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OpenVMS VAX Version 6.0
Upgrade and Installation Manual

OpenVMS

OpenVMS VAX Version 6.0 Upgrade and Installation Manual

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This manual provides step-by-step instructions for upgrading and installing the OpenVMS VAX operating system.

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Preface

Introduction   This manual is your *primary source* of information for upgrading and installing the OpenVMS VAX Version 6.0 operating system. Before you attempt to install or upgrade the operating system, be sure to read all the release notes and cover letters (if any) included in your distribution kit.

Who Should Use This Manual   If you are responsible for installing or upgrading the OpenVMS operating system and for performing related backup, shutdown, and startup procedures, read this manual before you install or upgrade to Version 6.0 of the OpenVMS VAX operating system.

How to Use This Manual   If you received factory-installed software with your computer, read that user documentation first for information about starting up your system. Otherwise, use this manual for step-by-step instructions for performing an installation or an upgrade. When the instructions in this manual direct you to do so, refer to the upgrade and installation supplement for information specific to your VAX computer.

How This Manual Is Organized   The information in this manual is organized as follows:

- Chapter 1 provides an overview of the upgrade and installation procedures. It describes what happens during an installation or an upgrade, lists some changes and restrictions you should be aware of, and refers you to the appropriate documentation.

- Chapter 2 describes the tasks you must perform before installing the OpenVMS VAX operating system.

- Chapter 3 describes how to install Version 6.0 of the OpenVMS VAX operating system on a VAXcluster or a standalone VAX computer.

- Chapter 4 lists the tasks you should perform after you install the OpenVMS VAX operating system.

- Chapter 5 contains cautions, restrictions, and requirements for upgrading your VAX computer system and tells you how to prepare your system for an upgrade.

- Chapter 6 contains additional information for upgrading a VAXcluster environment.

- Chapter 7 describes the procedure for upgrading a standalone VAX computer.

- Chapter 8 lists the tasks you should perform after the upgrade.

- Chapter 9 describes UETP (the User Environment Test Package) and how to use it to test the system.

- Chapter 10 describes how to customize DECwindows device support software.

- Chapter 11 describes how to use VMSTAILOR and DECW$TAILOR to add or remove optional OpenVMS software.

- Appendix A provides notes and supplemental license management information to the upgrade and installation procedures.

- Appendix B describes how to boot from the [SYSF] directory on the different types of VAX computers.

- Appendix C lists the subclasses in the OpenVMS VAX save sets C, D, E, and F.

- Appendix D lists DECwindows display server and font files.

- Appendix E provides a list of layered products that are immediately available with the release of the OpenVMS VAX Version 6.0 operating system.

  You should also refer to the *OpenVMS VAX Version 6.0 Release Notes Addendum*, which provides in-depth information regarding layered product availability and specific recommendations for customers who require layered products that are not immediately available upon the release of OpenVMS VAX Version 6.0.

- Appendix F lists files installed either over or under the version numbers of existing files during an upgrade.

- Appendix G describes methods for managing small capacity system disks, including some specific recommendations for installing or upgrading to the OpenVMS VAX Version 6.0 and the VMS DECwindows Motif Version 1.1 layered product.

- The Glossary defines commonly used terms.

- The Index provides a quick way to find information you need.

Associated Documents

The following documents contain information associated with performing an upgrade or installation:

- The upgrade and installation supplement for your VAX computer—Provides supplemental information necessary during an installation or upgrade, such as booting the system and determining device names.

- *OpenVMS VAX Version 6.0 Release Notes* and *OpenVMS VAX Version 6.0 Release Notes Addendum*—Describe changed software features, software problems and restrictions, layered product availability, and changes to the documentation for Version 6.0 of the OpenVMS VAX operating system.

- *OpenVMS VAX Version 6.0 New Features Manual*—Describes new software features for the OpenVMS VAX Version 6.0 operating system.

- *VMScluster Systems for OpenVMS*—Describes the procedures for establishing and managing VAXcluster configurations.

- *OpenVMS License Management Utility Manual*—Provides information about registering and managing licenses on an OpenVMS VAX system.

- *OpenVMS VAX Guide to System Security*—Describes security features provided by the OpenVMS VAX operating system, including criteria for C2 systems.

- The hardware manuals supplied with your VAX computer provide detailed information about system hardware.

Conventions Used in This Manual

In this manual, every use of OpenVMS VAX means the OpenVMS VAX operating system.

The following conventions are also used in this manual:

Ctrl/*x*	A sequence such as Ctrl/*x* indicates that you must hold down the key labeled Ctrl while you press another key or a pointing device button.
PF1 *x*	A sequence such as PF1 *x* indicates that you must first press and release the key labeled PF1, then press and release another key or a pointing device button.
Return	In examples, a key name enclosed in a box indicates that you press a key on the keyboard. (In text, a key name is not enclosed in a box.)
. . .	A horizontal ellipsis in examples indicates one of the following possibilities: • Additional optional arguments in a statement have been omitted. • The preceding item or items can be repeated one or more times. • Additional parameters, values, or other information can be entered.

.	A vertical ellipsis indicates the omission
.	of items from a code example or command
.	format; the items are omitted because
	they are not important to the topic being
	discussed.
( )	In format descriptions, parentheses indicate that, if you choose more than one option, you must enclose the choices in parentheses.
[ ]	In format descriptions, brackets indicate optional elements. You can choose one, none, or all of the options. (Brackets are not optional, however, in the syntax of a directory name in an OpenVMS file specification, or in the syntax of a substring specification in an assignment statement.)
{ }	In format descriptions, braces surround a required choice of options; you must choose one of the options listed.
boldface text	Boldface text represents the introduction of a new term or the name of an argument.
	Boldface text is also used to show user input in Bookreader versions of the manual.
italic text	Italic text emphasizes important information, indicates variables, and indicates complete titles of manuals. Italic text also represents information that can vary in system messages (for example, Internal error *number*), command lines (for example, /PRODUCER=*name*), and command parameters in text.
UPPERCASE TEXT	Uppercase text indicates a command, the name of a routine, the name of a file, or the abbreviation for a system privilege.
-	A hyphen in code examples indicates that additional arguments to the request are provided on the line that follows.
numbers	All numbers in text are assumed to be decimal, unless otherwise noted. Nondecimal radixes—binary, octal, or hexadecimal—are explicitly indicated.

This manual often refers to products by their abbreviated names. For example, the VAX 8200, VAX 8250, VAX 8300, and VAX 8350 computers are referred to as the VAX 8200, 8250, 8300, 8350. The MicroVAX 2000 computer is referred to as the MicroVAX 2000, and so on.

1

Overview of Installation and Upgrade Procedures

Overview

This chapter describes what happens during the installation and upgrade procedures. It lists changes since the previous version and cautions and restrictions you should be aware of for OpenVMS VAX Version 6.0. It also describes the contents of the distribution kit, tells you whether you should do an installation or an upgrade, and refers you to the appropriate documentation.

Cautions, Restrictions, and Changes

Introduction   This section describes cautions and restrictions you should be aware of and the new or changed features in the OpenVMS Version 6.0 installation and upgrade procedures.

Cautions   **Layered Product Availability.** Some layered products will not be available immediately upon the release of the OpenVMS VAX Version 6.0 operating system. Appendix E of this manual provides a list of layered products that are available with the release of OpenVMS VAX Version 6.0.

You should also refer to the *OpenVMS VAX Version 6.0 Release Notes Addendum*, which provides in-depth information regarding layered products, including:

*   Availability status for 300 layered products

*   Layered product versions that work on OpenVMS VAX Version 6.0

*   Mixed-version cluster compatibility status

*   Prerequisite layered product dependencies matrix

*   Layered products that need to be reinstalled

*   Specific recommendations for customers who require layered products that are not immediately available

DECnet–VAX Phase V Users. The OpenVMS VAX Version 6.0 kit installs the DECnet–VAX (DNA Phase IV) software. If you are currently running any of the DECnet Phase V products (DECnet–VAX Extensions, DECnet/OSI Version 5.5 for OpenVMS VAX, or DECnet/OSI Version 5.6 for OpenVMS VAX), you need to be aware of the current status of the network before you install or upgrade to of the OpenVMS VAX Version 6.0 operating system. (Installation and upgrade procedures are described later in this chapter.)

The DECnet–VAX Extensions product is not supported for OpenVMS VAX Version 6.0. If you currently have DECnet–VAX Extensions running on your system, you need to plan now for the upgrade to DECnet/OSI. You can ugrade to DECnet/OSI Version 5.6 now or wait for DECnet/OSI Version 5.7, which is planned for release in January 1994.

Note that DECnet/OSI Version 5.6 for OpenVMS VAX is supported on VMS Version 5.5–2. DECnet/OSI Version 5.7 for OpenVMS VAX is the release of DECnet/OSI that will be supported on OpenVMS VAX Version 6.0.

If you are currently using OSI, X.25, or NCL components and want to continue to use them with OpenVMS VAX Version 6.0, you must install DECNET/OSI Version 5.7 for OpenVMS VAX when it becomes available. Refer to the DECnet/OSI planning and installation documentation for information about planning for and implementing DECnet/OSI.

DECnet–VAX Version 6.0 is shipped with OpenVMS VAX Version 6.0. To upgrade to DECnet–VAX Version 6.0, you must perform an *installation* of OpenVMS VAX Version 6.0, which will produce a new DECnet–VAX Phase IV system.

After the OpenVMS VAX Version 6.0 installation procedure completes, you will need to run the Phase IV NETCONFIG.COM and edit the SYSTARTUP_VMS.COM file to be sure that STARTNET.COM is not automatically run on system startup (refer to the section Configuring and Starting DECnet for OpenVMS in Chapter 4).

If you are currently running Version 5.5 or Version 5.6 of DECnet/OSI for OpenVMS VAX, you have the following options:

- You can remain at VMS Version 5.5–2 until DECnet/OSI Version 5.7 is available.

- You can revert to DECnet–VAX Phase IV if you have no need for OSI, X.25, or NCL. If you choose this option, you must perform an installation of the OpenVMS VAX operating system.

The network products associated with DECnet–VAX Extensions (P.S.I., WANDD, VOTS, OSAK, and FTAM) are no longer available separately. If you need these products, you must migrate to DECnet/OSI Version 5.7 for OpenVMS VAX when it becomes available. See the DECnet/OSI installation and configuration manuals for information about upgrading your DECnet/OSI software.

Restrictions

Restrictions for OpenVMS VAX Version 6.0 include:

- The minimum memory requirement has increased from 2 megabytes to 4 megabytes.

- The MA780 shared memory is no longer supported.

- You cannot install or upgrade to Version 6.0 of the OpenVMS VAX operating system on the following VAX computers and system disks:

Computers	MicroVAX I, VAXstation I, VAXstation 8000, and VAX 11/725
System disks	RK07, RL02, RC25, RD32, RD51, RD52, RD53, RZ22, and RZ23

- If your system uses an RZ23L or some other small capacity system disk (less than 150 megabytes), the entire OpenVMS VAX Version 6.0 operating system *and* the complete VMS DECwindows Motif Version 1.1 layered product will not fit on your disk. Appendix G describes some methods that will enable you to install or upgrade to OpenVMS VAX Version 6.0 and VMS DECwindows Motif Version 1.1 on a small capacity system disk.

  Note that you can use the methods described in Appendix G to free up disk space on any system.

Changes Since the Previous Version

New or changed features include:

- **New Default Editor.** The default editor has been changed from /EDT to /TPU. This means that, when you enter the DCL command EDIT, you now start the Extensible Versatile Editor (EVE) instead of EDT.

  If you want to use EDT, you must use the /EDT qualifier on the EDIT command. Likewise, you must modify any DCL command procedure that uses the EDIT command to include the /EDT qualifier. For more information, see *OpenVMS VAX Version 6.0 Release Notes*.

- **DECwindows.** The OpenVMS VAX operating system no longer ships the VMS DECwindows product. The operating system now ships only the DECwindows base support and workstations support components. To get full DECwindows support, you must also install the separate DECwindows Motif for OpenVMS VAX (previously called VMS DECwindows Motif layered product, which supports both Motif and XUI environments.

  Note: The DECwindows base support and DECwindows workstations support components are *not* shipped with the DECwindows Motif for OpenVMS VAX layered product.

  The DECwindows base support component includes the DECwindows transport and DECwindows keymap files. If you plan to run DECwindows software, you must select this option when installing or upgrading to OpenVMS VAX Version 6.0. (Or, you can use the DECW$TAILOR utility to provide these files later, as described in Chapter 11.)

  The DECwindows workstation support component includes the X11 display server, graphics drivers, and font files necessary for running OpenVMS on VAX workstations. If you are installing on a workstation or on a cluster that contains workstations, you must select this option when installing or upgrading to OpenVMS VAX Version 6.0 or use the DECW$TAILOR utility to provide these files later.

If you are installing on a system that does not include workstations but does have Xterminals, you might want to choose the DECwindows workstation support option to provide additional font files or use the DECW$TAILOR utility to provide these files later. (VT1200 terminals require the font files.)

- **New Save Sets.** Two new save sets (Help Message and OpenVMS Manuals) are available. These save sets can be installed on the system disk or on an alternate disk.

- **Library Decompression.** LIBDECOMP.COM now lets you select which libraries to decompress.

- **SYSTARTUP_V5.COM Renamed.** During Phase 1 of an upgrade, the procedure renames SYSTARTUP_V5.COM to SYSTARTUP_VMS.COM.

All these features are discussed in this manual.

Definitions: A Few Key Terms

You should be familiar with the following key terms before performing an installation or upgrade:

Term	Definition
Distribution Media	The media containing the OpenVMS VAX operating system software. This software is supplied in a format that the computer cannot use until you perform an installation or upgrade.
System Disk	The disk that contains (or will contain) the OpenVMS VAX operating system in a usable format. The installation or upgrade procedure converts the OpenVMS VAX operating system software to this usable format when transferring the software from the distribution media to the system disk.
Local Drive	A drive that is connected directly to a VAX computer. For example, a magnetic tape drive connected directly to a VAX computer is referred to as a local tape drive. If you have a standalone VAX computer, it is likely all the drives connected to your system are local drives.
InfoServer	A general-purpose disk storage server that allows you to use the distribution compact disc to install the operating system on remote client systems connected to the same LAN (local area network).
Source Drive	The drive that holds the distribution media during the upgrade or installation.
Target Drive	The drive that holds the system disk—or, for some files, the alternate disk—during the upgrade or installation.

Term	Definition
HSC Drive	A drive connected to a hierarchical storage controller (HSC) device. For example, a magnetic tape drive connected to an HSC device is referred to as an HSC tape drive.
	The HSC is a self-contained, intelligent, mass storage subsystem that enables VAXcluster nodes to share Digital Storage Architecture (DSA) disks.

For definitions of other specialized terms used in this manual, see the glossary at the end of this book.

Locating Files on the Distribution Media

Introduction
The OpenVMS VAX Version 6.0 files are stored on the distribution media as the following save sets:

Save Set Name	Description
VMS060.A	Required
VMS060.B	Required
VMS060.C	Library (optional)
VMS060.D	Optional (see Appendix C)
VMS060.E	Help Message (optional)
VMS060.F	OpenVMS manuals (optional)

On Magnetic Tape
The OpenVMS VAX Version 6.0 magnetic tape kit contains OpenVMS VAX software on three tapes. The first tape contains the required save sets VMS060.A and VMS060.B. The second tape contains the save sets VMS060.C and VMS060.D. The third tape contains save sets VMS060.E and VMS060.F and the DECwindows base support and workstation support files.

On Tape Cartridges
The OpenVMS VAX Version 6.0 TK50 tape kit contains OpenVMS VAX software on two tape cartridges. The first cartridge contains VMS060.A, VMS060.B, VMS060.C, VMS060.D, VMS060.E, and VMS060.F save sets. The second cartridge contains standalone BACKUP and DECwindows base support and workstation support files.

On Compact Disc
The OpenVMS VAX Version 6.0 compact disc kit contains all of the save sets and DECwindows base and workstation support files on one compact disc.

Note that you can install or upgrade the operating system from a local compact disc drive as well as from an InfoServer device.

Installation Procedure

What Happens During an Installation

When you install the OpenVMS VAX operating system, the installation procedure does the following:

- Initializes the system disk, overwriting its contents.

- Creates a system directory structure.

- Transfers the OpenVMS VAX files from the distribution media to the system disk. Some files can be transferred to an alternate disk.

When to Perform an Installation

Use the installation procedure under the following conditions:

- If your VAX computer is new (it has never had any version of the operating system running on it, including factory-installed software).

- If your VAX computer is running a previous version of the operating system and you want to overwrite the entire contents of the system disk (the OpenVMS VAX operating system, application software, and user files).

- If you are running a previous version of the operating system, but you cannot upgrade. For example, if you changed the names of system directories on the system disk, the upgrade procedure will not work correctly. You can either restore the system disk to its original directory structure, or you can reinstall the OpenVMS VAX operating system.

Caution: The installation procedure initializes the system disk, overwriting its contents. For this reason, use the installation procedure only on new VAX computers or if you want to destroy the contents of the system disk.

How to Use the Installation Documentation

This manual contains step-by-step instructions for performing an OpenVMS VAX installation. However, you will need to refer to several different documents before and during the installation. Figure 1–1 illustrates the major steps in an installation and the documents you will use to perform each step.

Figure 1–1 Documentation Used to Perform an Installation
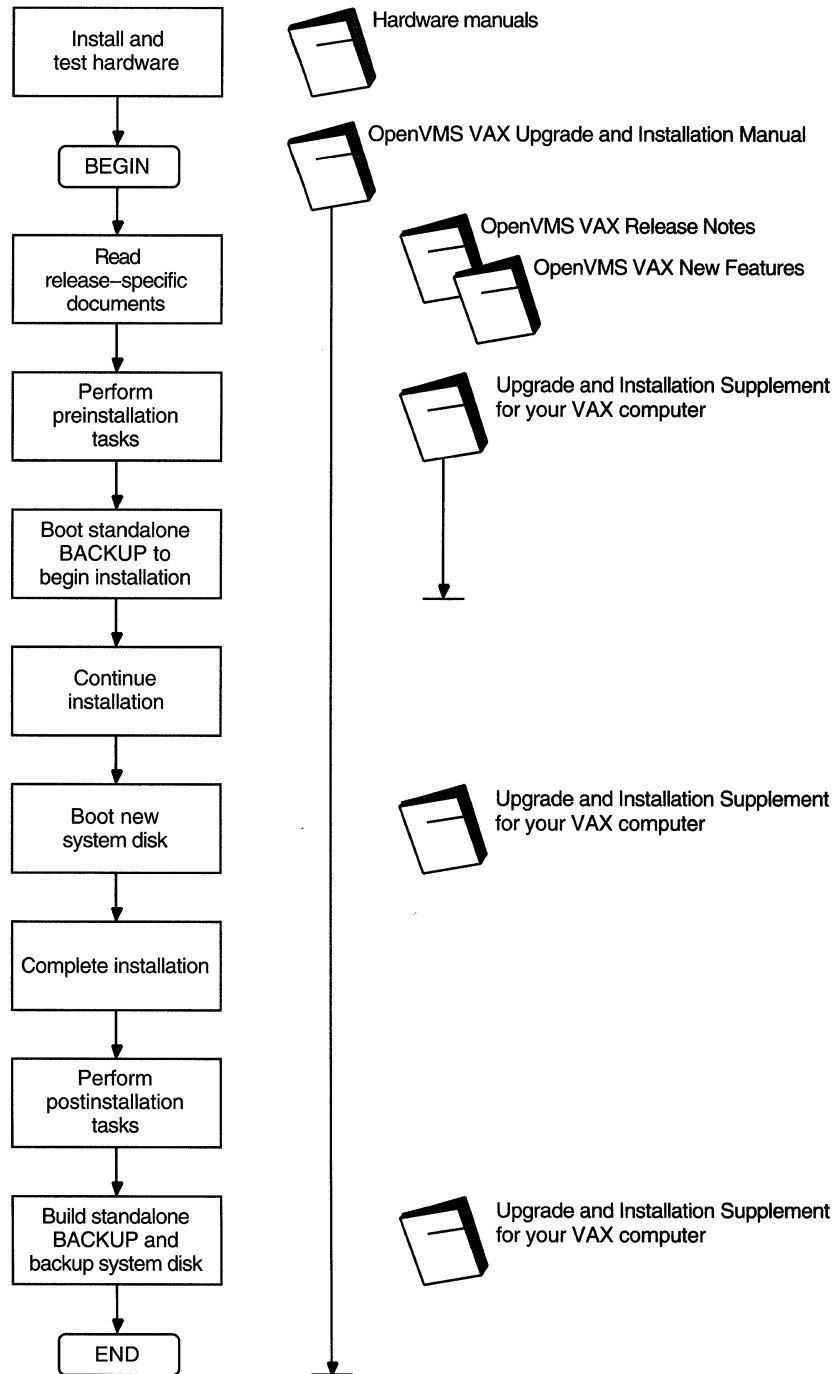
ZK–9697–GE

Upgrade Procedure

What Happens During an Upgrade

When you upgrade the OpenVMS VAX operating system, the upgrade procedure does the following:

- Deletes and purges some OpenVMS VAX files on the system disk but leaves all the user files intact.

- Transfers the new OpenVMS VAX files from the distribution media to the system disk.

  Note: The upgrade procedure puts the most recent versions of the OpenVMS VAX files in SYS$COMMON.

- Merges some of the old VMS files and the new OpenVMS VAX files and replaces others.

