-ROM drives, or tape drives, you know which drive is your boot device.

If you are booting from a Small Computer System Interconnect (SCSI) device, check the cabling of your hardware to determine which controller you are booting from.

3.2.1.1 Determining the Slot Number (Default)

To determine which controllers and devices are configured on your system, type the following command at the console prompt:

```
>> cnfg
```

This command displays the options present on the system. Your system will display output similar to the following (the output will differ depending on your system configuration):

```
7:KN02-AA       DEC     V5.3a   TCF0    (16 MB)
6:PMAD-AA       DEC     V5.3a   TCF0    (enet:08-00-2b-16-85-7e)
5:PMAZ-AA       DEC     v5.3a   TCF0    (SCSI=7)
2:PMAZ-AA       DEC     v5.3a   TCF0    (SCSI=7)
1:PMAG-AA       DEC     T3.0a   TCF0    (PXG--D=24)
```

The first column displays the slot numbers of the device controllers. The last column displays the devices in each slot. If your system has more than one device in a particular slot, a display similar to the following appears:

```
 3: KN02-BA  DEC      X5.4g    TCF0  (32 MB)
                                     (enet: 08-00-2b-16-58-d6)
                                     (SCSI = 7)
 1: PMAG-CA  DEC      V5.3a    TCF0  (PX -- D=8)
```

3.2.1.2 Determining the Boot Device Number

To determine the device number of your boot device, type a command with the following syntax:

cnfg *slot_number*

For example, to determine the device number of a SCSI disk drive with a controller in slot 5, type the following command:

```
>> cnfg 5
```

The system displays a table similar to the following:

```
5:      PMAZ-AA   DEC     V5.3a     TCF0          (SCSI = 7)
-------------------------------------------------------------

          DEV    PID               VID      REV   SCSI DEV
-------------------------------------------------------------
-------------------------------------------------------------
          rz3    RZ56   (C)DEC     DEC      0200    DIR
          tz5                                         SEQ
```

In this example, the disk drive is identified by the letters "rz". The device number for the disk drive is 3 (rz3). The tape drive is identified by the letters "tz". The device number for the tape drive is 5 (tz5).

Now that you know the slot number and the device number, you can boot your system or set your system's environmental boot variable. Follow the directions given in the appropriate booting sections.

If the command shows that you have multiple devices configured on the same controller, you will have to know which device is the boot device. If you do not know which device is the boot device, consult your system administrator.

3.2.2 Booting from the TK50 Tape Cartridge Kit

Follow the instructions included with your TK50 tape kit for inserting the TK50 into the tape drive.

Follow this procedure to boot the system:

1. Make sure that your TK50 tape cartridges are write-protected.
2. Load the tape cartridge labeled ULTRIX AND UWS V4.4 (RISC) BOOT UPGRADE into the tape drive. Ensure the tape is on line and ready to use.
3. To determine the device number of the SCSI tape, use the same slot number and device number determined by the `cnfg` command in Section 3.2.1.2.

   For example to boot a SCSI tape (tz) at slot 5, drive 5, type the following command:

   ```
   >> boot 5/tz5
   ```

You have completed booting your system. Continue the installation procedure with Chapter 4.

3.2.3 Booting from the CD-ROM Optical Disc Kit

If your CD-ROM optical disc is not already in its caddy, follow the instructions in the hardware manual for inserting the optical disc into the caddy.

Follow this procedure to boot the system:

1. Load the CD-ROM optical disc with the label ULTRIX/UWS V4.4 (RISC) SUPPORTED into the drive. Wait for the drive to be on line and ready.
2. Use a command with the following syntax to boot your system:

   boot *slot_number*/rz*device_number*/vmunix

   Replace *slot-number* with the slot number of the CD-ROM controller. Replace *device-number* with the device number of your optical disc drive.

   For example, to boot the system from optical disc drive number 4 on slot number 1, type the following command:

   ```
   >> boot 1/rz4/vmunix
   ```

You have completed booting your system. Continue the installation procedure with Chapter 4.

3.2.4 Booting from the Network

To boot the system from the network, use a command with the following syntax:

boot *slot_number*/mop

Replace *slot_number* with the slot number of the network controller.

For example, to boot from the network on slot number 6, type the following command:

```
>> boot 6/mop
```

Next, the installation software displays some system information, followed by the memory and hardware configurations.

You have completed booting your system. Continue the installation procedure with Chapter 4.

3.3 DECsystem 5100 Processor

To prepare the DECsystem 5100 hardware:

1. Turn on the power to the console terminal and all additional peripheral devices.
2. Turn on the power to the processor.
3. Remove any TK50 tape cartridges and CD-ROM optical discs from their associated drives.

The console subsystem now prints an initial display and ends with the console mode prompt:

```
>>
```

The boot command you type depends on the software distribution kit: TK50, CD-ROM, or network. The boot command for each distribution kit is described in this section.

3.3.1 Booting from the TK50 Tape Cartridge Kit

Follow the instructions included with your TK50 tape kit for inserting the tape into the tape drive.

Follow this procedure to boot the system:

1. Make sure that your TK50 tape cartridges are write-protected.
2. Load the tape cartridge labeled ULTRIX AND UWS V4.4 (RISC) BOOT/UPGRADE into the tape drive. Ensure the tape is on line and ready to use.
3. Use the following command to determine the unit number of the drive for your device:

   ```
   >> conf
   ```

   A display appears that shows what is assigned to each unit number on your system.
4. Use a command with the following syntax to boot your system:

   boot -f tz(0, *unit-number*)

   Replace *unit-number* with the unit number of your tape drive.

   The following example shows the command to boot the system from tape drive number 5:

   ```
   >> boot -f tz(0,5)
   ```

Next, the installation software displays some system information, followed by the memory and hardware configurations.

You have completed booting your system. Continue the installation procedure with Chapter 4.

3.3.2 Booting from the CD-ROM Optical Disc Kit

If your CD-ROM optical disc is not already in its caddy, follow the instructions in the hardware manual for inserting the optical disc into the caddy.

Follow this procedure to boot the system:

1. Load the CD-ROM optical disc with the label ULTRIX/UWS V4.4 (RISC) SUPPORTED into the drive. Wait for the drive to be on line and ready.
2. Use the following command to determine the unit number of the drive for your device:

   ```
   >> conf
   ```

   A display appears that shows what is assigned to each unit number on your system.
3. Use a command with the following syntax to boot your system:

   boot -f rz(0,*unit-number*,0)vmunix

   Replace *unit-number* with the unit number of your optical disc drive.

   The following example shows the command to boot the system from optical disc drive number 4:

   ```
   >> boot -f rz(0,4,0)vmunix
   ```

Next, the installation software displays some system information, followed by the memory and hardware configurations.

You have completed booting your system. Continue the installation procedure with Chapter 4.

3.3.3 Booting from the Network

To boot the system over the network, type a command with the following syntax at the console mode prompt:

boot -f mop(*net-interface*)

If you have more than one network interface, replace *net-interface* with the number of the interface you want to use. If you have only one network interface, replace *net-interface* with zero (0).

Next, the installation software displays some system information, followed by the memory and hardware configurations.

You have completed booting your system. Continue the installation procedure with Chapter 4.

3.4 DECsystem 5400 Processor

To prepare the DECsystem 5400 hardware:

1. Turn on the power to the console terminal and all additional peripheral devices.
2. Turn on the power to the DECsystem 5400 processor.
3. Remove any TK50 or TK70 tape cartridges from their associated drives.

The console subsystem prints an initial display, ending with the console mode prompt:

```
>>
```

Follow the instructions included with your TK50 tape kit for inserting the tape into the tape drive.

Follow this procedure to boot the system:

1. Make sure that your tape cartridges are write-protected.
2. Load the tape cartridge labeled ULTRIX AND UWS V4.4 (RISC) BOOT/UPGRADE into the tape drive. Ensure the tape is on line and ready to use.
3. To determine the unit number of the drive for your device, first enter the following command to invoke the VAX console:

   ```
   >> maint
   ```

   When the VAX console prompt appears, enter the following command:

   ```
   >>> show device
   ```

   A display appears that shows what is assigned to each unit number on your system. Record the unit number of your tape drive, then enter the following command to return to the RISC console:

   ```
   >>> exit
   ```

4. Use a command with the following syntax to boot your system:

   boot -f tm(0, *unit-number*)

   Replace *unit-number* with the unit number of your tape drive.

   The following example shows the command to boot the system from tape drive number 0:

   ```
   >> boot -f tm(0,0)
   ```

Next, the installation software displays some system information, followed by the memory and hardware configurations.

You have completed booting your system. Continue the installation procedure with Chapter 4.

3.5 DECsystem 5500 Processor

To prepare the DECsystem 5500 series processor hardware:

1. Turn on the power to the console terminal and all additional peripheral devices.
2. Turn on the power to the processor.
3. Remove any TK50 tape cartridges and CD-ROM optical discs from their associated drives.

The console subsystem now prints an initial display and ends with the console mode prompt:

```
>>
```

The boot command you type depends on the software distribution kit: TK50, CD-ROM, or network. Before beginning, you must determine the slot and device numbers of your boot device.

Follow this procedure to boot the system:

1. Make sure that your tape cartridges are write-protected.
2. Load the tape cartridge labeled ULTRIX AND UWS V4.4 (RISC) BOOT/UPGRADE into the tape drive. Ensure the tape is on line and ready to use.
3. To determine the unit number of the drive for your device, first enter this command to invoke the VAX console:

   ```
   >> maint
   ```

   When the VAX console prompt appears, enter the following command:

   ```
   >>> show device
   ```

   A display appears that shows what is assigned to each unit number on your system. Record the unit number of your tape drive, then enter the following command to return to the RISC console:

   ```
   >>> exit
   ```

3.5.1 Booting from the SCSI Tape Device

Use a command with the following syntax to boot your system:

boot -f tz(0, *unit-number*)

Replace *unit-number* with the unit number of your tape drive.

The following example shows the command to boot the system from tape drive number 0:

```
>> boot -f tz(0,0)
```

You have completed booting your system. Continue the installation procedure with Chapter 4.

3.5.2 Booting from the Q–bus Tape Device

Use a command with the following syntax to boot your DECsystem 5500 from a Q–bus tape:

boot -f tm(0, *unit-number*)

Replace *unit-number* with the unit number of your tape drive.

The following example shows the command to boot your DECsystem 5500 from tape drive number 0:

```
>> boot -f tm(0,0)
```

You have completed booting your system. Continue the installation procedure with Chapter 4.

3.5.3 Booting from the CD-ROM Optical Disc Kit

If your CD-ROM optical disc is not already in its caddy, follow the instructions in the hardware manual for inserting the optical disc into the caddy.

Follow this procedure to boot the system:

1. Load the CD-ROM optical disc with the label ULTRIX/UWS V4.4 (RISC) SUPPORTED into the drive. Wait for the drive to be on line and ready.
2. Use the following command to determine the unit number of the drive for your device:

   ```
   >> show devices
   ```

   A display appears that shows what is assigned to each unit number on your system.
3. Use a command with the following syntax to boot your system:

   boot -f rz(*controller-number, unit-number*,0)vmunix

   Replace *controller-number* with the controller number. Replace *unit-number* with the unit number of your optical disc drive.

   The following example shows the command to boot the system from optical disc drive number 4:

   ```
   >> boot -f rz(0,4,0)vmunix
   ```

Next, the installation software displays some system information, followed by the memory and hardware configurations.

You have completed booting your system. Continue the installation procedure with Chapter 4.

3.5.4 Booting from the Network

To boot the system over the network, type a command with the following syntax at the console mode prompt:

boot -f mop(*net-interface*)

If you have more than one network interface, replace *net-interface* with the number of the interface you want to use. If you have only one network interface, replace

net-interface with zero (0).

Next, the installation software displays some system information, followed by the memory and hardware configurations.

You have completed booting your system. Continue the installation procedure with Chapter 4.

3.6 DECsystem 5810/5820/5830/5840 Processor

To prepare the DECsystem 5810/5820/5830/5840 hardware:

1. Turn on the power to the console terminal and all additional peripheral devices.
2. Turn on the power to the processor.
3. Remove any TK50 or TK70 tape cartridges from their associated drives.

The console subsystem now prints an initial display and ends with the console mode prompt:

```
>>
```

Follow the instructions included with your TK50 tape kit for inserting the tape into the tape drive.

Follow this procedure to boot the system:

1. Make sure that your tape cartridges are write-protected.
2. Load the tape cartridge labeled ULTRIX AND UWS V4.4 (RISC) BOOT UPGRADE into the tape drive. Ensure the tape is on line and ready to use.
3. To determine the node number of the drive for your device, use the following command:

   ```
   >> show config
   ```

   A display, similar to the following, appears on your screen. It shows what is assigned to each slot number on your system:

   ```
        Type                Rev
   1+   KN58A/A  (8081)     0000
   2    KN58A/B
   9+   MS62A    (4001)     0002
   E+   DWMBA/A  (2001)     0002
   XBI  E
   1+   DWMBA/B  (2107)     000A
   2+   KDB50    (010E)     131C
   4+   CIBCA    (0108)     41C2
   6+   TBK70    (410B)     0307
   C+   DEBNI    (0118)     0100
   ```

   Record the slot number of your XMI-to-BI bus adapter (XBI), which is hexadecimal E in the example. Also record the node number of your TBK70 controller, which is 6 in the example. (Do not include the plus sign (+) that appears in the output.)

4. Use a command with the following syntax to boot your system:

   boot -f tms(/x0x*slot-number*/b*node-number*, *unit-number*)

   Replace *slot-number* with the slot number of your XBI adapter. Replace *node-number* with the node number on the XBI where your TBK70 controller is located. Replace *unit-number* with the unit number of your TBK70 controller. The unit number is always the same as the node number on the XBI where your TBK70 controller is located.

   The following example shows the command to boot the system from XBI slot E

for a TBK70 controller located on XBI node 6:

```
>> boot -f tms(/x0xe/b6,6)
```

Next, the installation software displays some system information, followed by the memory and hardware configurations.

You have completed booting your system. Continue the installation procedure with Chapter 4.

3.7 MicroVAX 2000, VAXserver 2000, or VAXstation 2000 Processor

The following instructions assume you have no bootable software on any device in your system. To prepare the MicroVAX 2000, VAXserver 2000, or VAXstation 2000 hardware:

1. Set the system unit on/off switch to 1 (on).
2. Turn on the power to the disk expansion box (if present).
3. Turn on the power to the TZK50 expansion box (if present).
4. Turn on the power to peripheral devices, such as printers or modems.
5. Remove any TK50 tape cartridges and RX50 or RX33 diskettes from their associated drives.

   After about 20 seconds, the monitor displays a power-up test sequence similar to:

   ```
   KA410 V1.0
   F...E...D...C...B...A...9...8...7...6...5...4...3...2...1...
   ```

   The first line is hardware revision information.

   The second line is a countdown of the system self-test diagnostics. The countdown may be followed by some status or error messages. The owner's manual explains these status and error messages and also how you can tell whether the self-test passed.
6. After the system finishes the self-test countdown, press the halt button on the rear of the system unit. The console mode prompt appears:

   ```
   >>>
   ```

You are now ready to boot the system. The boot command you type depends on the software distribution kit: TK50 or network. The boot command for each distribution kit is described in this section.

3.7.1 Booting from the TK50 Tape Cartridge Kit

Follow the instructions included with your TK50 tape kit for inserting the TK50 tape into the tape drive.

Follow this procedure to boot the system:

1. Make sure that your tape cartridges are write-protected.
2. Load the tape cartridge labeled ULTRIX AND UWS V4.4 (VAX) BOOT/UPGRADE into the tape drive. Ensure the tape is on line and ready to use.
3. Type the following at the console mode prompt:

   ```
   >>> b mua0
   ```

Next, the installation software displays some system information, followed by the memory and hardware configurations.

You have completed booting your system. Continue the installation procedure with Chapter 4.

3.7.2 Booting from the Network

To boot the system over the network, type the following command at the console mode prompt:

```
>>> b esa0
```

Next, the installation software displays some system information, followed by the memory and hardware configurations.

You have completed booting your system. Continue the installation procedure with Chapter 4.

3.8 MicroVAX 3100, VAXserver 3100, or VAXstation 3100 Processor

The following instructions assume you have no bootable software on any device in your system. To prepare the MicroVAX 3100, VAXserver 3100, or VAXstation 3100 hardware:

1. Set the monitor on/off switch to 1 (on).
2. Turn on the power to all disk expansion boxes (if present).
3. Turn on the power to all TZK50 and CD-ROM optical disc expansion boxes (if present).
4. Set the system unit on/off switch to 1 (on).
5. Turn on the power to peripheral devices, such as printers and modems.
6. Remove any TK50 tape cartridges and CD-ROM optical discs from their associated drives.

   After about 20 seconds, the monitor displays a power-up test sequence similar to this:

   ```
   KA42-B V1.0
   F...E...D...C...B...A...9...8...7...6...5...4...3...2...1...
   ```

   The first line is hardware revision information.

   The second line is a countdown of the system self-test diagnostics. The countdown may be followed by some status or error messages. The owner's manual explains these status and error messages and also how you can tell whether the self-test passed.

7. Press the halt button on the rear of the system unit after the system finishes the self-test countdown. The console mode prompt appears:

   ```
   >>>
   ```

You are now ready to type the boot command. The boot command you type depends on the software distribution kit: TK50, CD-ROM, or network. The boot command for each distribution kit is described in this section.

3.8.1 Booting from the TK50 Tape Cartridge Kit

Follow the instructions included with your TK50 tape kit for inserting the TK50 tape into the tape drive.

Follow this procedure to boot the system:

1. Make sure that your tape cartridges are write-protected.
2. Load the tape cartridge labeled ULTRIX AND UWS V4.4 (VAX) BOOT/UPGRADE into the tape drive. Ensure the tape is on line and ready to use.

3. Type the following command to determine the drive from which to boot:

   ```
   >>> show device
   ```

   After several seconds, a nine-column table is displayed. You need the following information from this table:

   – The logical device name, which is shown in column 1.

   – The physical device name, which is shown in column 8.

4. Type the boot command at the console mode prompt, using the logical device name determined by the `show device` output.

   For example, a TZ30 or TZK50 device connected to SCSI controller A with SCSI bus ID number 5 would require a boot command like the following:

   ```
   >>> b mka500
   ```

Next, the installation software displays some system information, followed by the memory and hardware configurations.

You have completed booting your system. Continue the installation procedure with Chapter 4.

3.8.2 Booting from the CD-ROM Optical Disc Kit

If your CD-ROM optical disc is not already in its caddy, follow the instructions in the hardware manual for inserting the optical disc into the caddy.

Follow this procedure to boot the system:

1. Load the CD-ROM optical disc with the label ULTRIX/UWS V4.4 (VAX) SUPPORTED, into the drive. Wait for the drive to be on line and ready.

2. Type the following command to determine the drive from which to boot:

   ```
   >>> show device
   ```

   After several seconds, a nine-column table is displayed. You need the following information from this table:

   – The logical device name, which is shown in column 1.

   – The physical device name, which is shown in column 8.

3. Type the boot command at the console mode prompt, using the logical device name determined by the `show device` output.

   For example, an RRD40 device connected to SCSI controller B with SCSI bus ID number 4 would require a boot command like the following:

   ```
   >>> b dkb400
   ```

Next, the installation software displays some system information, followed by the memory and hardware configurations.

You have completed booting your system. Continue the installation procedure with Chapter 4.

3.8.3 Booting from the Network

To boot the system over the network, type the following command at the console mode prompt:

```
>>> b esa0
```

Next, the installation software displays some system information, followed by the memory and hardware configurations.

You have completed booting your system. Continue the installation procedure with Chapter 4.

3.9 MicroVAX 3300/3400 or VAXserver 3300/3400 Processor

To prepare the MicroVAX 3300/3400 or VAXserver 3300/3400 hardware:

1. Turn on the power to the console terminal and all additional peripheral devices.
2. Set the front panel HALT ENABLE/DISABLE switch to the halt enabled position.
3. Turn on the power to the processor.
4. Remove any TK50 tape cartridges from their associated drives.

The console subsystem now prints an initial display similar to the following on the console terminal:

```
KA640-A   T3.0-10, VMB 2.2

Performing normal system tests.

41..40..39..38..37..36..35..34..33..32..31..30..29..28..27..26..
25..24..23..22..21..20..19..18..17..16..15..14..13..12..11..10..
09..08..07..06..05..04..03..

Tests completed.
```

Then the console mode prompt appears:

```
>>>
```

You are now ready to type the boot command. The boot command you type depends on the software distribution kit: TK50 or network. The boot command for each distribution kit is described in this section.

3.9.1 Booting from the TK50 Tape Cartridge Kit

Follow the instructions included with your TK50 tape kit for inserting the TK50 tape into the tape drive.

Follow this procedure to boot the system:

1. Make sure that your tape cartridges are write-protected.
2. Load the tape cartridge labeled ULTRIX AND UWS V4.4 (VAX) BOOT/UPGRADE into the tape drive. Ensure the tape is on line and ready to use.
3. Type the following command at the console mode prompt:

   ```
   >>> b mua0
   ```

Next, the installation software displays some system information, followed by the memory and hardware configurations.

You have completed booting your system. Continue the installation procedure with Chapter 4.

3.9.2 Booting from the Network

To boot the system over the network, type the following command at the console

mode prompt:

```
>>> b esa0
```

Next, the installation software displays some system information, followed by the memory and hardware configurations.

You have completed booting your system. Continue the installation procedure with Chapter 4.

3.10 MicroVAX II, MicroVAX 3500/3600/3800/3900, VAXserver 100/3500/3600/3800/3900, VAXstation 3200/3500, VAXstation II, or VAXstation II/GPX Processor

This section describes how to boot the following processors:

- MicroVAX II
- MicroVAX 3500/3600/3800/3900
- VAXserver 100/3500/3600/3800/3900
- VAXstation 3200/3500
- VAXstation II
- VAXstation II/GPX

To prepare the hardware:

1. Turn on the power to the console terminal and all additional peripheral devices.
2. Make sure the HALT, write-protect, and READY switches (located on the processor's front panel) are set to their out positions.
3. Set the back panel HALT ENABLE/DISABLE switch to the halt enabled position.
4. Turn on the power to the processor.
5. Remove any TK50 tape cartridges from their associated drives.