  Certain OpenVMS VAX files are placed either over or under existing files (that is, they are given a version number above or below the version number of the existing file). This is done to protect any customizations to the files and results in having two versions of the file when the upgrade is completed. For more information, see Appendix F.

- Cleans up files and structures used only during the upgrade.

- Leaves your VMS license and System Integrated Product (SIP) licenses intact.

  You do not need to reinstall these licenses after you upgrade. (See Appendix A for detailed information about license management for OpenVMS VAX Version 6.0.)

When to Perform an Upgrade

In most cases, you can use the upgrade procedure to obtain a higher version of the OpenVMS VAX operating system. Unlike the installation procedure, the upgrade procedure does not initialize your system disk. This means you can get the latest version of the operating system and keep your user files and optional software files intact.

Restrictions

The upgrade procedure will not work correctly if you have changed the names of system directories on your system disk. Restore your system disk to a standard directory structure before attempting an upgrade.

How to Use the Upgrade Documentation

This manual contains step-by-step instructions for performing an OpenVMS VAX upgrade. However, you will need to refer to several different documents before and during an upgrade. Figure 1–2 illustrates the major steps in an upgrade and the documents you will use to perform each step.

Figure 1–2 Documentation Used to Perform an Upgrade
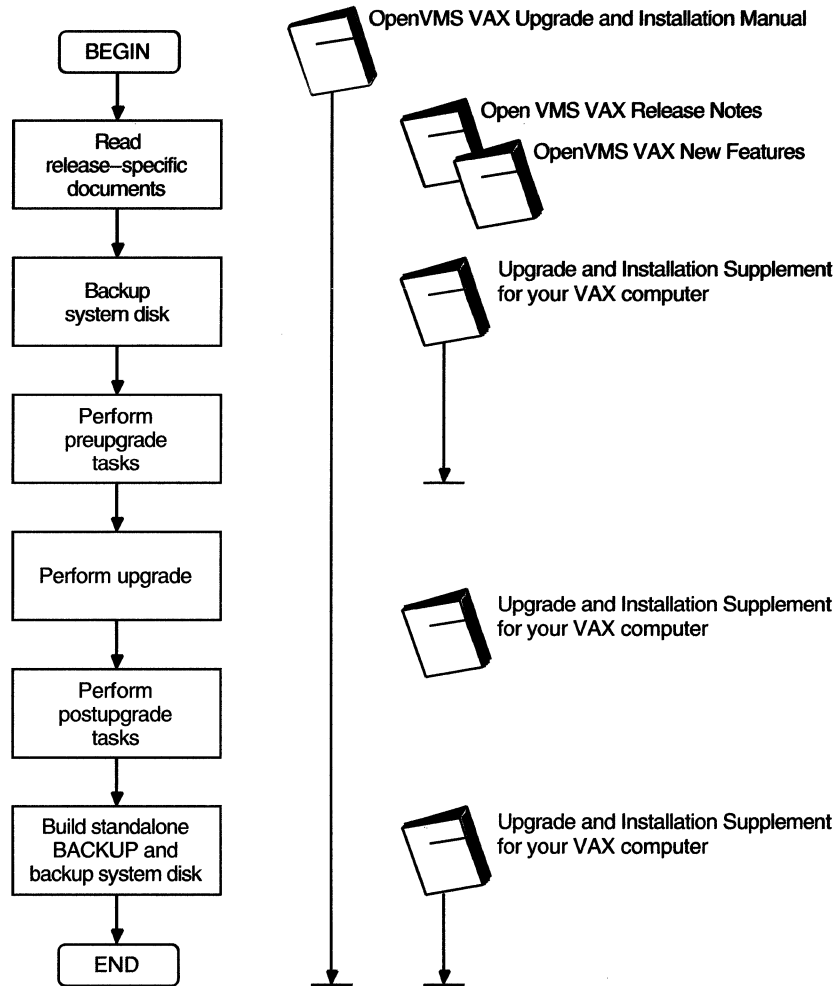
ZK–9696–GE

Where to Go Next

If you are installing the OpenVMS VAX operating system, go to Chapter 2.

If you are upgrading the OpenVMS VAX operating system, go to Chapter 5.

2

Before Installing OpenVMS VAX

Overview

This chapter describes how to prepare for installing the OpenVMS VAX Version 6.0 operating system, including:

- Being aware of the cautions and restrictions
- Ensuring your hardware is ready
- Ensuring your software distribution kit is complete
- Preparing for a C2 system
- Preparing for a VAXcluster environment
- Preparing your tape and disk drives
- Gathering the information you need to supply during the installation procedure
- Completing the preinstallation checklist

If you are an experienced system manager, you can use the checklist at the end of the chapter to complete all the necessary preinstallation tasks.

If you are a less-experienced system manager, you should read the entire chapter and then use the checklist to make sure you completed all the preinstallation tasks.

Cautions and Restrictions

Introduction
Before you begin the installation procedure, note the following cautions and restrictions.

Cautions

- The software installation procedure overwrites the contents of the system disk. Use the installation procedure only if your VAX computer is new or if you want to destroy the contents of the system disk. If your system disk contains files you want to save, you should *upgrade* to the new version of OpenVMS VAX. For an overview of the upgrade procedure, see Chapter 5.

- Do not attempt to use VMSINSTAL with OPTION G to transfer OpenVMS VAX save sets to another media type; doing so will produce an unusable system. Instead, you can use the DCL command COPY to transfer save sets to another media type.

  If you move the save sets from the distribution media before beginning the installation, you must move them to the [000000] directory on a disk that is *not* the system disk; otherwise, the installation will fail.

Restrictions

- If your system contains Digital Storage Systems Interconnect (DSSI) disks attached to a KFQSA controller, you will notice a change in the device names for DSSI disks attached to KFQSA controllers.

  When you boot standalone BACKUP, it will display the devices on your system using the *new* device naming scheme. Use the new device names throughout the installation and after you complete the installation.

- If you want to use DECwindows software with OpenVMS VAX Version 6.0, you must purchase and install the VMS DECwindows Motif Version 1.1, or higher, layered product. (Note that, for versions higher than 1.1, the name of the layered product is DECwindows Motif for OpenVMS VAX.)

Are You Ready to Install?

Introduction   Before you begin to install the OpenVMS VAX operating system, make sure you have all the required hardware and software components.

Hardware Components   Examine your hardware for the following:

- Make sure the hardware has been installed and checked for proper operation. For detailed information about the hardware, see the hardware manual for your VAX computer.

- Make sure you know how to turn on and operate your system components, including the system unit, console, monitor, drives, terminals, and printers. If necessary, read the manuals that came with these components.

- Set up your system to record the installation procedure on either a hardcopy terminal or a printer attached to the console terminal. If you do not do this, the screen messages will be lost. You will need a transcript in case there is a problem during the installation. For more information, see the upgrade and installation supplement for your computer.

Software Components   Examine your software for the following:

- Make sure you have all the items listed on the bill of materials (BOM) in the OpenVMS VAX distribution kit. If your kit is incomplete, notify Digital Software Supply, and request priority shipment of any missing items.

- Before installing the OpenVMS VAX operating system, read Appendix A of this manual for license management information, the *OpenVMS VAX Version 6.0 New Features Manual*, *OpenVMS VAX Version 6.0 Release Notes*, and any cover letters included with your kit.

- Read the Before Installing OpenVMS section in the upgrade and installation supplement for your VAX computer, which describes tasks specific to your VAX computer that you must complete before beginning the installation.

Preparing for an Installation

Introduction

Now that you have determined that your hardware and software components are ready, you can make the necessary preparations for installing the OpenVMS VAX operating system.

Preparing for a C2 System

Many of the security features provided by the OpenVMS VAX operating system are directed toward the criteria for a C2 system, as defined in the *Department of Defense Trusted Computer System Evaluation Criteria*, published by the Department of Defense Computer Security Center (DOD 5200.28-STD).

A C2 system is the shipped system that has been configured according to the guidelines in Appendix C of the *OpenVMS VAX Guide to System Security*. Before installing OpenVMS VAX, become familiar with the requirements for operating an OpenVMS VAX system within the C2 framework.

Preparing for a VAXcluster Environment

If you are installing the OpenVMS VAX operating system in a VAXcluster environment, the installation procedure will ask you for information about your VAXcluster environment. Before proceeding, review *VMScluster Systems for OpenVMS*, which provides the information you will need to answer questions during the installation.

Note: Entering incorrect information during the installation can force you to repeat the entire installation procedure.

Table 2–1 lists the VAXcluster information you need and explains how to obtain that information. For a complete explanation, see *VMScluster Systems for OpenVMS*.

Table 2–1   VAXcluster Information for Installations

Information You Need	How to Get It
Type of configuration	Configuration types are distinguished by the interconnect device that the VAX computers in the cluster use to communicate with one another— CI (Computer Interconnect), Ethernet, DSSI (Digital Storage Systems Interconnect), or FDDI (Fiber Distributed Data Interface).
DECnet node name and node address	Determined by the network or system manager for each VAX computer on the network. See your system or network manager for the DECnet node name and node address for the VAX computer on which you are installing the OpenVMS VAX operating system. See the *DECnet for OpenVMS Guide to Networking* for more information.

Table 2–1 (Cont.) VAXcluster Information for Installations

Information You Need	How to Get It
Allocation class value	During the installation procedure you will be asked for the ALLOCLASS value of the VAX computer on which you are installing the OpenVMS VAX operating system. For example:
	`Enter a value for MYNODE's ALLOCLASS parameter:`
	Refer to *VMScluster Systems for OpenVMS* for the rules on specifying allocation class values. Note that, in a mixed-interconnect VAXcluster environment, the allocation class value cannot be zero. It has to be a value between 1 and 255. This is also true for any VAX computer that is connected to a dual-pathed disk.
	When you enter the allocation class value, the installation procedure uses it to automatically set the value of the system parameter ALLOCLASS.
Quorum disk	See *VMScluster Systems for OpenVMS* to determine whether you want a quorum disk in the cluster.
Location for page and swap files	See the *VMScluster Systems for OpenVMS* to determine where the page and swap files will be located for the system from which you are installing the OpenVMS VAX operating system software.
MOP servers, disk servers, tape servers	To establish either a local area or a mixed-interconnect cluster, determine which systems will be Maintenance Operations Protocol (MOP) servers, disk servers, and tape servers. Refer to *VMScluster Systems for OpenVMS*.
Cluster group number and cluster password	Needed to establish either a local area or a mixed-interconnect cluster.
	Cluster group number: A number in the range from 1 to 4095 or from 61440 to 65535.
	Cluster password: Can range from 1 to 31 alphanumeric characters, including dollar signs ($) and underscores (_).

Preparing Tape and Disk Drives

Prepare your tape and disk drives using the following steps:

1. Decide which drive will hold the distribution tape and which drive will hold the system disk. Determine the device names for each drive, and write these names on a piece of paper. You will need this information throughout the installation. If you need information about devices and device names, refer to the Before Installing the OpenVMS Operating System section in the upgrade and installation supplement for your VAX computer.

   Note: Do not place the distribution media in the drive at this point.

2. Follow this step only if the **source drive** or **target drive** is attached to a hierarchical storage controller (HSC). Otherwise, go to step 3.

   Make sure that both the CI and HSC devices are turned on and on line. Obtain the HSC name from the system manager, or use the following procedure:

   a. Press Ctrl/C at the HSC console terminal.

   b. Enter the following command at the HSC> prompt and press Return:

   ```
   HSC> SHOW SYSTEM
   ```

   The information displayed includes the name of the HSC. For example:

   ```
   18-JUN-1993 15:00:00.00 Boot:21-Feb-1992 11:31:11.41  Up: 51:00
   Version V350              System ID: %X000000011        Name: MUTT
                .
                .
                .
   DISK allocation class = 1 TAPE allocation class = 0
   Start command file Disabled

   SETSHO - Program Exit
   ```

   For more information, see the *HSC User's Guide*.

3. Place a **scratch disk** in the drive for the system disk (unless the system disk is fixed).

4. Spin up the disk that will be the system disk but *do not* write protect it.

Information You Need During the Installation

During the installation, the procedure prompts you to supply certain information. To save time once the procedure begins, be sure you have the following information available. Remember, entering incorrect information during the installation could force you to repeat the entire installation procedure.

Required Information	Explanation
Passwords	You will be prompted to type passwords of at least 8 characters for the SYSTEM, SYSTEST, and FIELD accounts.
Optional components	The installation procedure prompts you to specify whether you want to install the *library* (VMS060.C) and *optional* (VMS060.D) components. Appendix C lists the files included in these components.
	You can save some space on your system disk if you choose *not* to install these components, but be sure to review Appendix C before deciding.

Required Information	Explanation
Location for Help Message utility and online manuals	Two new save sets are available with this release of the operating system. Save set VMS060.E contains the online Help Message utility, and VMS060.F contains three online reference manuals in ASCII format: *OpenVMS Master Index*, *OpenVMS Glossary*, and *Overview of OpenVMS Documentation*.
	Know the name of the disk on which you will be installing these save sets. You can install these save sets on your system disk or on alternate disks. (However, if you copied the distribution kit to some other media from which you will be performing the installation, you cannot install these save sets on that media.) Save set VMS060.E can reside on one alternate disk, and save set VMS060.F can reside on another. However, you cannot divide the text files in save set VMS060.F between disks; they must all be on the same disk.
DECwindows components	The installation procedure prompts you to specify which of the following DECwindows components you want to install:

- DECwindows base support (required for running DECwindows software), which includes:
  - DECwindows transport
  - DECwindows keymaps
- DECwindows workstation support (required for VAX workstations), which includes:
  - DECwindows X11 display server
  - Graphics drivers
  - 75 dots/inch video fonts
  - 100 dots/inch video fonts (option available only if you select DECwindows workstation support)

You must install the DECwindows Motif for OpenVMS VAX (previously called VMS DECwindows Motif) layered product if you want to run the DECwindows software. VMS DECwindows Motif Version 1.1 is the minimum supported version for systems running OpenVMS VAX Version 6.0. If you do not know which version of DECwindows Motif you are currently running on your system, you can check by entering the following command:

```
$ ANALYZE/IMAGE SYS$LIBRARY:DECW$XLIBSHR.EXE
```

Note: The DECwindows Motif for OpenVMS VAX layered product does *not* have the DECwindows base and workstation support components. To get full DECwindows support, you must select the DECwindows components provided with the OpenVMS VAX Version 6.0 kit and install the separate DECwindows Motif for OpenVMS VAX layered product, which supports both Motif and XUI environments.

Required Information	Explanation
PAK information	The information listed on Product Authorization Keys (PAKs) for your OpenVMS VAX license and any system-integrated products you will run. The installation procedure gives you the opportunity to register any licenses you have. To register your licenses, you will need to enter the information listed on the PAK for each license.

Preinstallation Checklist

Introduction

Before you begin the installation, use the following checklist to make sure you have completed all of the tasks described in this chapter:

Did you . . .

☐ Read the cautions and restrictions described at the beginning of this chapter?

☐ Make sure the hardware is installed and tested? (Described in the hardware manuals for your VAX computer.)

☐ Check the contents of your kit against the bill of materials (BOM)?

☐ Read Appendix A of this manual, the *OpenVMS VAX Version 6.0 New Features Manual*, the *OpenVMS VAX Version 6.0 Release Notes*, and any cover letters included with your kit?

☐ Read the section Preparing for a C2 System for special considerations about running the OpenVMS VAX operating system in a C2 environment if you intend to create a C2 compliant environment?

☐ Turn on the system? (Described in the upgrade and installation supplement for your VAX computer.)

☐ Set up your system to record the installation procedure? (Described in the upgrade and installation supplement for your VAX computer.)

☐ Read the Before Installing OpenVMS section in the upgrade and installation supplement for your VAX computer and perform the tasks described there?

☐ Make sure you have the most recent version of the console media if you have a VAX computer that uses console media? (Described in the upgrade and installation supplement for your VAX computer.)

☐ Determine whether you want a CI-only, local area, or mixed-interconnect cluster if you are installing the OpenVMS VAX operating system on a VAX computer in a VAXcluster environment? (Described in *VMScluster Systems for OpenVMS*.)

You should have the following information, depending on the type of VAXcluster:

- CI-Only VAXcluster: Get the allocation class value, DECnet node name, and DECnet node address for the computer. You also need to decide if you want a quorum disk and where the page and swap files for the system from which you are installing will be located.

- Local Area and Mixed-Interconnect VAXclusters: Get the allocation class value, the DECnet node name, the DECnet node address, the cluster group number, and the cluster password. You also need to decide if you want a quorum disk and where the page and swap files for the system from which you are installing will be located.

☐ Prepare the disk and tape drives? (Described in the section Preparing Tape and Disk Drives.)

☐ Make sure you have the following information (described in the section Information You Need During the Installation) available:

- Passwords containing at least 8 characters for the SYSTEM, SYSTEST, and FIELD accounts?

- A list of optional OpenVMS VAX components you want to install?

- A list of optional DECwindows support components you want to install?

- Information listed on Product Authorization Keys (PAKs) for your OpenVMS VAX license and any system-integrated products you will run?

Where to Go Next

After you have performed all the tasks in the checklist, go to Chapter 3 to begin the installation.

3

Installing the OpenVMS VAX Operating System

Overview

During the installation procedure, OpenVMS VAX files are transferred from the distribution media to the system disk or, for certain files, to an alternate disk. The following installation tasks are described in this chapter:

- Booting standalone BACKUP
- Creating the system disk
- Joining a VAXcluster
- Setting passwords
- Creating the rights database
- Registering licenses
- Running AUTOGEN

At certain points in the procedure you will need to refer to the upgrade and installation supplement for your VAX computer.

Booting Standalone BACKUP

Introduction

Standalone BACKUP is a subset of the OpenVMS Backup utility (BACKUP). Because you boot it into main memory, standalone BACKUP executes outside the control of the operating system. You use standalone BACKUP to restore the *required* save sets from the distribution media to your system disk.

Where to Find Standalone BACKUP

Each piece of media in the distribution kit has a label that indicates its contents. For example, there are two tape cartridges in a TK50 kit. Standalone BACKUP is on the tape cartridge labeled *VMS V6.0 BIN TK50 2/2 S/A BKUP.*

Booting from Tape Cartridge

If your distribution media is tape cartridges, complete the following steps to boot standalone BACKUP. (If you are using an InfoServer device, go to the next section.)

1. Place the media that contains standalone BACKUP in the source drive or in the console drive.

2. Follow the instructions in the Booting Standalone BACKUP section of the upgrade and installation supplement for your VAX computer.

3. After you boot standalone BACKUP, the system displays the following:

```
%BACKUP-I-IDENT, standalone BACKUP V6.0; the date is 18-JUN-1993 15:00
$
```

Note: If you have a tape cartridge kit, remove the tape cartridge 2/2 from the drive after you boot standalone BACKUP. Put the tape cartridge that contains the OpenVMS VAX operating system in the drive. The tape cartridge is labeled *VMS V6.0 BIN TK50 1/2 VMS BINARY.*

Where to Go Next

After you have booted standalone BACKUP, go to the section Creating the System Disk.

Booting from an InfoServer Device

If you are using the InfoServer to boot standalone BACKUP from a compact disc, complete the following steps:

1. Insert the distribution compact disc into the drive.

2. Follow the instructions in the Booting Standalone BACKUP section of the upgrade and installation supplement for your VAX computer.

3. Enter your VAX processor boot command by using the designator for the Ethernet adapter in the boot path and, except for the VAX 9000 computer, add the /R5:100 qualifier to the boot command.

For example, on a VAX 6000 computer:

```
>>> B/R5:100/X:D/B:6 ET0
```

On VAX 9000 computers, standalone BACKUP resides on the console hard disk. Because the boot process is slightly different for each type of controller, each supported controller has a unique boot command procedure. Refer to the upgrade and installation supplement for your VAX 9000 computer for instructions for booting standalone BACKUP on your system.

4. During an InfoServer boot, the procedure prompts you for a file name that contains an ISL (initial system load) boot program instead of a virtual memory boot (VMB) program. Select one of the two files as follows:

- ISL_SVAX_060

- ISL_LVAX_060

Use the following table to determine which file name and boot path designator to use for your processor. Note that the VAX 9000 computer has the ISL file data built in its VMB image that runs from the console.

Processor Series	ISL File	Boot Path Designator
VAX 3000	ISL_SVAX_060	ESA0 (LANCE), XQA0 (DELQA)
VAX 4000	ISL_SVAX_060	EZA0 (SGEC), XQA0 (DELQA)
VAX 6000	ISL_LVAX_060	EXA0 (DEMNA), FXA0 (DEMFA), ETA0 (DEBNI) (DEBNA)
VAX 7000	ISL_LVAX_060	EXA0 (DEMNA), FXA0 (DEMFA)
VAX 10000	ISL_LVAX_060	EXA0 (DEMNA), FXA0 (DEMFA)
MicroVAX	ISL_SVAX_060	ESA0 (LANCE), XQA0 (DELQA)
VAXstation	ISL_SVAX_060	ESA0 (LANCE)
VAXft 110, 310, 410, 610, and 612	ISL_SVAX_060	EPA0 (LANCE)

On a VAX 6000 computer, you would respond to the prompt as shown in the following example:

```
Loading system software.
```

```
Filename: ISL_LVAX_060
```

5. The InfoServer ISL program then displays the following menu:

```
Network Initial System Load Function
Version 1.1

    FUNCTION         FUNCTION
      ID
      1    -         Display Menu
      2    -         Help
      3    -         Choose Service
      4    -         Select Options
      5    -         Stop

    Enter a function ID value:
```

If you need more information, select function ID 2 for help.