The console subsystem now prints an initial display similar to the following on the console terminal:

```
KA630-A.V1.3
Performing normal system tests.
  7..6..5..4..3..
Tests completed.
```

Then the console mode prompt appears:

```
>>>
```

You are now ready to type the boot command. The boot command you type depends on the software distribution kit: TK50 or network. The boot command for each distribution kit is described in this section.

3.10.1 Booting from the TK50 Tape Cartridge Kit

Follow the instructions included with your TK50 tape kit for inserting the TK50 tape into the tape drive.

Follow this procedure to boot the system:

1. Make sure that your tape cartridges are write-protected.
2. Load the tape cartridge labeled ULTRIX AND UWS V4.4 (VAX) BOOT/UPGRADE into the tape drive. Ensure the tape is on line and ready to use.

3. Type the following command at the console mode prompt:

```
>>> b mua0
```

Next, the installation software displays some system information, followed by the memory and hardware configurations.

You have completed booting your system. Continue the installation procedure with Chapter 4.

3.10.2 Booting from the Network

To boot the system over the network, type the following at the console mode prompt:

```
>>> b xqa0
```

Next, the installation software displays some system information, followed by the memory and hardware configurations.

You have completed booting your system. Continue the installation procedure with Chapter 4.

3.11 VAXstation 3520 or VAXstation 3540 Processor

The following instructions assume you have no bootable software on any device in your system. To prepare the VAXstation 3520 or VAXstation 3540 hardware:

1. Set the monitor on/off switch to 1 (on).
2. Set the system unit on/off switch to 1 (on).
3. Turn on the power to the CD-ROM box (if present).
4. Turn on the power to peripheral devices, such as printers and modems.
5. Remove any TK50 tape cartridges and CD-ROM optical discs from their associated drives.

   After about 20 seconds, the monitor displays a power-up test sequence similar to this:

   ```
   KA60 V1.0
   F..E..D..C..B..A..9..8..7..6..5..4..3..2..1..0
   Tests complete.
   ```

   The first line is hardware revision information.

   The second line is a countdown of the system self-test diagnostics. The countdown may be followed by some status or error messages. The owner's manual explains these status and error messages and also how you can tell whether the self-test passed.
6. Press the halt button on the front of the system unit after the system finishes the self-test count down. The console mode prompt appears:

   ```
   CPU1c>>>
   ```

You are now ready to type the boot command. The boot command you type depends on the software distribution kit: TK50, CD-ROM, or network. The boot command for each distribution kit is described in this section.

3.11.1 Booting from the TK50 Tape Cartridge Kit

Follow the instructions included with your TK50 tape kit for inserting the TK50 tape into the tape drive.

Follow this procedure to boot the system:

1. Make sure that your tape cartridges are write-protected.
2. Load the tape cartridge labeled ULTRIX AND UWS V4.4 (VAX) BOOT/UPGRADE into the tape drive. Ensure the tape is on line and ready to use.
3. Type the following command at the console mode prompt:

   ```
   >>> b mua0
   ```

Next, the installation software displays some system information, followed by the memory and hardware configurations.

You have completed booting your system. Continue the installation procedure with Chapter 4.

3.11.2 Booting from the CD-ROM Optical Disc Kit

If your CD-ROM optical disc is not already in its caddy, follow the instructions in the hardware manual for inserting the optical disc into the caddy.

Follow this procedure to boot the system:

1. Load the CD-ROM optical disc with the label ULTRIX/UWS V4.4 (VAX) SUPPORTED, into the drive. Wait for the drive to be on line and ready.
2. Type the following command to determine the drive from which to boot:

   ```
   >>> show scsi
   ```

   A seven-column table is displayed. This table contains the commands for possible devices from which to boot.
3. Look at column 4, labeled DEVNAM, which contains device names. Find the RRD40 or RRD42 device name in the list.
4. Find the corresponding boot command in column 2, labeled VMB, which contains the virtual memory boot command for each device.
5. Type the appropriate boot command from the list in column 2, for example:

   ```
   >>> b dka600
   ```

Next, the installation software displays some system information, followed by the memory and hardware configurations.

You have completed booting your system. Continue the installation procedure with Chapter 4.

3.11.3 Booting from the Network

To boot the system over the network, type the following command at the console mode prompt:

```
>>> b esa0
```

Next, the installation software displays some system information, followed by the memory and hardware configurations.

You have completed booting your system. Continue the installation procedure with Chapter 4.

3.12 VAX–11/750 Processor

To prepare the VAX–11/750 hardware:

1. Turn on the power to the processor.
2. Set the processor power-on action switch to HALT and the rotary key switch to LOCAL. It makes no difference how the boot device switch is set during the installation.
3. Make sure power is on for the console terminal and all additional peripheral devices.
4. Halt the processor so that the console terminal displays the console mode prompt:

   ```
   >>>
   ```

Follow this procedure to boot the system:

1. Insert the TU58 tape cassette labeled ULTRIX V4.2 (VAX) TU58 BOOT 1/1 into the console TU58 drive on the front of the processor.
2. Type the following command at the console mode prompt:

   ```
   >>> b dda0
   ```

   After the boot media has been read, a message similar to the following displays:

   ```
   Please remove the volume "ULTRIX" from the console drive.
   Insert the first standalone system volume and enter "YES" when ready:
   ```

3. Remove the TU58 tape cassette labeled ULTRIX V4.2 (VAX) TU58 BOOT 1/1.
4. Insert the first standalone system volume, labeled ULTRIX V4.3 (VAX) STANDALONE ULTRIX TU58 #1. Type YES at the prompt.

   More system information appears, followed by a display similar to the following:

   ```
   Resuming load operation on volume "", please stand by. . .
      .
      .
      .
   Load the TU58 labeled 'STANDALONE ULTRIX TU58 #2'.
   Press the Return key when ready.
   ```

5. Remove the TU58 tape cassette labeled ULTRIX V4.3 (VAX) STANDALONE ULTRIX TU58 #1, replace it with the TU58 tape cassette labeled ULTRIX V4.3 (VAX) STANDALONE ULTRIX TU58 #2, and press Return.

   More system information appears, followed by a display similar to the following:

   ```
      .
      .
      .
   Load the TU58 labeled 'STANDALONE ULTRIX TU58 #3'.
   Press they Return key when ready.
   ```

6. Remove the TU58 tape cassette labeled ULTRIX V4.3 (VAX) STANDALONE ULTRIX TU58 #2, replace it with the TU58 tape cassette labeled ULTRIX V4.3 (VAX) STANDALONE ULTRIX TU58 #3, and press Return.

More system information appears, followed by a display similar to the following:

```
.
.
.
Load the TU58 labeled 'STANDALONE ULTRIX TU58 #4'.
Press the Return key when ready.
```

7. Remove the TU58 tape cassette labeled ULTRIX V4.3 (VAX) STANDALONE ULTRIX TU58 #3, replace it with the TU58 tape cassette labeled ULTRIX V4.3 (VAX) STANDALONE ULTRIX TU58 #4, and press Return. The installation software displays the memory and hardware configurations.
8. Remove the TU58 tape cassette labeled ULTRIX V4.3 (VAX) STANDALONE ULTRIX TU58 #4.
9. Reload the TU58 tape cassette labeled ULTRIX V4.2 (VAX) TU58 BOOT 1/1. This media is necessary for booting your system if your configuration requires access to hardware microcode.

You have completed booting your system. Continue the installation procedure with Chapter 4.

3.13 VAX–11/780 or VAX–11/785 Processor

To prepare the VAX–11/780 or VAX–11/785 hardware:

1. Turn on the power to the processor.
2. Set the restart switch to OFF and the rotary key switch to LOCAL.
3. Make sure power is on for the console terminal and all additional peripheral devices.
4. Halt the processor so that the console terminal displays the console mode prompt:

```
>>>
```

Follow this procedure to boot the system:

1. Remove the RX01 console diskette that is in the drive inside the processor.
2. Insert the RX01 diskette labeled ULTRIX V4.2 RX01 BOOT 1/1. The diskette label should point toward the handle of the diskette drive.
3. Type the following at the console mode prompt:

```
>>> b
```

   After the boot media has been read, a message similar to the following displays:

```
Please remove the volume "ULTRIX" from the console drive.
Insert the first standalone system volume and enter "YES" when ready:
```

4. Remove the RX01 diskette labeled ULTRIX V4.2 RX01 BOOT 1/1.
5. Insert the first standalone system volume, labeled ULTRIX V4.3 (VAX) STANDALONE ULTRIX RX01 #1. Type YES to the prompt.

   More system information appears, followed by a display similar to the following:

```
Resuming load operation on volume "", please stand by. . .
   .
   .
   .
Load the RX01 labeled 'STANDALONE ULTRIX RX01 #2'.
Press the Return key when ready.
```

6. Remove the RX01 diskette labeled ULTRIX V4.3 (VAX) STANDALONE ULTRIX RX01 #1, replace it with the RX01 diskette labeled ULTRIX V4.3 (VAX) STANDALONE ULTRIX RX01 #2, and press Return.

   A display similar to this appears:

```
   .
   .
   .
Load the RX01 labeled 'STANDALONE ULTRIX RX01 #3'.
Press the Return key when ready.
```

7. Remove the RX01 diskette labeled ULTRIX V4.3 (VAX) STANDALONE ULTRIX RX01 #2, replace it with the RX01 diskette labeled ULTRIX V4.3 (VAX) STANDALONE ULTRIX RX01 #3, and press Return. The installation software displays the memory and hardware configurations.

A display similar to this appears:

```
.
.
.
Load the RX01 labeled 'STANDALONE ULTRIX RX01 #4'.
Press the Return key when ready.
```

8. Remove the RX01 diskette labeled ULTRIX V4.3 (VAX) STANDALONE ULTRIX RX01 #3, replace it with the RX01 diskette labeled ULTRIX V4.3 (VAX) STANDALONE ULTRIX RX01 #4, and press Return.
9. Remove the RX01 diskette labeled ULTRIX V4.3 (VAX) STANDALONE ULTRIX RX01 #4.
10. Reload the RX01 diskette labeled ULTRIX V4.2 RX01 BOOT 1/1.

You have completed booting your system. Continue the installation procedure with Chapter 4.

3.14 VAX 6000-nnn Series or VAXserver 6000-nnn Series Processor

This section describes how to boot the following processors:

- VAX 6000-210/220/230/240
- VAX 6000-310/320/330/340/350/360
- VAX 6000-410/420/430/440/450/460
- VAX 6000-510/520/530/540/550/560

Note that VAXserver 6000-nnn processors were formerly known as VAXserver 6210/6220 or VAXserver 6310/6320/6330/6340/6350/6360 processors.

To prepare the hardware:

1. Turn on the power to the processor.
2. Turn on the power for the console terminal and all additional peripheral devices.
3. Halt the processor so that the console terminal displays the console mode prompt:

   ```
   >>>
   ```

The boot command you type depends on whether or not your system has a CIBCA-AA or a CIBCA-AB controller. If your system has a CIBCA-AA controller, continue with Section 3.14.2. If your system has a CIBCA-AB controller, continue with Section 3.14.3. Otherwise, continue with Section 3.14.1.

3.14.1 Booting from the TK50 Tape Cartridge Kit

Follow the instructions included with your TK50 tape kit for inserting the tape into the tape drive. Then, follow this procedure to boot your system:

1. Make sure that your TK50 tape cartridges are write-protected.
2. Load the tape cartridge labeled ULTRIX AND UWS V4.4 (VAX) BOOT/UPGRADE into the tape drive. Ensure the tape is on line and ready to use.
3. Type the following command at the console mode prompt to begin the installation:

   ```
   >>> b /r5:10008 csa1
   ```

Next, the installation software displays some system information, followed by the memory and hardware configurations.

You have completed booting your system. Continue the installation procedure with Chapter 4.

3.14.2 Booting from a System with a CIBCA-AA Controller

Follow the instructions included with your TK50 tape kit for inserting the tape into the tape drive. Then, follow this procedure to boot a system with a console tape:

1. Make sure that your TK50 tape cartridges are write-protected.
2. Load the console tape supplied with your system into your console drive.

3. Type the following command at the console mode prompt:

```
>>> b /r5:10008 csa1
```

After the boot media has been read, a message similar to the following is displayed:

```
Please remove the volume "CONSOL" from the console drive.
Load the first standalone system volume into the console drive
and enter "YES" when ready:
```

4. Remove the console tape cartridge supplied with your processor.
5. Load the tape cartridge labeled ULTRIX AND UWS V4.4 (VAX) BOOT/UPGRADE into the console drive. Ensure the tape is on line and ready to use. Type YES to the prompt.

   More system information appears, followed by a display similar to the following:

```
Resuming load operation on volume "", please stand by. . .
```

   The installation software displays the memory and hardware configurations.
6. Remove the TK50 tape cartridge kit.
7. Reload the console tape cartridge supplied with your processor. This media is necessary for booting your system.

You have completed booting your system. Continue the installation procedure with Chapter 4.

3.14.3 Booting from a System with a CIBCA-AB Controller

Follow the instructions included with your TK50 tape kit for inserting the tape into the tape drive. Then, follow this procedure to boot a system:

1. Make sure that your TK50 tape cartridges are write-protected.
2. Load the tape cartridge labeled ULTRIX AND UWS V4.4 (VAX) BOOT/UPGRADE into the console drive. Ensure the tape is online and ready to use.
3. Type the following command at the console mode prompt:

```
>>> b /r5:10008 csa1
```

You have completed booting your system. Continue the installation procedure with Chapter 4.

3.15 VAX 8200/8250 or VAX 8300/8350 Processor

To prepare the VAX 8200/8250 or VAX 8300/8350 hardware:

1. Turn on the power to the processor.
2. Set the processor key switch 1 to ENABLE. Set the processor key switch 2 to HALT.
3. Make sure power is on for the console terminal and all additional peripheral devices.
4. Halt the processor.
5. Press the front panel Reset button and wait for the console mode prompt:

   ```
   >>>
   ```

Follow this procedure to boot the system:

1. Load the RX50 diskette labeled ULTRIX V4.2 (VAX) RX50 BOOT 1/1 in the processor's removable drive. Use the left drive if your unit is vertically positioned; use the uppermost drive if your unit is horizontally positioned. Make sure the orange arrow on the diskette lines up with the orange bar on the drive; otherwise, the boot procedure will fail.
2. Type the following at the console mode prompt:

   ```
   >>> b csa1
   ```

   After the boot media has been read, a message similar to the following displays:

   ```
   Please remove the volume "ULTRIX-32" from the console drive.
   Insert the first standalone system volume and enter "YES" when ready:
   ```

3. Remove the RX50 diskette labeled ULTRIX V4.2 (VAX) RX50 BOOT 1/1.
4. Insert the first standalone system volume, labeled ULTRIX V4.3 (VAX) STANDALONE ULTRIX RX50 #1. Type YES to the prompt.

   More system information appears, followed by a display similar to the following:

   ```
   Resuming load operation on volume "", please stand by. . .
      .
      .
      .
   Load the RX50 labeled 'STANDALONE ULTRIX RX50 #2'.
   Press the Return key when ready.
   ```

5. Remove the RX50 diskette labeled ULTRIX V4.3 (VAX) STANDALONE ULTRIX RX50 #1, replace it with the RX50 diskette labeled ULTRIX V4.3 (VAX) STANDALONE ULTRIX RX50 #2, and press Return.

   More system information appears, followed by a display similar to the following:

   ```
      .
      .
      .
   Load the RX50 labeled 'STANDALONE ULTRIX RX50 #3'.
   Press the Return key when ready.
   ```

6. Remove the RX50 diskette labeled ULTRIX V4.3 (VAX) STANDALONE ULTRIX RX50 #2, replace it with the RX50 diskette labeled ULTRIX V4.3

(VAX) STANDALONE ULTRIX RX50 #3, and press Return. The installation software displays the memory and hardware configurations.

7. Remove the RX50 diskette labeled ULTRIX V4.3 (VAX) STANDALONE ULTRIX RX50 #3.
8. Reload the RX50 diskette labeled ULTRIX V4.2 (VAX) RX50 BOOT 1/1. This media is necessary for booting your system if your configuration requires access to hardware microcode.
9. Enter your boot sequence, as displayed for you on the console display.

You have completed booting your system. Continue the installation procedure with Chapter 4.

3.16 VAX 8500/8530/8550, VAX 8700, or VAX 8800/8810 Processor

To prepare the VAX 8500/8530/8550, VAX 8700, or VAX 8800/8810 hardware:

1. Turn on the power to the processor.
2. Turn on the power to the console subsystem.
3. Initialize the system with the `@sysinit` command procedure.
4. Turn on the power to all additional peripheral devices.
5. Halt the processor so that the console terminal displays the console mode prompt:

   ```
   >>>
   ```

Follow this procedure to boot the system:

1. Load the RX50 diskette labeled ULTRIX V4.3 (VAX) STANDALONE ULTRIX RX50 #1 into the console subsystem's diskette drive unit 0. Use the left drive if your unit is vertically positioned; use the uppermost drive if your unit is horizontally positioned. Make sure the orange arrow on the diskette lines up with the orange bar on the drive; otherwise, the boot procedure will fail.
2. Type the following command at the console mode prompt:

   ```
   >>> @cnsl.com
   ```

   The installation software displays some system information, followed by this message:

   ```
      .
      .
      .
   Load the RX50 labeled 'STANDALONE ULTRIX RX50 #2'.
   Press the Return key when ready.
   ```

3. Remove the RX50 diskette labeled ULTRIX V4.3 (VAX) STANDALONE ULTRIX RX50 #1, replace it with the RX50 diskette labeled ULTRIX V4.3 (VAX) STANDALONE ULTRIX RX50 #2, and press Return. The installation software displays the memory and hardware configurations.
4. Remove the RX50 diskette labeled ULTRIX V4.3 (VAX) STANDALONE ULTRIX RX50 #2, replace it with the RX50 diskette labeled ULTRIX V4.3 (VAX) STANDALONE ULTRIX RX50 #3, and press Return. The installation software displays the memory and hardware configurations.
5. Remove the #3 RX50 diskette.

You have completed booting your system. Continue the installation procedure with Chapter 4.

3.17 VAX 8600/8650 Processor

To prepare the VAX 8600/8650 hardware:

1. Turn on the power to the processor.
2. Set the processor power-on action switch to HALT and the rotary key switch to LOCAL.
3. Turn on the power to the console terminal and all additional peripheral devices.
4. Halt the processor so that the console terminal displays the console mode prompt:

   ```
   >>>
   ```

Follow this procedure to boot the system:

1. Type the following command at the console mode prompt:

   ```
   >>> @cnsl.com
   ```

   After the boot media has been read, a message similar to the following is displayed:

   ```
   Please remove the volume "8600 console" from the console device.
   Insert the first standalone system volume and enter "YES" when ready:
   ```

2. Remove the RL02 console disk currently located in the disk drive inside the processor.

   Mount the RL02 disk labeled ULTRIX V4.3 (VAX) STANDALONE ULTRIX RL02 #1 onto the disk drive located inside the processor. Make sure the drive is online and ready for operation. Type YES to the prompt.

   A display similar to the following is displayed:

   ```
   Resuming load operation on volume "", please stand by. . .
   ```

   The installation software displays the memory and hardware configurations.

3. Remove the RL02 disk labeled ULTRIX V4.3 (VAX) STANDALONE ULTRIX RL02 #1.
4. Mount the RL02 console disk that you removed in step 2. Make sure the drive is online and ready for operation.

You have completed booting your system. Continue the installation procedure with Chapter 4.

3.18 VAX 8820/8830/8840 Processor

Look in the configuration section of your site management guide for the following numbers for the RA60 installation device:

- VAX Bus Interconnect (VAXBI) number, which is the VAXBI bus to which the controller is connected
- VAXBI node number, which is the node on the VAXBI bus to which the controller is connected
- Disk (dn) number, which is the unit number of the RA60 disk to which the controller is connected
- For an RA60 disk connected to a Hierarchical Storage Controller (HSC), the HSC Computer Interconnect (CI) node number

To prepare the VAX 8820/8830/8840 hardware:

1. Turn on the power to the processor.
2. Initialize the system with the `@sysinit` command procedure.
3. Turn on the power for the console terminal and all additional peripheral devices.
4. Halt the processor so that the console terminal displays the console mode prompt:

   ```
   >>>
   ```

5. Load the label ULTRIX AND UWS V4.4 (VAX) into the software distribution device.
6. Enter the device information you obtained from the configuration section of your site management guide.
7. Enter the boot sequence described in the section that applies to your system.

3.18.1 Booting Sequence for a System Disk Connected to a Local Controller

Enter the numbers and the boot command specified in the following order:

d r1*BI-number BI-node*
d r3*disk-number*
@bdara

The following example shows the sequence for BI number 2, BI node 1, and RA60 disk 0:

```
>>> d r1 21
>>> d r3 0
>>> @bdara
```

The system then displays the boot command for you to type.

You have completed booting your system. Continue the installation procedure with Chapter 4.

3.18.2 Booting Sequence for a System Disk Connected to an HSC

Enter the numbers and the boot command specified in the following order:

d r1*BI-number BI-node*
d r2*HSC-node-number*
d r3*disk-number*
@bcara

The following example shows the sequence for BI number 3, BI node 4, HSC node 8, and RA60 disk 2:

```
>>> d r1 34
>>> d r2 8
>>> d r3 2
>>> @bcara
```

The system then displays the boot command for you to type.

You have completed booting your system. Continue the installation procedure with Chapter 4.

3.19 VAX 9000 Processor

To prepare the VAX 9000 hardware, follow these steps:

1. Turn on the power to the console terminal.
2. Set the Startup switch to Halt.
3. Set the Power switch to the On position.
4. Set the Service Processor Access switch to Local/SPU.

Note that to boot the system, you will be using an editor similar to EDT to edit a file. Online editing help is available.

Follow the instructions included with your TK50 tape kit for inserting the tape into the tape drive.

To boot the system, follow these steps:

1. Make sure that your tape cartridge is write-protected.
2. Load the tape cartridge labeled ULTRIX V4.3 (VAX) VAX 9000 INSTL TK50 into the tape drive located inside the processor. Ensure the tape is online and ready to use.
3. Type the following command at the console mode prompt to inform the operating system that the tape labeled ULTRIX is in tape drive mua7:

   ```
   >>> mount mua7: ultrix
   ```

4. Next, copy the following command to the `userfiles` directory. This command takes approximately 7–10 minutes to complete.