6. After you boot standalone BACKUP, the system displays the following:

```
%BACKUP-I-IDENT, standalone BACKUP V6.0; the date is 18-JUN-1993 15:00
$
```

Where to Go Next

Once you have booted standalone BACKUP, go to the section Creating the System Disk.

Creating the System Disk

Overview

This section describes the steps for transferring the OpenVMS VAX files from the distribution media to your system disk or, for certain files, to an alternate disk.

To transfer the OpenVMS VAX files from the distribution kit to your system disk, perform the following steps:

Step 1: Determine Device Names

If you have not already done so, determine the device names for the source drive and the target drive. Write these names on a piece of paper. You will need this information throughout the installation. If either the source drive or the target drive is connected to an HSC, you also need the name of the HSC. (To determine the value for *hsc-name,* see the section Preparing Tape and Disk Drives in Chapter 2.)

If you need more information about determining the device names for your system, refer to the upgrade and installation supplement for your VAX computer.

Step 2: Load Distribution Media

Each piece of media in the distribution kit has a label that indicates its contents. Place the media that contains the OpenVMS VAX operating system in the *source-drive.*

If your OpenVMS VAX distribution kit consists of more than one piece of media, insert the first piece of media in the *source-drive.* For example, if you have a TK50 tape cartridge kit, make sure the tape labeled *VMS V6.0 BIN TK50 1/2 VMS BINARY* is in the *source-drive.*

If you are installing from a compact disc, it is already in the drive.

Step 3: Transfer VMS060.B to Your System Disk

Enter a BACKUP command in the following format to transfer the VMS060.B save set to your system disk:

```
$ BACKUP/IMAGE/VERIFY [hsc-name]source-drive:VMS060.B/SAVE_SET-
_$ [hsc-name]target-drive:
```

Substitute the appropriate device names for *hsc-name* (if appropriate), *source-drive,* and *target-drive.* Make sure you put a colon (:) after each device name and that you use zeros rather than the letter "O" in the device names and in VMS060.

The square brackets ([ ]) indicate that you need the *hsc-name* only if the device is connected to an HSC.

For example, if your system has a *source-drive* that is a local TU80 magnetic tape drive with a device name of MUA0 and a *target-drive* that is an RA60 disk drive with a device name of MUA1, enter the following command and press the Return key:

```
$ BACKUP/IMAGE/VERIFY MUA0:VMS060.B/SAVE_SET MUA1:
```

If your system has a *source-drive* that is a local tape cartridge drive with a device name of MUC6 or a *target-drive* that is an RA81 disk drive with a device name of DUA1 and an HSC name of YOURS, enter the following command and press Return:

```
$ BACKUP/IMAGE/VERIFY MUC6:VMS060.B/SAVE_SET YOURS$DUA1:
```

The procedure transfers the VMS060.B save set from the distribution kit to the system disk.[1] The amount of time this takes varies depending on the type of VAX computer and distribution media you have. During the process, the command displays the following message:

```
%BACKUP-I-STARTVERIFY, starting verification pass
```

This message indicates that the VMS060.B save set has been transferred to the system disk and the files are being checked for errors. If, instead, you see a message similar to the following, you might have the wrong volume of the distribution kit in the source drive:

```
% BACKUP-F-OPENIN, error opening  MUA0:[000000]VMS060.B; as
  input
- SYSTEM-W-NOSUCHFILE, no such file
     .
     .
     .
If you do want to perform another standalone BACKUP operation,
ensure the standalone BACKUP volume is online and ready.
Enter "YES" to continue:
```

If the procedure displays the previous messages, remove the distribution volume from the drive and replace it with the correct volume as described in Step 2. Then type YES, press Return, and repeat this step.

When standalone BACKUP has completed checking files, the procedure displays the following message:

```
%BACKUP-I-PROCDONE, Operation completed. Processing finished at 18-JUN-1993  15:00.
If you do not want to perform another standalone BACKUP operation,
use the console to halt the system.

If you do want to perform another standalone BACKUP operation,
ensure the standalone application volume is online and ready.
Enter "YES" to continue:
```

Step 4: Boot the New System Disk

Halt the system and boot the new system disk, as described in the upgrade and installation supplement for your VAX computer.

When the boot is completed, the procedure displays a message and prompts you to enter the date and time. Enter the date and time using the 24-hour clock format and press Return.

---

[1]   The BACKUP command creates a system disk that includes a set of volume parameters provided by Digital, including CLUSTER_SIZE (disk access scheme). For more information, see the upgrade and installation supplement for your VAX computer.

For example:

```
OpenVMS VAX Version 6.0 Major version id = 1 Minor version id = 0
                 OpenVMS VAX V6.0 Installation Procedure
                       Model: VAXserver 3600 Series
               System device: RA82 - _DUA8
                 Free blocks: 1170940
                    CPU type: 10-01
* Please enter the date and time (DD-MMM-YYYY HH:MM):18-JUN-1993 15:00

STDRV-I-STARTUP, VMS startup begun at 18-JUN-1993 15:00:00.59
%SET-I-NEWAUDSERV, identification of new audit server process is 00000028
  .
  .
  .
%%%%%%%%%% OPCOM  18-JUN-1993 15:00:15.46  %%%%%%%%%%
Message from user JOB_CONTROL on POKIPC
%JBC-E-OPENERR, error opening SYS$COMMON:[SYSEXE]QMAN$MASTER.DAT

%%%%%%%%%% OPCOM  18-JUN-1993 15:00:15.41  %%%%%%%%%%
Message from user JOB_CONTROL on POKIPC
-SYSTEM-W-NOSUCHFILE, no such file

LICENSE-F-EMTLDB, license database contains no license records
%LICENSE-E-NOAUTH, DEC VAX-VMS use is not authorized on this node
-%LICENSE-F-NOLICENSE, no license is active for this software product
-%LICENSE-I-SYSMGR, please see your system manager
Startup processing continuing...

%STDRV-I-STARTUP, VMS startup begun at 18-JUN-1993 15:03:00.00
```

Note: The procedure displays OPCOM messages from JOB_ CONTROL stating the master queue file QMAN$MASTER.DAT does not exist. You can ignore these messages. You will create the queue file later.

The procedure also displays error messages stating that the OpenVMS VAX license is not registered. You can ignore these messages. License registration occurs later in the procedure. For more information about registering your licenses, see Appendix A and the *OpenVMS License Management Utility Manual*.

Step 5: Specify the Volume Label

The procedure prompts you to specify the volume label of the system disk. A volume label is the name the OpenVMS VAX operating system uses to refer to the system disk. You can press the Return key to accept the default volume label, OpenVMS060, or you can enter a volume label of your choice. The volume label can be 1 to 12 characters long; do not use spaces. For example:

```
If this system disk is to be used in a cluster with multiple system
disks, then each system disk must have a unique volume label. Any
nodes having system disks with duplicate volume labels will fail to
boot into the cluster.

You can indicate a volume label of 1 to 12-characters in length. If you
want to use the default name of OpenVMS060, just press the Return key in
response to the next question.

* Enter the volume label for this system disk [OpenVMS060]: SYSDSK1
```

Step 6: Specify the Source Drive

The procedure prompts you to specify which drive holds the distribution kit. Enter the device name for the source drive.

For example, if you are not using the InfoServer and the source drive is a magnetic tape drive with the device name MUA0, type MUA0 and press Return.

```
* Enter the name of the drive holding the OpenVMS distribution media: MUA0
* Is the OpenVMS media ready to be mounted? [N] YES
%MOUNT-I-MOUNTED, VMS060      mounted on _MUA0:
```

If you are not using the InfoServer, continue to Step 7: Select Optional OpenVMS Components.

If you are using an InfoServer, enter DAD1:.

```
* Enter the volume label for this system disk [OpenVMS060]: SYSDSK1
* Enter name of drive holding the OpenVMS distribution media: DAD1:
```

The procedure then prompts you to:

```
* Enter the InfoServer service name [VMS060]:
* Enter the InfoServer work group number [0]:
```

Press the Return key as a response to both of these prompts.

The InfoServer work group number was determined when you made a selection from the menu displayed by the InfoServer ISL program (refer to the section Booting Standalone BACKUP). If the answer to the group number is incorrect, the procedure displays the following:

```
InfoServer work group number must be in the range 0-1023.
```

The procedure then prompts you:

```
* Is the OpenVMS media ready to be mounted? [N]: Y
  %MOUNT-I-MOUNTED, VMS060      mounted on _DAD1:
```

Step 7: Select Optional OpenVMS Components

The procedure displays information about OpenVMS VAX files that are optional and about the remaining amount of disk space. The information is similar to the following:

```
Select optional software you want to install. You can install one
or more of the following OpenVMS or DECwindows components:

o OpenVMS library                         -  39500 blocks
o OpenVMS optional                        -  18500 blocks
o OpenVMS HELP MESSAGE                     -   7800 blocks
o Text versions of three OpenVMS manuals  -   7200 blocks
o DECwindows workstation support          -  21800 blocks
o DECwindows base support                 -   3500 blocks

Space remaining on system disk: 1170752 blocks
```

You must indicate which of the options you want to install. If you require network support, you must select the OpenVMS library component.

Note: If you do not install the optional components at this time, you can install them after the installation by using the VMSTAILOR or DECW$TAILOR utility. However, the Help Message utility and the three OpenVMS manuals can be tailored on to the system disk only. If you do not choose them at this point

in the procedure and want them on an alternate device, you will not be able to use VMSTAILOR to restore them later.

If you want to install Help Message and the OpenVMS manuals on an alternate disk *after* the installation procedure completes, you can use the BACKUP command, as follows:

BACKUP/VERIFY source-device:[000000]VMS060.E/SAVE_SET- target-device:[directory-name]

For *source-device*, enter the device name for the drive on which the distribution media is mounted. For *target-device*, enter the device name on which the alternate disk is mounted, and for *directory-name*, enter the name of the directory to which you are copying the files.

Also note that, for TK50 tape cartridges, it is quicker to install OpenVMS VAX software during the installation than to add software after the installation with a tailoring utility. For information about using VMSTAILOR, see Chapter 11.

To select the options you want to install, follow the instructions displayed by the procedure.

OpenVMS Library Files

The procedure displays the following message:

* Do you want to install the OpenVMS library files? (Y/N)

The file subclasses of the VMS060.C save set are listed in Appendix C. If you want to install the VMS060.C files, type Y (for YES) and press Return. If you require network support, you must select the OpenVMS library component. If you do *not* want to install the VMS060.C files, type N (for NO) and press Return.

OpenVMS Optional Files

The procedure displays the following message:

* Do you want to install the OpenVMS optional files? (Y/N)

The file subclasses of the VMS060.D save set are listed in Appendix C. If you want to install the VMS060.D files, type Y and press Return. If you do *not* want to install the VMS060.D files, type N and press Return.

Help Message Files

The procedure displays the following message:

```
The Help Message utility (MSGHLP) provides online explanations
and user actions for OpenVMS messages in place of the hardcopy
OpenVMS System Messages and Recovery Procedures Reference Manual,
which is now separately orderable.

The MSGHLP database, MSGHLP$LIBRARY.MSGHLP$DATA,
consumes approximately 7800 blocks and will be
placed by default on your system disk in SYS$COMMON:[SYSHLP]
unless you specify an alternate device when prompted.
```

* Do you want to install the MSGHLP database? (Y/N)

The Help Message utility is an online system for system messages documentation. You can install Help Message either on the system disk or on an alternate disk. If you want to install the Help Message files, type Y and press Return.

The procedure displays the following message:

```
You can install this database on your system disk in SYS$COMMON:[SYSHLP]
or on an alternate device. If you specify an alternate device, but no
directory, MSGHLP$LIBRARY.MSGHLP$DATA is placed in [HELP_MESSAGE]. When
prompted, specify the system disk or an alternate device,
using this format:
                        device:[directory]
* Where do you want to install the MSGHLP database?[SYS$COMMON:[SYSHLP]] DUA1
```

The Help Message database is installed in the area you specify, and the system displays information similar to the following:

```
        Space remaining on alternate device DUA1: 124532 blocks
```

OpenVMS Manuals

The procedure displays the following message:

```
You have the choice of installing the text version of one or more
OpenVMS manuals:

o OpenVMS Master Index                         -    6000 blocks
o OpenVMS Master Glossary                      -     750 blocks
o Overview of OpenVMS Documentation            -     450 blocks

You can install these manuals, by default, to your system disk
in [SYSHLP.VMSDOC] or to an alternate device of your choice.
In either case, all manuals must reside on the same device.
If you choose an alternate device and do not specify a directory,
[VMSDOC_TEXT] will be created for you.  The device structure
for the alternate device should resemble the following:
                        device:[directory]
Do you want any of these three OpenVMS manuals?: (Y/N)
```

Type Y to install all three manuals or to install a subset of the manuals.

The following message is displayed:

```
Do you want all three OpenVMS manuals? (Y/N)
```

To install all three manuals, type Y. To install a subset, type N and the system will display each manual title and prompt you to type either Y or N to select it.

When you have completed selecting which manuals to install, the following prompt is displayed:

```
* Where do you want to install the OpenVMS manual(s)? [SYSHLP.VMSDOC]
```

Press Return to accept the default, [SYSHLP.VMSDOC] on the system disk, or enter the alternate disk name and press Return.

Step 8: Choose DECwindows Support Options

Next, the procedure displays messages about the DECwindows components shipped with OpenVMS VAX Version 6.0.

Important: The OpenVMS VAX operating system no longer ships the VMS DECwindows product. The operating system now ships only the DECwindows base support and DECwindows workstation support components. To get full DECwindows support, you must also install the separate DECwindows Motif for OpenVMS VAX (previously called VMS DECwindows Motif) layered product, which supports both Motif and XUI environments.

Note: The DECwindows base support and DECwindows workstation support components are *not* shipped with the layered product. If you want to install these options, you must select them now or use the DECW$TAILOR option after the installation procedure completes.

The procedure displays the following:

```
You can select DECwindows support now, or you can use the
DECW$TAILOR utility to provide or remove DECwindows support
after the installation.

Some media, TK50s in particular, can be very slow when
tailoring on files. You might want to provide DECwindows
options now and tailor off unwanted files later.

You can install all of the DECwindows components provided in
this kit, which requires approximately 25300 blocks, or you
can select specific components.

o DECwindows workstation support              -  17800 blocks
  -  75 dots per inch video fonts (included)
  - 100 dots per inch video fonts (optional) -   4000 blocks
o DECwindows base support                     -   3500 blocks

If you are installing this kit on a workstation or on a VAXcluster
that contains workstations, then you must choose the DECwindows
workstation support option.

If you are installing this kit on a system that does not include
workstations but does include Xterminals, then you might want to
choose the DECwindows workstation support option to provide font
files.  If you decide not to select the DECwindows workstation
support option at this time, then you will have to use the
DECW$TAILOR utility to provide font files for the Xterminals.

If you plan to run DECwindows software, then you must choose the
DECwindows base support option.

NOTE: This kit does NOT contain full DECwindows support. It includes
      only the DECwindows base and workstation support components.
      To obtain full DECwindows support, you must also install the
      separate DECwindows Motif for OpenVMS VAX layered product.

NOTE: VMS DECwindows Motif Version 1.1 is the minimum version that
      can be used with OpenVMS VAX Version 6.0.

* Do you want to provide optional DECwindows support? (Y/N)
```

Before You Decide

Before you indicate whether you want to install DECwindows support software, consider the following:

If you...	Then you should choose ...
intend to install the DECwindows Motif layered product	DECwindows base support.
intend to install the DECwindows Motif layered product on a workstation or on a VAXcluster that contains workstations or Xterminals	DECwindows workstation support.
are installing on a workstation or on a VAXcluster that includes workstations or Xterminals	DECwindows workstation support.
have a workstation monitor capable of displaying 100 dots/inch (for example, a VR150, VR160, or VR295)	DECwindows workstation support with the 100 dots/inch option. By selecting the workstation support files, you automatically get 75 dots/inch video font files, and you will be prompted to indicate if you want to install 100 dots/inch video font files.

If you *do not* want to install DECwindows support, type N, press Return, and go to the next step.

If you want to install DECwindows support, type Y and press Return. The procedure displays the following message:

```
* Do you want to install DECwindows workstation support? (Y/N)
```

If you answer YES to this prompt, the following DECwindows components will be installed:

- DECwindows workstation support

- 75 dots/inch video fonts

- DECwindows base support

You are also given the option to select the 100 dots/inch video fonts.

If you decide not to install the DECwindows workstation support, you are given the option to select the DECwindows base support, which is required if you plan to run any DECwindows software.

```
* Do you want to install DECwindows base support? (Y/N)
```

**Step 9: Verify
Your Choices**

The procedure displays a list of OpenVMS VAX and DECwindows support options you have selected and gives you the opportunity to change your mind before proceeding by displaying the following message:

```
* Is this correct? (Y/N)
```

If you answer NO to this prompt, you can respecify the OpenVMS and DECwindows support options you want to install.

**Step 10: Install
OpenVMS
Options**

If your distribution kit is on tape cartridges or compact disc and you answer YES to the prompt in Step 9, the installation procedure begins restoring the OpenVMS options you have selected.

For example, if you elected to install the VMS060.C, VMS060.D, VMS060.E, and VMS060.F save sets, the procedure displays the following messages:

```
Restoring OpenVMS library save set ...
%BACKUP-I-STARTVERIFY, starting verification pass

Restoring OpenVMS optional save set ...
%BACKUP-I-STARTVERIFY, starting verification pass

Restoring OpenVMS Help Message save set ...
%BACKUP-I-STARTVERIFY, starting verification pass

Restoring OpenVMS manuals save set ...
%BACKUP-I-STARTVERIFY, starting verification pass
```

If your distribution media is magnetic tape and you answer YES to the prompt in Step 9, you must mount tape 2 of the distribution kit. The procedure then begins restoring the VMS060.C and VMS060.D save sets if you elected to install them.

```
Restoring OpenVMS library save set ...
%BACKUP-I-STARTVERIFY, starting verification pass

Restoring OpenVMS optional save set ...
%BACKUP-I-STARTVERIFY, starting verification pass
```

If you are installing from magnetic tape, the procedure prompts you to mount the third tape. The procedure then begins restoring the VMS060.E and VMS060.F save sets if you elected to install them.

```
Restoring OpenVMS Help Message save set ...
%BACKUP-I-STARTVERIFY, starting verification pass

Restoring OpenVMS manuals save set ...
%BACKUP-I-STARTVERIFY, starting verification pass
```

You can use the VMSTAILOR utility to remove the optional OpenVMS files that you do not need after you finish the installation. For more information on removing files with VMSTAILOR see Chapter 11.

Where to Go Next

If you are installing DECwindows support software, go to the section Step 11: Install DECwindows Support Software.

If you are not installing DECwindows support software, go to the section Joining a VAXcluster.

Step 11: Install DECwindows Support Software

If you are installing from magnetic tape or compact disc the distribution media containing the DECwindows support files is already loaded on your source drive.

If you are installing from tape cartridges, remove the tape that contains the OpenVMS VAX operating system from the source drive when you see a message similar to the following:

```
You can now remove the OpenVMS distribution kit from MUA0:.

Load the DECwindows distribution kit.
```

Put the tape cartridge that contains the DECwindows support files in the source drive. The cartridge is labeled *VMS V6.0 BIN TK50 2/2 S/A BKUP*. (Note that you do *not* load the DECwindows Motif for OpenVMS layered product at this time.)

When prompted, type the device name of the source drive and press Return. For example:

```
* Enter name of the drive holding the DECwindows distribution media: MUA0
* Is the DECwindows media ready to be mounted? [N] YES
```

The procedure installs the DECwindows options that you specified and displays messages similar to the following:

```
%MOUNT-I-MOUNTED, DEC060 mounted on _MUA0:

    Restoring DECwindows base support save set ...
%BACKUP-I-STARTVERIFY, starting verification pass

    Restoring DECwindows workstation support save set ...
%BACKUP-I-STARTVERIFY, starting verification pass

    Restoring DECwindows 75 dots per inch fonts save set ...
%BACKUP-I-STARTVERIFY, starting verification pass

    Restoring DECwindows 100 dots per inch fonts save set ...
%BACKUP-I-STARTVERIFY, starting verification pass
```

Note: The DECwindows support files are listed in Appendix D. After you finish the installation, you can use the DECwindows tailoring utility, DECW$TAILOR, to remove the DECwindows files you do not need. For more information about removing files with DECW$TAILOR, see Chapter 11.

If your distribution media is tape cartridges or magnetic tape, the procedure displays a message similar to the following after the DECwindows options you have selected have been successfully installed:

```
You can now remove the DECwindows distribution kit from MUA0:.
```

Remove the distribution media from the drive.

If your distribution media is compact disc leave it in the drive.

Joining a VAXcluster

Introduction

The installation procedure now asks whether you are installing the OpenVMS VAX operating system in a VAXcluster or standalone environment. If you are installing a VAXcluster, the procedure asks a series of questions about your configuration. Refer to *VMScluster Systems for OpenVMS* to get the information you need to answer these questions.

VAXcluster or Standalone?

The procedure displays the following messages:

```
Creating [VMS$COMMON] directory tree

In a cluster, you can run multiple systems sharing all files except
PAGEFILE.SYS, SWAPFILE.SYS, SYSDUMP.DMP and VAXVMSSYS.PAR.

* Will this node be a cluster member? (Y/N)
```

If you are installing a ...	Then ...
standalone system	do the following: 1. Type N and press Return. 2. If you selected DECwindows workstation support, the procedure asks you if you want DECwindows Motif as your default windowing system. Type Y or N and press Return. 3. Go to the section Setting Passwords.
VAXcluster environment	do the following: 1. Type Y and press Return. 2. Make sure you have a VAXcluster license PAK for each node in the VAXcluster. 3. Go to the next step.