   ```
   >>> copy mua7:[]ultrix.ima [userfiles]
   ```

5. Type the following command before removing the TK50 tape:

   ```
   >>> dismount mua7:
   ```

6. Remove the TK50 tape from the tape drive.
7. Copy the standalone boot command procedure located in the `userfiles` directory to the ULTRIX boot command procedure by typing the following command:

   ```
   >>> copy [userfiles]sabkupboo.cmd [userfiles]ultrixboo.cmd
   ```

8. Next, define `ultrix.ima` as the root image and then identify the disk unit information for your system. To do this, you need to edit the `ultrixboo.cmd` file.

   To invoke the editor, type the following command:

   ```
   >>> edit [userfiles]ultrixboo.cmd
   ```

   The screen displays an end-of-buffer message:

   ```
   [EOB]
   ```

   If you have a video display terminal, the `edit` command invokes a full-screen editor similar to EDT. If you have a hardcopy terminal, it invokes a line editor.

Note

Online help for full-screen or line editing is available at any time during the editing session. Press the PF2 key or type `help` at the asterisk (*) or the command prompt (:).

After the last line in the comment section (noted by exclamation points (!)), open up a line for editing and add the following command:

```
DEFINE/SYSTEM SYS$ROOTIMAGE [USERFILES]ULTRIX.IMA
```

Your file should look similar to the following:

```
!Inputs:
!
!       P1 - "TRUE" for /START "FALSE" otherwise
   .
   .
   .
!       All other GRPs are clear
DEFINE/SYS SYS$ROOTIMAGE [USERFILES]ULTRIX.IMA
```

Move the cursor to the last line in the section containing the DEPOSIT commands. Open up a line for editing and add the following command:

```
DEPOSIT R5 %X8
```

This entry tells the system that the `DEPOSIT` command for register 5 is %X8. Your file should look similar to the following:

```
EXAMINE/SYMBOL=START_ADDRESS PC      !Get the start address
   .
   .
   .
DEPOSIT R0 %X40                      ! Set device type (CONSOLE)
DEPOSIT R3 1                         ! Set the disk unit number
DEPOSIT R5 %X8                       ! required mode for ULTRIX
```

To end the editing session, press Ctrl/Z. The system will display an asterisk (*). Type `exit`. The installation procedure returns you to the system prompt.

9. To initialize the hardware, type the following command:

   ```
   >>> i/k
   ```

10. To boot the ULTRIX software, type the following command. This will take several minutes to complete.

    ```
    >>> b ultrix
    ```

You have completed booting your system. Continue the installation procedure with Chapter 4.

Performing the Installation 4

This chapter describes how to perform the basic and advanced installations. You must perform an installation in these situations:

- When you have never installed ULTRIX or ULTRIX Worksystem Software systems.
- When you have the ULTRIX or ULTRIX Worksystem Software installed, but the product version is not Version 4.2 or higher.

Note

If your system is ULTRIX or ULTRIX Worksystem Software Version 4.2 or higher, you can perform an upgrade instead of an installation. Continue with Chapter 5 to perform an upgrade.

Whether you decide to do a basic or an advanced installation, you need to complete the tasks described in Section 4.1 through Section 4.5.

Through Section 4.5, the basic and advanced installation follow similar paths by requiring you to specify a system disk, reboot the system, and specify system information. However, the information you provide for the system disk in the advanced installation may differ from that in the basic installation.

After Section 4.5, the two installation procedures diverge. The basic installation uses the default file system layout and installs the mandatory subsets. The advanced installation can take one of two paths:

- You can select the default disk partitions, the default file system layout, and a choice of optional subsets.
- You can select customized disk partitions, a customized file system layout, and a choice of optional subsets.

There are some postinstallation procedures that you cannot perform if you choose the basic installation. For example, printer services are not available with the basic installation. See Table 4-1 for further information.

If you plan to perform the advanced installation, before proceeding you should review Chapter 2 to ensure that you have enough disk space and that the disks' partitions are as you want them. Refer to Table 2-2 and Table 2-6 for this information. Example D-1 is an example of an advanced installation.

If you want to abort an installation at any time, enter `Ctrl/c`. The installation procedure will stop. You will need to restart the installation procedure from the beginning.

4.1 Choosing the Type of Installation

Throughout the installation procedure, you will be prompted for information about the installation. Some prompts have a default response which is shown by brackets surrounding a letter, for example [b]. Press Return to accept the default response or enter the letter that corresponds to the option you want to choose.

The first step in installing the software is choosing whether to perform a basic or advanced installation. The system displays a brief message describing the basic installation and a menu like the following:

```
Select one of the following options:

        1) BASIC Installation
        2) ADVANCED Installation
        3) System management

Enter your choice:
```

Type the number corresponding to the type of installation you want to perform. See Chapter 7 for further information on the system management option. After you make your selection, the prompt for the next task is displayed.

Note

Advanced installations are required for VAXstation 3520 and 3540 systems.

4.2 Selecting the Software Distribution Device

This section applies only if your system uses console boot media. The following processors use console boot media:

- VAX–11/750
- VAX–11/780
- VAX–11/785
- VAX 8200/8250
- VAX 8300/8350
- VAX 86XX
- VAX 85XX
- VAX 87XX
- VAX 8800 series

If your system does not use console boot media, continue the installation procedure with Section 4.3.

Because your system uses console boot media, you must select the device on which you will load the distribution media supplied with your kit. The system displays a table listing the possible software distribution devices for your system.

The table lists the following information:

Selection	The selection number associated with each possible distribution device.

Device Name	The Digital name for each device.
ULTRIX Name	The ULTRIX identifier for each device.
Device Number	The device number of each device.
Controller Name	The name of the peripheral controller to which the device is connected.
Controller Number	The controller number associated with each device. You need the controller number only if the table shows two devices of the same type with the same device number.

For example, a VAX–11/785 processor displays a table similar to the following:

```
*** SOFTWARE DISTRIBUTION DEVICE SELECTION ***

The 'Guide to Installing ULTRIX' explains the following table
of software distribution devices and which installation media you should
load on it:

SOFTWARE DISTRIBUTION DEVICE TABLE

Selection   Device     ULTRIX     Device       Controller   Controller
            Name       Name       Number       Name         Number
-------------------------------------------------------------------------
    1       RA60        ra2         2          KDB50          4
    2       TU81        tms0        0          TU81           20
-------------------------------------------------------------------------
```

To select the software distribution device, follow these steps:

1. Type the selection number corresponding to the device you want.
2. Load the Boot/Upgrade media into the software distribution device you selected from the table. Make sure the device is on line.
3. After the message displays the Digital name for the device, the ULTRIX name, and the device number of your selection, the procedure asks you to confirm your choice. To confirm your choice, enter `y`. After you press Return, the table of system disk drives is displayed.

4.3 Selecting the Disk for the root Partition

The next step in installing the software is specifying your system disk. The system disk, also referred to as the `a` or root partition, will contain the root file system.

The procedure displays a table listing the following information:

Selection	The selection number associated with each possible system disk.
Device Name	The Digital name for each disk.
ULTRIX Name	The ULTRIX identifier for each disk.
Device Number	The device number of each disk.
Controller Name	The controller name associated with each disk. You need the controller number only if the table shows two disks of the same type with the same device number.
Controller Number	The unit number for the system disk must be in the range 0 to 254 for `ra`-type disks and in the range 0 to 31 for other types

of disks. This disk will contain the root file system and the swap1 space.

The system displays a table similar to the one shown in the following example of a DECstation 5000 processor. This table lists the devices available for your processor. Select the device you want to contain the root file system by typing the selection number at the prompt and pressing Return.

```
*** SYSTEM DISK SELECTION ***

The 'Guide to Installing ULTRIX' explains the following table
of system disk drives.  Select one of the devices below to contain the
root file system:

SYSTEM DISK TABLE

Selection   Device     ULTRIX     Device       Controller   Controller
            Name       Name       Number       Name         Number
------------------------------------------------------------------------
    1       RZ55        rz0          0         SCSI           0
    2       RZ56        rz1          1         SCSI           0
    3       RZ56        rz13         5         SCSI           1
------------------------------------------------------------------------

Enter your choice: 3
```

After you enter your selection number, a message is displayed indicating the device name and the device number. You are asked to make sure the disk drive is on line and write-enabled. Then, you are asked to confirm your choice. If you decide not to use the device you selected, enter `n` at the prompt and choose another device from the table.

```
You selected RZ56, device number 13.  Make sure this disk drive is on
line and write-enabled (if applicable to your disk drive), then confirm
your choice.

Use RZ56, rz13, for your system disk? (y/n) []: y
```

If you selected the advanced installation and you have nonstandard disk partitions on the system disk, a prompt is displayed asking you to select either the default partition table or the existing partition table. The default partition table refers to the standard disk partitions for this release. The existing partition table refers to partitions that have been customized.

```
Select one of the following partition tables to be displayed for the
system disk rz13 RZ56:

     1 ) Default partition table
     2 ) Existing partition table


Enter your choice: 2
```

Depending on your choice, the system displays either the default partition table or the existing partition table. Then, the system asks if these are the disk partitions you want. Type `y` at the prompt if you want to choose the partition table displayed. Type `n` at the prompt if you decide you want to choose a different table. If you enter `n`, the system will redisplay the prompt to select either the default or existing partition table.

Note

If you select the existing partition table and the existing partition sizes are below the minimum sizes established for this release, your selection will be rejected.

After you enter and confirm your choice, the system allocates, makes, and restores the root file system on partition `a` of the system disk. A message similar to the following is displayed:

```
The installation procedure now allocates the root file system on
partition 'a' of the system disk, rz13 RZ56.

Making the root file system on rz13 RZ56.

The installation procedure is now restoring the root file system to
partition 'a' of the system disk, rz13 RZ56.
1351+0 records in
1351+0 records out
```

4.4 Rebooting the System

After the root file system is restored to the `a` partition, the installation procedure prints messages telling you how to reboot your system. Follow these steps to reboot the system:

1. If the system has not halted the processor for you, halt the processor, following the instructions provided by the system.

   After you halt the processor, the system displays the console mode prompt. Note that on VAX workstations the console prompt may be displayed anywhere along the left side of your screen, instead of at the end of the installation messages.

2. Type the boot command at the console mode prompt, using the boot sequence provided by the system. For example, the boot command sequence provided by the installation procedure for the DECsystem 5000 is as follows:

   ```
   *** BOOTSTRAP COMMAND SEQUENCE ***
   Issue the following console commands to set your default bootpath variable
   and to boot your system disk:
           >> setenv boot "2/rz5/vmunix -a"
           >> boot
   ```

   For example, at the prompt for the DECsystem 5000, enter:

   ```
   >> setenv boot "2/rz5/vmunix -a"
   >> boot
   ```

4.5 Specifying System Information

A series of prompts is displayed asking you to enter system information. Read these prompts carefully. Each prompt tells you the correct format to use. If you enter an inappropriate response, you continue to receive the prompt until you enter a valid response.

The prompts ask you to provide the following information:

- The system name

  After you enter the system name, you are asked to confirm your choice. Network installations do not ask you for a system name.

- The date and time
- Your time zone
- Whether your area alternates between daylight savings and standard time
- Your geographic area
- A superuser password

  Choose a superuser password that other people are unlikely to guess and keep it secure. The password should be up to eight characters in length. A longer password will be truncated to eight characters. After you enter your superuser password, you are prompted to reenter it to confirm that it is correct. Note that as a security measure the password you enter is not displayed on the terminal. After you set up the superuser password, anyone who logs in with the superuser name root, must use the password you choose here. Do not use the password given in the following example:

```
*** SPECIFY THE SUPERUSER PASSWORD ***


Enter new password: faR!Kle
Verify: faR!Kle
```

At this point, the basic and advanced installation procedures diverge. If you selected the basic installation, continue with Section 4.7. If you selected the advanced installation, continue with Section 4.6.

4.6 Allocating File Systems

If you selected the advanced installation, the procedure continues as follows. The system disk you selected contains the root file system on partition `a`.

If you chose to use the default partition table, the system displays a table showing the default file system layout. The table shows the locations of the following areas on your system disk:

- The root file system
- The `/usr` file system
- The swap1 space
- The crash dump space

The information displayed looks similar to the following:

```
*** FILE SYSTEM DEFAULT OPTION ***
The following table shows the default file system layout on RZ56, rz13:
partition     bottom        top       size    overlap       default
    a              0      32767      32768    c             root
    b          32768     163839     131072    c             swap, dump
    g         163840     731505     567666    c,d,e         /usr
If you choose the defaults, the var area will be allocated to /usr/var.
```

A prompt is displayed asking if you want to choose the default file system layout.

```
Do you want to choose the default file system layout? (y/n): y
```

If you want to accept the defaults, enter `y`. The system will display information similar to the following.

```
Making the new file system for /usr on /dev/rrz13g RZ56
*** SUPPORTED SOFTWARE INSTALLATION ***
   .
   .
   .
```

If you enter `y` at the prompt, continue with Section 4.7. If you enter `n` at the prompt, continue with Section 4.6.1.

4.6.1 Allocating the /usr File System

If you chose not to use the default partition table, the system displays a table similar to the one shown in the following example of a DECstation 5000. This table lists the disks connected to your processor. Select the disk on which you want to allocate the `/usr` file system by typing the disk's selection number at the prompt. Refer to the file system worksheet in Table 2-6 for the disk name.

```
*** /usr FILE SYSTEM ALLOCATION ***
You can allocate the /usr file system to one of the disks listed in the
table below.  See the Guide to Installing ULTRIX for an explanation of
this table:
/usr FILE SYSTEM ALLOCATION TABLE
Selection   Device     ULTRIX     Device       Controller   Controller
            Name       Name       Number       Name         Number
-------------------------------------------------------------------------
    1       RZ55        rz0          0         SCSI           0
    2       RZ56        rz1          1         SCSI           0
    3       RZ56        rz13         5         SCSI           1
-------------------------------------------------------------------------


Enter your choice: 3


You selected RZ56, device number 13.  Make sure this disk is
on line and write-enabled (if applicable to this drive) and then
confirm your choice.


Use RZ56, rz13 for /usr file system? (y/n) []: y
```

After you enter your confirmation, a message is displayed indicating:

- The partitions available on the disk you selected
- The size in kB of each available partition
- Other partitions over which each available partition extends

The system instructs you to enter the letter of the partition on which you want to allocate the `/usr` file system. Refer to the `/usr` file system worksheet in Table 2-5 that you filled out for the partition.

A default partition is displayed in the square brackets only if the disk is the system

disk.

```
The disk rz13 you selected from the previous table has the following
partitions available, on which you can allocate the /usr file system:
partition      size (kB)  overlap
-----------------------------------------------
    d     ---      146265       c,g
    e     ---      146265       c,g,h
    f     ---      275137       c,h
    g     ---      283833       c,d,e
    h     ---      283834       c,e,f
-----------------------------------------------

Type the letter of the partition on which you want to allocate the /usr
file system [no default]: g

Making the new file system for /usr on /dev/rrz13g RZ56
```

4.6.2 Allocating the swap1 Space

The system displays a table similar to the one shown in the following example. This table lists the disks connected to your processor. Select the disk on which you want to allocate the swap1 space.

```
*** ALLOCATE THE SWAP1 SPACE ***

You can allocate the swap1 space to one of the disks listed in the
table below.  See the Guide to Installing ULTRIX for an explanation of
this table:

SWAP1 SPACE ALLOCATION TABLE

Selection   Device     ULTRIX     Device       Controller   Controller
            Name       Name       Number       Name         Number
-------------------------------------------------------------------------
    1       RZ55        rz0          0         SCSI           0
    2       RZ56        rz1          1         SCSI           0
    3       RZ56        rz13         5         SCSI           1
-------------------------------------------------------------------------

Enter your choice: 3

You selected RZ56, device number 13.  Make sure this disk is
on line and write-enabled (if applicable to this drive) and then
confirm your choice.

Use RZ56, rz13 for swap1 space? (y/n) []: y
```

After you enter your confirmation, a message is displayed indicating:

- The partitions available on the disk you selected
- The size in kB of each available partition
- Other partitions over which each available partition extends

Refer to the file system worksheet in Table 2-6 for the disk name and partition.

Note

If you choose a partition that overlaps the a partition, where customized partition information resides, you will overwrite any customized partition table that describes the disk you selected and overwrite the superblock. For this reason the system does not include the a partition in the list of partitions available for the swap area.

```
The disk rz13 you selected from the previous table has the following
partitions available, on which you can allocate the swap1 space:
partition      size (Kbytes)  overlap
-----------------------------------------------
    b     ---       65536       c
    f     ---      275137       c,h
    h     ---      283834       c,e,f
-----------------------------------------------

Type the letter of the partition on which you want to allocate the
swap1 space [b]: b
```

Note

If you want to upgrade the system in future releases, you must allocate the swap1 space on partition b of the system disk.

4.6.3 Allocating the swap2 Space

A prompt is displayed asking 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 4.6.4. Otherwise, enter y and complete this section.

```
*** ALLOCATE THE SWAP2 SPACE ***

Do you want to allocate a second swap space? (y/n) [n]: y
```

The system displays a table similar to the one shown in the following example. This table lists the disks connected to your processor. Select the disk on which you want to allocate the swap2 space.

```
You can allocate the swap2 space to one of the disks listed in the
table below.  See the Guide to Installing ULTRIX for an explanation of
this table:
SWAP2 SPACE ALLOCATION TABLE
Selection   Device     ULTRIX     Device       Controller   Controller
            Name       Name       Number       Name         Number
-------------------------------------------------------------------------
    1       RZ55        rz0          0         SCSI           0
    2       RZ56        rz1          1         SCSI           0
    3       RZ56        rz13         5         SCSI           1
-------------------------------------------------------------------------
```

```
Enter your choice: 1


You selected RZ55, device number 0.  Make sure this disk is
on line and write-enabled (if applicable to this drive) and then
confirm your choice.


Use RZ55, rz0 for swap2 space? (y/n) []: y
```

After you enter your confirmation, a message is displayed indicating:

- The partitions available on the disk you selected
- The size in kB of each available partition
- Other partitions over which each available partition extends

You are prompted to enter the letter of the partition on which you want to allocate the swap2 space. Refer to the file system worksheet in Table 2-6 for the disk name and partition.

```
The disk rz0 you selected from the previous table has the following
partitions available, on which you can allocate the swap2 space:
partition      size (Kbytes)  overlap
-----------------------------------------------
    b     ---       73728       c
    c     ---      324520       a,b,d,e,f,g,h
    d     ---       40960       c,g
    e     ---       40960       c,g
    f     ---      122880       c,g
    g     ---      234408       c,d,e,f,h
    h     ---       29608       c,g
-----------------------------------------------


Type the letter of the partition on which you want to allocate the
swap2 space [no default]: b
```

4.6.4 Allocating the Crash Dump Space

The system displays a table similar to the one shown in the following example. This table lists the disks connected to your processor. Select the disk on which you want to allocate the crash dump space.

```
*** ALLOCATE THE CRASH DUMP SPACE ***

You can allocate the crash dump space to one of the disks listed in the
table below.  See the Guide to Installing ULTRIX for an explanation of
this table:

CRASH DUMP SPACE ALLOCATION TABLE

Selection   Device     ULTRIX     Device       Controller   Controller
            Name       Name       Number       Name         Number
-------------------------------------------------------------------------
    1       RZ55        rz0          0         SCSI           0
    2       RZ56        rz1          1         SCSI           0
    3       RZ56        rz13         5         SCSI           1
-------------------------------------------------------------------------
```

```
Enter your choice: 3


You selected RZ56, device number 13.  Make sure this disk is
on line and write-enabled (if applicable to this drive) and then
confirm your choice.


Use RZ56, rz13 for crash dump space? (y/n) []: y
```

After you enter your confirmation, a message is displayed indicating:

- The partitions available on the disk you selected
- The size in kB of each available partition
- Other partitions over which each available partition extends

You are prompted to enter the letter of the partition on which you want to allocate the crash dump space. You can allocate the crash dump space to the same partition as either swap1 or swap2. Refer to the file system worksheet in Table 2-6 for the disk name.

Note

The crash dump space must be on a disk connected to the same controller as the system disk.

```
The disk rz13 you selected from the previous table has the following
partitions available, on which you can allocate the crash dump space:
partition      size (Kbtyes)  overlap
-----------------------------------------------
    f     ---      275137       c,h
    h     ---      283834       c,e,f
    b     ---       65536       c
-----------------------------------------------


Type the letter of the partition on which you want to allocate the
crash dump space [b]: b
```

4.6.5 Allocating the var Area

The system displays a table similar to the one shown in the following example. This table lists the disks connected to your processor. Select the disk on which you want to allocate the `var` area.

```
*** ALLOCATE THE var FILE SYSTEM ***
You can allocate the var file system to one of the disks listed in the
table below. See the Guide to Installing ULTRIX for an explanation of
this table:
var FILE SYSTEM ALLOCATION TABLE
Selection   Device     ULTRIX     Device       Controller   Controller
            Name       Name       Number       Name         Number
-------------------------------------------------------------------------
    1       RZ55        rz0          0         SCSI           0
    2       RZ56        rz1          1         SCSI           0
    3       RZ56        rz13         5         SCSI           1
-------------------------------------------------------------------------
```

```
Enter your choice: 3


You selected RZ56, device number 13.  Make sure this disk is
on line and write-enabled (if applicable to this drive) and then
confirm your choice.


Use RZ56, rz13 for var file system? (y/n) []: y
```

After you enter your confirmation, a message is displayed indicating:

- The partitions available on the disk you selected
- The size in kB of each available partition
- Other partitions over which each available partition extends

You are prompted to enter the letter of the partition on which you want to allocate the `var` area. You can allocate the `var` area either to a separate partition as a file system, or as a directory under the `/usr` file system. If you want to allocate the `var` area to the `/usr` file system, select the same disk and partition selected in Section 4.6.1. Refer to the file system worksheet in Table 2-6.

```
The disk rz13 you selected from the previous table has the following
partitions available, on which you can allocate the var file system:
partition      size (Kbytes)  overlap
-----------------------------------------------
    f     ---      275137       c,h
    h     ---      283834       c,e,f
    g     ---      283833       c,d,e
-----------------------------------------------


Type the letter of the partition on which you want to allocate the var
file system [g]: h


Making the new file system for var on /dev/rrz13h RZ56
```

Continue with Section 4.7.

4.7 Installing ULTRIX Worksystem Software

If you are installing on a machine other than a workstation, a message describing the licenses required to load ULTRIX Worksystem Software is displayed, followed by a prompt to choose whether or not to install the ULTRIX Worksystem Software. For example:

```
This distribution media includes subsets for ULTRIX Worksystem
Software (UWS).  A UWS license (on a workstation) or a UWS Server
License (on a timesharing machine or server) is required to install
these subsets.

Do you want to install ULTRIX Worksystem Software? y/n []:
```

After you respond to the prompt, continue with Section 4.8.

If you are installing to a workstation, you are asked to select the type of monitor display being used. Refer to your system's hardware guide for this information.

Type the selection number at the prompt.

```
Select one of the options below that describes the type of display
being used:

        1) Black and White
        2) Color
        3) Gray Scale

Enter your choice:
```

After you enter your choice, continue with Section 4.8.

4.8 Loading the Software Subsets

Next, you can load the software subsets from the distribution media.

If you are installing from a TK50 or MT9 tape, continue with Section 4.8.1.

If you are installing from a CD-ROM, continue with Section 4.8.2.

If you are installing from the network and choose the basic installation, continue with Section 4.8.3.

If you are installing from the network and choose the advanced installation, continue with Section 4.8.4.

4.8.1 Installing from TK50 or MT9 Tape

If you are installing from a TK50 or an MT9 tape, you are now required to change tape cartridges. The installation script prompts you with the following statement:

```
                *** SUPPORTED SOFTWARE INSTALLATION ***

Remove the tape containing the BOOT/UPGRADE software and replace it with
the tape containing the SUPPORTED software subsets.
```

Remove the tape marked ULTRIX AND UWS V4.4 BOOT/UPGRADE and replace it with the tape marked ULTRIX AND UWS V4.4 SUPPORTED SOFTWARE Volume 1.

Note

The tape marked ULTRIX AND UWS V4.4 BOOT/UPGRADE contains only the bootstrap sequence and the update subsets. Other tapes, marked as SUPPORTED SOFTWARE, contain the supported subsets.

The installation software prompts you to make sure the distribution media containing the supported software subsets for ULTRIX is mounted and on line. If it is not, mount the media labeled SUPPORTED and prepare the device for read-only operations. The installation software displays the following prompt and message:

```
Please make sure your installation tape is mounted and on-line.
Are you ready (y/n)?
```

After you enter y, the procedure displays the following message:

```
Positioning Tape
```

If you are performing a basic installation, continue with Section 4.8.3. If you are performing an advanced installation, continue with Section 4.8.4.

4.8.2 Installing from a CD-ROM

If you are installing from a CD-ROM, the device is already prepared and loaded. If you chose a basic installation continue with Section 4.8.3. If you chose an advanced installation continue with Section 4.8.4.

4.8.3 Loading Software Subsets for the Basic Installation

When you choose the basic installation, the system first displays the following request:

```
*** Select the DECwindows User Interface ***

1) DECwindows for OSF/Motif
2) X11/DECwindows (XUI)

Enter your choice [1]:
```

After you make your choice, the system loads the software subsets and displays copying, working, and verifying messages. For example:

```
Base System (UDTBASE440)
   Copying from /dev/nrmt0h (tape)
     Working....Tue May 10 17:38:02 EDT 1994
   .
   .
   .
   Verifying
     Working....Tue May 10 17:42:22 EDT 1994
   .
   .
   .
```

If you are doing a tape installation, some of the subsets are on a second (or more, with MT9 tapes) tape volume. When the procedure needs these subsets, the system displays the following message:

```
Volume change.  Rewinding tape...   Working...Tue May 10
17:01:00 GMT 1994
```

When the tape has finished rewinding, you see the following:

```
Please remove tape volume 1 and replace it with volume 2
```

Remove the tape volume and replace it with the next tape volume. Continue this procedure each time a tape is rewound until all the tapes have been read.

Next, the system asks if the tape is online and ready. If you enter y the installation procedure continues installing the subsets. When the system finishes installing the software subsets, it displays a message telling you that the software subsets have been installed.

Continue with Section 4.9.

4.8.4 Loading Software Subsets for the Advanced Installation

When you choose the advanced installation, the system first displays the following request:

```
*** Select the DECwindows User Interface ***

1) DECwindows for OSF/Motif
2) X11/DECwindows (XUI)

Enter your choice [1]:
```

After you make your choice, the system displays a menu of required software subsets.

```
***  Enter Subset Selections ***

The following subsets are mandatory and will be installed automatically:
   .
   .
   .
```

The system then displays a list of the optional subsets and asks you to enter the numbers corresponding to the optional subsets you want to install. Separate multiple selections with spaces.

```
The subsets listed below are optional:
   .
   .
   .

Enter your choice(s): 1 2 3 4 5
```

The system pauses briefly while it determines that the selected subsets will fit on the disk.

Next, the system displays a list of the subsets you chose to install and asks you to verify your choice.

```
You are installing the following subsets:
   .
   .
   .

Is this correct? (y/n): y
```

If you want to change your choice of subsets, enter `n` at the prompt; the system will again prompt you to select the optional subsets.

The system loads the software subsets and displays copying, working, and verifying messages. For example:

```
Base System (UDTBASE440)
   Copying from /dev/nrmt0h (tape)
     Working....Tue May 10 17:38:02 EDT 1994
   .
   .
   .
   Verifying
     Working....Tue May 10 17:42:22 EDT 1994
```

If you are installing from tape, some of the optional subsets are on a second (or more, with MT9 tapes) tape volume. If you selected any of these optional subsets, the

system displays the following message:

```
Volume change.  Rewinding tape...   Working...Tue May 10
17:01:00 GMT 1994
```

When the tape is rewound, the system displays the following message:

```
Please remove tape volume 1 and replace it with volume 2
```

Remove the tape volume and replace it with the next tape volume. Continue this procedure each time a tape is rewound until all the tapes have been read.

Next, the system asks if the tape is on line and ready. If you enter `y`, the installation procedure continues installing the subsets and displays a message telling you when the subsets have been installed.

Continue with Section 4.9.

Note

For VAXstation 3520 and 3540 systems, you must choose the VS35XX X11/DECwindows Fonts optional subset.

If you are installing your software over the network and the upgrade subsets are available for this release on your server, these will appear in the subset selection menu. Be sure to select the corresponding upgrade subset for each subset you select. For example, if you want to install the Software Development Utilities subset and an upgrade exists for it, enter the selection number for the option and the selection number for the Software Development Utilities UPGRADE.

4.9 Loading the Software Subset Upgrades

This release of ULTRIX and UWS contains software subset upgrades. How you install these subsets depends on your distribution media. If you are installing from TK50 or MT9 tape, continue with Section 4.9.1. If you are installing from CD-ROM, continue with Section 4.9.2. If you are installing from the network, continue with Section 4.10.

4.9.1 Loading Upgrades from TK50 or MT9 Tape

If you are installing from a TK50 tape, the system asks you to remove the tape labeled ULTRIX AND UWS V4.4 SUPPORTED SOFTWARE and replace it with the tape labeled ULTRIX AND UWS V4.4 BOOT/UPGRADE.

```
The installation software has successfully installed the software
subsets. You can now remove the tape containing the software subsets
from the device.

Please mount the tape containing the BOOT/UPGRADE subsets.
```

Note

The tape labeled ULTRIX AND UWS V4.4 BOOT/UPGRADE is the same tape that you used to boot your system. It contains both the bootstrap sequence and the upgrade subsets.

Next, the system asks you to make sure your installation tape is mounted and on line

and asks if you are ready.

```
Please make sure your installation tape is mounted and on-line.

Are you ready (y/n)? y
```

After you enter y, the system displays the following message:

```
Positioning Tape
```

If you chose the basic installation, only the standard upgrades are installed.

If you chose the advanced installation, the system displays a menu of all upgrade subsets. You are prompted to select the subsets you want to install. Select each subset and separate multiple selections with spaces.

If you select the following option, only the subsets listed as mandatory are installed:

```
None of the Above
```

If you enter y at the prompt asking you to confirm your selection, the system loads the subsets. If you enter n, the system redisplays the menu and asks you to enter and confirm your choice of subsets. After you confirm your choice, the system installs the subsets.

When the subset installation is complete, the system displays a message telling you that the software subsets have been installed. If you chose the advanced installation, continue with Section 4.10. If you chose the basic installation, continue with Section 4.11.

Note

If for some reason the system is unable to install the upgrade subsets, the following error message is displayed:

```
The installation procedure was unable to install the Upgrade subsets.
```

The system then attempts to install the upgrade subsets a second time.

```
*** Attempting again to install the Upgrade subsets ***
```

If the system is still unable to install the upgrade subsets, the following error message is displayed:

```
The installation procedure failed to install the Upgrade
subsets.  This causes the installation procedure to stop.
Contact your DIGITAL representative.
```

4.9.2 Loading Upgrades from CD-ROM

If you are installing from CD-ROM disk and there are upgrade subsets on the media

that must be installed, the system displays the following message:

```
Installing Upgrade Subsets
```

If you chose the basic installation, only the standard upgrade subsets are installed.

If you chose the advanced installation, the system displays a menu of all upgrade subsets. You are prompted to select the subsets you want to install. Select each subset and separate multiple selections with spaces.

If you select the following option, only the subsets listed as mandatory are installed:

```
None of the Above
```

If you enter `y` at the prompt asking you to confirm your selection, the system loads the subsets. If you enter `n` at the prompt, the system redisplays the menu and asks you to enter and confirm your choice of subsets. Once you have confirmed your choice, the system installs the subsets.

When the subset installation is complete, the system displays a message telling you that the software subsets have been installed. If you chose the advanced installation, continue with Section 4.10. If you chose the basic installation, continue with Section 4.11.

Note

If for some reason the system is unable to install the upgrade subsets, you will receive the following error message:

```
The installation procedure was unable to install the Upgrade subsets
```

The system attempts to install the upgrade subsets a second time.

```
*** Attempting again to install the Upgrade subsets ***
```

If the system is still unable to install the upgrade subsets, the following error message is displayed:

```
The installation procedure failed to install the Upgrade
subsets.  This causes the installation procedure to stop.
Contact your DIGITAL representative.
```

4.10 Specifying Kernel Options for the Configuration File

This section applies only if you chose the advanced installation.

After you install the upgrade, the system displays a table listing the kernel options for the configuration file and asks you to enter the selection number for each kernel option you want. Separate multiple selection numbers with spaces.

After you enter your selection, the system displays a list of the kernel options you

selected and asks you to confirm your choice.

```
*** CONFIGURATION FILE KERNEL OPTION SELECTION ***
    Selection   Kernel Option
-------------------------------------------------------------
        1       Local Area Transport (LAT)
        2       Bisynchronous Communication protocol (VAX only)
        3       Computer Interconnect (CI) network
        4       Diagnostic/Utilities Protocol (DUP)
        5       ISO9660 File System Support (CDFS)
        6       Ethernet Packet Filter
        7       Enhanced Security Features
        8       All of the above
        9       None of the above
-------------------------------------------------------------


Enter the selection number for each kernel option you want.
For example, 1 3 : 1 3 5 7


You specified the following kernel options:
        Local Area Transport (LAT)
        Computer Interconnect (CI) network
        ISO9660 File System Support (CDFS)
        Enhanced Security Features
```

If you do not want the kernel options you selected, enter `n` at the prompt. The system redisplays the list of kernel options. Once you are satisfied with your choice, enter `y` at the prompt.

```
Is this correct? (y/n) [n]: y
```

What is displayed next depends on whether you have hardware installed in the floating address space. If the system does not find devices in the floating address space, it issues a message like the following:

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

Configuration file complete.
```

If the system finds devices in the floating address space, it issues a message with a list of devices similar to the following:

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

The system found these devices in the floating
address space:

uda2    on uba0 at 160354
dz0     on uba0 at 160100
dz1     on uba0 at 160110

Configuration file complete.
```

The system displays a prompt asking if you want to edit the configuration file. Enter `y` at the prompt if you need to modify the configuration file. You are expected to understand the format of the configuration file and how to use the `ed` editor. (For more information on editing your system's configuration file, see the *Guide to*

Configuration File Maintenance.)

```
Do you want to edit the configuration file? (y/n) [n]:
```

If you answer n, the installation procedure continues by performing the system's configuration.

You will need to edit the configuration file in the following situations:

- Your system's configuration does not conform to CSR address assignment rules.

  When you install ULTRIX software, the UNIBUS and Q-bus devices that reside in the floating address space are automatically sized. Therefore, the placement of devices in this space is critical to the success of your installation.

  If your configuration does not conform to CSR address assignment rules, you must perform an advanced installation because it allows you to edit the system configuration file built by the system. If you have questions about the accuracy of your floating address space configuration, contact your Digital Field Service representative.

- You have disk controllers in the floating address space.

  If your system contains any disk controllers with addresses assigned in the floating address space (address space beginning with 016), the installation assumes that the controller has no devices attached to it because the installation software cannot correctly find the number of drives attached to a disk controller in floating address space.

  To include any drives attached to a disk controller in the floating address space, you need to edit the configuration file and manually add these drives to the file. The following example represents the relevant portion of a configuration file before and after it was edited during the installation. The system in this example has three KFQSA controllers: uq0, uq17, and uq18, of which uq17 and uq18 are in the floating address space, and each controller has one drive attached to it, unit numbers 0, 1, and 3, respectively. The software places the following information in the configuration file:

  ```
  controller    uda0      at  uba0
  controller    uq0       at  uda0     csr 0172150   vector uqintr
  disk          ra0       at  uq0      drive 0
  controller    uda1      at  uba0
  controller    uq17      at  uda1     csr 0160334   vector uqintr
  controller    uda2      at  uba0
  controller    uq18      at  uda2     csr 0160340   vector uqintr
  ```

  The configuration file does not include drives 1 and 3. To include these drives, edit the configuration file as follows:

  ```
  controller    uda0      at  uba0
  controller    uq0       at  uda0     csr 0172150   vector uqintr
  disk          ra0       at  uq0      drive 0
  controller    uda1      at  uba0
  controller    uq17      at  uda1     csr 0160334   vector uqintr
  disk          ra1       at  uq17     drive 1
  controller    uda2      at  uba0
  controller    uq18      at  uda2     csr 0160340   vector uqintr
  disk          ra2       at  uq18     drive 3
  ```

- You have multiple MSCP controllers on the Q-bus.

  If your system has controllers on a Q-bus, the installation procedure assumes that the drive numbers on the second controller are 0, 1, 2, and 3. This may not be

true for your system. You need to edit the configuration file to assign the correct drive numbers to the second controller.

Note

Your system's configuration file may contain lines representing unsupported devices that are commented out with a number sign (#) as the first character of the line. Do not remove the number signs at this time because the modules required for these devices are on the unsupported kit, which you have not yet installed.

Once the unsupported kit is installed, remove the number signs and use the resulting configuration file to build a kernel containing the unsupported modules.

The time required for system configuration varies according to processor.

4.11 Console Boot Defaults and Console Media

Section 4.11.1 and Section 4.11.2 contain processor-specific information for updating console boot defaults and console media. If these sections do not apply to your processor, continue with Section 4.12.

4.11.1 Updating the Console Boot Default

If you have one of the following processors, the next step in the installation procedure is to update the console boot defaults:

- MicroVAX 3100
- MicroVAX 3500
- MicroVAX 3300/3400
- VAXserver 3300/3400
- VAX 6000-nnn series or VAXserver 6000-nnn series

Once the system halts the processor, follow the instructions displayed on the screen. Once you have completed these instructions, you can enter the `b` command whenever you need to boot your system. See the *Guide to System Shutdown and Startup* for more information. Continue the installation procedure with Section 4.12.

4.11.2 Updating the Console Media

If you have one of the following processors with the system disk connected to a Hierarchical Storage Controller (HSC), the next step in the installation procedure is to update the console media:

- VAX-11/750
- VAX-11/780
- VAX-11/785
- VAX 8600/8650
- VAX 8200/8250

- VAX 8300/8350

The following system prompt is displayed:

```
*** CONSOLE MEDIA UPDATE ***
```

You need a blank tape, disk, or diskette, depending on the type of console media. The procedure instructs you to do the following:

1. Ensure the console media is in the drive.
2. Press Return to extract the files.
3. Remove the console media from the drive.
4. Insert a blank piece of console media, first making sure that is write-enabled. For a TU58 tape cassette, the RECORD tab should be in the leftmost position. For an RX50 diskette, there should be no write-protect tab on the edge of the diskette.
5. Press Return. Messages similar to the following are displayed:

```
Building console for ULTRIX.
This takes several minutes

   .
   .
   .
Directory listing of the new console follows.
   .
   .
   .
```

6. What you do next depends on which processor you have.
   - For a VAX–11/750, remove the TU58 tape cassette from the drive and write-lock the cassette. Then, reinsert the TU58 cassette into the drive. Follow the instructions that are displayed, telling you to set the front switch labeled BOOT DEVICE to the position that boots the cassette.

     If your system includes a Computer Interconnect (CI), the distributed console tape labeled ULTRIX V4.2 BOOT 1/1, an equivalent tape, or a customized tape built for a CI/HSC system disk should remain in its drive at all times. This is necessary to load required CI microcode.
   - For a VAX–11/780 or VAX–11/785, leave the RX01 console diskette in the drive. The files on this diskette let you automatically boot the system, using the default boot commands.
   - For a VAX 8200/8250/8300/8350, if your system includes a Computer Interconnect (CI), the distributed console diskette labeled ULTRIX V4.2 BOOT 1/1, an equivalent diskette, or a customized diskette built for a CI/HSC system disk should remain in its drive at all times. This is necessary to load required CI microcode.

     You must also update the Electrically Erasable Programmable Read-Only Memory (EEPROM) to specify the default boot device. Refer to the hardware guide for information.

     You should also run the VAX diagnostic program EBUCA.

Continue the installation procedure with Section 4.12.

4.12 Completing the Installation and Rebooting the System

Depending on your processor type and system disk, the software either reboots the system automatically or displays instructions on how to reboot your system.

Note

You can cause MicroVAX 2000 and VAXstation 2000 processors to boot automatically from a disk other than device 0 by issuing the TEST 51 command at the console prompt. Refer to the hardware documentation that comes with these processors for more information.

The system displays messages similar to the following:

```
*** SOFTWARE INSTALLATION PROCEDURE COMPLETE ***

The following files were created during the installation procedure:

/vmunix                          - customized kernel
/genvmunix                       - generic kernel
/usr/adm/install.log             - installation log file
/usr/adm/install.FS.log          - file systems log file
/usr/adm/install.DEV.log         - special device log file
```

If you are installing to a system without a graphics console, a login prompt is displayed. The login prompt indicates that your installation was successful. For example:

```
   .
   .
   .
Ultrixboot - V4.4  Fri Jun 10  06:15:25 EDT 1994
   .
   .
   .
ULTRIX V4.4 System #1: Fri Jun 10 04 06:18:28 EDT 1994
   .
   .
   .
ULTRIX V4.4 (mysystem)
login:
```

If you are installing to a workstation, a Start Session dialog box is displayed indicating that your ULTRIX Worksystem Software session manager is running. The box contains a login prompt and a password prompt. You can now log in to the superuser account by typing `root` at the login prompt and the superuser password specified earlier in the installation at the password prompt.

See the *DECwindows User's Guide* for information about how to use ULTRIX Worksystem Software, including how to log in and use the Session Manager.

4.13 Postinstallation Procedures

A message referring to the locations of `/vmunix`, `/genvmunix`, and the log files is included in the message-of-the-day file, `/etc/motd`, and will appear each time you log in to your system. If you want, you can delete these references from your `/etc/motd` file. See the *Guide to System and Network Setup* for information about the `/etc/motd` file.

Print out the `log` files generated in `/usr/adm` during your installation. You may need information from these files for system maintenance. Each system has a two-user license as the default. If you want to increase your system's simultaneous login

capacity to more than two users, you must register your Product Authorization Keys (PAKs). See the *Guide to Software Licensing* for information about registering PAKs.

The following table lists some of the tasks you may want to perform, with the name of the utility used to perform each task. See the *Guide to System and Network Setup* for more information about the tasks you will need to complete after the installation to establish your system's environment. See the *Security Guide for Administrators* for instructions on how to set up your system for enhanced security.

Note

The installation procedure does not provide an area for users' files. You must do this manually after the installation of the system is complete. See the *Guide to System and Network Setup* for more information.

Table 4-1: Postinstallation Tasks

Task	Utility
Using the License Management Facility	`lmf`(8)
Setting up the License Management Facility	`lmfsetup`(8)
Adding users and setting up a users' file area	`adduser`(8)
Adding devices	`MAKEDEV`(8)
Setting up printers*	`lprsetup`(8)
Setting up a local area network	`netsetup`(8)
Setting up a Network File System	`nfssetup`(8)
Setting up `uucp`*	`uucpsetup`(8)
Setting up the Yellow Pages service	`ypsetup`(8)
Setting up the BIND/HESIOD service	`bindsetup`(8)
Setting up the enhanced security features*	`secsetup`(8)
Setting up the Simple Network Management Protocol*	`snmpsetup`(8n)
Setting up the Services Order Configuration file	`svcsetup`(8)
Setting up for remote installation services*	`ris`(8)
Setting up for diskless management services*	`dms`(8)

The asterisk (*) denotes the tasks that can be performed only if you chose the advanced installation. For example, if you chose the basic installation you will not be able to set up your printer unless you install the optional subsets.

Use the `setld` utility to load the unsupported software subsets and to add and delete software subsets. Proper use of `setld` will help you manage disk space. For further information about the `setld`(8) utility see the *ULTRIX Reference Pages.*

Performing an Upgrade 5

You can upgrade an existing ULTRIX and ULTRIX Worksystem Software Version 4.2 or higher system to an ULTRIX and ULTRIX Worksystem Software Version 4.4 system by following the instructions in this chapter. When you upgrade an existing system, you do not have to perform a complete installation.