Determine the Type of VAXcluster

If you answered Yes to the previous question, the procedure displays the following message:

`Now configuring system to be a cluster member.`

The installation procedure then displays several questions about the configuration of your VAXcluster. Your answers to these questions depend on whether you want to install a CI-only, local area, FDDI, DSSI, or mixed interconnect VAXcluster. Before answering these questions, you must determine which type of VAXcluster you want to install. For a complete description of VAXcluster types, see *VMScluster Systems for OpenVMS*.

CI-Only VAXcluster

Table 3–1 lists the questions you are asked if you want a CI-only VAXcluster and explains the typical responses.

Table 3–1 Installation Questions for CI-Only VAXclusters

Question	How to Respond
Will this node be a cluster member (Y/N)?	Enter Y.
What is the node's DECnet node name?	Enter the unique DECnet node name—for example, KRUP. The DECnet node name can be from 1 to 6 alphanumeric characters in length and cannot include dollar signs or underscores.
What is the node's DECnet node address?	Enter the unique DECnet node address—for example, 2.2.
Will the Ethernet be used for cluster communications (Y/N)?	Enter N. A CI-only VAXcluster does not use the Ethernet for cluster communications.
Will KRUP be a disk server (Y/N)?	Enter Y if you want local disks to be served to the cluster. If you enter Y, the procedure will ask if the node will serve HSC disks. Enter N to this second question. HSC disks are available to all nodes in a CI-cluster. Refer to *VMScluster Systems for OpenVMS* for information on served cluster disks.
Enter a value for KRUP's ALLOCLASS parameter:	If the system includes a dual-ported disk, enter the appropriate allocation class value (it must be a value between 1 and 255). Otherwise, enter 0. For information on selecting the ALLOCLASS parameter, see *VMScluster Systems for OpenVMS*.

(continued on next page)

Table 3–1 (Cont.) Installation Questions for CI-Only VAXclusters

Question	How to Respond
Does this cluster contain a quorum disk (Y/N)?	Enter Y or N, depending on your configuration. If you enter Y, the procedure asks for the name of the quorum disk. Enter the device name of the quorum disk. Refer to *VMScluster Systems for OpenVMS* for information on quorum disks.

Local Area and Mixed-Interconnect VAXcluster
Table 3–2 lists the questions you are asked if you want a local area VAXcluster or a mixed-interconnect VAXcluster and explains the typical responses.

Table 3–2 Installation Questions for Local Area and Mixed-Interconnect VAXclusters

Question	How to Respond
Will this node be a cluster member (Y/N)?	Enter Y.
What is the node's DECnet node name?	Enter the unique DECnet node name—for example, KRUP. The DECnet node name can be from 1 to 6 alphanumeric characters in length and cannot include dollar signs or underscores.
What is the node's DECnet node address?	Enter the unique DECnet node address—for example, 2.2.
Will the Ethernet be used for cluster communications (Y/N)?	Enter Y. The Ethernet is required for cluster (SCS internode) communications in local area and mixed-interconnect VAXclusters.
Enter this cluster's group number:	Enter a number in the range from 1 to 4095 or 61440 to 65535.
Enter this cluster's password:	Enter the cluster password. The password must be from 1 to 31 alphanumeric characters in length and can include dollar signs and underscores. (The password is not displayed while you enter it.)
Reenter this cluster's password for verification:	Reenter the password.
Will KRUP be a disk server (Y/N)?	Enter Y. In local area and mixed-interconnect VAXclusters, the system disk is always served to the cluster. Refer to *VMScluster Systems for OpenVMS* for information on served cluster disks.
Will KRUP serve HSC disks (Y)?	Enter a response appropriate for your configuration.
Enter a value for KRUP's ALLOCLASS parameter:	Enter the appropriate allocation class value. If you have a mixed-interconnect VAXcluster, the value must be between 1 and 255; you cannot enter 0.
Does this cluster contain a quorum disk (Y/N)?	Enter Y or N, depending on your configuration. If you enter Y, the procedure asks for the name of the quorum disk. Enter the device name of the quorum disk. Refer to *VMScluster Systems for OpenVMS* for information on quorum disks.

Setting Passwords

Introduction Next, the installation procedure prompts you to set passwords for the SYSTEM, SYSTEST, and FIELD accounts and uses this information to create a rights database.

How to Enter Passwords When setting the passwords, remember:

- Passwords must be 8 characters or more.

- Passwords are not displayed by the system while you are entering them.

- Press Return after you enter each password.

- Each password is verified.

Use the following procedure to set passwords:

1. Supply the passwords when prompted by the installation procedure, as follows:

```
Now we will ask you for new passwords for the following accounts:

        SYSTEM, SYSTEST, FIELD

Passwords must be a minimum of 8 characters in length. All passwords
will be checked and verified. Any passwords that can be guessed easily
will not be accepted.

* Enter password for SYSTEM:
* Re-enter for verification:
%UAF-I-MDFYMSG, user record(s) updated
%VMS-I-PWD_OKAY, account password for SYSTEM verified

* Enter password for SYSTEST:
* Re-enter for verification:
%UAF-I-MDFYMSG, user record(s) updated
%VMS-I-PWD_OKAY, account password for SYSTEST verified

    The SYSTEST_CLIG account will be disabled. You must re-enable
    it before running UETP but do not assign a password.
* Enter password for FIELD:
* Re-enter for verification:
%UAF-I-MDFYMSG, user record(s) updated
%VMS-I-PWD_OKAY, account password for FIELD verified
```

2. If there are no password errors, the procedure creates your rights database, and you can proceed to the next section.

   If you enter a password incorrectly or if the password is too easy to guess, the procedure displays error messages similar to the following:

```
%VMS-I-PWD_INVALID, account password for SYSTEST is invalid
%VMS-I-PWD_WEAK, password is too easy to guess

Because of the preceding error, you must take action to secure this account.
You must either disable this account, change its password, or do both.
```

3. When the procedure asks if you want to disable the account, type N and press Return. When the procedure asks if you want to enter a new password, type Y and press Return. Then enter a new password. For example:

```
Do you want to disable this account (Y/N)? N
Do you want to change the account password (Y/N)? Y
You must now select a new primary password for the SYSTEST account. The
password you select must be at least 8 characters in length and cannot
be the same as the name of the account:

New password:
Verification:
%UAF-I-MDFYMSG, user record(s) updated
%VMS-I-PWD_SET, primary password for account SYSTEST set
```

4. When you have successfully set the passwords, the installation procedure creates your rights database, which lets you manage user access to the system, and displays the following message:

```
Creating RIGHTS database file, SYS$SYSTEM:RIGHTSLIST.DAT
Ignore any "-SYSTEM-F-DUPIDENT, duplicate identifier" errors
        .
        .
        .
```

Postinstallation Tasks Described

Introduction After the procedure creates the rights database, it displays messages describing postinstallation tasks you might want to perform.

Important: Note that you do not perform these tasks now but *after* the installation completes.

Sample Message The tasks displayed on your screen might vary from the following example, depending on what options you chose to install earlier in the procedure.

```
After the installation finishes, you might want to do one or more of the
following tasks:

o DECOMPRESS THE SYSTEM LIBRARIES - To save space, many of the system
libraries are shipped in a data-compressed format.  If you have
enough disk space, you can decompress the libraries for faster access.
To data expand the libraries, type:

    $ @SYS$UPDATE:LIBDECOMP.COM

If you do not decompress these libraries, you will experience slower
response with the HELP and LINK commands.

o BUILD A STANDALONE BACKUP KIT - You can build a standalone backup kit
using the procedure described in the upgrade and installation supplement
provided for your VAX computer.

o TAILOR THE SYSTEM DISK - You might want to review the files provided or
not provided during this installation. If you find there are files
you want to remove from the system disk (TAILOR OFF) or files you want
to add (TAILOR ON), use the following utilities to perform the
desired tailoring.

    OpenVMS tailoring:          $ RUN SYS$UPDATE:VMSTAILOR

    DECwindows tailoring:       $ RUN SYS$UPDATE:DECW$TAILOR

Note: The tailor procedure cannot be used to TAILOR ON or to TAILOR OFF
files located on an alternate device.
```

For more information about decompressing the system libraries, see the section Decompressing System Libraries in Chapter 4. For information on using VMSTAILOR or DECW$TAILOR, see Chapter 11.

After the messages about postinstallation tasks are displayed, the procedure displays the following message:

```
    Continuing with OpenVMS VAX V6.0 installation procedure.

    Configuring all devices on the system...

%STDRV-I-STARTUP, VMS startup begun at 18-JUN-1993 15:31:34:23
```

Where to Go Next You can now go to the next section to register your licenses.

Registering Licenses

Introduction

Before you can use the OpenVMS VAX operating system and its components, you must first register all licenses. If you do not register your licenses at this point in the procedure, you must register them immediately after the installation, *before* you perform the other postinstallation tasks.

How to Register Your Licenses

You must register your licenses in the following order:

1. Register the OpenVMS VAX license for the VAX computer on which you have just installed the operating system. If you have a VAXcluster environment, you then register an OpenVMS VAX license for each additional VAX computer in the cluster that will boot off the system disk that you just created. Each registered OpenVMS VAX license must be assigned to one of the nodes for the cluster.

2. Register the licenses for any System Integrated Products (SIPs) that you purchased.

Where to Find More Information

For more information about registering licenses, see the following:

- *OpenVMS License Management Utility Manual*, which provides:

  - Details about all LICENSE commands, error messages, and recovery procedures for licensing tasks

  - A description of VMSLICENSE.COM, with step-by-step instructions for registering licenses

  - Examples of license registration using VMSLICENSE.COM and LICENSE REGISTER commands

- Appendix A of this manual for notes and supplemental information concerning licenses

Types of Licenses

The OpenVMS VAX operating system uses one of two different categories of licenses, depending on the hardware and software configuration used and currently supported. The two categories of operating system licenses for OpenVMS VAX are:

- VAX VMS licensing

- OpenVMS VAX licensing

The VAX VMS licenses include the rights for the Rdb/VMS Run-Time Option for OpenVMS VAX. This allows you to run an application developed using Rdb/VMS for OpenVMS VAX software. However, Rdb/VMS for OpenVMS VAX has separate media and documentation. In addition, if you want to perform Rdb development, you must purchase a separate license. (Refer to SPD 25.59.xx for more information.)

The following table describes the types of licenses for each licensing category. Digital provides the proper license type with the purchase of the system. Not all license types are available for every system model.

Type of License	Description
	VAX VMS Licenses
Traditional License	Provides unlimited use to the users on a defined system. VAX VMS traditional licenses are sized to capacity according to system type.
Multiuser License	Provides use according to a specified number of concurrent users. This is an activity-based license. The Multiuser License gives you the right to use the operating system for up to the limit of users specified in the license. An operating system *user* is one who is logged into the system or one who is using the operating system software by means other than login, or both. This license is available only on limited system models, primarily MicroVAX and VAX 4000 systems.
	Interactive use of VAX systems licensed with the Multiuser License can be increased by the addition of the OpenVMS VAX Interactive User License[1] for one or more users. For more information, refer to the description of the OpenVMS VAX Interactive User License later in this table.

[1]The OpenVMS VAX Interactive User License is not supported by the VMS or OpenVMS VAX operating system releases prior to VMS Version 5.5.

Type of License	Description
VAX VMS Licenses	
VAX VMS Workstation License	Provides use for a single user on a VAX workstation. This license type allows one direct login for the single user and then one additional login for system management purposes only.
	Additional interactive use of VAX workstations licensed with the VAX VMS Workstation License requires the addition of an OpenVMS VAX Interactive User License[1] for one or more users. For more information, refer to the description of the OpenVMS VAX Interactive User License later in this table.
File and Application Server License	Provides for the noninteractive use of OpenVMS VAX. OpenVMS based VAXservers are sold with a File and Application Server License.
	The intent of an OpenVMS based VAXserver is to provide file, print, application, and compute *services* to *clients* who have remotely submitted their requests for these services. This license type also allows one direct login for system management purposes only.
	Additional interactive use of OpenVMS VAXservers licensed with the File and Application Server License requires the addition of an OpenVMS VAX Interactive User License[1] for one or more users. For more information, refer to the description of the OpenVMS VAX Interactive User License later in this table.
OpenVMS VAX Licenses	
OpenVMS VAX O/S Base License[2]	Provides the right to unrestricted, noninteractive use of the OpenVMS VAX operating system for the execution of remotely submitted requests for batch, print, application, and computing services, on a designated, single processor.
	No direct OpenVMS VAX operating system logins by users are permitted on the system. One direct login is allowed for system management purposes only.
	The OpenVMS VAX O/S Base License does not include the license right for the Rdb/VMS Run-Time Option for OpenVMS VAX. The Rdb/VMS for OpenVMS VAX Run-Time License is available separately.
	Interactive use of systems licensed with an OpenVMS VAX O/S Base License requires the addition of an OpenVMS VAX Interactive User License[1] for one or more users.

---

[1]The OpenVMS VAX Interactive User License is not supported by the VMS or OpenVMS VAX operating system releases prior to VMS Version 5.5.

[2]The OpenVMS VAX O/S Base License is not supported by the VMS or OpenVMS VAX operating system releases prior to VMS Version 5.5.

Type of License	Description
OpenVMS VAX Licenses	
OpenVMS VAX Interactive User License[1]	Provides the right to interactively use the operating system by a specified, or unlimited, number of concurrent users on a designated, single processor. A user is one who is logged in to a processor or one who is interactively using the operating system software by means other than login, or both. An OpenVMS VAX O/S Base License, or any of the four types of VAX VMS Licenses, is a prerequisite for the OpenVMS VAX Interactive User License.

[1]The OpenVMS VAX Interactive User License is not supported by the VMS or OpenVMS VAX operating system releases prior to VMS Version 5.5.

How to Register OpenVMS VAX Licenses

You can use the SYS$UPDATE:VMSLICENSE.COM procedure to register a license for any Digital product that supplies a Product Authorization Key (PAK). Or, you can register licenses with the LICENSE REGISTER command. See the *OpenVMS License Management Utility Manual* for detailed information.

The installation procedure displays the following message:

```
If you have any Product Authorization Keys (PAKS) to register, you can
register them now.

* Do you want to register any Product Authorization Keys? (Y/N)
```

If you choose ...	Then ...
not to register the licenses at this time	do the following: 1. Type N and press Return. 2. GO to the section Running AUTOGEN. 3. Remember that, after the installation, you must register your licenses *before* performing any other postinstallation tasks (see Chapter 4).
to register your licenses now	do the following: 1. Type Y and press Return. 2. Be sure you have a copy of your PAK for each license you will register. 3. Go to the next section to begin the licensing procedure.

Beginning the Licensing Procedure

By typing Y (Yes) to register your licenses now, you invoke the SYS$UPDATE:VMSLICENSE.COM procedure, which displays the following message:

```
OpenVMS License Management Utility Options:

    1. REGISTER a Product Authorization Key
    2. AMEND an existing Product Authorization Key
    3. CANCEL an existing Product Authorization Key
    4. LIST Product Authorization Keys
    5. MODIFY an existing Product Authorization Key
    6. DISABLE an existing Product Authorization Key
    7. DELETE an existing Product Authorization Key
    8. COPY an existing Product Authorization Key
    9. MOVE an existing Product Authorization Key
   10. ENABLE an existing Product Authorization Key
   11. SHOW the licenses loaded on this node
   12. SHOW the unit requirements for this node

   99. Exit this procedure

Type '?' at any prompt for a description of the information
requested.

Enter one of the above choices [1]
```

Select the appropriate options (beginning with 1, as shown) until you have successfully registered all required PAKs.

How to Register System Integrated Products

After you register the OpenVMS VAX license, you must register the license for any of the following System Integrated Products (SIPs) you have purchased:

- VAXclusters

- DECnet for OpenVMS

  There are two DECnet for OpenVMS licenses:

  - The end node license named DVNETEND

  - The routing node license named DVNETRTG

    All routing nodes must have a routing license. Each end node can have either an end node license or a routing license. If neither license is registered and activated, DECnet does not start and your use is limited to local DECnet only (SET HOST 0). If DECnet for OpenVMS is running when you register your license, you must stop and then restart DECnet for OpenVMS.

    You can control which VAXcluster nodes have access to each license. Using the LICENSE MODIFY /INCLUDE=(node-name[,node-name,...]) command, you can assign licenses to nodes and limit access as needed. For example, you can assign a routing node license to only one VAXcluster node and assign the end node licenses to the remaining VAXcluster nodes. If you choose this approach, make sure you assign a license to each end node license. Specify include lists for each license of the same type. For details, see the *OpenVMS License Management Utility Manual*.

- OpenVMS RMS Journaling

  On systems that do not have registered and activated
  journaling licenses, users cannot write to any files marked for
  journaling.

- Volume Shadowing

  You must register and activate a license for Volume Shadowing
  for OpenVMS on each node using volume shadowing, including
  satellites in a VAXcluster system.

**Where to Go
Next**

To complete the installation procedure, continue on to the next
section, Running AUTOGEN.

Running AUTOGEN

Introduction

The remaining portion of the installation procedure runs AUTOGEN to evaluate your hardware configuration and estimate typical workloads. AUTOGEN then sets system parameters, the sizes of page, swap, and dump files, and the contents of VMSIMAGES.DAT. When AUTOGEN finishes and the system has rebooted, the installation procedure is complete.

How AUTOGEN Works

The installation procedure runs AUTOGEN, as follows:

1. The installation procedure displays a series of messages similar to the following:

```
Running AUTOGEN to compute new SYSTEM parameters ...

%AUTOGEN-I-BEGIN, GETDATA phase is beginning.
%AUTOGEN-I-NEWFILE, a new version of SYS$SYSTEM:PARAMS.DAT has been created
        You may wish to purge this file.
%AUTOGEN-I-END, GETDATA phase has successfully completed.
        .
        .
        .
%AUTOGEN-I-BEGIN, REBOOT phase is beginning.
```

If you need to create or modify the size of the pagefile or swapfile, use the SYSMAN utility. For more information, see the *OpenVMS System Manager's Manual: Essentials.*

2. After AUTOGEN finishes, the procedure displays a series of shutdown messages that begin like this:

```
The system is shutting down to allow the system to boot with the
generated site-specific parameters and installed images.

The system will automatically reboot after the shutdown and the
upgrade will be complete.

    SHUTDOWN -- Perform an Orderly System Shutdown
```

3. After the system shuts down, the procedure tries to reboot the new system disk. If the system does not reboot automatically, reboot it manually.

For example, suppose you have a VAX–11/780 computer and the system disk is on an RA60 disk drive with a unit number of one. Enter the following command and press Return:

```
>>> B DUA1
```

For information on booting, refer to the upgrade and installation supplement for your VAX computer. Then return to this manual.

4. After the system reboots, the procedure displays the following message:

```
OpenVMS VAX Version V6.0 Major version id = 1 Minor version id = 0

****************************************************************

OpenVMS VAX V6.0

You have SUCCESSFULLY installed the OpenVMS VAX operating system.

The system is now executing the STARTUP procedure. Please
wait for the completion of STARTUP before logging in to the
system.

****************************************************************
```

Note: If you did not register your OpenVMS VAX license as described in the section Registering Licenses, the procedure displays warning messages that the OpenVMS license must be registered. Be sure to register this license when the installation procedure finishes. For more information, see Appendix A and the *OpenVMS License Management Utility Manual*.

Finally, the procedure displays informational messages and accounting information. For example:

```
%SET-I-INTSET, login interactive limit = 64, current interactive value = 0
  SYSTEM        job terminated at 18-JUN-1993 15:37:04.00

Accounting information:
  Buffered I/O count:        859      Peak working set size:        565
  Direct I/O count:          478      Peak virtual size:           2570
  Page faults:              5003      Mounted volumes:                0
  Charged CPU time:  0 00:00:55.33    Elapsed time:       0 00:01:31.24
```

At this point the OpenVMS VAX operating system is running.

5. Press the Return key. The system asks you for the user name and password. Log into the SYSTEM account so you can perform certain postinstallation tasks. For example:

```
Welcome to OpenVMS VAX V6.0

Username: SYSTEM
Password:
    .
    .
    .
Welcome to OpenVMS VAX Version V6.0
```

If you forget the password, follow the instructions for performing an emergency startup in the *OpenVMS System Manager's Manual: Essentials*.

6. There are several postinstallation tasks you must perform before you can use the system. These tasks are described in Chapter 4.

4

After Installing OpenVMS VAX

Overview

After you have installed the OpenVMS VAX operating system, you need to perform several important tasks to prepare the system for operation. This chapter describes the following postinstallation tasks in the order you perform them:

1. Registering licenses

2. Backing up your system disk

3. Customizing your system

4. Configuring and starting DECnet for OpenVMS

5. Testing the system

6. Decompressing system libraries

7. Removing unwanted files

8. Backing up the customized system disk

9. Running AUTOGEN

10. Completing the postinstallation checklist

If you are an experienced system manager, you can use the checklist at the end of the chapter to complete the necessary postinstallation tasks.

If you are a less-experienced system manager, you should read the entire chapter and then use the checklist to make sure you have completed all the postinstallation tasks.

Registering Your Licenses

Background

The installation procedure gave you the opportunity to register any software product licenses. If you did not register your OpenVMS VAX license at that time, you must do so before you can use the OpenVMS VAX operating system. You must also register the licenses for any of the following System Integrated Products you have purchased:

VAXclusters
DECnet for OpenVMS
OpenVMS RMS Journaling
Volume Shadowing

Where to Find More Information

For step-by-step instructions about registering licenses, see the *OpenVMS License Management Utility Manual* and Appendix A of this manual, which provides supplemental information.

Backing Up Your System Disk

Background

Now that you have spent time installing the operating system, you should protect your work by making a backup copy of the system disk in case you have any problems while customizing it. Digital recommends that you perform the following operations:

- Make a standalone BACKUP kit on the system disk and on removable media

- Perform a standalone BACKUP of your system disk

You should also back up your system disk after you have customized it.

Where to Find More Information

For complete information about these operations, see the upgrade and installation supplement for your VAX computer.

Customizing the System

Background

You can customize the system to meet the specific needs of your site. In addition, if your VAX computer is part of a VAXcluster environment, you must prepare the cluster environment and configure the cluster.

Where to Find More Information

For instructions on customizing your system, refer to the following:

- Read the chapter on booting in the upgrade and installation supplement for your VAX computer. This chapter explains the different ways to boot the system. It also tells you how to shut down the system.

- If the computer is part of a VAXcluster environment, read *VMScluster Systems for OpenVMS* for further information about setting up a cluster.

- Read the *OpenVMS System Manager's Manual: Essentials* for instructions on customizing and using your system. You will find information about the following tasks:

  - Editing the template files SYCONFIG.COM, SYLOGICALS.COM, SYLOGIN.COM, and SYSTARTUP_VMS.COM

  - Starting the queue manager and creating a queue database. (If you are installing on a VAXcluster system with multiple system disks, see the *VMScluster Systems for OpenVMS* for additional instructions.)

  - Setting up user accounts

  - Adjusting system parameters

- If you plan to use DECnet for OpenVMS, read the section Configuring and Starting DECnet for OpenVMS and perform the steps described there.

- If your system communicates with systems in other time zones, you can use the time conversion service and the Coordinated Universal Time (UTC) system services to compensate for differences in time stamps because of differing time zones. For information about setting up your system to compensate for time zones, see the *OpenVMS System Manager's Manual: Essentials*.

Configuring and Starting DECnet for OpenVMS

Introduction

In local area and mixed-interconnect VAXcluster systems, DECnet for OpenVMS is required for both system management functions and for cluster communications, such as remote booting operations. All VAXcluster systems require DECnet for OpenVMS, which ensures that system managers can access all VAXcluster computers from a single terminal.

If you plan to run DECnet for OpenVMS, you must perform the following tasks.

Configure Your System

After you have registered the DECnet for OpenVMS license, execute the interactive command procedure SYS$MANAGER:NETCONFIG.COM to automatically configure your system for networking. See the *DECnet for OpenVMS Guide to Networking* for instructions on using NETCONFIG.COM.

Edit SYSTARTUP_VMS

After you start the queue manager, edit the commands in SYS$COMMON:[SYSMGR]SYSTARTUP_VMS.COM that pertain to networking, so that DECnet starts automatically when your system is booted. Choose one of the following commands to start the network and remove the comment delimiter (!) from that command:

```
$! IF F$SEARCH("SYS$SYSTEM:NETACP.EXE") .NES. "" THEN @SYS$MANAGER:STARTNET
$! IF F$SEARCH("SYS$SYSTEM:NETACP.EXE") .NES. "" THEN SUBMIT SYS$MANAGER:STARTNET.COM
```

Both of the previous commands perform the same task. However, the first command executes STARTNET.COM and delays further processing until the procedure is completed; the second submits STARTNET.COM to a batch queue and continues executing SYSTARTUP_VMS.COM. If you plan to run both DECnet for OpenVMS and DECwindows Motif for OpenVMS VAX, you must also edit SYS$COMMON:[SYSMGR]SYSTARTUP_VMS.COM to add a comment delimiter (!) immediately following the dollar-sign ($) in the DEFINE DECW$IGNORE_DECNET command as follows:

```
$! DEFINE DECW$IGNORE_DECNET TRUE
```

If you are not going to start DECnet for OpenVMS or have not yet started it, this command tells DECwindows not to wait for DECnet.

Testing the System with UETP

Background

UETP (the User Environment Test Package) is a software package that tests whether the OpenVMS VAX operating system is installed correctly. As part of the postinstallation procedure, you should run UETP to verify your installation.

Note that UETP needs at least 1200 free blocks on the system disk.

Where to Find More Information

For complete information, see Chapter 9.

Decompressing System Libraries

Background

Decompressing the system libraries gives the system faster access to them. You can decompress all the system libraries or just some of them. Table 4–1 gives the number of blocks consumed by each library after decompression.

Table 4–1 Sizes of Decompressed System Libraries

Library	Blocks	Library	Blocks
HELPLIB.HLB	8145	EDFHLP.HLB	37
STARLET.OLB	6009	TPUHELP.HLB	1036
VAXCCURSE.OLB	91	ACLEDT.HLB	109
VAXCRTL.OLB	476	INSTALHLP.HLB	62
VAXCRTLG.OLB	11	MNRHELP.HLB	80
DECCCURSE.OLB	132	PATCHHELP.HLB	82
DECCRTL.OLB	1419	PHONEHELP.HLB	32
DECCRTLG.OLB	49	SDA.HLB	109
ERFLIB.TLB	97	SHWCLHELP.HLB	150
MAILHELP.HLB	232	SYSGEN.HLB	171
EDTHELP.HLB	229	TECO.HLB	67
DBG$HELP.HLB	1826	UAFHELP.HLB	333
EXCHNGHLP.HLB	117	EVE$HELP.HLB	1197
NCPHELP.HLB	535	EVE$KEYHELP.HLB	145
ANLRMSHLP.HLB	16	STARLET.MLB	2341
DISKQUOTA.HLB	12	LIB.MLB	2120

The additional amount of disk space required to decompress all the system libraries is about 10,500 blocks. To find out how much disk space you have, enter the following command and press the Return key:

```
$ SHOW DEVICE SYS$SYSDEVICE
```

How to Decompress Libraries

To decompress the system libraries, you run LIBDECOMP.COM by logging into the SYSTEM account, entering the following command, and pressing Return:

```
$ @SYS$UPDATE:LIBDECOMP.COM
```

The following information is displayed:

```
           VMS Library Decompression Utility

   Options:

     1  HELPLIB.HLB        12  DBG$HELP.HLB      23  PHONEHELP.HLB
     2  STARLET.OLB        13  EXCHNGHLP.HLB     24  SDA.HLB
     3  VAXCCURSE.OLB      14  NCPHELP.HLB       25  SHWCLHELP.HLB
     4  VAXCRTL.OLB        15  ANLRMSHLP.HLB     26  SYSGEN.HLB
     5  VAXCRTLG.OLB       16  DISKQUOTA.HLB     27  TECO.HLB
     6  DECCCURSE.OLB      17  EDFHLP.HLB        28  UAFHELP.HLB
     7  DECCRTL.OLB        18  TPUHELP.HLB       29  EVE$HELP.HLB
     8  DECCRTLG.OLB       19  ACLEDT.HLB        30  EVE$KEYHELP.HL
     9  ERFLIB.TLB         20  INSTALHLP.HLB     31  STARLET.MLB
    10  MAILHELP.HLB       21  MNRHELP.HLB       32  LIB.MLB
    11  EDTHELP.HLB        22  PATCHHELP.HLB

   or    A    ALL libraries to be decompressed
         E    EXIT this procedure

 * Enter letter or number(s) of libraries to be decompressed
   (Separate multiple entries with a comma):
```

Enter the appropriate letter or the numbers of the libraries you want to decompress. To decompress all libraries, the process takes approximately one half hour.

If you prefer, you can execute LIBDECOMP interactively or as a batch job. If you use either of these methods, you can decompress up to 8 libraries each time you execute LIBDECOMP by listing the names of the libraries you want to decompress as parameters on the command line. Be sure to separate the library names with commas and do not include the file extension. For example, to decompress the VAXCRTL.OLB, DISKQUOTA.HLB, and LIB.MLB libraries as a batch job, enter the following command:

```
$ SUBMIT/NOTIFY/PARAMETERS=(VAXCRTL, DISKQUOTA, LIB)-
_$ SYS$UPDATE:LIBDECOMP
```

To decompress these same libraries interactively, enter the following command:

```
$ @SYS$UPDATE:LIBDECOMP VAXCRTL, DISKQUOTA, LIB
```

Note that, when you type the command for a batch job, you enclose the list of library names within parentheses. You do not use parentheses on the interactive command line.

Removing or Adding OpenVMS Files

Background

To remove unwanted OpenVMS VAX files from the system disk, use VMSTAILOR or DECW$TAILOR. For example, if you are not running DECnet for OpenVMS, use VMSTAILOR to remove the files associated with DECnet.

Note: You cannot use VMSTAILOR to remove files installed on an alternate device from save sets VMS060.E or VMS060.F.

Where to Find More Information

For complete information about using VMSTAILOR and DECW$TAILOR to remove optional OpenVMS VAX software see Chapter 11.

Backing Up the Customized System Disk

Background

Now that you have spent time installing and customizing the operating system, protect your work by making a standalone backup copy of the system disk.

Where to Find More Information

For complete information about these operations, see the upgrade and installation supplement for your VAX computer. Once you have made a standalone backup copy of the system disk, install any software products that you want to run on your system. Follow the directions given in the software product installation manuals.

Running AUTOGEN

Background

When you installed the OpenVMS VAX operating system, the procedure executed AUTOGEN to set the values of system parameters and the sizes of the page and swap files according to the system's workload.

In many cases, AUTOGEN can improve system performance by using dynamic feedback information from the running system. As a postinstallation task, you should run AUTOGEN again using the feedback mechanism to make further adjustments to system parameters.

When AUTOGEN runs, it uses the parameter values in SYS$SYSTEM:MODPARAMS.DAT. Note that hard-coded values in MODPARAMS.DAT affect AUTOGEN's calculations of the feedback parameters. For AUTOGEN to properly calculate minimum default values, you should replace the hard-coded values in MODPARAMS.DAT with MIN_ values. If you need to modify the parameter values calculated by AUTOGEN, you can use AUTOGEN to change the hard-coded values in MODPARAMS.DAT.

For information about using AUTOGEN, see the *OpenVMS System Manager's Manual: Essentials*.

When to Run AUTOGEN

After installing the operating system, run AUTOGEN again using the following procedure:

1. After 24 hours of operation, run AUTOGEN in feedback mode and reboot the system.

2. Run AUTOGEN in this same way, again, two working days later.

   Note: For the VAX 9000 computer, AUTOGEN's initial parameter calculations are conservative. To obtain parameter values that match your system workload, you can run AUTOGEN in feedback mode a number of times. For more information, see the upgrade and installation supplement for your VAX 9000 computer.

3. Digital recommends that you run AUTOGEN from SAVPARAMS through TESTFILES on a weekly basis and examine AGEN$PARAMS.REPORT to determine the need for additional changes.

What to Do Next

After you run AUTOGEN following the first 24 hours of system operation (step 1), use the Postinstallation Checklist to make sure you have completed all the tasks described in this chapter.

Postinstallation Checklist

Introduction   Use the following checklist to make sure you perform all the necessary postinstallation tasks.

Did you . . .

☐ Register your licenses if you did not do so during the installation procedure? (Described in Appendix A of this manual and the *OpenVMS License Management Utility Manual*).

☐ Build a standalone BACKUP kit on the system disk and on removable media? (Described in the upgrade and installation supplement for your computer.)

☐ Back up the system disk as a safeguard before customizing the system? (Described in the upgrade and installation supplement for your computer.)

☐ Customize the system? (Described in the section Customizing the System.)

☐ Configure and start DECnet for OpenVMS? (Described in the section Configuring and Starting DECnet for OpenVMS.)

☐ Run UETP (the User Environment Test Package) to test the system? (Described in Chapter 9.)

☐ Decompress the system libraries using LIBDECOMP.COM? (Described in the Decompressing System Libraries section.)

☐ Remove unwanted files from the system disk using the OpenVMS tailoring utility? (Described in Chapter 11.)

☐ Back up the system disk after you have customized it? (Described in the upgrade and installation supplement for your computer.)

☐ Run AUTOGEN after the system has been running for at least 24 hours to collect feedback information? (Described in the section Running AUTOGEN.)

5

Before Upgrading OpenVMS VAX

Overview

Before you do an upgrade, you need to perform several important tasks to prepare the system. This chapter describes what you need to know and do to prepare for an upgrade, including:

- Being aware of the cautions and restrictions
- Making sure your hardware is ready and your software distribution kit is complete
- Examining AUTOGEN feedback data
- Backing up your system disk
- Preparing your system disk
- Preparing your system
- Gathering the information for the upgrade procedure
- Completing the preupgrade checklist

If you are an experienced system manager, you can use the checklist at the end of this chapter to complete the necessary preupgrade tasks.

If you are a less-experienced system manager, you should read the entire chapter and then use the checklist to make sure you have completed all the preupgrade tasks.

Cautions and Restrictions

Introduction

Before you begin the upgrade, take note of the following cautions and restrictions.

Cautions

• If you used the Snapshot facility to boot your current system with a system snapshot image, you must change the BOOT_ STYLE system parameter to 0 before you can perform an upgrade. To change the BOOT_STYLE system parameter to 0, enter the following commands:

```
$ RUN SYS$SYSTEM:SYSMAN
SYSMAN> PARAMETERS USE CURRENT
SYSMAN> PARAMETERS SET BOOT_STYLE 0
SYSMAN> PARAMETERS WRITE CURRENT
SYSMAN> EXIT
$
```

You can re-execute the Snapshot command procedure (SYS$MANAGER:SNAPSHOT.COM) after the upgrade is completed, as described in the *OpenVMS System Manager's Manual: Essentials*.

• If you have the DECset Version 11 layered product installed on your system, you must remove the @DEBUG$STARTUP.COM command from the system startup procedure. The debugger shipped with OpenVMS VAX Version 6.0 is a superset of the debugger that was shipped with the DECset Version 11 software. Removing the @DEBUG$STARTUP.COM command will cause the debugger shipped with OpenVMS VAX Version 6.0 to be the default system debugger.

To remove the @DEBUG$STARTUP.COM command *before* you upgrade the operating system software, perform the following steps:

1. Log in to an account with system privileges.

2. Using the editor of your choice, open the SYS$STARTUP:SYSTARTUP_V5.COM file and search for the following command:

```
$ @DEBUG$STARTUP
```

Delete the command and any parameters. (The command might have an optional parameter of either VMS or DECSET.)

3. Exit from the file, saving the change.

If you do not remove this command before you upgrade the operating system software, you must remove it after the upgrade, and you must deassign the logicals that were defined by DEBUG$STARTUP.COM. Perform the following steps:

1. Log in to the account that you used to perform the upgrade.

2. Enter the following commands:

```
$ DEASSIGN DEBUG
$ DEASSIGN DEBUGSHR
$ DEASSIGN DEBUGUISHR
$ DEASSIGN DBGTBKMSG
$ DEASSIGN DEBUG$HELP
$ DEASSIGN DEBUG$UIHELP
$ DEASSIGN DEBUGAPPCLASS
$ DEASSIGN VMSDEBUGUIL
```

3. Using the editor of your choice, open the SYSTARTUP_VMS.COM file (the upgrade procedure renames SYSTARTUP_V5.COM to SYSTARTUP_VMS.COM) and search for the following command:

```
$ @DEBUG$STARTUP
```

Delete the command and any parameters. (The command might have an optional parameter of either VMS or DECSET.)

4. Exit from the file, saving the change.

- The Version 6.0 upgrade procedure provides new files and directories in the directory [VMS$COMMON...]. If you had any special protections and access control lists (ACLs) before the upgrade, you need to reapply them to reestablish the security environment you had previously established. For more information on creating and maintaining a secure environment, see the *OpenVMS VAX Guide to System Security*.

- Before you perform an upgrade, remove or rename any special testing or debugging files that you might have in any of the SYS$SPECIFIC: or SYS$SYSROOT: directories. Files in these directories are used in place of the files in SYS$COMMON: directories.

As a minimum, you should check the following directories:

```
SYS$SYSROOT:[SYSEXE]
SYS$SYSROOT:[SYS$LDR]
```

Because the upgrade procedure affects the SYS$COMMON: directories and does not check or alter the contents of the SYS$SPECIFIC: or SYS$SYSROOT: directories, any testing or debugging files that you have in these directories remain there unchanged until you remove or rename them. If you do not remove or rename these files, your system might behave in an unpredictable manner.

- The upgrade procedure does *not* work across the network. DECnet for OpenVMS is not available during the upgrade, so you must have the save sets available locally.

- If the node you are upgrading is a cluster member, the upgrade procedure checks the previously set values of several system parameters at the beginning of the upgrade (see the section Beginning the Upgrade Procedure in Chapter 7). If any of the values are less than that required to upgrade to OpenVMS VAX Version 6.0, you are given the choice of continuing or canceling the upgrade. If you choose to continue the upgrade, the entire upgrade might not be completed and the cluster might be left in a hung state.

- If you changed the names of system directories on your system disk, the upgrade procedure will not work correctly. Restore your system disk to a standard directory structure before you attempt an upgrade.

- If you use your AUTOGEN feedback data, you should save this information before rebooting the system with minimum startup to begin the upgrade. For more information, see the section Examining AUTOGEN Feedback Data.

- If you elect not to install optional components, the upgrade procedure removes existing files for those components from the system disk. You can install optional files during the upgrade or later using VMSTAILOR.

  Note: Some optional files can be placed on an alternate device. You cannot tailor files on or off an alternate device.

- Do not attempt to use VMSINSTAL with OPTION G to transfer OpenVMS VAX save sets to another media type; doing so will produce an unusable system. Instead, you can use the DCL command COPY to transfer save sets to another media type.

  If you move the OpenVMS VAX save sets from the distribution media to the system disk or some other disk before beginning the upgrade, the save sets must be in the [000000] directory of the disk, or the upgrade will fail.

- You must not move the system disk or the distribution kit from one drive to another during the upgrade.

- Before you start the upgrade procedure in a VAXcluster environment, you must shut down all the nodes that boot from the system disk you are upgrading, including the node you perform the upgrade on.

- The upgrade procedure deletes all the operator and accounting logs. To save these files, move them to a user directory before you start the upgrade.

**Caution:
Service Update
PAK and
Temporary PAK
Users**

Digital has supplied valid license Product Authorization Keys
(PAKs) to most customers who were originally supported with
Service Update PAKs (SUPs). If you have not received a valid
permanent license PAK or have misplaced your license PAK,
please contact your local office for PAK resolution before you
proceed with the OpenVMS VAX Version 6.0 upgrade.

Verify that you registered your permanent license PAKs
and that you are no longer using any SUPs or temporary
PAKs. If you are currently using SUPs or temporary PAKs
for OpenVMS VAX, System Integrated Products (SIPs), or
layered products, the PAKs typically are registered in one of
two databases: SYS$SPECIFIC:[SYSEXE]LMF$SYSTEM.LDB
or SYS$COMMON:[SYSEXE]LMF$LICENSE.LDB. The
authorization number for a SUP usually begins with SQM or
AWS and has a version number or product release date associated
with it. A temporary PAK usually begins with an authorization
number of ATP or ATS and has either a product release date or a
key termination date associated with it.

Enter the following command to determine whether you have
SUPs or temporary PAKs registered in your node-specific LMF
database:

`$ LICENSE LIST/FULL/DATABASE=SYS$SPECIFIC:[SYSEXE]LMF$SYSTEM.LDB`

If no licenses are displayed or the following error message appears
on your screen, you have no SUPs or temporary PAKs registered
in SYS$SPECIFIC:[SYSEXE]LMF$SYSTEM.LDB:

```
%RMS-F-FNF, file not found
```

Enter one of the following commands to determine whether
you have any SUPs or temporary PAKs registered in
SYS$COMMON:[SYSEXE]LMF$LICENSE.LDB or in a
user-defined database:

`$ LICENSE LIST/FULL/DATABASE=SYS$COMMON:[SYSEXE]LMF$LICENSE.LDB`

`$ LICENSE LIST/FULL/DATABASE=user_defined_database`

If any SUPs or temporary PAKs are active in any of the
databases, you can delete them after receiving and registering
the corresponding permanent PAKs. Register the corresponding
permanent license PAKs by using the command procedure
@SYS$UPDATE:VMSLICENSE. See the *OpenVMS License
Management Utility Manual* for complete PAK registration
instructions.

Restrictions

- Before you can upgrade to OpenVMS VAX Version 6.0, your system must be running at least Version V5.5 of the VMS operating system. For example, you can upgrade a system disk to Version 6.0 of the OpenVMS VAX operating system from any of the following versions (or related hardware releases):

  VMS Version V5.5
  VMS Version V5.5–1
  VMS Version V5.5–2

  You *cannot* upgrade to OpenVMS VAX Version 6.0 from a VMS Version A5.5, A5.5–1, or A5.5–2 system. To convert an A5.5 system to a Version V5.5 system, do the following:

  1. Log in to the SYSTEM account.

  2. Enter the following command to execute the SYS$UPDATE:VMS$UPGRADE_A55_V55.COM command procedure:

     ```
     $ @SYS$UPDATE:VMS$UPGRADE_A55_V55
     ```

  3. Answer YES to the following question:

     ```
     Do you wish to convert queues now ? (YES,NO,ABORT) YES
     ```

  4. When the command procedure completes, reboot your system.

  You can now upgrade to OpenVMS VAX Version 6.0.