When you use this upgrade procedure, the ULTRIX system that existed on your previous system is upgraded, with the following exceptions:

- The UWS DECwindows user environment on your system

  The UWS DECwindows User Environment that existed on your previous system is not automatically upgraded. During the upgrade procedure you must choose which UWS DECwindows User Environment you want your upgraded system to employ, either the DECwindows for OSF/Motif interface, or the X11/DECwindows (XUI) interface. Thus, you can choose to upgrade to a newer version of your current DECwindows User Interface, or you can switch from one interface style to another through the upgrade procedure.

- The unsupported subsets on your system

  The upgrade procedure does not upgrade any unsupported subsets. If your system has unsupported subsets installed on it, you must remove them before performing the upgrade procedure. There are two reasons why you should do this. First, the contents of the subsets may change over time, so that newer versions of the subsets may contain corrected or different software. Second, the files from earlier, unsupported subsets, if not deleted remain on your system wasting disk space.

  Use the `setld -d` command to remove unsupported subsets after you have backed up your current system and before you begin the upgrade procedure.

Before you begin the upgrade procedure, be sure to review the *ULTRIX and UWS Release Notes* and the *ULTRIX and UWS System Notes* for information about the upgrade procedures and about layered products.

Note

You cannot use this upgrade procedure on any system running ULTRIX or ULTRIX Worksystem Software versions earlier than Version 4.2. For these earlier versions of the product, you must perform a complete installation, either a basic or advanced installation. Complete installations are described in Chapter 4.

The upgrade procedure has three main functions:

1. The procedure selects, copies, and verifies new product software subsets from a distribution media to your system.
2. The procedure selects, copies, and verifies update subsets to the new product subsets from a distribution media to your system.

3. The procedure rebuilds the kernel on your system with the upgraded software to produce a new version of the system.

You use the ULTRIX and UWS Supported and Boot/Upgrade distribution media to upgrade the system.

There are three possible upgrade paths:

- If you are upgrading a local system from TK50 or MT9 tapes, from CD-ROM, or from the network as a client of a Remote Installation Services (RIS) server, go to Section 5.1.
- If you are upgrading a new or existing RIS area on a server, go to Section 5.2.
- If you are upgrading a new or existing Diskless Management System (DMS) area on a server, go to Section 5.3.

Note

When you use the upgrade procedure, you must rebuild the kernel for your system. You must also edit your system configuration file when you have made customizations to it. Please preview the upgrade instructions in this chapter before you begin an upgrade.

5.1 Upgrading a Local System

Depending on the load device of your processor, use one of the following distribution devices to load the software:

- TK50 cartridge tape
- 9-track magnetic tape
- CD-ROM
- Network (from a RIS server)

The upgrade procedure makes use of the `setld` utility and is essentially the same for all distribution device types.

If you must abort the upgrade for any reason, press Ctrl/c to abort processing and prevent changes. Then, restart the upgrade from the beginning.

5.1.1 Starting the Upgrade

To start the upgrade, follow these steps:

1. Log in to your system as `root`.
2. Bring your system down to single-user mode. Your system must be in single-user mode to perform the upgrade procedure.

   The following command brings the system down to single-user mode after a

delay of five minutes:

```
# /etc/shutdown +5 "Upgrading to ULTRIX V4.4"
```

For more information on shutting down your system, see the *Guide to System Shutdown and Startup* and the `shutdown`(8) reference page.

3. Unmount all file systems and remount all ULTRIX file systems by entering the following commands:

```
# /etc/umount -a -f
# /etc/mount -a -t ufs
```

4. Run the `/etc/update` program to start the daemon that will keep your file system consistent. Enter the following command:

```
# /etc/update
```

Refer to `update`(8) for more information.

Note

If you are keeping a script for the session, this is a good place to start the script.

Continue with the section that describes the upgrade for the distribution media you are using:

- Section 5.1.2, for upgrading from a TK50 or MT9
- Section 5.1.3, for upgrading from a CD-ROM
- Section 5.1.4, for upgrading from the network

5.1.2 Upgrading from a TK50 or MT9

If you are upgrading from tape, make sure that the tape is write-protected. For both TK50 and MT9 tapes, follow these steps:

1. Load the first volume of the media labeled Supported onto your system's software distribution device.
2. Enter the following command; replace *N* with the logical unit number of the device you are using:

```
# /etc/setld -l /dev/nrmtNh
```

3. The system issues the following prompt to be sure that your distribution device is on line:

```
Please make sure your installation tape is mounted and on-line.
Are you ready (y/n) ?
```

When you have determined that the tape is mounted and on line, answer `y` to the prompt.

Go to Section 5.1.5.

5.1.3 Upgrading from a CD-ROM

If you are upgrading from a CD-ROM, follow these steps:

1. Load the CD-ROM onto your system's distribution device.
2. Enter the following command: replace *N* with the logical unit number of the device you are using:

   ```
   # /etc/mount -r /dev/rzNc /mnt
   ```

3. If your system is a RISC machine, enter the following command:

   ```
   # /etc/setld -l /mnt/RISC/BASE
   ```

   If your system is a VAX machine, enter the following command:

   ```
   # /etc/setld -l /mnt/VAX/BASE
   ```

Go to Section 5.1.5.

5.1.4 Upgrading from the Network

If your system is a registered client and you are upgrading from the network, enter the following command: replace *server:* with the name of your RIS server, followed by a colon:

```
# /etc/setld -l server:
```

Refer to Section 5.2 for information about setting up a RIS server.

Continue with Section 5.1.5.

5.1.5 Loading the Software Subsets

If you are upgrading from tape, the procedure displays a `Positioning Tape` message.

Then, the procedure displays the following request:

```
*** Select the DECwindows User Interface ***

1) DECwindows for OSF/Motif
2) X11/DECwindows (XUI)

Enter your choice [1]:
```

After you have made your choice, the procedure begins to extract the subsets from the distribution media. If you are upgrading from CD-ROM or the network, the procedure does not display a positioning tape message before it asks you to select the DECwindows user interface.

The procedure determines which subsets are mandatory for your system and lists them as mandatory subsets. The procedure then lists those subsets that are optional for your system. If there are no optional subsets listed, the procedure asks you whether you want to continue.

Follow these steps to load the supported subsets from the distribution media:

1. If there are no optional subsets listed, the procedure asks you whether you wish to continue. Enter `y` at the prompt and skip to Step 3, below. The procedure loads the mandatory subsets specific to your system by copying and verifying each subset.

2. If there are optional subsets listed, the procedure asks you to select from three options: All of the Above, None of the Above, and Exit without installing subsets. Enter the number that represents the None of the Above option. The procedure loads the mandatory subsets specific to your system by copying and verifying each subset.
3. After it loads the subsets, the procedure may display the following message:

   ```
   Required kernel is not available.
   ```

   When this message appears, you will eventually follow the instructions in Section 5.1.8 to complete the upgrade by rebuilding your system's kernel when there is not a kernel available.

   Otherwise, you will eventually follow the instructions in Section 5.1.7 to complete the upgrade by rebuilding your system's kernel using an available kernel.

   Next, however, you must apply updates to any subsets just loaded.

Continue with Section 5.1.6.

Note

If at a later time you decide to install any of the optional subsets, be sure to install the corresponding update subsets, if they exist, for the subsets you install. For example, if you later install subset UDTACCT440, be sure to also install the corresponding update subset UDTACCT441.

5.1.6 Loading the Software Subset Updates

Next, you must load the software subsets that update the subsets just loaded.

How you load the software subset updates depends on whether your distribution media is tape, CD-ROM, or the network.

5.1.6.1 Updating from a TK50 or MT9

If your distribution media is tape, follow these instructions to load the software subset updates.

1. Load the first volume of the media labeled ULTRIX and UWS BOOT/UPGRADE onto your system's software distribution device.
2. Enter the following command, replacing *N* with the actual logical unit number of the device you are using:

   ```
   # /etc/setld -l /dev/nrmtNh
   ```

3. The system prompts you to be sure that your distribution device is on line, as follows:

   ```
   Please make sure your installation tape is mounted and on-line.
   Are you ready (y/n) ?
   ```

   When you have determined that the tape is mounted and on line, enter `y` to the prompt.

You are done loading the update subsets when the procedure returns to the superuser prompt. Then, you can continue with the instructions about rebuilding the kernel.

Go to Section 5.1.7 to complete the upgrade by rebuilding your system's kernel when the required kernel is available.

Go to Section 5.1.8 to complete the upgrade by rebuilding your system's kernel when the required kernel is not available.

5.1.6.2 Updating from CD-ROM

If your distribution media is CD-ROM, follow these instructions to load the software subset updates.

If your system is a RISC machine, enter the following command:

```
# /etc/setld -l /mnt/RISC/BASE_UPGRADE
```

If your system is a VAX machine, enter the following command:

```
# /etc/setld -l /mnt/VAX/BASE_UPGRADE
```

The subsets are loaded.

After the subsets are loaded, unmount the disk by entering the following command:

```
# /etc/umount /mnt
```

Remove the distribution media. Then, continue with the instructions about rebuilding the kernel.

Go to Section 5.1.7 to complete the upgrade by rebuilding your system's kernel when the required kernel is available.

Go to Section 5.1.8 to complete the upgrade by rebuilding your system's kernel when the required kernel is not available.

5.1.6.3 Updating from the Network

If your distribution media is the network, the updates were automatically loaded. The procedure is done when it returns the superuser prompt.

Go to Section 5.1.7 to complete the upgrade by rebuilding your system's kernel when the required kernel is available.

Go to Section 5.1.8 to complete the upgrade by rebuilding your system's kernel when the required kernel is not available.

5.1.7 Rebuilding a Kernel when the Required Kernel Is Available

To rebuild a kernel on a system when the required kernel is available, take the following steps:

1. Use the `doconfig` command with the `-c` option to rebuild your kernel. Replace *HOSTNAME* in the following command with the name of your system typed in all capital letters:

   ```
   # /etc/doconfig -c HOSTNAME
   ```

   The `-c` option specifies that the new kernel be built using the configuration file that already exists in the `/sys/conf/vax` directory for VAX processors or the `/sys/conf/mips` directory for RISC processors.

2. Note that the `doconfig` command allows you to edit the configuration file. For more information about editing the system configuration file, see the *Guide to Configuration File Maintenance*.

The following prompt appears immediately after you invoke the doconfig command with the -c option:

```
Do you want to edit the configuration file (y/n) [n]?
```

Only a few configurations require that you edit the configuration file at this point. Thus, in most cases, you can enter no at this prompt.

The doconfig program then displays the following message as it begins to rebuild your kernel:

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

When the doconfig command finishes executing, it reports the location of a newly built VAX kernel as follows:

```
The new kernel is /sys/VAX/HOSTNAME/vmunix
```

It reports the location of a newly built RISC kernel as follows:

```
The new kernel is /sys/MIPS/HOSTNAME/vmunix
```

When the doconfig program completes, it returns you to the superuser prompt.

3. Copy the new VAX kernel to root by entering the following command:

   ```
   # mv /sys/VAX/HOSTNAME/vmunix /vmunix
   ```

   Or, copy the new RISC kernel to root by entering the following command:

   ```
   # mv /sys/MIPS/HOSTNAME/vmunix /vmunix
   ```

4. The generic kernel, /genvmunix was loaded from the software distribution during the upgrade. Now, copy it to root by entering the following command:

   ```
   # cp /usr/genvmunix /genvmunix
   ```

   Note

   If you are keeping a script of the session, end it now by entering Ctrl/D.

5. To complete the upgrade and activate the new kernel, reboot the system by entering the following command:

   ```
   # /etc/reboot
   ```

When the reboot command returns you to the login prompt, the upgrade is complete.

5.1.8 Rebuilding a Kernel when the Required Kernel Is Not Available

To rebuild a kernel on a system when the required kernel is not available, take the following steps:

1. Copy genvmunix to vmunix by entering the following command:

   ```
   # cp /usr/genvmunix /vmunix
   ```

Note

If you are keeping a script of the session, end it now by entering Ctrl/D.

2. Unmount all file systems and reboot your system by entering the following commands:

```
# /etc/umount -a
# /etc/reboot
```

3. When your system comes up to multiuser mode, log in as `root` and bring your system to single-user mode by entering the following command:

```
# /etc/shutdown now "switching to single-user"
```

4. Unmount all file systems and remount all UFS file systems by entering the following command:

```
# /etc/umount -a -f
# /etc/mount -a -t ufs
```

5. If you have customized your system's configuration file, enter the following command to make a copy of your system's configuration file:

```
# cp /sys/conf/mips/HOSTNAME /sys/conf/mips/HOSTNAME.V4.3A
```

Replace the *HOSTNAME* in the example with the name of your system.

Note

Customizations of the configuration file include local changes to its global, options, and pseudodevice definitions. You can restore the customizations in two ways:

- During step 8, as the `doconfig` program is running, enter `yes` when you are asked if you want to edit the newly created configuration file. The `doconfig` program places you in the `ed` editor and you can add the necessary customizations.
- During step 8, as the `doconfig` program is running, enter `no` when you are asked if you want to edit the newly created configuration file. After the `doconfig` program finishes, use the text editor of your choice to enter the necessary customizations in the new configuration file, and then rebuild your kernel using the `doconfig -c` command. For more information on using the `doconfig` command with the `-c` option, see the `doconfig`(8) reference page.

6. Invoke the `doconfig` command with no options, as follows:

```
# doconfig
```

While the system is running with a generic kernel, the `doconfig` program places the proper configuration entries in your system's configuration file and makes any special device files that may be required, with the exception of local configuration customizations.

7. The `doconfig` program is menu-driven and first asks you to supply your system's name, then tells you that a system with that name exists, and asks you whether you want to replace the existing system.

Enter y to indicate you do want to replace the system. For example:

```
A system with that name exists. Replace it (y/n) [n]:  y
```

The program next asks you for the date and time and the time zone for your system.

8. The doconfig program then asks you if you want to edit the configuration file. Enter no at the prompt, unless you wish at this time to customize the new configuration file. If you want to customize now, enter y at the prompt and the doconfig program will place you into an editing session. After you exit from the editing session, the doconfig program resumes.
9. When the doconfig program finishes, it prints out informational messages like the following, listing the path to the new kernel and to the log of device special files that it created in the /dev directory. For example, building on a system named SAMSA:

```
*** PERFORMING SYSTEM CONFIGURATION ***
    working ..... Mon Jun  10 09:11:45 EDT 1993
    working ..... Mon Jun  10 09:13:45 EDT 1993
    working ..... Mon Jun  10 09:15:46 EDT 1993

*** DEVICE SPECIAL FILE CREATION ***
    working ..... Mon Jun  10 09:16:35 EDT 1993

A log file listing Special Device Files is located in /dev/MAKEDEV.log


The new kernel is /sys/MIPS/SAMSA/vmunix
```

10. Move /vmunix to /genvmunix by entering the following command:

```
# mv /vmunix /genvmunix
```

11. Copy the new kernel created by the doconfig program to the root partition. For example:

```
# cp /sys/MIPS/SAMSA/vmunix  /vmunix
```

Note

If you are running BIND/Hesiod, edit the /etc/rc.local file and add the BIND extension to the hostname entry, because doconfig overwrites the existing hostname entry with the name of your system without its BIND extension.

12. You may now enable your windowing system by running the script that updates the /etc/ttys file. Enter the following command:

```
# /etc/server_scps
```

13. Reboot your system to bring in the new kernel by entering the following command:

```
# /etc/reboot
```

When the reboot command returns you to the login prompt, the upgrade procedure is complete.

5.2 Upgrading a Remote Installation Services Area

The following sections describe the steps you must follow to upgrade a Remote Installation Services (RIS) area on a server. To create a new RIS area on your RIS server, refer to the *Guide to Sharing Software on a Local Area Network*.

You can upgrade an existing RIS area only on Version 4.3 or higher servers.

To upgrade a RIS area, follow these steps:

1. Log in to the server system as `root`.
2. Run the `/etc/ris` utility. Select the Delete Software menu item.
3. Select the RIS area to be upgraded from the menu.
4. Select the appropriate client architecture (VAX or RISC) from the menu.
5. If your current system is Version 4.2A or higher, delete the current ULTRIX Supported Product and ULTRIX BOOT/UPGRADE products from the selected RIS area by selecting their product numbers from the menu.

   If your current system is Version 4.2, delete the current ULTRIX Supported Product and MANDATORY UPGRADE products from the selected RIS area by choosing their product numbers from the menu.
6. Install the Version 4.4 product into the RIS area. The instructions for this part of the upgrade are the same as for installing products into an existing RIS area. Refer to the *Guide to Sharing Software on a Local Area Network* for these instructions.

   You are required to repeat this step twice. First, to install the Supported volumes, then to install the Boot/Upgrade volume.

   The procedure is complete when the the `/etc/ris` utility displays the following message:

   ```
   Finished Extracting Subsets from Distribution Media
   ```
7. Use the RIS Modify option to modify the product for each registered client. Be sure to choose both the Supported Products and the Boot Upgrade options when modifying each client.
8. When the RIS main menu reappears, choose the exit option to return to the superuser prompt.

5.3 Upgrading a Diskless Management System Area

The following section describes how to perform the upgrade on a server's Diskless Management System (DMS) area. The process consists of installing the product into the server's DMS area.

If your server supports multiple diskless areas, you must repeat the upgrade process for each area.

Note

Use the correct media to upgrade the product in your diskless areas. The upgrade will fail unless you use RISC media for an area serving RISC clients and use VAX media for an area serving VAX clients.

Perform the following steps to upgrade an existing diskless area on a server:

1. Shut down all registered diskless clients.
2. Back up the diskless environments.
3. Load the first volume of the Supported media onto your software distribution device, if you have not done so already. If you are installing the product from CD-ROM, use the `mount` command as follows; replace *N* with the logical unit number of the device you are using:

   ```
   # /etc/mount -r /dev/rzNc /mnt
   ```

4. Invoke the `dms` utility:

   ```
   # /etc/dms
   ```

5. Choose the Install Software option from the Diskless Management Services menu.
6. The system presents you with two software installation options. Choose the option Add software to Existing Area from the Install Software menu.
7. The system asks you into which existing diskless environment you want to install software, and lists your options. Select the appropriate environment.
8. The system prompts you to enter the device special file name or mount point of the distribution media. Your responses depend on which distribution media you use, tape or CD-ROM.

   If you are installing from a TK50 tape or MT9 tape, the command is the same for both VAX and RISC environments. Enter the following command, replacing *N* with the logical unit number of the device you are using:

   /dev/rmt*N*h

   Make sure that the installed media is write-protected.

   Note

   When installing from tape, the procedure determines which tapes must be loaded and prompts you to mount the appropriate volumes. For example, you could receive a message like the following:

   ```
   Please remove tape Vol 4 and replace it with Vol 2
   ```

   Follow the instructions the procedure supplies.

   If you are installing from CD-ROM to an area serving RISC clients, enter the following command:

   /mnt/RISC/BASE

   If you are installing from CD-ROM to an area serving VAX clients, enter the

following command:

/mnt/VAX/BASE

9. If there are clients already registered, the procedure displays the following question:

   ```
   The product software will automatically be propagated to every
   registered client.  Is that alright? (y/n):
   ```

   Enter `y` at the prompt to propagate the product to registered clients. If you enter `n` at the prompt, you will have to upgrade clients later.

10. Next, the procedure displays the following request:

    ```
    *** Select the DECwindows User Interface ***

    1) DECwindows for OSF/Motif
    2) X11/DECwindows (XUI)

    Enter your choice [1]:
    ```

    After you make your choice, the system lists mandatory and optional subsets from the Supported media and installs them.

    The system copies and verifies each subset you selected.

11. If your installation media is TK50 or MT9, remove the Supported tape from the drive and load the Boot/Upgrade tape in the drive.

12. Choose the Install Software option from the Diskless Management Services menu.

13. The system presents you with two software installation options. Choose the option, Add software to Existing Area from the Install Software menu.

14. The system asks you into which existing diskless environment you want to install software, and lists your options. Select the appropriate environment.

15. The system prompts you to enter the device special file name or mount point of the distribution media. Your responses depend on which distribution media you use, tape or CD-ROM.

    If you are installing from a TK50 tape or MT9 tape, the command is the same for both VAX and RISC environments. Enter the following command, replacing *N* with the actual logical unit number of the device you are using:

    /dev/rmt*N*h

    Make sure that the installed media is write-protected.

    If you are installing from CD-ROM to an area serving RISC clients, enter the following command:

    /mnt/RISC/BASE_UPGRADE

    If you are installing from CD-ROM to an area serving VAX clients, enter the

following command:

```
/mnt/VAX/BASE_UPGRADE
```

16. If there are clients already registered, the procedure displays the following question:

    ```
    The product software will automatically be propagated to every
    registered client.  Is that alright? (y/n):
    ```

    Enter `y` at the prompt to propagate the product to registered clients. If you enter `n` at the prompt, you will have to upgrade clients later.

    The system lists mandatory and optional subsets from the Boot/Upgrade media and installs them.

    The system copies and verifies each subset you selected.

17. If your upgrade media is a CD-ROM, use the following command to unmount the disk:

    ```
    # /etc/umount /mnt
    ```

    If your installation media is TK50 or MT9 tape, remove it from the drive.

Your upgrade is complete. You may now reboot each new client, unless you have modified the area of previously-registered clients. In that event, you must run the DMS Rebuild Kernel option for each client. Then you can reboot the clients.

Adding and Deleting Software Subsets 6

The setld utility is used to install and manage software. You can save disk space with the setld command by specifying and loading only the software subsets that you need. This chapter describes how to use the setld utility. You must have superuser privileges to modify the system software using setld. The setld utility has several command line syntaxes to list, add, and delete software subsets. Although the command lines differ, the setld command lines use certain command arguments as follows:

- The *dir* argument specifies the destination of the subset. Specify this argument if you are loading the software to a file hierarchy that starts somewhere other than at root (/).
- The optional *subset* argument specifies the name of the subset.
- The *location* argument specifies the device special file or mount point containing the media from which the subset or product is to be transferred.

If you specify a *dir* argument, it must precede the command function. If you specify a *subset* or a *location* argument, it must follow the command function.

For detailed information on the setld command, its functions, and the command line syntax, see setld(8) in the *ULTRIX Reference Pages*.