- If you want to use DECwindows software with OpenVMS VAX Version 6.0, you must install the DECwindows Motif for OpenVMS VAX layered product. You can install this layered product either before or after you perform the upgrade.

- You cannot upgrade to OpenVMS VAX Version 6.0 on the following:

  VAX 4000–100A
  VAX 4000–105A
  VAX 4000–500A
  VAX 4000–600A
  VAX 4000–700A
  VAX 4000–800A
  VAX 3100–90A
  VAX 3100–95A
  VAXft Model 810
  HSZ1x (RAID disk)
  DEFTA (FDDI Turbochannel adapter)
  DEFQA (FDDI Q–bus adapter)

  If you have any of these hardware types configured in your system and you attempt to upgrade to OpenVMS VAX Version 6.0, the upgrade procedure will abort.

If the unsupported hardware is part of a VAXcluster, you can create a separate system disk for OpenVMS VAX Version 6.0 and keep your VMS Version 5.5–2 system disk to support the hardware that cannot run Version 6.0. Otherwise, you must keep your system at VMS Version 5.5–2 (or Version 5.5–2H4 for the VAX 4000s) until the next release of OpenVMS VAX.

• If you have a shared system dump file in SYS$COMMON:[SYSEXE], the shared dump file cannot have the name SYSDUMP.DMP. If you have a shared system dump file with this name, Digital recommends that you rename it to SYS$COMMON:[SYSEXE]SYSDUMP-COMMON.DMP. For more information, see the System Management section of the *OpenVMS VAX Version 6.0 Release Notes*.

• You cannot upgrade a shadowed system disk. If your system disk is part of a shadow set, you must create a nonshadowed system disk before beginning the upgrade. For more information, see the *Volume Shadowing for OpenVMS*.

• The upgrade procedure is designed so that you should not have to reinstall most layered products after the upgrade. However, you might need to reinstall certain layered products because of product-specific installation procedures.

For example, you must reinstall layered products that either create directories synonymous with system directories or use OpenVMS defined data structures. If a layered product is available (refer to Appendix E), yet exhibits unexpected behavior once Version 6.0 of the OpenVMS VAX operating system is running, check the *OpenVMS VAX Version 6.0 Release Notes* for layered-product restrictions. If problems persist, contact your Digital Services representative.

Note: If you use VAX Workstation Support (VWS) software, you must install the VWS layered product after the upgrade.

• If you have one or more of the following products installed on your system, you must reinstall those products following an upgrade:

DEC FORTRAN Version 6.0 or later
DEC COBOL Version 5.1 or later
DEC Ada Version 6.0 or later

If the upgrade procedure detects that these products are installed on your system, it displays a message similar to the following:

```
You have DEC FORTRAN installed. This OpenVMS VAX V6.0 upgrade
replaces Run-Time Library images provided by DEC FORTRAN, therefore
you must reinstall DEC FORTRAN after completing the OpenVMS VAX
upgrade.

For more information, see the OpenVMS VAX V6.0 Upgrade and Installation
Manual and the DEC FORTRAN Release Notes.

* Do you want to continue? [Y]:
```

If you continue with the upgrade and do not reinstall the product, software packages that require the new run-time library (RTL) will not execute properly.

If you have the distribution media for the affected product, you can continue the upgrade and reinstall the RTL image from that media after the upgrade completes.

If you do not have the product named in the message installed on your system, the message indicates that some software package has bundled that product's RTL image. If you know which software package did this, you can reinstall the RTL image from that media after the upgrade completes. If you do not know which software package requires the new RTL image, contact your Digital representative.

Are You Ready to Upgrade?

Introduction   Before you begin to upgrade the OpenVMS VAX operating system, make sure you have all the required hardware and software components.

Hardware Components   Examine your hardware for the following:

- Make sure your hardware has been checked for proper operation. To perform a successful upgrade, you must understand the basic operations of the VAX computer that you are upgrading. Refer to the upgrade and installation supplement for your VAX computer. If you have a VAXcluster environment, refer to *VMScluster Systems for OpenVMS*.

- Set up your system to record the upgrade procedure on either a hardcopy terminal or a printer attached to the console terminal. If you do not do this, the screen messages will be lost. You will need a transcript in case there is a problem during the upgrade. For more information, see the upgrade and installation supplement for your VAX computer.

- Have scratch console media (media that does not contain files you want to save) available for the following VAX computers:

      VAX 8600, 8650
      VAX 8200, 8250, 8300, 8350
      VAX–11/730
      VAX–11/750
      VAX–11/780, 785

  For example, if you have a VAX–11/780 or VAX–11/785 computer, you need a scratch RX01 floppy diskette.

Software Components   Examine your software for the following:

- Make sure you have all the items listed on the bill of materials (BOM) in the OpenVMS distribution kit. If your kit is incomplete, notify Digital Software Supply, and request priority shipment of any missing items.

- Before upgrading the OpenVMS VAX operating system, read Appendix A of this manual, the *OpenVMS VAX Version 6.0 New Features Manual*, *OpenVMS VAX Version 6.0 Release Notes*, and any cover letters included with your kit.

Examining AUTOGEN Feedback Data

Background

After the upgrade is finished, AUTOGEN runs. If it finds valid feedback data on your system, it tries to use AUTOGEN feedback. Feedback data is produced by the SAVPARAMS phase of AUTOGEN and is stored in SYS$SYSTEM:AGEN$FEEDBACK.DAT. Valid feedback data is defined as follows:

- The system was up for at least 24 hours when the feedback data was gathered.

- The feedback data is not over 30 days old.

Note: If your feedback data is not valid, AUTOGEN will run without feedback (all previous feedback-generated parameters will be replaced by the AUTOGEN NOFEEDBACK calculations).

How to Check Feedback Data

To ensure that AUTOGEN feedback will run after the upgrade, do the following:

1. Check the validity of your current feedback data by entering the following command:

   ```
   $ @SYS$UPDATE:AUTOGEN GETDATA TESTFILES
   ```

   This command is for test purposes and does not result in the modification of system parameters or changes to the page and swap files. If your current feedback is valid, AUTOGEN will use it during the upgrade, and you can proceed to the next section.

   If your current feedback data is invalid, AUTOGEN will issue several warnings. If you get these warnings, go to Step 2.

2. If your current feedback is invalid, you can generate new feedback data (assuming your system was up for at least 24 hours). Enter the following command:

   ```
   $ @SYS$UPDATE:AUTOGEN SAVPARAMS TESTFILES
   ```

   This command is for test purposes and does not result in the modification of system parameters or changes to the page and swap files. Again, AUTOGEN warns you if the feedback data just produced is invalid.

3. If you follow Steps 1 or 2 and your current feedback data is valid, AUTOGEN uses your current feedback-generated parameters during the upgrade. Your current feedback-generated parameters will not be lost during the upgrade.

Backup Tasks

Introduction

Digital recommends that you make a standalone backup copy of the system disk and, if your configuration allows it, upgrade the *backup copy*. If there are problems, you will still have a working system disk.

How to Back Up the System Disk

To make a backup copy of the system disk, follow the instructions in the upgrade and installation supplement for your VAX computer. If you do not have a removable system disk, back up your system disk to tape and restore the image backup to the system disk. This eliminates disk fragmentation on the system disk and creates contiguous free disk blocks required for the upgrade. (The upgrade can fail if there are not sufficient contiguous free blocks.) Store the backup tapes in a safe place.

How to Back Up Console Media

If you have one of the following VAX computers, you also must make a backup copy of the console media:

> VAX–11/730
> VAX–11/750
> VAX–11/780, 785
> VAX 8200, 8250, 8300, 8350, 8600, 8650

To make a backup copy of the console media, use the SYS$UPDATE:CONSCOPY.COM procedure, as described in the upgrade and installation supplement for your VAX computer. Use the backup copy of the console media during the upgrade procedure. The upgrade procedure updates the console media for you.

If your VAX computer uses one of the following console media, you did not receive a new standalone BACKUP kit with your OpenVMS VAX distribution kit:

> TU58 tape cartridge
> RX33 diskette
> RX50 diskette
> RX01 diskette
> RL02 disk cartridge

Before beginning the upgrade, make sure you have a standalone BACKUP kit on one of these media. If you do not have one, create a standalone BACKUP kit using the STABACKIT.COM procedure as described in the upgrade and installation supplement for your VAX computer.

Note: You cannot build standalone BACKUP on TU58 or RX01 console media because the OpenVMS VAX Version 6.0 kit is too large. If your VAX computer uses a TU58 or RX01, build a standalone BACKUP kit before upgrading and retain the backup copies for use with future versions of OpenVMS VAX.

Preparing Your System Disk

Introduction

To prepare the system disk for the upgrade, log in to the SYSTEM account and, depending on your configuration, complete some or all of the following tasks:

Create a Nonshadowed System Disk

If you are using a volume-shadowed system disk, you must create a nonshadowed system disk to upgrade. Follow the instructions in the *Volume Shadowing for OpenVMS* to prepare a nonshadowed system disk for the upgrade.

Boot the Backup Copy of Your System Disk

If you need to boot the backup copy of your system disk or if you are upgrading a VAXcluster environment, enter the following command (otherwise, go to the next step):

```
$ @SYS$SYSTEM:SHUTDOWN
```

When the procedure asks if an automatic system reboot should be performed, press Return for NO. If you are a VAXcluster member, choose the CLUSTER_SHUTDOWN option. When the procedure is finished, halt the system as described in the upgrade and installation supplement for your VAX computer.

If applicable, remove the system disk and replace it with the backup copy.

Boot the system from the backup copy of the system disk. If you do not know how to boot the system, refer to the upgrade and installation supplement for your VAX computer.

Log in to the SYSTEM account.

Copy SYSUAF.DAT to SYS$SYSTEM

The current copy of SYSUAF.DAT must be on the system disk in the SYS$SYSTEM directory. Otherwise, you cannot proceed with the upgrade. If you have moved your copy of SYSUAF.DAT to another location, copy it to SYS$SYSTEM for the duration of the upgrade.

Note: If you are doing a rolling upgrade, the shared version of SYSUAF.DAT is not updated.

Move any files that you do not want changed into a user directory.

Rename System Dump File

If you have a shared system dump file in SYS$COMMON:[SYSEXE], the shared dump file cannot have the name SYSDUMP.DMP. If you have a shared system dump file with this name, Digital recommends that you rename it to SYS$COMMON:[SYSEXE]SYSDUMP-COMMON.DMP.

Analyze the System Disk

To analyze the system disk for inconsistencies and errors in the file structure, enter the following command:

```
$ ANALYZE/DISK_STRUCTURE SYS$SYSDEVICE
```

The following message represents normal behavior; you can ignore it:

```
%ANALDISK-I-OPENQUOTA, error opening QUOTA.SYS
```

If you find any other errors on the system disk, repair the errors by entering the following command:

```
$ ANALYZE/DISK_STRUCTURE/REPAIR SYS$SYSDEVICE
```

Refer to the *OpenVMS System Management Utilities Reference Manual* for more information on the ANALYZE/DISK_STRUCTURE command.

Check Page and Swap Files

Make sure the page file (PAGEFILE.SYS) and, if appropriate, the swap file (SWAPFILE.SYS) are in SYS$SPECIFIC:[SYSEXE]. The upgrade requires that the page file be located on the system disk in SYS$SPECIFIC:[SYSEXE]. The swapfile (SWAPFILE.SYS) does not need to be located on the system disk for the upgrade, but if it is located on the system disk, the file must be located in SYS$SPECIFIC:[SYSEXE].

If the upgrade procedure finds these files in the common directory, it will move them to the system-specific directory before continuing. Check the page file to make sure it is at least 4600 blocks. Use the following procedure:

1. To find out the size of the page file, enter the following command:

   ```
   $ @SYS$UPDATE:SWAPFILES
   ```

   The procedure displays the size of the page file and asks you to enter a new value, as follows:

   ```
   Enter new size for paging file:
   ```

   If the page file (PAGEFILE.SYS) size is greater than 4600 blocks, press the Return key. If it is less than 4600 blocks, enter 4600 and press Return.

2. If the swap and dump files are on the system disk, the procedure displays the sizes of each file. To keep the current values, press Return after each prompt.

   If the swap file is not on the system disk, the procedure asks if you want to create one. You do not need swap and dump files on the system disk for the upgrade procedure. Enter the appropriate response for your system.

   If you changed the size of the page file or created a swap file, a message is displayed that tells you to reboot the system. Do not reboot now. You will reboot later.

Check for Free Blocks

Check the system disk to make sure there is enough room for the upgrade. To determine whether you have enough room, enter the following command:

```
$ SHOW DEVICE SYS$SYSDEVICE
```

To upgrade the OpenVMS VAX *required* files, the minimum number of free blocks required is 40,500. If you plan to upgrade the OpenVMS *library* or *optional* files, you might not need more free blocks because many files are deleted as the upgrade progresses, freeing up additional space.

Set System Parameters

During the upgrade procedure, the system is shut down and rebooted a number of times. To avoid startup of certain system integrated products and layered products on the system during each reboot, set the system parameter STARTUP_P1 to MIN. Enter the following commands:

```
$ RUN SYS$SYSTEM:SYSMAN
SYSMAN> PARAMETERS USE CURRENT
SYSMAN> PARAMETERS SET STARTUP_P1 "MIN"
SYSMAN> PARAMETERS WRITE CURRENT
SYSMAN> EXIT
```

Make sure the system parameters SCSNODE and SCSSYSTEMID are defined on your system. To determine whether these parameters are defined on your system, enter the following commands:

```
$ RUN SYS$SYSTEM:SYSMAN
SYSMAN> PARAMETERS SHOW SCSNODE
SYSMAN> PARAMETERS SHOW SCSSYSTEMID
```

If SCSNODE and SCSSYSTEMID are not set correctly, enter the following commands where *node* is a 1- to 6-character unique DECnet node name and *systemid* is (DECnet area * 1024) + node number:

```
SYSMAN> PARAMETERS USE CURRENT
SYSMAN> PARAMETERS SET SCSNODE "node"
SYSMAN> PARAMETERS SET SCSSYSTEMID systemid
SYSMAN> PARAMETERS WRITE CURRENT
    .
    .
    .
```

Make sure the system parameter VMS5 is set to 0. If your system has a KFQSA controller, the VMS5 parameter might have been set to a nonzero value for a previous upgrade. The VMS5 parameter is reserved for Digital's use only.

To check the value of the VMS5 parameter, enter the following commands:

```
$ RUN SYS$SYSTEM:SYSMAN
SYSMAN> PARAMETERS USE CURRENT
SYSMAN> PARAMETERS SHOW VMS5
Parameter Name          Current   Default   Minimum   Maximum Unit  Dynamic
--------------          -------   -------   -------   ------- ----  -------
VMS5                       1         0         0         -1
```

If the current value of VMS5 is not 0, set it to 0 by entering the following commands:

```
SYSMAN> PARAMETERS USE CURRENT
SYSMAN> PARAMETERS SET VMS5 0
SYSMAN> PARAMETERS WRITE CURRENT
SYSMAN> EXIT
```

Add Modified System Parameters to MODPARAMS.DAT Any system parameter values that you modified and *did not* enter in MODPARAMS.DAT are lost during the upgrade. To retain the values of these parameters, enter their names in MODPARAMS.DAT and the value that AUTOGEN needs to add to the default minimum value.

For example, if you modified GBLPAGES by 128 pages above the default, add the following line to SYS$SYSTEM:MODPARAMS.DAT:

```
ADD_GBLPAGES=128
```

When AUTOGEN runs after the upgrade, it uses the values in MODPARAMS.DAT.

The following section, Preparing the System, tells you how to get your system ready for an upgrade.

Preparing the System

To prepare the system for the upgrade, use the following procedure:

Enable Auto Restart or Manual Reboot

If your computer uses console media, set the computer to restart automatically. For some VAX computers this means setting one or more switches. For others, this means entering certain console mode commands. To determine how to enable auto restart, refer to the upgrade and installation supplement for your VAX computer.

If you have a system that does not use console media, set your system so you can reboot it manually. For more information, refer to the upgrade and installation supplement for your VAX computer.

Shut Down and Reboot the System

Shut down and reboot the system to activate any system parameters that you changed (STARTUP_P1, for example). To shut down the system, enter the following command:

```
$ @SYS$SYSTEM:SHUTDOWN
```

When the procedure asks if an automatic system reboot should be performed, type Y (for YES) and press the Return key.

After the system reboots, log in to the SYSTEM account.

Prevent Interactive Logins

To prevent users from logging in to the system during the upgrade, enter the following command:

```
$ SET LOGINS/INTERACTIVE=0
```

Check for DECnet for OpenVMS

To determine whether your system is running DECnet for OpenVMS software, enter the following command:

```
$ SHOW NETWORK
```

If the system displays the following message, go to the next step:

```
%SHOW-I-NONET, network unavailable
```

If the system displays information on the status of the DECnet for OpenVMS network, enter the following commands to shut down the network:

```
$ RUN SYS$SYSTEM:NCP
NCP> SET EXECUTOR STATE OFF
NCP> EXIT
```

Stop Queues

To stop all batch and print queues, enter the following command:

```
$ STOP/QUEUES/ON_NODE
```

Gathering Information for the Upgrade

Introduction　　　At different points during the upgrade, the procedure prompts you to supply information.

Information　　　To save time once the procedure begins, be sure you have the
You Need　　　following information readily available. Remember, entering incorrect information during the upgrade could force you to repeat the entire upgrade procedure.

Required Information	Explanation
Device names	You will need to specify the device names for the drives that will hold the distribution media and the system disk.
Passwords	You will be prompted to type passwords of at least 8 characters for the SYSTEM, SYSTEST, and FIELD accounts.
Optional components	The upgrade procedure prompts you to specify whether you want to install the library (VMS060.C) and optional (VMS060.D) OpenVMS components. Appendix C lists the files included in these components.
	You can save some space on your system disk if you choose *not* to install these components, but be sure to review Appendix C before deciding.
Location for Help Message utility and online manuals	Two new save sets are available with this release of the operating system. Save set VMS060.E contains the online Help Message utility, and VMS060.F contains three online reference manuals in ASCII format: *OpenVMS Master Index*, *OpenVMS Glossary*, and *Overview of OpenVMS Documentation*.
	Know the name of the disk on which you will be installing these save sets. You can install these save sets on your system disk or on alternate disks. (However, if you copied the distribution kit to some other media from which you will be performing the installation, you cannot install these save sets on that media.) Save set VMS060.E can reside on one disk, and save set VMS060.F can reside on another alternate disk. However, you cannot divide the text files in save set VMS060.F between disks; they must all be on the same disk.

Required Information	Explanation

DECwindows components	The installation procedure prompts you to specify which of the following DECwindows components you want to install:
	
	• DECwindows base support (required for running DECwindows software), which includes:
	
	  – DECwindows transport
	
	  – DECwindows keymaps
	
	• DECwindows workstation support (required for VAX workstations), which includes:
	
	  – DECwindows X11 display server
	
	  – Graphics drivers
	
	  – 75 dots/inch video fonts
	
	  – 100 dots/inch video fonts (option available only if you select DECwindows workstation support)
	
	Note that you must install the DECwindows Motif for OpenVMS VAX (previously called VMS DECwindows Motif) layered product if you want to run the DECwindows software. VMS DECwindows Motif Version 1.1 is the minimum supported version for systems running OpenVMS VAX Version 6.0. If you do not know which version of DECwindows Motif you are currently running on your system, you can check by entering the following command:
	
	`$ ANALYZE/IMAGE SYS$LIBRARY:DECW$XLIBSHR.EXE`
	
	Also note that the layered product does *not* have the DECwindows base and workstation support components. To get full DECwindows support, you must select the DECwindows components provided with the OpenVMS VAX Version 6.0 kit and install the separate DECwindows Motif for OpenVMS VAX layered product, which supports both Motif and XUI environments.

PAK information	The information listed on Product Authorization Keys (PAKs) for any new products you will register. You do not need to register your OpenVMS VAX license or the licenses for any System Integrated Products (SIPs) you are already running.

Where to Go Next

Once you have completed these steps, use the checklist in Preupgrade Checklist to make sure you have completed all the necessary tasks before continuing with the upgrade.

Preupgrade Checklist

Introduction

Before you begin the upgrade procedure, use the following checklist to make sure you have completed all the necessary preupgrade tasks.

Did you . . .

☐ Read the *OpenVMS VAX Version 6.0 New Features Manual* and the *OpenVMS VAX Version 6.0 Release Notes*?

☐ Read the cautions and restrictions described at the beginning of this chapter and in Chapter 1?

☐ Make sure you have enough free blocks for the upgrade? You need at least 40,500 free blocks for the required files to start the upgrade. (Described in the section Preparing Your System Disk.) The entire upgrade requires 133,500 blocks.

☐ Set up your system to record the upgrade procedure on either a hardcopy terminal or a printer attached to the console terminal? If you do not do this, the screen messages will be lost. You will need a transcript in case there is a problem during the upgrade. For information on how to connect a hardcopy device to your console to record the procedure, see the upgrade and installation supplement for your VAX computer.

☐ Check your AUTOGEN feedback information to be sure it is valid before rebooting the system? (Described in the section Examining AUTOGEN Feedback Data.)

☐ Make a backup copy of the system disk and, if applicable, of the console media? (Described in the upgrade and installation supplement for your computer.)

☐ If, in previous versions, your distribution kit provided standalone BACKUP on one of the following media types, make sure you have created a standalone BACKUP kit on one of these media types?

    RX33
    TU58
    RX50
    RX01
    RL02

(Described in the section Backup Tasks.)

☐ Make sure SYSUAF.DAT is in the SYS$SYSTEM directory? (Described in the section Preparing Your System Disk.)

☐ Make sure PAGEFILE.SYS and SWAPFILE.SYS (if they are located on the system disk) are in the SYS$SPECIFIC:[SYSEXE] directory? (Described in the section Preparing Your System Disk.)

☐ Make sure the page file is at least 4600 blocks? (Described in the section Preparing Your System Disk.)

☐ If you have a shared system dump file in SYS$COMMON:[SYSEXE], make sure the shared file is not named SYSDUMP.DMP? (Described in the section Preparing Your System Disk.)

☐ If your system disk is part of a shadow set, create a nonshadowed system disk to upgrade? (Described in the *Volume Shadowing for OpenVMS*.)

☐ Set the appropriate system parameters and make sure that STARTUP_P1 is set to MIN? (Described in the section Preparing Your System Disk.)

☐ If upgrading from the InfoServer, define the system parameter SCSNODE? (Described in the section Preparing Your System Disk.)

☐ If your system has a KFQSA controller, make sure the VMS5 parameter is set to 0? (Described in Preparing Your System Disk.)

☐ Set up the system to restart automatically? (Described in the upgrade and installation supplement for your VAX computer.)

☐ Shut down and reboot the system from which you will perform the upgrade? If you are upgrading a VAXcluster, shut down all computers that boot from the system disk you are upgrading?

☐ Set interactive logins to 0?

☐ Shut down DECnet for OpenVMS software? (Described in the section Preparing the System.)

☐ Before attempting a queue manager upgrade, determine that IPC is running and that SCSNODE and SCSSYSTEMID in MODPARAMS.DAT are correct?

☐ Before beginning a rolling upgrade, make sure the queue manager is not running on a node to be upgraded? If the queue manager is running, move it to a node that you will not be upgrading. You can move the queue manager by entering the following command:

START/QUEUE/MANAGER/ON=(nonupgrading node1,-
node2,. . . noden,*)

☐ Check your site-specific startup procedures for instances of the START/QUEUE/MANAGER command where the /ON qualifier specifies the node you are upgrading as one of the preferred nodes? If a startup procedure does contain such a start queue command, modify the command file to exclude the node you are upgrading from the /ON qualifier list. Modifying the command to START/QUEUE/MANAGER/ON=* will suffice.

☐ Make sure you have the following information (described in the section Gathering Information for the Upgrade) available:

- The device names of the drives that will hold the system disk and the distribution media?

- Passwords of at least 8 characters for the SYSTEM, SYSTEST, and FIELD accounts?

- A list of optional OpenVMS VAX components you want to install?

- A list of optional DECwindows components you want to install?

- The information listed on Product Authorization Keys (PAKs) for any new product licenses you will register?

☐ Create a command procedure to be used when booting from [SYSF]? See Appendix B.

Where to Go Next

To upgrade a standalone system, go to Chapter 7.

To upgrade a VAXcluster environment, go to Chapter 6.

6

Upgrading a VAXcluster Environment

Overview

This chapter describes how to upgrade a VAXcluster environment. Refer to *VMScluster Systems for OpenVMS* for more detailed information on VAXcluster environments.

Concurrent and Rolling Upgrades

Introduction

There are two types of cluster upgrades: concurrent and rolling. The type of upgrade you use depends on whether you want to maintain the availability of the cluster during the upgrade and whether you have more than one system disk.

Concurrent Upgrades

During a concurrent upgrade, you must shut down the entire cluster and upgrade each system disk. No one can use the cluster until you upgrade each system disk and reboot each VAX computer. If all systems in the VAXcluster environment are booted from one system disk, you must perform a concurrent upgrade.

Note: For OpenVMS VAX Version 6.0 concurrent upgrades, all nodes in the cluster must be running at least Version 5.5 of the VMS operating system. (See the Restrictions section in Chapter 5 for more information.)

To perform a concurrent upgrade, go to the section Concurrent Upgrades.

Rolling Upgrades

During a rolling upgrade, you can keep some of the VAX computers in the cluster running while you upgrade others (you must have more than one system disk). The cluster runs temporarily with different versions of the operating system.

Note: For OpenVMS VAX Version 6.0 rolling upgrades, all nodes in the cluster must be running at least Version 5.5 of the VMS operating system.

To perform a rolling upgrade, go to the section Rolling Upgrades.

Concurrent Upgrades

Introduction

You perform a concurrent upgrade by shutting down the entire cluster, upgrading each system disk, and rebooting each VAX computer in the cluster. When the cluster reboots, each VAX computer will be running the upgraded version of the operating system. Users cannot access the cluster until you upgrade each system disk and reboot each VAX computer.

How to Perform a Concurrent Upgrade

To perform a concurrent upgrade, use the following procedure:

1. Shut down the entire cluster by logging in to the SYSTEM account on each node *locally*, entering the following command, and choosing the CLUSTER_SHUTDOWN option:

   ```
   $ @SYS$SYSTEM:SHUTDOWN
   ```

2. If you have only one system disk for your cluster, go to Step 3.

   If you have more than one system disk, select one to upgrade.

3. Perform a conversational boot of a single VAX computer from the system disk you will be upgrading. For more information about the conversational boot procedure, refer to the upgrade and installation supplement for your VAX computer.

   At the SYSBOOT> prompt, use the SHOW VOTES and SHOW EXPECTED_VOTES command to display the current values of the parameters. Write these values down because you will need to restore them later. Set the VOTES and EXPECTED_VOTES values to 1 by entering the following commands:

   ```
   SYSBOOT> USE CURRENT
   SYSBOOT> SET VOTES 1
   SYSBOOT> SET EXPECTED_VOTES 1
   SYSBOOT> CONTINUE
   ```

4. Upgrade the system disk, using the procedure in Chapter 7.

5. If you have only one system disk, go to Step 6.

   If you have more than one system disk, shut down the system that you just upgraded. Then repeat Steps 2 through 4 to upgrade each system disk in the cluster. When you finish upgrading all of the system disks, go to Step 6.

6. Reboot each computer in the VAXcluster environment.

7. Complete the postupgrade procedures described in Chapter 8.

Rolling Upgrades

Introduction   During a rolling upgrade, you upgrade each system disk individually, allowing old and new versions of the operating system to run together temporarily in the same cluster. Clusters running two versions of the operating system are called mixed-version clusters. Because rolling upgrades allow mixed-version clusters, the systems that you are not upgrading remain available.

Restrictions   The following restrictions apply to rolling upgrades:

- Digital recommends that all VAX computers in a cluster run the same version of the operating system. Mixed-version clusters are supported *only* for the purpose of upgrading the entire cluster incrementally. Digital further recommends that all VAX systems in a VAXcluster run the latest version of the OpenVMS VAX operating system.

- A rolling upgrade does not apply when all systems boot from a single system disk. When all systems boot from a single system disk, perform a concurrent upgrade using the procedure described in the section Concurrent Upgrades.

- During the rolling upgrade, the queuing system is disabled on the nodes being upgraded. The queuing system on the other nodes should be unaffected by the upgrade as long as a START/QUEUE/MANAGER/ON=(upgrade node . . .) command is not executed. A START/QUEUE/MANAGER command could attempt to move the queue manager process to the node being upgraded if the /ON qualifier indicates that it is one of the preferred nodes. If the queue manager attempts to run on the node being upgraded, the queuing system will hang on the entire cluster.

  If your startup file contains a START/QUEUE/MANAGER /ON=(upgrade node1, node2 . . . node*n*) command, do not boot in any nonupgrading nodes until you have modified the startup file. (Modifying the command to START/QUEUE/MANAGER/ON=* will suffice. Booting in a node will cause the queuing system to hang on the cluster if the START/QUEUE/MANAGER/ON=(upgrade node, . . .) command is executed.

  If the cluster queuing system hangs during the upgrade, it is most likely caused by the queue manager attempting to run on the upgrading node. To clear the condition, move the queue manager to a node you are not upgrading by entering the following command:

  START/QUEUE/MANAGER/ON=(nonupgrading node1,-
  node2 . . . node*n*)

How to Perform a Rolling Upgrade

To perform a rolling upgrade follow these steps:

1. Check the votes and make adjustments to maintain the proper quorum so the cluster can continue to operate throughout the upgrade. (*VMScluster Systems for OpenVMS* describes this procedure in detail.)

2. Select a system disk to upgrade.

3. Shut down all VAX computers booting from the system disk that you are upgrading, except for the computer that you will use to apply the upgrade. VAX computers that do not boot from the system disk that you are upgrading remain available to users.

   a. Log in to the SYSTEM account on the VAX computer you are shutting down.

   b. Enter the following command:

      ```
      $ @SYS$SYSTEM:SHUTDOWN.COM
      ```

   c. On one of the VAX computers that is still running, enter the following command:

      ```
      $ SET CLUSTER/EXPECTED_VOTES
      ```

   d. Repeat Steps a through c for each VAX computer requiring a shutdown.

   This procedure lets one VAX computer continue running from the system disk (assuming computers running from different system disks supply enough votes to sustain cluster quorum).

4. If proper quorum is not maintained at any time during the upgrade procedure, the shutdown procedure will hang the cluster. If the cluster hangs during a shutdown, enter the following commands on the system console of a CPU that is still a cluster member:

   ```
   $  Ctrl/P
   >>> H
   >>> D/I 14 C
   >>> C
   IPC> Q
   IPC> Ctrl/Z
   ```

5. Upgrade the system disk using the procedure in Chapter 7.

   Caution: The upgrade procedure requires exclusive access to the drive that holds the distribution media. Do not mount the distribution media on other nodes.

6. During phase 1 of the upgrade, the procedure will ask if you are performing a rolling upgrade. If you enter Y, the procedure asks you several questions to determine if all system disks in the cluster (other than the one you are upgrading) are running at least VMS Version V5.5. For example:

   ```
   * Are the other system disks running VMS V5.5 or higher?
   ```

All systems in the cluster must be running at least VMS Version V5.5 to perform the rolling upgrade. Type Y and press the Return key.

7. When the upgrade has completed, reboot each VAX computer that boots from the system disk you have just upgraded.

8. Perform the postupgrade tasks described in Chapter 8.

9. Repeat Steps 2 through 7 for each system disk you are upgrading. Once you have performed tasks a through d in Step 3, you do not need to perform them again.

Adding an OpenVMS VAX Version 6.0 Supported CPU

If you need to add a new CPU supported by OpenVMS VAX Version 6.0 to an existing Version 5.5 VAXcluster, Digital supports two options, listed in the following preferred order:

1. Upgrade the entire cluster to OpenVMS VAX Version 6.0 and bring the new CPU in as a member.

2. If you need to keep some systems in the cluster at VMS Version 5.5, you must upgrade a system disk in the cluster to Version 6.0 using the rolling upgrade procedure and then boot the new CPU into the cluster using that system disk.

7

Upgrading the OpenVMS VAX Operating System

Overview

This chapter explains the procedure for upgrading a single OpenVMS VAX system disk, including:

- How to prepare for booting from the [SYSF] directory
- How to configure devices
- How to begin the installation
- What the procedure does and what you are asked to do during the six phases of the upgrade

You must complete each phase of the upgrade procedure. On most VAX computers the upgrade procedure continues automatically from phase to phase. Read the screen displays carefully and, if you need to reboot your VAX computer manually, refer to the upgrade and installation supplement for your VAX computer and Appendix B of this manual.

Before you begin the upgrade procedure, read the overview of the upgrade procedure described in Chapter 1 and complete the preupgrade tasks described in Chapter 5. If you are upgrading a VAXcluster, you must also read Chapter 6.

Preparing to Boot from [SYSF]

Introduction

During the upgrade procedure, you are asked to boot the system from the [SYSF] directory on the system disk. The [SYSF] directory is a root directory created on the system disk by the upgrade procedure. It temporarily holds the system files used in the upgrade until the procedure moves the files to their permanent location. The upgrade procedure then removes the [SYSF] directory from the system disk.

If you do not know how to boot from [SYSF], read the upgrade and installation supplement for your VAX computer and Appendix B of this manual.

Ignore any error messages after the first reboot that indicate an invalid dump header version. These messages are normal and are to be expected.

Modifying Boot Command Procedures

Some VAX computers require a special command procedure to boot from [SYSF]. If you are performing an upgrade on one of the following VAX computers you must modify the boot command procedures, DEFBOO and *ddd*GEN before beginning the upgrade procedure:

    VAX 8530, 8550, 8700, 8810, 8820-N
    VAX 8820, 8830, 8840

To modify the boot command procedures, exit from the OpenVMS VAX operating system (but do not shut it down) and enter the appropriate console mode. Make copies of DEFBOO and *ddd*GEN before you modify them. Name the copies DEFBOO.SAV and *ddd*GEN.SAV.

The upgrade and installation supplement for your VAX computer describes the procedures for copying and modifying DEFBOO and *ddd*GEN. Use these procedures to modify DEFBOO and *ddd*GEN so that they specify [SYSF] as the directory from which to boot.

In DEFBOO, change the DEPOSIT command that sets boot flags in register 5 (R5) as follows:

DEPOSIT R5=F0000000

In *ddd*GEN, change the DEPOSIT command as follows:

DEPOSIT R5 F0000001

If you are upgrading a VAX 8200, 8250, 8300, or 8350 computer, you must create a boot command procedure that allows you to boot from the [SYSF] directory before beginning the upgrade. The upgrade and installation supplement for your VAX computer describes how to create this boot command procedure.

Configuring Devices

Introduction

Because you rebooted your system with minimum startup, the system did not automatically configure all devices. However, you might need access to some of the devices to perform the upgrade.

How to Configure Devices

To make sure you can access the devices that might be needed for the upgrade, run SYSGEN to reconfigure the devices on the system and run STARTUP CONFIGURE by entering the following commands:

```
$ RUN SYS$SYSTEM:SYSGEN
SYSGEN> AUTOCONFIGURE ALL
SYSGEN> EXIT
$ @SYS$SYSTEM:STARTUP CONFIGURE
```

Beginning the Upgrade Procedure

Overview

This section describes how to start the upgrade procedure using VMSINSTAL. You can type a question mark (?) for help at any time while running VMSINSTAL.

The instructions refer to the *source drive* and the *target drive*, where:

- The source drive is the drive that holds the distribution kit.
- The target drive is the drive that holds the system disk.

Step 1: Load Distribution Media

Put the distribution compact disc or tape in the source drive. If your OpenVMS VAX distribution kit contains several tapes, put the first one in the drive. The paper labels on the tapes indicate the order in which you use them.

If you are not using an InfoServer device, go to Step 3: Start VMSINSTAL.

If you are using an InfoServer device, proceed to the next step.

Step 2: If Upgrading from the InfoServer

If upgrading from an InfoServer device, perform the following steps:

1. Start the InfoServer Client software by entering the following command:

   ```
   $ @SYS$STARTUP:ESS$STARTUP CLIENT
   ```

   The CLIENT parameter loads the client driver, ESS$DADDRIVER.EXE, and the InfoServer transport driver, ESS$LASTDRIVER.EXE.

2. To start the InfoServer Client software each time the system boots, add the following line to SYS$MANAGER:SYSTARTUP_ V5.COM:

   ```
   $ @SYS$STARTUP:ESS$STARTUP CLIENT
   ```

3. As the startup procedure executes, it displays the following messages:

   ```
   %LASTCP-I-VERSION, LASTDRIVER X1.5 is stopped
   %LASTCP-I-ADAINIT, Initializing adapter xxx for LASTDRIVER
   %LASTCP-I-STARTED, LASTDRIVER X1.5 started on node yyy
   ```

4. After you start the InfoServer Client software, you must make the compact disc drive accessible to your system by completing the following steps:

   a. Insert the distribution compact disc in the compact disc drive connected to the InfoServer.

b. Enter the following commands:

```
$ RUN SYS$SYSTEM:ESS$LADCP
LADCP> BIND VMS060
%LADCP-I-BIND, service bound to logical unit DAD$VMS060 (_DADn:)
LADCP> EXIT
```

Make note of the device name _DADn: in the previous display. You will have to specify this device name during the upgrade.

Step 3: Start VMSINSTAL

To start VMSINSTAL, use the following procedure:

1. Log in to the SYSTEM account.

2. Enter the following command:

```
$ @SYS$UPDATE:VMSINSTAL
```

VMSINSTAL displays a message similar to the following, depending on which version of the operating system is currently running on your system:

```
       VAX/VMS Software Product Installation Procedure V5.5

It is 18-JUN-1993 at 15:00.00.00

Enter a question mark (?) at any time for help.
```

VMSINSTAL checks your system's account quotas. If it finds account quotas that are less than it expects, VMSINSTAL displays a message similar to the following:

```
%VMSINSTAL-W-LOWQUOTA, The following account quotas may be too low.
-VMSINSTAL-W-LOWQUOTA, If you want to modify these account quotas, type NO to
-VMSINSTAL-W-LOWQUOTA, the next question, modify the appropriate quotas, log out
-VMSINSTAL-W-LOWQUOTA, then log back in and restart this procedure.

        ASTLM: currently 24; minimum expected 40
        BIOLM: currently 18; minimum expected 40
        BYTLM: currently 32512; minimum expected 32768

* Do you want to continue anyway [NO]?
```

To modify the account quotas, type N and press the Return key, modify the account quotas you want to change, log out of the SYSTEM account, then log back in and restart VMSINSTAL.

If you do not want to modify the account quotas, type Y and press the Return key to continue the upgrade.

Step 4: Back Up the System Disk

The procedure displays the following message:

```
* Are you satisfied with the backup of your system disk [YES]?
```

If you have made a standalone backup of the system disk, press Return and go to Step 5: Specify the Source Drive.

If you have not made a standalone image backup of the system disk, do the following:

1. Type N (for NO) and press Return. VMSINSTAL ends and the dollar-sign prompt ($) is displayed.

2. Back up the system disk as described in the upgrade and installation supplement for your VAX computer.

3. After you have made a backup of the system disk, start the upgrade procedure again.

Step 5: Specify the Source Drive

VMSINSTAL asks for the name of the drive that holds the distribution media:

```
* Where will the distribution volumes be mounted:
```

Enter the device name of the source drive. For example, if you have a VAX 6000 series computer that has a TK70 with a device name of MUC6, type *MUC6* and press the Return key.

If the drive is connected to an HSC, enter the HSC name and the device name of the drive separated by a dollar sign ($). (If you do not enter the device name in this manner, it will cause a failure in Phase 2.) For example, if the HSC name is MUTT and the device name is MUA0, enter the following and press Return:

```
* Where will the distribution volumes be mounted: MUTT$MUA0
```

If you are not using an InfoServer device, proceed to Step 6: Enter Product Name.

If you are upgrading from a compact disc drive connected to an InfoServer, the device name is DAD*n*. The *n* part of the device name was displayed when you bound to the distribution compact disc as previously described in Step 2: If Upgrading from the InfoServer.

If VMSINSTAL displays an error message, make sure the drive is connected and set up properly. Enter the name again. If VMSINSTAL displays another error message, use the following procedure to verify the device name:

1. Press Ctrl/Y to exit from VMSINSTAL.

2. Enter the SHOW DEVICE command to make sure you have the correct device name.

3. Restart the upgrade procedure from Step 3: Start VMSINSTAL.

If VMSINSTAL does not display an error message, proceed to Step 6: Enter Product Name.

Step 6: Enter Product Name

When VMSINSTAL displays the following message, type VMS060 and press the Return key. Make sure that you use the number zero (not the letter "O") when you type VMS060. For example:

```
* Products: VMS060
```

When the procedure displays the following message, press Return:

```
* Enter installation options you wish to use (none):
```

Step 7: Mount the First Volume

VMSINSTAL displays a message similar to the following:

```
Please mount the first volume of the set on _MUA0.
```

When the procedure displays the following message, type Y (for YES) and press Return:

```
* Are you ready?  Y
```

The procedure displays messages similar to the following:

```
%MOUNT-I-MOUNTED, VMS060 mounted on _MUA0:

The following products will be processed:

  VMS V6.0
```

After a slight pause, the procedure displays messages similar to the following:

```
        Beginning installation of OpenVMS V6.0 at 15:05

%VMSINSTAL-I-RESTORE, Restoring product saveset A...
```

Step 8: Checking for DECnet–VAX Phase V

The upgrade procedure checks to see if you have any DECnet–VAX Phase V Wide Area Network Device Drivers (WANDD) running on your system. If it detects the presence of one of these drivers, it displays the following message:

```
This upgrade procedure has detected the presence of
VAX Wide Area Network (WAN) Device Drivers.

This upgrade does not install Wide Area Device Drivers.
To continue running WAN devices, you must install the
VAX Wide Area Device Drivers kit for OpenVMS VAX
immediately after this upgrade.

If you do not have the software available locally, you
might want to exit from this upgrade.

* Do you want to continue with this upgrade? [N]
```

Before you respond to this prompt, be sure you have read the Cautions section at the beginning of Chapter 1.