6.1 Listing Software Subsets

To display the status of all subsets known to the system, specify the setld command with the −i (inventory) function. The format is as follows:

setld [**-D** *dir*] **-i** [*subset*]

For example, to display a list of subsets, enter the following:

```
# setld -i
```

To display the files included in a particular subset, for example, UDTUUCP435, enter the following:

```
# setld -i UDTUUCP435
```

6.2 Adding Subsets

To add a subset to your system, use the setld command with the −l (load) function, the location argument and the subset argument. The format is as follows:

setld [**-D** *dir*] **-l <***location***>** *subset* [*subset***...**]

The following examples show how to add subsets to your system from tape and from a file server.

6.2.1 Adding Subsets from Tape

To add or reinstall a subset on the `/mnt` directory of your system from a kit residing at tape drive `/dev/rmt1h`, enter a command like the following:

```
# setld -D /mnt -l  /dev/rmt1h UDTUUCP430
```

6.2.2 Adding Subsets from a File Server

To add or reinstall subsets from a file server, enter a command like the following, substituting the name of the file server for the *`server`* in the example:

```
# setld -l server:
```

6.3 Deleting Subsets

To delete a subset from your system, use the `setld` command with the `-d` function and the subset argument. The syntax is as follows:

setld [**-D** *dir*] **-d** *subset* [*subset***...**]

For example, to delete the UDTUUCP435 subset from your system, enter the following:

```
# setld  -d UDTUUCP435
```

Working in the Standalone ULTRIX Environment 7

The standalone ULTRIX environment is a memory-resident environment that is used to initiate ULTRIX installations. The primary purpose of the standalone ULTRIX environment is to support the initial phases of an installation, which include selecting the distribution and system devices, as well as restoring the root file system image to the target system disk. Throughout the installation process, full ULTRIX device drivers are used.

The standalone ULTRIX environment also supports limited 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

The standalone ULTRIX environment provides commands that assist in recovering from root file system corruption and help perform general file system and disk maintenance tasks. It is a limited environment that does not perform like a full ULTRIX operating system environment. You should perform system management activities in the standalone ULTRIX environment only if you have extensive ULTRIX or UNIX operating system experience.

This chapter explains how to invoke the standalone ULTRIX environment, identifies some of its commonly used capabilities, and describes how to extend the standalone ULTRIX environment so that additional commands can be used.

7.1 Invoking the Standalone ULTRIX Environment

The media and the commands that you use to invoke the standalone ULTRIX environment are dependent on the type of processor that you are using. These media and commands are identified and described in Chapter 3 of this manual.

As part of the installation, the system displays the following menu of options:

```
Select one of the following options:

        1) BASIC Installation
        2) ADVANCED Installation
        3) System management

Enter your choice:
```

Choose the third item, System Management, to invoke the standalone ULTRIX environment. The system responds by placing the system in single-user mode and by displaying the superuser (#) shell prompt.

7.2 Standalone ULTRIX Environment Capabilities

The standalone ULTRIX environment enables you to perform several system management activities. In some cases, you have to use system primitives instead of the more advanced system commands. For example, to make a new file system, you would use the `mkfs` command instead of the `newfs` command.

Note

At boot time, the system does not configure controllers assigned floating CSR addresses. Only peripheral devices connected to controllers that have been assigned fixed CSR addresses are accessible.

If you want access to special device files, you have to create them using the `MAKEDEV` command. You can use the standalone system to perform the following tasks:

- Edit a file using the `ed` editor
- Repair corrupted file systems with the `fsck` command
- Create new file systems with the `mkfs` command
- Restore the boot block with the `dd` command
- Restore file systems with the `restore` command
- Modify partition tables with the `chpt` command
- Mount other disks and file systems with the `mount` command

The *Guide to Backup and Restore* gives an example of how to restore the root file system using the standalone ULTRIX environment after a catastrophic event has occurred.

7.3 Extending the Standalone ULTRIX Environment

If you find that the commands and utilities provided by the standalone ULTRIX environment do not completely meet your needs, you can extend the environment to include access to other commands. To extend the environment, perform the following steps:

1. Make the device special files for the device that contains the target commands. To do this, change directories as follows:

   ```
   # cd /dev
   ```

   After changing directories, use the following syntax to create the special device files:

   MAKEDEV *device*

   The following example shows the command for making a device special file for `rz0a`.

   ```
   # MAKEDEV rz0a
   ```

2. Mount the device. For example, to mount the `rz0a` device on the `/mnt` file

system, use the following format:

```
# /etc/mount /dev/rz0a /mnt
```

This enables you to access any of the commands or files on that device. To see what commands and files are available, enter the following command:

```
# ls /mnt
```

The system responds by displaying the contents of /mnt.

If there are directories that you want to include in your search path, reset and export the path environment variable. For example, to add /mnt/bin to your path, enter the following command:

```
# PATH = "$PATH:/mnt/bin"; export PATH
```

To exit the standalone environment and halt the processor, enter the following command:

```
# /etc/halt
```

To exit the standalone environment and return to the menu, press Ctrl/d.

RISC Supported Software Subsets A

Table A-1 contains the following information about each supported software subset for RISC processors:

- The subset name and contents.
- Whether the subset is required for a minimum ULTRIX system or whether it is optional.
- Whether the subset is dependent on other subsets. That is, the subset will not function unless the subsets on which it is dependent are installed before it is.
- Any system configuration file entries that must be edited into the system configuration file for the subset to function.

Note

All subsets require UDTBASE440, the Base System subset.

Table A-1: RISC Supported Subsets Descriptions and Dependencies

Subset Name	Contents	Dependencies
DXMDECW440 Optional	Additional OSF/Motif Apps The OOTB applications for the OSF/Motif user interface.	
DXMMAIL440 Optional	DECwindows OSF/Motif Mail The mailer for the OSF/Motif user interface.	UDTCDABASE440 UDTINET440 UDTMH440 UDTUMAIL440
DXMMAN440 Optional	OSF/Motif Reference Pages Reference pages for the OSF/Motif user interface.	UDTDCMT440
DXMX11440 Optional	OSF/Motif User Environment The MIT X11R5 tools.	
DXMDEVG0440 Optional	UWS Worksystem Development G0 Library The G0 libraries for UWS.	UDTPGMR440, DXMXM440

Subset Name	Contents	Dependencies
DXMXM440	OSF/Motif Development Env.	UDTPGMR440
Optional	The OSF/Motif development environment.	
UDTACCT440	Accounting Software	
Optional	Programs and data files needed to perform system accounting. This subset contains log files that grow automatically. It is intended for users familiar with ULTRIX system administration.	
UDTAFM440	Adobe Font Metric Files	
Optional	Font metrics (character bounding box, width, name, ligature, kerning, and font properties) for PostScript outline fonts used by text formatting applications in PostScript output devices.	
UDTBASE440	Base System	Required for all subsets
Required	Fundamental utilities and data files for the ULTRIX operating system. Base System includes the C compiler and linker, the editors, library and data files needed for POSIX environment, and all of the general-purpose programs. This subset cannot be removed.	
UDTBIN440	Kernel Configuration Files	Required to install layered products that require the kernel to be rebuilt.
Required	Utility programs and binary files required to configure ULTRIX kernels. This subset can be deleted after installation.	
UDTCDABASE440	CDA Base System	
Optional	Run-time components for CDA.	
UDTCDAPGMR440	CDA Software Dev Libraries	UDTPGMR440
Optional	Programming libraries for CDA.	
UDTCOMM440	Communications Utilities	UDTINET440
Optional	Utilities for several types of serial communications with other systems, including `tip`, `ftp`, and `telnet`.	

Subset Name	Contents	Dependencies
UDTDCMT440	Doc. Preparation Extensions	
Optional	Tools to format, manage, and display reference pages. The `nroff` formatter and required macros.	
UDTDCMTEXT440	Other Doc. Preparation Software	UDTDCMT440
Optional	Additional `nroff` macro packages, bibiography tools, and `roff` tools.	
UDTDL440	Diskless Environment Support	
Optional	Software for a diskless environment. This subset is required only for diskless management services.	
UDTEXAMPLES440	Programming Examples	
Optional	Programming examples for: `dbx`, `dli`, `ncs`, device drivers, and others.	
UDTEXER440	System Exerciser Package	
Optional	Programs that help in diagnosing problems with your hardware and peripheral devices.	
UDTINET440	TCP/IP Networking Utilities	Kernel configuration: options INET
Required	Programs and data used to implement Internet networking on your ULTRIX system.	

Subset Name	Contents	Requires
UDTINTLPGMR440 Optional	Internationalization Dev. Env. Source for internationalization languages.	
UDTINTLRT440 Optional	Internationalization Run-time Env. Internationalization languages for `setlocale` and internationalization tools.	UDTPGMR440
UDTKERB440 Optional	Kerberos Network Authentication Programs and data used to implement Kerberos network authentication on your ULTRIX system.	
UDTMAN440 Optional	Ref. Pages for Sys. Admin. & Users Online reference pages for Sections 1, 4, 5, 6, 7, and 8 of the *ULTRIX Reference Pages*.	UDTDCMT440
UDTMANPGMR440 Optional	Reference Pages for Programmers Online reference pages for Sections 2 and 3 of the *ULTRIX Reference Pages*.	UDTDCMT440
UDTMH440 Optional	RAND Mail Handler Programs that constitute the RAND Corporation MH mail reader interface.	UDTUMAIL440 UDTINET440
UDTMIPSPGMR440 Optional	MIPS 3 Libraries Contains the `-mips3` libraries for programmers who want to compile programs using the `-mips3` option.	UDTPGMR440
UDTMOP440 Optional	Maintenance Operations Protocol Software necessary to use your system as a boot server for LAT, DMS, or RIS.	Kernel configuration: options DLI pseudodevice dli
UDTNFS440 Required	Network File System Utilities Programs and data files you need to share file systems over the network. This subset contains the files used to implement the Yellow Pages facility.	UDTINET Kernel configuration: options NFS options RPC

Subset Name	Contents	Requires
UDTPGMR440 Optional	Software Development Utilities 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, the `lex` and `yacc` parser packages, and the G0 libraries.	
UDTPRESTO440 Optional	Prestoserve Utilities Utilities for monitoring and administering Prestoserve.	
UDTPRINT440 Optional	Printer Support Environment Printer commands such as `lpr`, `lpq`, and `lpd`, utilities, configuration files, filters, and PostScript printer support.	
UDTRPCDEV440 Optional	RPC Development Environment Programs and data that implement the Remote Procedure Call (RPC) development environment.	UDTPGMR440
UDTRPCRT440 Optional	RPC Run-time Environment Programs and data that implement the Remote Procedure Call (RPC) run-time environment. This subset is optional.	
UDTSCCS440 Optional	Source Code Control System Programs that make up the UNIX Source Code Control System, which provides a regulation mechanism for large software projects.	
UDTSEC440 Optional	Enhanced Security Features Programs and data that provide enhanced security features.	Kernel configuration: options AUDIT options SYS_TPATH pseudodevice audit
UDTSMSCAMP440 Optional	Sys. Config. Mgmt. Program (SCAMP) This is a menu-driven program for basic system administration.	

Subset Name	Contents	Requires
UDTUMAIL440 Required	Extended (Berkeley) Mailer Programs and data that implement the BSD `sendmail` facility.	UDTINET440
UDTUUCP440 Optional	UNIX-to-UNIX Copy Facility Programs and data files needed to let your system participate in a network of machines using the UNIX UUCP facility to transmit files over serial communications lines.	UDTCOMM440 UDTINET440
UDT21OPGMR440 Optional	Symbolic Links for 210 Compiler Contains necessary symbolic links between layered products which depend on MIPS Version 2.10 tools and the current directories.	UDTPGMR440
UDWDECW440 Optional	Additional DECwindows Applications Additional X11/DECwindows client applications such as Calendar and PostScript Previewer.	
UDWFONT440 Required for Worksystems	X11/DECwindows 75dpi Fonts Fonts for X11/DECwindows.	
UDWFONT15440 Required for DECsystem 5000 Model 200 with 2–D and 3–D graphics	X11/DECwindows 100dpi Fonts Workstation font files for systems using either the VR160 15-inch monitor or higher resolution graphics.	
UDWFONTSTR440 Required for DECsystem 5000 Model 200 with 3–D graphics	X11/DECwindows PEX Fonts X11/DECwindows fonts for 3–D graphics cards.	
UDWMAIL440 Optional	DECwindows Mail Application DECwindows mail application for `dxmail`.	UDTUMAIL440 UDTMH440 UDTINET440 UDTCDABASE440
UDWMAN440 Optional	UWS Runtime Reference Pages Online UWS reference pages for Sections 1, 4, 5, 6, 7, and 8.	UDTDCMT440

Subset Name	Contents	Dependencies
UDWMANPGMR440	UWS Development Reference Pages	UDTDCMT440
Optional	Online UWS reference pages for Sections 2 and 3.	
UDWSER440	B&W, Color, or PX Server	
Optional	Server for X11/DECwindows.	
UDWSYSMGNT440	System Management Tools	
Optional	X11/DECwindows system management programs.	
UDWWSTSER440	X11R4 PXG Server	
Optional	Server for X11RR PXG 3D graphics.	
UDWX11440	X11/DECwindows User Environment	
Required for Worksystems	X Window System client programs.	
UDWXDEV440	Worksystem Development Environment	UDTBASE440
Optional	Library and data files needed to produce X Window System client applications. Includes example programs demonstrating how to get started.	
UDWXTXSER440	Truecolor Server	
Optional	Server for True Color Graphics.	

VAX Supported Software Subsets B

Table B-1 contains the following information about each supported software subset for VAX processors:

- The subset name and contents.
- Whether the subset is required for a minimum ULTRIX system or whether it is optional.
- Whether the subset is dependent on other subsets. That is, the subset will not function unless the subset(s) on which it is dependent are installed before it is.
- Any system configuration file entries that must be edited into the system configuration file for the subset to function.

Note

All subsets require ULTBASE440, the Base System subset.

Table B-1: VAX Supported Software Subset Descriptions and Dependencies

Subset Name	Contents	Dependencies
DXVDECW440	Additional OSF/Motif Appls.	
Optional	The OOTB applications for the OSF/Motif user interface.	
DXVMAIL440	DECwindows OSF/Motif Mail	ULTCDABASE440 ULTINET440 ULTMH44O ULTUMAIL440
Optional	The mailer for the OSF/Motif user interface.	
DXVMAN440	OSF/Motif Reference Pages	ULTDCMT440
Optional	The reference pages for the OSF/Motif user interface.	
DXVX11440	OSF/Motif User Environment	
Optional	The MIT X11R5 tools.	
DXVXM440	The OSF/Motif Development Env.	ULTPGMR440
Optional	The OSF/Motif development environment.	

Subset Name	Contents	Dependencies
ULTACCT440	Accounting Software	
Optional	Programs and data files needed to perform system accounting. This subset contains log files that grow automatically. It is intended for users familiar with ULTRIX system administration.	
ULTAFM440	Adobe Font Metric Files	
Optional	Font metrics (character bounding box, width, name, ligature, kerning, and font properties) for PostScript outline fonts used by text formatting applications in PostScript output devices.	
ULTBASE440	Base System	Required for all subsets
Required	Fundamental utilities and data files for the ULTRIX operating system. Base System includes the C compiler and linker, the editors, library and data files needed for POSIX environment, and all of the general-purpose programs. This subset cannot be removed.	
ULTBIN440	Kernel Configuration Files	Required to install layered products that require the kernel to be rebuilt.
Required	Utility programs and binary files required to configure ULTRIX kernels. This subset can be deleted after installation.	
ULTCDABASE440	CDA Base System	
Optional	Run-time components for CDA.	
ULTCDAPGMR440	CDA Software Dev Libraries.	ULTPGMR440
Optional	Programming libraries for CDA.	
ULTBSC440	Bisynchronous Communications	Kernel configuration: options BSC pseudodevice bsc
Optional	Programs needed to use the 3780 and 2780 emulation features provided with your ULTRIX system.	

Subset Name	Contents	Dependencies
ULTCOMM440	Communications Utilities	ULTINET440
Optional	Utilities for several types of serial communications with other systems, including `tip`, `ftp`, and `telnet`.	
ULTDCMT440	Doc. Preparation for Ref. Pages	
Optional	Tools to format, manage, and display reference pages. The `nroff` formatter and required macros.	
ULTDCMTEXT440	Doc. Preparation Extensions	ULTDCMT440
Optional	Additional `nroff` macro packages, bibiography tools, and `roff` tools.	
ULTDL440	Diskless Support Environment	
Optional	Software for a diskless environment. This subset is required only for diskless management services.	
ULTEXAMPLES440	Programming Examples	
Optional	Programming examples for: `dbx`, `dli`, `ncs`, device drivers, and others.	
ULTEXER440	System Exerciser Package	
Optional	Programs that help in diagnosing problems with your hardware and peripheral devices.	
ULTINET440	TCP/IP Networking Utilities	
Required	Programs and data used to implement Internet networking on your ULTRIX system.	
ULTINTLPGMR440	Internationalization Dev. Env.	ULTPGMR440
Optional	Source for internationalization languages.	
ULTINTLRT440	Internationalization Run-time Env.	
Optional	Internationalization languages for `setlocale` and internationalization tools.	

Subset Name	Contents	Dependencies
ULTKERB440	Kerberos Network Authentication	
Optional	Programs and data used to implement Kerberos network authentication on your ULTRIX system.	
ULTMAN440	Ref. Pages for Sys. Admin. & Users	ULTDCMT440
Optional	Online reference pages for Sections 1, 4, 5, 6, 7, and 8 of the *ULTRIX Reference Pages*.	
ULTMANPGMR440	Reference Pages for Programmers	ULTDCMT440
Optional	Online reference pages for Sections 2 and 3 of the *ULTRIX Reference Pages*.	
ULTMH440	The RAND Mail Handler	ULTINET440 ULTUMAIL440
Optional	Programs that constitute the RAND Corporation MH mail reader interface.	

Subset Name	Contents	Dependencies
ULTMOP440 Optional	Maintenance Operations Protocol Software necessary to use your system as a boot server for LAT, DMS, or RIS.	Kernel configuration: options DLI pseudodevice dli
ULTNFS440 Required	Network File System Utilities Programs and data files you need to share file systems over the network. This subset contains the files used to implement the Yellow Pages facility.	ULTINET440 Kernel configuration: options NFS options RPC
ULTPASCAL440 Optional	Pascal Development Package Pascal language compiler and associated libraries and tools.	
ULTPGMR440 Optional	Software Development Utilities 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.	Required for: ULTINTL440 ULTRPCDEV440
ULTPRESTO440 Optional	Prestoserve Utilities Utilities for monitoring and administering Prestoserve.	
ULTPRINT440 Optional	Printer Support Environment Printer commands such as `lpr`, `lpq`, and `lpd`, utilities, configuration files, filters, and PostScript printer support.	
ULTRPCDEV440 Optional	RPC Development Environment Programs and data that implement the Remote Procedure Call (RPC) development environment.	ULTPGMR440
ULTRPCRT440 Optional	RPC Run-time Environment Programs and data that implement the Remote Procedure Call (RPC) run-time environment.	

Subset Name	Contents	Dependencies
ULTSCCS440 Optional	Source Code Control System Programs that make up the UNIX Source Code Control System, which provides a regulation mechanism for large software projects.	
ULTSEC440 Optional	Enhanced Security Features Programs and data that provide enhanced security features.	Kernel configuration: options AUDIT options SYS_TPATH pseudodevice audit
ULTSMSCAMP440 Optional	Sys. Config. Mgmt. Program (SCAMP) This is a menu-driven program for basic system administration.	
ULTUMAIL440 Required	Extended (Berkeley) Mailer Programs and data that implement the BSD `sendmail` facility.	ULTINET440
ULTUUCP440 Optional	UNIX-to-UNIX Copy Facility Programs and data files needed to let your system participate in a network of machines using the UNIX UUCP facility to transmit files over serial communications lines.	ULTCOMM440 ULTINET440
ULTVAXC440 Optional	VAX C Development Package VAX C language compiler and associated libraries and tools.	
UWSDECW440 Optional	Additional DECwindows Applications Additional X11/DECwindows client applications such as Calendar and the PostScript Previewer.	
UWSFONT440 Required for Worksystems	X11/DECwindows 75dpi Fonts Fonts for X11/DECwindows.	
UWSFONT15440 Optional	X11/DECwindows 100dpi Fonts Workstation font files for systems using either the VR160 15-inch monitor or higher resolution graphics.	

Subset Name	Contents	Dependencies
UWS3DFONT440 Required for VAXstation 3520/3540	VS35XX X11/DECwindows Fonts X11/DECwindows fonts for VAXstation 3520/3540 processors.	
UWSMAIL440 Optional	DECwindows Mail Application DECwindows mail application for `dxmail`.	ULTINET440 ULTCDABASE440 ULTMH440 ULTUMAIL440
UWSMAN440 Optional	UWS Runtime Reference Pages Online UWS reference pages for Sections 1, 4, 5, 6, 7, and 8.	ULTDCMT440
UWSMANPGMR440 Optional	UWS Ref. Pages for Programmers Online UWS reference pages for Sections 2 and 3.	ULTDCMT440
UWSSER440 Required for Worksystems	X11/DECwindows Servers X11/DECwindows server support.	Requires: ULTBASE440
UWSSYSMGNT Optional	System Management Tools X11/DECwindows system management programs.	Requires: ULTBASE440
UWSX11440 Required for Worksystems	X11/DECwindows User Environment X Window System client programs.	
UWSXDEV440 Optional	Worksystem Development Environment Library and data files needed to produce X Window System client applications. Includes example programs demonstrating how to get started.	ULTPGMR44

Unsupported Software Subsets C

Table C-1 contains the following information about each unsupported software subset on the RISC and VAX software distribution:

- The subset name and contents. The UDX and DXM prefixes indicate RISC software subsets. The ULX and DXV prefixes indicate VAX software subsets.
- Whether the subset is dependent on other subsets. That is, the subset will not function unless the subset(s) on which it is dependent are installed before it is.
- The asterisk (*) denotes user-contributed software.

Note

All RISC subsets require the UDTBASE440 subset; all VAX subsets requre the ULTBASE440 subset.

You can use the `setld` command to install some or all of the unsupported software subsets included with your ULTRIX system. See Chapter 6 and the `setld`(8) for more information.

Table C-1: Unsupported Software Subset Descriptions and Dependencies

Subset Name	Contents	Dependencies
DXMUNDEMO440	OSF/MOTIF Demos (RISC) RISC demonstration programs for the OSF/Motif interface.	UDTPGMR440
DXVUNDEMO440	OSF/MOTIF Demos (VAX) VAX demonstration programs for the OSF/Motif interface.	ULTPGMR440
ULXAPL440*	APL Development Package APL language interpreter and associated utilities.	

Subset Name	Contents	Dependencies
ULXBASE440*	Base Extension	
UDXBASE440*	Programs and data files that can be useful in some environments. These include obsolete boot programs, drivers for unsupported devices, the `troff` package with fonts, and miscellaneous software.	
ULXBIB440*,	Bibliographic Utilities	ULTDCMT440 or UDTDCMT440
UDXBIB440*	Programs and data useful in maintaining bibliographic information.	
ULXCOURIER440*,	Remote Procedure Call Compiler	
UDXCOURIER440*	Modules for producing software using the COURIER remote procedure call protocol.	
ULXCPM440*	CP/M 8in Diskette Utility	
	Utilities for reading and writing 8-inch diskettes used with the CP/M operating system.	
ULXDCMT440,	Document Preparation Software	
UDXDCMT440	Additional documentation preparation utilities and fonts.	
ULXDOC440,	Supplementary Documentation	ULTDCMT440 or UDTDCMT440
UDXDOC440	Online copies of Supplementary Documentation.	
ULXEDIT440*,	GNU Emacs	
UDXEDIT440*	The public-domain GNU Emacs editor and edit-macro files.	
ULXF77440	Unsupported FORTRAN Utilities	
	Utilities for developing programs using the UNIX `f77` dialect of FORTRAN.	
ULXGAMES440*,	Games and Diversions	
UDXGAMES440*	Programs used for entertainment.	

Subset Name	Contents	Dependencies
ULXHYPER440*	Hyperchannel Utilities The Hyperchannel driver and associated daemons and utilities.	
ULXICON440*	ICON (Language) Development Package Translator and linker for the ICON programming language.	
ULXINGRES440	University INGRES QUEL DBMS (database management system).	
ULXINET440 UDXINET440	TCP/IP Networking Util Extension Networking utilities: `traceroute`, `slip`.	
ULXLEARN440, UDXLEARN440	Computer-Aided System Tutor Software for the `learn` program, which provides lessons in aspects of the computing environment. This subset is useful for persons new to the UNIX environment.	
ULXLISP440	Franz Lisp Development Package Programs that make up the Franz Lisp program development environment, including interpreter, libraries, and compiler.	
ULXMAN440, UDXMAN440	Unsupported Online Manuals Online reference pages for programs found in the Base Extension subset.	UDTDCMT440 or ULTDCMT440
ULXMOD2440,	Modula-2 Development Package Modula-2 compiler and libraries.	
ULXNEWS440, UDXNEWS440	USENET News Interface Software Software needed to participate in the USENET news network.	ULTCOMM440 and ULTUUCP440, or UDTCOMM440 and UDTUUCP440

Subset Name	Contents	Dependencies
ULXNOTES440, UDXNOTES440	Notesfiles Package Software that lets you establish `notesfiles` on your ULTRIX system.	
ULXRCS440, UDXRCS440	Revision Control System Programs that make up a package similar to the SCCS facility provided with the supported software subsets.	

Subset Name	Contents	Dependencies
ULXSHELLS440, UDXSHELLS440	Aux. Command Line Interpreters The ‘‘distributed’’ shell and a version of the C shell that features command completion.	
ULXSPMS440	Software Project Management System A package useful for managing large software development efforts.	
ULXTERM440 UDXTERM440 Optional	Additional Terminal Drivers Additional `terminfo` files and terminal drivers	
ULXTOOLS440*, UDXTOOLS440*	Misc. User-Contributed Utilities Small utilities contributed by the user community.	
ULXUNEXAMP440 or UDXUNEXAMP440	Unsupported DECwindows Examples DECwindows programming examples.	UDTPGMR440, ULTPGMR440
ULXUNFONTS440 UDXUNFONTS440	Unsupported MIT fonts MIT fonts	
ULXUNMAN440, UDXUNMAN440	Unsupported X11 Reference Pages Online reference pages for unsupported X11 R4 features that are in the UDXUNMIT440 and ULXUNMIT440 subsets.	ULTDCMT440 or UDTDCMT440
ULXUNMIT440 UDXUNMIT440	Unsupported X11 Components Programs and fonts for the X Window System protocol level 11, Release 4. Contains applications such as `xterm`, `xload`, and `xedit`.	
ULXVARIAN440	Raster Plotter Package Software used to typeset documents on the VARIAN typesetter.	

Sample Advanced Installation Procedure D

Example D-1 is a sample log of an advanced installation performed on a DECstation 5000 Model 150.

What the installation software displays 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.

D.1 Sample Advanced Installation Procedure.

Example D-1: Sample Advanced Installation

```
*** STANDALONE ULTRIX ENVIRONMENT ***

If you select the BASIC Installation option from the list that follows,
the installation software creates file systems on default partitions on
your system disk and loads the mandatory ULTRIX software subsets.

If you require additional installation choices, select the ADVANCED
Installation option.

Select one of the following options:

      1) BASIC Installation
      2) ADVANCED Installation
      3) System management

Enter your choice: 2

*** SYSTEM DISK SELECTION ***

The 'Guide to Installing ULTRIX' explains the following table
of system disk drives.  Select one of the devices below to contain the
root file system:

SYSTEM DISK TABLE

Selection   Device     ULTRIX     Device       Controller   Controller
            Name       Name       Number       Name         Number
------------------------------------------------------------------------
    1       RZ57        rz0          0         SCSI           0
    2       RZ25        rz2          2         SCSI           0
    3       RZ24        rz3          3         SCSI           0
------------------------------------------------------------------------

Enter your choice: 1

You selected RZ57, device number 0. Make sure this disk drive
is on line and write-enabled (if applicable to your disk drive), then
confirm your choice.

Use RZ57, rz0, for your system disk? (y/n) []: y
```

Example D-1: (continued)

```
The installation procedure now allocates the root file system on
partition 'a' of the system disk, rz0 RZ57.

Making the root file system on rz0 RZ57.

The installation procedure is now restoring the root file system to
partition 'a' of the system disk, rz0 RZ57.

*** BOOTSTRAP COMMAND SEQUENCE ***

Issue the following console commands to set your default bootpath variable
and to boot your system disk:

      >> setenv boot "3/rz0/vmunix -a"
      >> boot


 *** SYSTEM NAME SPECIFICATION ***

Select the name of your system using alphanumeric characters.
The first character must be a letter.   For example, tinker.

Enter your system name:  rain

You selected rain as the name of your system.
Is this correct? (y/n) [y]:

*** 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, 02:54
p.m. on Feb 2, 1993 would be entered as:

      9302021454

Enter the date and time: 9310051015

*** TIME ZONE SELECTION ***

Select the time zone for your area, using the options listed in the
table below.  You can also enter the number of hours (-12 to 12) in
time east of Greenwich.

  Selection Time Zone
---------------------------------
      e          Eastern
      c          Central
      m          Mountain
      p          Pacific
      g          Greenwich
---------------------------------

Enter your choice: e

Does your area alternate between Daylight Savings and Standard
time? (y/n) [y]:


Select your geographic area for Daylight Savings Time, using the
options in the table below.

  Selection Geographic Area
--------------------------------
      u          USA
      a          Australia
      e          Eastern Europe
```

Example D-1: (continued)

```
      c          Central Europe
      w          Western Europe
-------------------------------

Enter your choice [u]:

The current date and time is Tue Oct  5 10:15:04 EDT 1993


*** FILE SYSTEM DEFAULT OPTION ***

The following table shows the default file system layout on RZ57, rz0:

partition     bottom        top       size    overlap       default
    a              0      32767      32768    c             root
    b          32768     217087     184320    c             swap, dump
    g         217088     831487     614400    c             /usr

If you choose the defaults, the var area will be allocated to /usr/var.

Do you want to choose the default file system layout? (y/n): n

*** /usr FILE SYSTEM ALLOCATION ***

You can allocate the /usr file system to one of the disks listed in the
table below.  See the Guide to Installing ULTRIX for an explanation of
this table:

/usr FILE SYSTEM ALLOCATION TABLE

Selection   Device     ULTRIX     Device       Controller   Controller
            Name       Name       Number       Name         Number
-------------------------------------------------------------------------
    1       RZ57        rz0          0         SCSI           0
    2       RZ25        rz2          2         SCSI           0
    3       RZ24        rz3          3         SCSI           0
-------------------------------------------------------------------------

Enter your choice: 1

You selected RZ57, device number 0.  Make sure this disk is
on line and write-enabled (if applicable to this drive) and then
confirm your choice.

Use RZ57, rz0 for /usr file system? (y/n) []: y

The disk rz0 you selected from the previous table has the following
partitions available, on which you can allocate the /usr file system:

partition      size (Kbytes)  overlap
-----------------------------------------------
    d   ---         149504   c,h
    e   ---         149504   c,h
    f   ---         262273   c,h
    g   ---         307200   c
    h   ---         561281   c,d,e,f
-----------------------------------------------

Type the letter of the partition on which you want
to allocate the /usr file system [g]: h

Making the new file system for /usr on /dev/rrz0h RZ57


*** ALLOCATE THE SWAP1 SPACE ***

You can allocate the swap1 space to one of the disks listed in the
table below.  See the Guide to Installing ULTRIX for an explanation of
this table:

SWAP1 SPACE ALLOCATION TABLE
```

Example D-1: (continued)

```
Selection   Device     ULTRIX     Device       Controller   Controller
            Name       Name       Number       Name         Number
-------------------------------------------------------------------------
    1       RZ57        rz0          0         SCSI           0
    2       RZ25        rz2          2         SCSI           0
    3       RZ24        rz3          3         SCSI           0
-------------------------------------------------------------------------

Enter your choice: 1

You selected RZ57, device number 0.  Make sure this disk is
on line and write-enabled (if applicable to this drive) and then
confirm your choice.

Use RZ57, rz0 for swap1 space? (y/n) []: y

The disk rz0 you selected from the previous table has the following
partitions available, on which you can allocate the swap1 space:

partition      size (Kbytes)  overlap
-----------------------------------------------
    b   ---          92160   c
    g   ---         307200   c
-----------------------------------------------

Type the letter of the partition on which you want
to allocate the swap1 space [b]:

*** ALLOCATE THE SWAP2 SPACE ***

Do you want to allocate a second swap space? (y/n) [n]: n


*** ALLOCATE THE CRASH DUMP SPACE ***

You can allocate the crash dump space to one of the disks listed in the
table below.  See the Guide to Installing ULTRIX for an explanation of
this table:

CRASH DUMP SPACE ALLOCATION TABLE

Selection   Device     ULTRIX     Device       Controller   Controller
            Name       Name       Number       Name         Number
-------------------------------------------------------------------------
    1       RZ57        rz0          0         SCSI           0
    2       RZ25        rz2          2         SCSI           0
    3       RZ24        rz3          3         SCSI           0
-------------------------------------------------------------------------

Enter your choice: 1

You selected RZ57, device number 0.  Make sure this disk is
on line and write-enabled (if applicable to this drive) and then
confirm your choice.

Use RZ57, rz0 for crash dump space? (y/n) []: y

The disk rz0 you selected from the previous table has the following
partitions available, on which you can allocate the crash dump space:

partition      size (Kbytes)  overlap
-----------------------------------------------
    g   ---         307200   c
    b   ---          92160   c
-----------------------------------------------

Type the letter of the partition on which you want
to allocate the crash dump space [b]:


*** ALLOCATE THE var FILE SYSTEM ***
```

Example D-1: (continued)

```
You can allocate the var file system to one of the disks listed in the
table below. See the Guide to Installing ULTRIX for an explanation of
this table:

var FILE SYSTEM ALLOCATION TABLE

Selection   Device     ULTRIX     Device       Controller   Controller
            Name       Name       Number       Name         Number
------------------------------------------------------------------------
    1       RZ57        rz0          0         SCSI           0
    2       RZ25        rz2          2         SCSI           0
    3       RZ24        rz3          3         SCSI           0
------------------------------------------------------------------------

Enter your choice: 1

You selected RZ57, device number 0.  Make sure this disk is
on line and write-enabled (if applicable to this drive) and then
confirm your choice.

Use RZ57, rz0 for var file system? (y/n) []: y

The disk rz0 you selected from the previous table has the following
partitions available, on which you can allocate the var file system:

partition      size (Kbytes)  overlap
-----------------------------------------------
    g   ---          307200   c
    h   ---          561281   c,d,e,f
-----------------------------------------------

Type the letter of the partition on which you want
to allocate the var file system [g]:

Making the new file system for var on /dev/rrz0g RZ57



Select one of the options below that describes the type of display
being used:

      1) Black and White
      2) Color
      3) Gray Scale

Enter your choice: 1


*** SUPPORTED SOFTWARE INSTALLATION ***

Remove the tape containing the BOOT/UPGRADE software and replace it with
the tape containing the SUPPORTED software subsets.

Please make sure your installation tape is mounted and on-line.
Are you ready (y/n)? y
Positioning Tape


*** Select the DECwindows User Interface ***

1) DECwindows for OSF/Motif
2) X11/DECwindows (XUI)

Enter your choice [1]: 1

*** Enter Subset Selections ***

The following subsets are mandatory and will be installed automatically:
 * Base System                          * Kernel Config Files
 * TCP/IP Networking Utilities          * Network File System Utilities
 * Extended (Berkeley) Mailer           * B&W, Color, or PX Server
```

Example D-1: (continued)

```
 * OSF/Motif User Environment            * X11/DECwindows 75dpi Fonts

The subsets listed below are optional:
 1) Truecolor Server                      2) X11R4 PXG Server
 3) X11/DECwindows 100dpi Fonts           4) X11/DECwindows PEX Fonts
 5) Printer Support Environment           6) RAND Mail Handler
 7) Sys. Config. Mgmt. Program (SCAMP)    8) Communications Utilities
 9) Unix-to-Unix Copy Facility           10) Maintenance Operations Protocol
11) Accounting Software                  12) Kerberos Network Authentication
13) Enhanced Security Features           14) Prestoserve Utilities
15) System Exerciser Package             16) Doc. Preparation for Ref. Pages
17) Doc. Preparation Extensions          18) Adobe Font Metric Files
19) Software Development Utilities       20) Source Code Control System
21) Internationalization Runtime Env.    22) Internationalization Dev. Env.
23) CDA Base System                      24) CDA Software Dev Libraries
25) RPC Runtime Environment              26) RPC Development Environment
27) Ref. Pages for Sys. Admin. & Users   28) Reference Pages for Programers
29) Programming Examples                 30) Additional OSF/Motif Apps.
31) DECwindows OSF/Motif Mail            32) OSF/Motif Development Env.
33) OSF/Motif Reference Pages            34) System Management Tools
35) Worksystem Dev. G0 Libraries         36) Mips 3 Libraries
37) Symbolic Links for 2.10 Compiler

38) All mandatory and all optional subsets
39) Mandatory subsets only
40) Exit without installing subsets

Enter your choice(s): 38
      Working....Tue Oct  5 10:27:46 EDT 1993

You are installing the following subsets:
   Base System                              Kernel Config Files
   TCP/IP Networking Utilities              Network File System Utilities
   Extended (Berkeley) Mailer               B&W, Color, or PX Server
   OSF/Motif User Environment               X11/DECwindows 75dpi Fonts
   Truecolor Server                         X11R4 PXG Server
   X11/DECwindows 100dpi Fonts              X11/DECwindows PEX Fonts
   Printer Support Environment              RAND Mail Handler
   Sys. Config. Mgmt. Program (SCAMP)       Communications Utilities
   Unix-to-Unix Copy Facility               Maintenance Operations Protocol
   Accounting Software                      Kerberos Network Authentication
   Enhanced Security Features               Prestoserve Utilities
   System Exerciser Package                 Doc. Preparation for Ref. Pages
   Doc. Preparation Extensions              Adobe Font Metric Files
   Software Development Utilities           Source Code Control System
   Internationalization Runtime Env.        Internationalization Dev. Env.
   CDA Base System                          CDA Software Dev Libraries
   RPC Runtime Environment                  RPC Development Environment
   Ref. Pages for Sys. Admin. & Users       Reference Pages for Programers
   Programming Examples                     Additional OSF/Motif Apps.
   DECwindows OSF/Motif Mail                OSF/Motif Development Env.
   OSF/Motif Reference Pages                System Management Tools
   Worksystem Dev. G0 Libraries             Mips 3 Libraries
   Symbolic Links for 2.10 Compiler

Is this correct? (y/n): y

Base System  (UDTBASE440)
   Copying from /dev/nrmt0h (tape)
      Working....Tue Oct  5 10:28:20 EDT 1993
      Working....Tue Oct  5 10:30:36 EDT 1993
      Working....Tue Oct  5 10:32:52 EDT 1993
      Working....Tue Oct  5 10:34:55 EDT 1993
   Verifying
      Working....Tue Oct  5 10:35:49 EDT 1993

Kernel Config Files  (UDTBIN440)
   Copying from /dev/nrmt0h (tape)
      Working....Tue Oct  5 10:37:06 EDT 1993
      Working....Tue Oct  5 10:39:15 EDT 1993
      Working....Tue Oct  5 10:41:26 EDT 1993
```

Example D-1: (continued)

```
      Working....Tue Oct  5 10:43:36 EDT 1993
   Verifying
      Working....Tue Oct  5 10:45:27 EDT 1993

TCP/IP Networking Utilities  (UDTINET440)
   Copying from /dev/nrmt0h (tape)
      Working....Tue Oct  5 10:47:01 EDT 1993
   Verifying

Network File System Utilities  (UDTNFS440)
   Copying from /dev/nrmt0h (tape)
      Working....Tue Oct  5 10:48:58 EDT 1993
   Verifying

Extended (Berkeley) Mailer  (UDTUMAIL440)
   Copying from /dev/nrmt0h (tape)
   Verifying

B&W, Color, or PX Server (UDWSER440)
   Copying from /dev/nrmt0h (tape)
      Working....Tue Oct  5 10:50:32 EDT 1993
      Working....Tue Oct  5 10:51:17 EDT 1993
      Working....Tue Oct  5 10:53:21 EDT 1993
   Verifying
      Working....Tue Oct  5 10:54:30 EDT 1993

OSF/Motif User Environment (DXMX11440)
   Copying from /dev/nrmt0h (tape)
      Working....Tue Oct  5 10:55:03 EDT 1993
      Working....Tue Oct  5 10:57:08 EDT 1993
      Working....Tue Oct  5 10:59:11 EDT 1993
      Working....Tue Oct  5 11:01:13 EDT 1993
   Verifying
      Working....Tue Oct  5 11:01:56 EDT 1993

X11/DECwindows 75dpi Fonts (UDWFONT440)
   Copying from /dev/nrmt0h (tape)
      Working....Tue Oct  5 11:02:39 EDT 1993
      Working....Tue Oct  5 11:03:56 EDT 1993
   Verifying

Truecolor Server (UDWXTXSER440)
   Copying from /dev/nrmt0h (tape)
      Working....Tue Oct  5 11:05:12 EDT 1993
      Working....Tue Oct  5 11:07:05 EDT 1993
   Verifying

X11R4 PXG Server (UDWWSTSER440)
   Copying from /dev/nrmt0h (tape)
      Working....Tue Oct  5 11:08:49 EDT 1993
   Verifying

X11/DECwindows 100dpi Fonts (UDWFONT15440)
   Copying from /dev/nrmt0h (tape)
      Working....Tue Oct  5 11:10:02 EDT 1993
      Working....Tue Oct  5 11:12:04 EDT 1993
      Working....Tue Oct  5 11:14:05 EDT 1993
      Working....Tue Oct  5 11:16:22 EDT 1993
   Verifying

X11/DECwindows PEX Fonts (UDWFONTSTR440)
   Copying from /dev/nrmt0h (tape)
   Verifying

Printer Support Environment  (UDTPRINT440)
   Copying from /dev/nrmt0h (tape)

Volume change. Rewinding tape...  Working....Tue Oct  5 11:18:32 EDT 1993

Please remove tape volume 1 and replace it with volume 2.
Are you ready (y/n)? y
```

Example D-1: (continued)

```
      Working....Tue Oct  5 11:21:06 EDT 1993
   Verifying

RAND Mail Handler  (UDTMH440)
   Copying from /dev/nrmt0h (tape)
      Working....Tue Oct  5 11:22:12 EDT 1993
   Verifying

Sys. Config. Mgmt. Program (SCAMP)  (UDTSMSCAMP440)
   Copying from /dev/nrmt0h (tape)
   Verifying

Communications Utilities  (UDTCOMM440)
   Copying from /dev/nrmt0h (tape)
      Working....Tue Oct  5 11:25:00 EDT 1993
   Verifying

Unix-to-Unix Copy Facility  (UDTUUCP440)
   Copying from /dev/nrmt0h (tape)
      Working....Tue Oct  5 11:25:42 EDT 1993
   Verifying

Maintenance Operations Protocol  (UDTMOP440)
   Copying from /dev/nrmt0h (tape)
   Verifying

Accounting Software  (UDTACCT440)
   Copying from /dev/nrmt0h (tape)
   Verifying

Kerberos Network Authentication  (UDTKERB440)
   Copying from /dev/nrmt0h (tape)
      Working....Tue Oct  5 11:27:42 EDT 1993
   Verifying

Enhanced Security Features  (UDTSEC440)
   Copying from /dev/nrmt0h (tape)
      Working....Tue Oct  5 11:28:43 EDT 1993
   Verifying

Prestoserve Utilities  (UDTPRESTO440)
   Copying from /dev/nrmt0h (tape)
   Verifying

System Exerciser Package  (UDTEXER440)
   Copying from /dev/nrmt0h (tape)
   Verifying

Doc. Preparation for Ref. Pages  (UDTDCMT440)
   Copying from /dev/nrmt0h (tape)
   Verifying

Doc. Preparation Extensions  (UDTDCMTEXT440)
   Copying from /dev/nrmt0h (tape)
      Working....Tue Oct  5 11:31:08 EDT 1993
   Verifying

Adobe Font Metric Files  (UDTAFM440)
   Copying from /dev/nrmt0h (tape)
   Verifying

Software Development Utilities  (UDTPGMR440)
   Copying from /dev/nrmt0h (tape)
      Working....Tue Oct  5 11:32:28 EDT 1993
   Verifying
      Working....Tue Oct  5 11:34:26 EDT 1993

Source Code Control System  (UDTSCCS440)
   Copying from /dev/nrmt0h (tape)
      Working....Tue Oct  5 11:34:50 EDT 1993
   Verifying
```

Example D-1: (continued)

```
Internationalization Runtime Env.  (UDTINTLRT440)
   Copying from /dev/nrmt0h (tape)
   Verifying

Internationalization Dev. Env.  (UDTINTLPGMR440)
   Copying from /dev/nrmt0h (tape)
   Verifying

CDA Base System (UDTCDABASE440)
   Copying from /dev/nrmt0h (tape)
      Working....Tue Oct  5 11:36:43 EDT 1993
   Verifying

CDA Software Dev Libraries (UDTCDAPGMR440)
   Copying from /dev/nrmt0h (tape)
      Working....Tue Oct  5 11:38:46 EDT 1993
   Verifying

RPC Runtime Environment  (UDTRPCRT440)
   Copying from /dev/nrmt0h (tape)
      Working....Tue Oct  5 11:39:36 EDT 1993
   Verifying

RPC Development Environment  (UDTRPCDEV440)
   Copying from /dev/nrmt0h (tape)
   Verifying

Ref. Pages for Sys. Admin. & Users  (UDTMAN440)
   Copying from /dev/nrmt0h (tape)
      Working....Tue Oct  5 11:41:00 EDT 1993
   Verifying

Reference Pages for Programers  (UDTMANPGMR440)
   Copying from /dev/nrmt0h (tape)
      Working....Tue Oct  5 11:42:44 EDT 1993
   Verifying

Programming Examples  (UDTEXAMPLES440)
   Copying from /dev/nrmt0h (tape)
      Working....Tue Oct  5 11:44:30 EDT 1993
   Verifying

Additional OSF/Motif Apps. (DXMDECW440)
   Copying from /dev/nrmt0h (tape)
      Working....Tue Oct  5 11:45:22 EDT 1993
      Working....Tue Oct  5 11:47:24 EDT 1993
   Verifying
      Working....Tue Oct  5 11:48:17 EDT 1993

DECwindows OSF/Motif Mail (DXMMAIL440)
   Copying from /dev/nrmt0h (tape)
      Working....Tue Oct  5 11:48:48 EDT 1993
   Verifying

OSF/Motif Development Env. (DXMXM440)
   Copying from /dev/nrmt0h (tape)
      Working....Tue Oct  5 11:50:22 EDT 1993
      Working....Tue Oct  5 11:52:29 EDT 1993
   Verifying
      Working....Tue Oct  5 11:53:51 EDT 1993

OSF/Motif Reference Pages (DXMMAN440)
   Copying from /dev/nrmt0h (tape)
      Working....Tue Oct  5 11:54:33 EDT 1993
   Verifying
      Working....Tue Oct  5 11:56:49 EDT 1993

System Management Tools (UDWSYSMGNT440)
   Copying from /dev/nrmt0h (tape)
      Working....Tue Oct  5 11:57:20 EDT 1993
      Working....Tue Oct  5 11:59:22 EDT 1993
```

Example D-1: (continued)

```
      Working....Tue Oct  5 12:01:24 EDT 1993
      Working....Tue Oct  5 12:01:45 EDT 1993
   Verifying

Worksystem Dev. G0 Libraries (DXMXDEVG0440)
   Copying from /dev/nrmt0h (tape)
      Working....Tue Oct  5 12:02:53 EDT 1993
      Working....Tue Oct  5 12:03:15 EDT 1993
   Verifying

Mips 3 Libraries  (UDTMIPS3PGMR440)
   Copying from /dev/nrmt0h (tape)
      Working....Tue Oct  5 12:05:10 EDT 1993
   Verifying

Symbolic Links for 2.10 Compiler  (UDT210PGMR440)
   Copying from /dev/nrmt0h (tape)
   Verifying
Rewinding Tape...
      Working....Tue Oct  5 12:08:55 EDT 1993

The installation software has successfully installed the software
subsets. You can now remove the tape containing the software subsets
from the device.

Please mount the tape containing the BOOT/UPGRADE subsets.

Please make sure your installation tape is mounted and on-line.
Are you ready (y/n)? y
Positioning Tape
      Working....Tue Oct  5 12:25:35 EDT 1993
      Working....Tue Oct  5 12:27:36 EDT 1993
      Working....Tue Oct  5 12:29:37 EDT 1993
      Working....Tue Oct  5 12:31:39 EDT 1993

The following subsets will be installed:
 * Generic Kernel
Do you wish to continue? (y/n): y

Generic Kernel  (UDTGENVMUNIX441)
   Copying from /dev/nrmt0h (tape)
      Working....Tue Oct  5 12:34:22 EDT 1993
   Verifying
Rewinding Tape...
      Working....Tue Oct  5 12:35:41 EDT 1993

The installation procedure has successfully installed the Upgrade
subsets

*** CONFIGURATION FILE KERNEL OPTION SELECTION ***

    Selection   Kernel Option
-----------------------------------------------------------------
      1     Local Area Transport (LAT)
      2     Bisynchronous Communication protocol (VAX only)
      3     Computer Interconnect (CI) network
      4     Diagnostic/Utilities Protocol (DUP)
      5     ISO9660 File System Support (CDFS)
      6     Ethernet Packet Filter
      7     Enhanced Security Features
      8     All of the above
            9     None of the above
-----------------------------------------------------------------

Enter the selection number for each kernel option you want.
For example, 1 3 :  1 2 3 4 5 6

You specified the following kernel options:

      Local Area Transport (LAT)
      Computer Interconnect (CI) network
```

Example D-1: (continued)

```
      Diagnostic/Utilities Protocol (DUP)
      ISO9660 File System Support (CDFS)
      Ethernet Packet Filter

Is this correct? (y/n) [n]: y

*** SYSTEM CONFIGURATION PROCEDURE ***

Configuration file complete.

Do you want to edit the configuration file? (y/n) [n]: n

*** PERFORMING SYSTEM CONFIGURATION ***


    working ..... Tue Oct  5 12:37:34 EDT 1993
    working ..... Tue Oct  5 12:39:35 EDT 1993
    working ..... Tue Oct  5 12:41:35 EDT 1993

*** DEVICE SPECIAL FILE CREATION ***
    working ..... Tue Oct  5 12:43:03 EDT 1993

*** SOFTWARE INSTALLATION PROCEDURE COMPLETE ***

The following files were created during the installation procedure:

/vmunix                         - customized kernel
/genvmunix                      - generic kernel
/usr/adm/install.log            - installation log file
/usr/adm/install.FS.log         - file systems log file
/usr/adm/install.DEV.log        - special device log file
```

Installation Notes E

This chapter discusses issues and known problems about the installation and upgrade of ULTRIX and UWS software. Read this appendix to see if the issues here pertain to your configuration.

E.1 Hardware

E.1.1 TZ85 Tape Drive Capacity

The blocking factor of the TZ85 tape drive is 4 Kbytes. This means that the data is managed internally in units of 4 Kbytes. This does not affect or limit the block size used by host systems. However, data is stored in units of 4 Kbytes on the media, and blocks that are not an integral multiple of 4 Kbytes cause capacity and throughput reductions.

Capacity reductions occur for the following utilities if the default parameters are used:

- `dump` (20%)
- `cpio` (75%)
- `dd` (85%)
- `tar` (20%)
- `ltf` (50%)

The following examples show how to use the commands when specifying a different default block size:

```
# tar chvbf 64 /dev/rmt0h .
# dd if=/dev/rrz1g of=/dev/rmt0h  bs=32768
# ltf -cfB /dev/rmt0h 32768 tz85_t2-2_dec.tz_image
# find . -cpio -ovB > /dev/rmt0h
```

The following sections discuss hardware and peripheral devices.

E.1.2 Procedure to Change ID Strings for TSZ07 Units

A vendor identity string change in the TSZ07 may cause some early units not to be recognized by the ULTRIX operating system. This section describes how to reset the Vendor ID and the Device ID strings associated with the earlier versions of the TSZ07.

To reset the Vendor ID, use the following steps. Note that you must take no longer than three seconds to perform each step from 3 through 7. If you do not perform these steps in the allotted time, you must begin the procedure from step 1.

1. Turn on both the AC Power Switch (rear panel) and the DC Power Switch (front panel).
2. If the ONLINE indicator is on, press the ONLINE switch (3) to turn the indicator off.
3. Press the WRT EN / TEST switch (4).
4. Press the DENSITY SELECT switch (5) and release, and then press the DENSITY SELECT switch (5) again.
5. Press the WRT EN / TEST switch (4).
6. Press the UNLOAD switch (2).
7. Press the DENSITY SELECT switch (5). The service aid now starts with the current vendor ID being displayed on the alphanumeric display and a cursor is placed on the left character space. The front panel switches function as follows:
   - 1 – Increments the selected character up the ASCII character set.
   - 2 – Decrements the selected character down the ASCII character set.
   - 3 – Moves the cursor one position to the right to select a character.
   - 4 – Exits service aid without saving changed characters.
   - 4 and 5 – Pressing both switches simultaneously saves new characters and exits the service aid; the message SAVING appears.
   - 5 – No function.
8. If the Vendor ID is DEC, exit the service aid. If the Vendor ID is CIPHER, change it to DEC, and save the change before you exit the service aid.

To reset the Device ID, use the following steps. Note that you must take no longer than three seconds to perform each step from 3 through 7. If you do not perform these steps in the allotted time, you must begin the procedure from step 1.

1. Turn on both the AC Power Switch (rear of panel) and the DC Power Switch (front panel).
2. If the ONLINE indicator is on, press the ONLINE switch (3) to turn the indicator off.
3. Press the WRT EN / TEST switch (4).
4. Press the DENSITY SELECT switch (5) and release, and then press the DENSITY SELECT switch (5) again.
5. Press the WRT EN / TEST switch (4).
6. Press the ONLINE switch (3).
7. Press the DENSITY SELECT switch (5). The service aid now starts with the current device ID being displayed on the alphanumeric display and a cursor is placed on the left character space. The front panel switches function as follows:
   - 1 – Increments the selected character up the ASCII character set.
   - 2 – Decrements the selected character down the ASCII character set.
   - 3 – Moves the cursor one position to the right to select a character.
   - 4 – Exits service aid without saving changed characters.

- 4 and 5 – Pressing both switches simultaneously saves new characters and exits the service aid; the message SAVING appears.
- 5 – No function.

8. If the Device ID is TSZ07, exit the service aid. If the Device ID is M995, change it to DEC, and save the change before you exit the service aid.

E.1.3 Graphics Drivers

If you set the ROM to use the serial line as the console, and there is a graphics board in the TURBOchannel option, the X server will not start up because the driver has not been initiated. This is because the graphics driver assumes it has been set up for the graphics console by the time it attempts to attach.

To avoid this, do not use the serial line console when you have a graphics device. Use the graphics console.

E.1.4 RQDX Q-bus Controller Jumper Settings

If there are multiple RQDX controllers and the RQDX2 is the last controller on the bus, ignore the jumper configuration stated in the hardware manual. The jumper setting should be 1, not 4 as stated in the hardware manual.

E.1.5 TK50 and TK70 Tape Usage

When a blank TK50 or TK70 tape is inserted into the drive, calibration marks are written on the tape. These calibration marks determine the tape format. The tape format can only be changed by a bulk tape eraser.

When using TK50 and TK70 tapes, the following rules apply:

- A TK50 formatted tape can be written and read on a TK50 drive.
- A TK50 formatted tape can be read but not written on a TK70 drive. The TK70 drive considers TK50 tapes to be hardware write-protected.
- A TK70 formatted tape can be written or read on a TK70 drive.
- A TK70 tape is completely unusable on a TK50 drive.

Violation of these rules may result in command failure and drive error log messages.

E.1.6 Data Corruption from Programs Accessing Tape Units

The TK70, TS11, and TU81 tape units require the data buffers to be aligned on a machine word boundary. Data corruption can occur if the data buffer boundaries are not aligned properly. When the buffer is declared as a local variable, the buffer will be on the user's program stack; alignment is therefore not ensured and may cause data corruption.

To ensure that the data buffer is correctly aligned, all programs that access tapes must declare the data buffer as a type static or as a global variable. The compilers then assure proper alignment of the data buffer and data.

E.1.7 Required Switch Settings for TSV05 Tape Drive

The switch settings for the TSV05 controller (M7196 and M7206) as described in the manuals *TSV05 Tape Transport – Pocket Service Guide* (EK-TSV05-PS-005) and *TSV05 Tape Transport Subsystem – Technical Manual* (EK-TSV05-TM-004) are incorrect.

The factory switch setting information for the M7206-PA module in the manuals lists switch E61-9 OFF. This factory switch setting does not work on ULTRIX systems running Version 3.0 and higher. The tape device always appears off line to the operating system if the switch is set to OFF.

E.1.8 Installing from a TE16 Tape Drive

During installation, you are asked to identify the software distribution device. If you are using a TE16 tape drive, choose the TU77 tape drive option. When your system is booted, the TE16 will be identified correctly.

E.1.9 Powering Down a TU81 Tape Drive

On the ULTRIX operating system, you cannot power down a controller while it is on line. If you attempt to power down or pull a controller while it is on line, problems may occur. Problems have been encountered because TU81 and TU81+ tape drives contain the TMSCP server logic.

If you must power down a TU81 drive, use the following steps:

1. Disconnect the TU81+ white cable, which connects the drive unit to the back plane of the host.
2. Power down the tape drive.
3. Attend to the tape unit as needed.
4. Power up the tape device.
5. Reconnect the TU81+ white cable.

E.1.10 TU81 Tape Drive Displaying Fault Light

A problem in the TU81 tape unit can cause data transfers to fail. All users who have TU81 tape units should contact a customer service representative to ensure that FCO number TU81 R-005 is applied and that the revision level is up to at least D1. Units that do not have this FCO applied will experience hard errors logged and the unit's controller fault light will light.

E.1.11 MSCP Disks Remain Off Line If Switched Off Line While in Use

If a disk unit served by the MSCP driver (any RA disk) is switched off line while operations are in progress, the disk cannot be brought back on line. If this happens, in-progress and subsequent data transfer operations to the unit will fail. The system call that failed will return an EIO error.

This condition can be cleared only by setting the unit back on line and rebooting the system.

E.1.12 Eight-Bit Terminal Driver Support

You must set up your hardware and software properly if you intend to use a terminal in full eight-bit mode. Refer to the `gettytab`(5) reference page for instructions on how to enable logins on terminal lines that require eight-bit characters. The `p8` and `pd` flags have been added to `gettytab` to facilitate the use of eight-bit characters.

Digital's VT100 series terminals are capable of displaying only the lower half of the DEC Multinational Character Set. Standard seven-bit ASCII characters are included in the lower half of the Multinational Character Set and ISO-8859/2.

Digital's VT200 and VT300 series terminals are capable of displaying the full DEC Multinational Character Set and ISO-8859/2. However, they do not display eight-bit characters when they are in VT100 mode. To determine the current terminal mode, call up the terminal's Set-Up Directory menu and select the `General` setup option.

For example, to change your VT220 terminal set up into eight-bit mode, follow these steps:

1. Call up the terminal's setup menu by pressing the Set-Up (F3) key. Select the `General` menu option.
2. Move to the field that allows you to select the terminal mode. Select the option `VT200 Mode, 7 Bit Controls.`
3. Select the `To Directory` option to return you to top level.
4. Call up the `Comm` menu. Select the `8 Bits, No Parity` option.
5. Exit from setup mode by pressing the Set-Up key again.

Note that when you change a VT200 or VT300 series terminal from VT100 mode, the F11 key no longer represents the escape key. Refer to your terminal's installation guide for a complete description of terminal setup.

The DECwindows terminal emulator, `dxterm` can also be set up for use with eight-bit characters. In this case, the terminal mode must be set to `VT300 Mode`, `7-bit Control`. Select the `Customize` menu, then the `General` menu.

E.2 Booting

E.2.1 Booting MSCP-type Disk Drives

For MSCP-type disk drives, the wait for critical system devices such as `root`, `swap`, and `dump` to become available may take up to 2 minutes. After waiting for 1 minute, a status message appears on the console that indicates that you must wait for a specified device.

E.3 Configuration

E.3.1 Unsupported Subsets

To install the unsupported subsets from tape, load the unsupported tape. To install subsets from your CD-ROM distribution, mount the `c` partition of the CD-ROM on `/mnt` and load subsets from `/mnt/RISC/UNSUPPORTED` or `/mnt/VAX/UNSUPPORTED`, as is appropriate.

E.3.2 The setld Command with the -v Function

The `setld` command with the `-v` function does not invoke `fverify`. This function checks to see if the subset is installed. If the subset is installed and it contains an Installation Verification Procedure (IVP), the IVP is executed.

E.3.3 Layered Products and the setld Command

Some layered products will not install because of an incompatibility with the `setld` command. When you try to install them, these products will issue an error message and exit before the `setld` menu is presented. To install these products, set the `STL_NOACTM` environment variable to 1. On VAX and RISC systems, `csh` users should enter the following command as `root`:

```
# setenv STL_NOACTM 1
```

Users of all other shells should enter this command:

```
# STL_NOACTM=1; export STL_NOACTM
```

Once you have set this variable, the product will be installed correctly.

Before installing any more products, unset the variable. On VAX and RISC systems, `csh` users should enter the following command as `root`:

```
# unsetenv STL_NOACTM
```

Users of all other shells should log out of the system and log back in before installing more software.

E.3.4 Optional Removal of the Kernel Object Subset

The ULTRIX operating system contains a kernel object subset, which allows full debug capabilities using the `dbx` debugger.

In order to save space, you can remove your kernel object subset from your installed system. On RISC processors, enter the following command:

```
# /etc/setld -d UDTBIN440
```

On VAX processors, enter the following command:

```
# /etc/setld -d ULTBIN440
```

It is important that you understand some of the trade-offs you make by removing this subset.

If you need to apply a kernel patch to your environment, you will need to reinstall the kernel object subset. This might require that you remove other system or user environments to make room for its installation. (This assumes that the space made available after removing the subset was used for another purpose.)

In general, any time you need to build a kernel for your system, the subset will need to be reinstalled. This could be for a simple need to modify some hardware or software configuration parameter in the system's configuration file.

We recommend that this procedure not be followed routinely. Rather, it is intended to solve space problems on smaller systems with smaller system disks. If you choose to remove the kernel object subset, wait until the system is properly configured and proven for some reasonable period of time.

E.3.5 Installing the Internationalization Subsets

Internationalization software has been divided into two subsets:

- UDTINTLPGMR430 and UDTINTLRT430 (RISC)
- ULTINTLPGMR430 and ULTINTLRT430 (VAX)

If you plan to use the Internationalization software, you must install both subsets.

E.3.6 Initial System Load Using RIS

During a base system installation using RIS, if a problem occurs when contacting the RIS server or with network traffic, an error in the `setld` utility causes the installation procedure to state that all mandatory subsets have been installed successfully and the following message is displayed:

```
The installation software successfully installed the mandatory software
subsets. However, it failed to install other parts of the supported
software subsets. You can continue with the installation and install
the other supported software subsets at a later time using the setld
utility or, you can request that the installation software again try
to install these supported software subsets.

Select one of the following options:

        1) Continue with the installation
        2) Try to re-install supported software subsets

Enter your choice [1]:
```

In order to complete the installation, check the network/RIS server status with the system administrator. If the problems are corrected, type 2 in response to the query and the installation process will continue.

E.3.7 Display Server Installation Script

The server installation script loads all servers but then removes all servers not relevant to the hardware you are installing on.

E.3.8 ULTRIX Worksystem Fonts Optional in DMS Installations

ULTRIX Worksystem Software fonts are not automatically installed on a diskless RISC or VAX workstation when the Diskless Management Services (DMS) utility is used for installation. Because all fonts are contained in optional subsets, when you install only the mandatory subsets, the X server will not come up because no fonts are available to it. Therefore, when doing a DMS installation, you must install a font for the server to use.

E.3.9 Rebuilding /genvmunix After an Upgrade Installation

The generic kernel image created by the installation process as `/genvmunix` can be useful at a later time. For example, it can be useful when you add new hardware such as a backup kernel image, and also for Prestoserve crash recovery when the system disk is lost.

To save the generic kernel image for later use, rebuild the generic kernel image after you perform the upgrade installation, but before you install any layered product. See the *Guide to Installing ULTRIX and UWS* for information on how to perform this

upgrade.

To rebuild the generic kernel on a RISC system:

```
# /etc/doconfig -c GENERIC
# cp /sys/MIPS/GENERIC/vmunix /genvmunix
# rm -rf /sys/MIPS/GENERIC
```

To rebuild the generic kernel on a VAX system:

```
# /etc/doconfig -c GENERIC
# cp /sys/VAX/GENERIC/vmunix /genvmunix
# rm -rf /sys/VAX/GENERIC
```

E.3.10 BINARY Configuration File and slip

The BINARY configuration file in `/sys/conf/mips` contains the pseudodevice definition for `slip`. However, the files necessary to build a kernel with `slip` are in the UDXINET430 subset, Unsupported TCP/IP Networking Util Extension.

If you want the `slip` program, you must install the UDXINET430 subset from the Unsupported Kit. If you do not want the program, you must delete its pseudodevice definition from the configuration file. The line to delete is:

```
pseudo-device sl
```

E.3.11 Vectors

To use vector processors on a system that supports vector processors, 6000-4xx, 6000-5xx, or 9000, you must add the following lines to the configuration file:

```
options           VECTORS
pseudo-device     vectors
```

Use the following syntax format for the options line:

```
options VECTORS =<number>
```

In the previous example, <number> is the maximum number of vector processes allowed. If a number is not specified, the maximum defaults to the MAXUPROC divided by 10.

E.3.12 Use of the hsc? Token in the System Configuration File

The `config` utility incorrectly handles the hsc? token in the system configuration file. Use the mscp token in place of the hsc? token to indicate a wildcard connection or, completely specify the hsc controller. For example:

```
ra0    at       hsc?  drive 0
```

The preceding line can be replaced with the following to match any hsc:

```
ra0    at       mscp  drive 0
```

Or, if connected to hsc0, the line can be replaced with the following:

```
ra0    at       hsc0  drive 0
```

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