If you decide to continue the upgrade, type Y and press the Return key. The procedure then checks what version of DECnet–VAX Phase V you are running. If you are using the DECnet–VAX Extensions product, the procedure displays the following message:

```
This upgrade procedure has detected the presence of
DECnet--VAX Extensions.  This product is no longer
supported in OpenVMS VAX V6.0.  Use of its components:

                    P.S.I.
                    WANDD
                    VOTS
                    OSAK
                    FTAM

requires that you install the DECnet/OSI for OpenVMS
VAX kit.  If you do not have that software available
locally, you might want to exit from this upgrade.
```

```
               If you do not exit from this upgrade at this time, then
               the above components will cease to operate.

          * Do you want to continue with this upgrade? [N]
```

If the procedure detects that you are running DECnet/OSI Version
5.5 for OpenVMS VAX it displays the following message:

```
               This upgrade procedure has detected the presence of
               DECnet/OSI for VMS V5.5.

               This upgrade installs the DECnet--VAX Phase IV software.
               To continue running DECnet/OSI, you must install the
               DECnet/OSI for OpenVMS VAX kit immediately after
               upgrading to OpenVMS VAX V6.0.

               The OpenVMS upgrade might leave the Phase IV network
               disabled, so you must have the DECnet/OSI for OpenVMS
               VAX kit available locally.

               If you do not have the software available locally, you might
               want to exit from this upgrade.

          * Do you want to continue with this upgrade? [N]
```

Again, before you decide whether to continue the upgrade, be sure
you have read the Cautions section at the beginning of Chapter 1.

Step 9:
Checking
for VMS
DECwindows
Motif Version
1.0

To run DECwindows applications with OpenVMS VAX Version
6.0, you must have Version 1.1 or higher of the DECwindows
Motif for OpenVMS (previously called VMS DECwindows Motif)
layered product installed on your system. The procedure displays
the following message *only* if you are currently running VMS
DECwindows Motif Version 1.0 on your system:

```
     If you are upgrading this kit on a workstation or on a VAXcluster
     that includes workstations, Digital REQUIRES you choose the DECwindows
     workstation support option provided in this kit.  Choosing this option
     requires that your system have VMS DECwindows Motif V1.1 or greater
     installed.

     You do NOT have VMS DECwindows Motif V1.1 or greater installed on your
     system at this time.  If you want to choose the DECwindows workstation
     support option you must:

          Proceed and complete this upgrade process and install VMS DECwindows
          Motif V1.1 or greater immediately following this upgrade
     OR
          Quit this upgrade process at this time, install VMS DECwindows Motif
          V1.1 or greater, and restart and complete this upgrade process

 * Do you want to continue the upgrade? (Y/N)
```

If you choose *not* to continue with the upgrade, type N and press
Return. You will have to start the upgrade procedure from the
beginning after you have installed the VMS DECwindows Motif
Version 1.1 layered product.

If you want to continue with the upgrade, type Y and press
Return.

Step 10:
Checking for
DEC PHIGS

The upgrade procedure displays the following message *only* if you are currently running a version of DEC PHIGS earlier than version 2.3D:

```
This upgrade procedure has detected the presence of a version of DEC PHIGS
that is not compatible with the DECwindows files included in this kit.
DEC PHIGS is used by 3D applications.  To provide your users with a compa-
tible version of DEC PHIGS, you must install the DEC PHIGS V2.3D (or later)
kit following the successful completion of this upgrade.

If you cannot install DEC PHIGS V2.3D following this upgrade, then you have
the following options:

- Continue and complete the entire upgrade.  Please note that 3D applica-
  tions will not work until DEC PHIGS V2.3D (or later) has been installed.

- Exit this upgrade at this time and restart the upgrade process when you
  have the DEC PHIGS V2.3D (or later) kit available to install.

* Do you want to continue the upgrade? (Y/N):
```

If you choose not to continue the upgrade, type N and press Return. You will have to restart the upgrade from the beginning.

If you want to continue the upgrade, type Y and press Return.

Step 11:
Monitor
Messages from
VMSINSTAL

The upgrade procedure displays several important messages that provide you with the following information:

- What VMSINSTAL is doing.

- Notes, suggestions, and restrictions about various parts of the upgrade.

- Status of the upgrade.

Read these messages carefully to decide whether or not you need to interrupt the upgrade procedure. An interruption is allowed before Phase 1. The procedure displays the following message:

```
* Do you want to continue? (Y/N):
```

To continue the upgrade, type Y and press the Return key.

To interrupt the upgrade, do the following:

1. Type N and press Return.

2. If prompted for another product, type EXIT to exit from VMSINSTAL.

Step 12: Verify
Date and Time

The procedure displays the current date and time. If the date and time are correct, type Y. If they are incorrect, type N. Enter the correct date and time using the 24-hour clock format and press Return. For example:

```
PLEASE ENTER DATE AND TIME (DD-MMM-YYYY HH:MM) 18-JUN-1993 15:10
```

Where to Go
Next

Continue with Phase 1 of the upgrade.

Upgrade Phase 1

Overview

This section describes Phase 1 of the upgrade. During this phase, you provide passwords for system accounts and select OpenVMS options, and the procedure restores the files in the OpenVMS *required* save set (VMS060.B).

At the end of this phase, the procedure shuts down your VAX computer. If your computer uses console media when booting and the boot file was modified as described in the section Preparing to Boot from [SYSF], the system should reboot automatically. Otherwise, you must reboot manually from the SYSF directory.

Step 1: Specify Type of Upgrade

At the beginning of Phase 1, the procedure displays a message similar to the following:

```
Upgrade Phase 1  18-JUN-1993 15:11:17.05
```

```
* Are you performing a rolling upgrade? (Y/N):
```

If you are performing a concurrent upgrade or an upgrade on a standalone system, type N and press the Return key.

If you are performing a rolling upgrade, type Y and press Return. Follow the instructions in the Rolling Upgrades section of Chapter 6.

Step 2: Enter Passwords

To ensure system security, the upgrade procedure requires you to enter passwords for the SYSTEM, SYSTEST, and FIELD accounts before continuing. Passwords must contain at least 8 characters; they are not displayed by the system. Press Return after you enter each password and it will be verified. For example:

```
To help provide a more secure system, you are asked to enter passwords
for key system accounts. Passwords must be a minimum of 8 characters
in length. You can enter new or existing passwords.
```

```
Enter passwords for the following accounts:

          SYSTEM, SYSTEST, FIELD

* Enter password for SYSTEM:
* Re-enter for verification:
%UAF-I-MDFYMSG, user record(s) updated
%VMS-I-PWD_OKAY, account password for SYSTEM verified

* Enter Password for SYSTEST
* Re-enter for verification:
%UAF-I-MDFYMSG, user record(s) updated
%VMS-I-PWD_OKAY, account password for SYSTEST verified

     The SYSTEST_CLIG account will be disabled. You must re-enable
     it before running UETP but do not assign a password.

%UAF-I-MDFYMSG, user record(s) updated

Enter password for FIELD:
Re-enter for verification:
%UAF-I-MDFYMSG, user record(s) updated
%VMS-I-PWD-OKAY, account password for FIELD verified
```

If you enter a password incorrectly or if the password is too easy to guess, the procedure displays error messages similar to the following:

```
%VMS-W-PWD-INVALID, account password for FIELD is invalid
%VMS-I-PWD-WEAK, password is too easy to guess

Because of the preceding error, you must take action to secure this account.
You must either disable this account, change its password, or do both.
```

When the procedure asks if you want to disable the account, type N and press the Return key. When the procedure asks if you want to enter a new password, type Y and press Return. Then enter a new password. For example:

```
Do you want to disable the account (Y/N)? N
Do you want to change the account password (Y/N)? Y
You must now select a new primary password for the FIELD account. The
password you select must be at least 8 characters in length and cannot be
the same as the name of the account.

New password:
Verification:
%UAF-I-MDFMSG, user record(s) updated
%VMS-I-PWD-SET, primary password for account FIELD set
```

After you have correctly entered the passwords, the procedure does the following:

- Checks the account quotas in the DEFAULT, SYSTEM, and various other accounts and modifies them if necessary

- Turns off quotas on the system disk

- Stops OPCOM

- Stops the error formatter (ERRFMT)

Step 3: Choose Boot Method

If your VAX computer is *not* one of the following, go to Step 4: File Cleanup.

> VAX 11/730
> VAX 11/750
> VAX 11/780
> VAX 8200, 8250, 8300, 8350
> VAX 8600, 8650
> VAX 9000

If your VAX computer is included in the preceding list, the procedure can temporarily modify the DEFBOO.CMD (or DEFBOO.COM if you have a VAX 8600 computer) to boot from the [SYSF] directory. During Phase 4 of the upgrade, the procedure restores the DEFBOO.CMD (or DEFBOO.COM) file that is set up to boot from the current system disk and system root.

The procedure displays a message similar to the following (*except for* VAX 11/730, 11/780, and 8600 computers):

```
* Do you want to boot from the [console media]?
```

If you prefer to boot your system manually from the [SYSF] directory or if you are booting directly from a local system disk, type N, press the Return key, and go to Step 4: File Cleanup to continue the upgrade.

Type Y and press Return if one of the following is true:

* You want to boot from the console media.

* Your computer is a VAX 11/730, 11/780, or 8600.

* You are using a CI750.

The procedure prompts you to insert the console media in the drive. Insert the backup copy of the console media into the drive and do not remove it from the drive until the upgrade has been completed. Make sure the console media is write enabled.

Step 4: File Cleanup

The procedure does the following:

* Renames SYSTARTUP_V5.COM to SYSTARTUP_VMS.COM.

* Renames files found in SYS$SPECIFIC:[SYSMGR] and in SYS$COMMON:[SYSMGR] by adding _OLD_SPECIFIC to the file extensions. For example, [SYSMGR]LOGIN.COM becomes [SYSMGR]LOGIN.COM_OLD_SPECIFIC.

* Cleans up the system disk by purging all accounting data files, operator logs, and the directory SYSERR. The procedure also deletes all JNL files in the root directory and its subdirectories.

* Builds the directory tree [SYSF] and deletes the OpenVMS VAX and DECwindows files that are not needed to reboot during Phase 2 of the upgrade.

As the procedure performs each of these tasks, it displays messages describing what is being done. When this step is completed, the procedure displays a message similar to the following:

```
File cleanup complete - 18-JUN-1993 15:29:41.92
```

Step 5: Select Optional OpenVMS Components

The procedure displays information about optional OpenVMS VAX files and the remaining amount of disk space. The information is similar to the following:

```
Select optional software you want to install. You can install
one or more of the following OpenVMS or DECwindows components:

o OpenVMS library                                - 39500 blocks
o OpenVMS optional                               - 18500 blocks
o OpenVMS Help Message                           -  7800 blocks
o Text versions of three OpenVMS manuals         -  7200 blocks
o DECwindows workstation support                 - 21800 blocks
o DECwindows base support                        -  3500 blocks

Space remaining on system disk: 80696 blocks
```

You must indicate which of the options you want to install. If you require network support, you must select the OpenVMS library component.

Note: If you do not install the optional OpenVMS components at this time, you can install them after the upgrade by using the VMSTAILOR and DECW$TAILOR utilities. However, the Help Message utility and the three reference manuals can be tailored on to the system disk only. If you do not choose the Help Message files or the three manuals at this point in the procedure and want them on an alternate device, you will not be able to use VMSTAILOR to restore them later. If you want to install Help Message and the OpenVMS manuals on an alternate disk *after* the installation procedure completes, you can use the BACKUP command, as follows:

BACKUP/VERIFY source-device:[000000]VMS060.E/SAVE_SET-target-device:[directory-name]

For *source-device*, enter the device name for the drive on which the distribution media is mounted. For *target-device*, enter the device name on which the alternate disk is mounted, and for *directory*, enter the name of the directory to which you are copying the files.

Also note that, for TK50 tape cartridges, it is quicker to install OpenVMS VAX software during the upgrade than to add software after the upgrade with a tailoring utility. For information about using VMSTAILOR, see Chapter 11. To select the options you want to install, follow the instructions displayed by the procedure.

OpenVMS Library Files

The procedure displays the following message:

`* Do you want to install the OpenVMS library files? (Y/N)`

The file subclasses of the OpenVMS *library* (VMS060.C) save set are listed in Appendix C. If you want to install the VMS060.C files, type Y and press Return. If you require network support, you must select the OpenVMS library component. If you do *not* want to install the VMS060.C files, type N and press Return.

OpenVMS Optional Files

The procedure displays the following message:

`* Do you want to install the OpenVMS optional files? (Y/N)`

The file subclasses of the OpenVMS *optional* (VMS060.D) save set are listed in Appendix C. If you want to install the VMS060.D files, type Y and press Return. If you do *not* want to install the VMS060.D files, type N and press Return.

Help Message Files

The procedure displays the following message:

```
The Help Message utility (MSGHLP) provides online explanations
and user actions for OpenVMS messages in place of the hardcopy
OpenVMS System Messages and Recovery Procedures Reference Manual,
which is now separately orderable.

The MSGHLP database, MSGHLP$LIBRARY.MSGHLP$DATA, consumes
approximately 7800 blocks and will be placed by default
on your system disk in SYS$COMMON:[SYSHLP] unless you specify an
alternate device when prompted.

* Do you want to install the MSGHLP database? (Y/N)
```

The Help Message utility is an online system for system messages documentation. You can install Help Message either on the system disk or on an alternate disk. If you want to install the Help Message files, type Y and press Return.

The procedure displays the following message:

```
You can install this database on your system disk in SYS$COMMON:[SYSHLP]
or on an alternate device. If you specify an alternate device, but no
directory, MSGHLP$LIBRARY.MSGHLP$DATA is placed in [HELP_MESSAGE]. When
prompted, specify the system disk or an alternate device
using this format:
                    device:[directory]
* Where do you want to install the MSGHLP database? [SYS$COMMON:[SYSHLP]] DUA1
```

The Help Message database is installed in the area you specified, and the system displays information similar to the following:

```
%MOUNT-I-MOUNTED, VMS060        mounted on DUA1

    Space remaining on alternate device DUA1:: 124532 blocks
```

OpenVMS Manuals

The procedure displays the following message:

```
You have the choice of installing the text versions of one or more
OpenVMS reference manuals:

o OpenVMS Master Index                    -   6000 blocks
o OpenVMS Master Glossary                 -    750 blocks
o Overview of OpenVMS Documentation       -    450 blocks

You can install these manuals, by default, to your system disk,
in [SYSHLP.VMSDOC] or to an alternate device of your choice.
In either case, all manuals must reside on the same device.
If you choose an alternate device and do not specify a directory,
[VMSDOC_TEXT] will be created for you.  The device structure
for an alternate device should resemble the following:
                    device:[directory]
Do you want any of these three OpenVMS manuals?: (Y/N)
```

Type Y to install all three manuals or to install a subset of the manuals.

The following message is displayed:

```
Do you want all three OpenVMS manuals? (Y/N)
```

To install all three manuals, type Y. To install a subset, type N and the system will display each manual title and prompt you to type either Y or N to select it.

When you have completed selecting which manuals to install, the following prompt is displayed:

```
* Where do you want to install the OpenVMS manual(s)? [SYSHLP.VMSDOC]
```

Press Return to accept the default, [SYSHLP.VMSDOC] on the system disk, or enter the alternate disk name and press Return.

Step 6: Choose DECwindows Support Options

Next, the procedure displays messages about the DECwindows components shipped with OpenVMS VAX Version 6.0.

Important: The OpenVMS VAX operating system no longer ships the VMS DECwindows product. The operating system now ships only the DECwindows base support and DECwindows workstation support components. To get full DECwindows support, you must also install the separate VMS DECwindows Motif layered product, which supports both Motif and XUI environments.

Note: The DECwindows base support and DECwindows workstation support components are *not* shipped with the VMS DECwindows layered product. If you want to install these options, you must select them now or use the DECW$TAILOR option after the installation procedure completes.

The procedure displays the following:

```
You can select DECwindows support now, or you can use the
DECW$TAILOR utility to provide or remove DECwindows support
after the upgrade.

Some media, TK50s in particular, can be very slow when
tailoring on files. You might want to provide DECwindows
options now and tailor off unwanted files later.

You can install all of the DECwindows components provided in
this kit, which requires approximately 25300 blocks, or you
can select specific components.

o DECwindows workstation support             -  17800 blocks
  -  75 dots per inch video fonts (included)
  - 100 dots per inch video fonts (optional) -   4000 blocks
o DECwindows base support                     -   3500 blocks

If you are installing this kit on a workstation or on a VAXcluster
that contains workstations, then you must choose the DECwindows
workstation support option.

If you are installing this kit on a system that does not include
workstations but does include Xterminals, then you might want to
choose the DECwindows workstation support option to provide font
files.  If you decide not to select the DECwindows workstation
support option at this time, then you will have to use the
DECW$TAILOR utility to provide font files for the Xterminals.

If you plan to run DECwindows software, then you must choose the
DECwindows base support option.
```

```
NOTE: This kit does NOT contain full DECwindows support.  It includes
      only the DECwindows base and workstation support components.
      To obtain full DECwindows support, you must also install the
      separate DECwindows Motif for OpenVMS VAX layered product.

NOTE: VMS DECwindows Motif Version 1.1 is the minimum version that
      can be used with OpenVMS VAX Version 6.0.
```

`* Do you want to provide optional DECwindows support? (Y/N)`

Before You Decide

Before you indicate whether you want to install DECwindows support software, consider the following:

If ...	Then you should choose ...
you intend to install the DECwindows Motif layered product	DECwindows base support.
you intend to install the DECwindows Motif layered product on a workstation or on a VAXcluster that contains workstations or Xterminals	DECwindows workstation support.
you are installing on a workstation or on a VAXcluster that includes workstations or Xterminals	DECwindows workstation support.
you have a workstation monitor capable of displaying 100 dots/inch (for example, a VR150, VR160, or VR295)	DECwindows workstation support with the 100 dots/inch option. By selecting the workstation support files, you automatically get 75 dots/inch video font files, and you will be prompted to indicate if you want to install 100 dots/inch video font files.

If you *do not* want to install the DECwindows software, type N, press Return, and go to the next step.

If you want to install DECwindows support, type Y and press Return. The procedure displays the following message:

`* Do you want to install DECwindows workstation support? (Y/N)`

If you answer YES to this prompt, the following DECwindows components will be installed:

• DECwindows workstation support

• 75 dots/inch video fonts

• DECwindows base support

You are also given the option to select the 100 dots/inch video fonts.

If you decide not to install the DECwindows workstation support, you are given the option to select the DECwindows base support, which is required if you plan to run DECwindows software.

`* Do you want to install DECwindows base support? (Y/N)`

Step 7: Verify Your Choices

The procedure displays a list of OpenVMS VAX and DECwindows support options that you have chosen and gives you the opportunity to change your mind before proceeding by displaying the following message:

`* Is this correct? (Y/N)`

If you answer YES to this prompt, the procedure restores the OpenVMS required save set (VMS060.B) and purges the page, swap, dump, and authorization files.

If you answer NO to this prompt, you can respecify the OpenVMS VAX and DECwindows options that you want to install. The procedure restores the DECwindows components you have chosen during Phase 2.

Step 8: Shut Down Your System

After several minutes, the upgrade procedure indicates that the system will shut down to reboot the partially upgraded OpenVMS VAX system and displays information about how to reboot the system.

On certain VAX computers, the procedure displays the following message:

`* Press RETURN to shutdown system:`

Once you have read the information displayed on the screen, press Return to begin the shutdown.

Step 9: Reboot the System

If your system uses console media, it should automatically reboot from the SYSF directory when the shutdown is complete. If you have a MicroVAX or if your system does not reboot from SYSF, halt the system and boot from the [SYSF] directory. For most MicroVAX and VAXstation computers, use the BOOT command in the following format and substitute the device name of the system disk for *ddcu*:

`>>> B/F0000000 ddcu`

For more information on booting your computer from the SYSF directory, see the upgrade and installation supplement for your VAX computer.

When the system reboots, it displays the OpenVMS VAX banner similar to the following:

`OpenVMS VAX Version BC60-xxx Major version id = 1 Minor version id = 0`

After the system reboots, the procedure continues with upgrade Phase 2.

Upgrade Phase 2

What the Procedure Does

At the beginning of Phase 2, the procedure displays a message similar to the following:

```
Continuing with OpenVMS VAX V6.0 Upgrade Procedure.

        Upgrade Phase 2        18-JUN-1993 15:55:42.57

%STDRV-I-STARTUP, OpenVMS startup begun at 18-JUN-1993 15:55:43.22
On MIN or UPGRADE system startup - CLUE is not run.
%SET-I-NEWAUDSVR, identification of new audit server process is 00000108
    .
    .
    .

%STDRV-I-STARTUP, VMS startup begun at 18-JUN-1993 15:57:00.59
```

During Phase 2, the upgrade procedure restores the rest of the library (C), optional (D), Help Message (E), and OpenVMS manuals (F) save sets and DECwindows support files if you elected to install them.

What You Do

During Phase 2, the procedure prompts you to do the following:

1. If your OpenVMS VAX distribution media is magnetic tape, the procedure asks you to replace volume 1 in the drive with volume 2 prior to restoring the VMS060.C and VMS060.D save sets. After restoring save set VMS060.D, the procedure prompts you to replace volume 2 with volume 3.

   Note: Do not remove the OpenVMS VAX distribution media until prompted to do so.

2. If your distribution media is tape cartridges, the procedure displays a message similar to the following after it restores the OpenVMS VAX files (if your distribution media is compact disc or magnetic tape, you will not see these messages):

   ```
   You can now remove the OpenVMS distribution kit from MUA0:.

   Load the DECwindows distribution kit.
   ```

   If you selected any of the DECwindows support options during Phase 1, put the tape cartridge that contains the DECwindows support files in the source drive. The cartridge is labeled *VMS V6.0 BIN TK50 2/2 S/A BKUP*. The procedure displays the following:

```
* Enter name of the drive holding the DECwindows distribution media: MUA0
* Is the DECwindows media ready to be mounted? [N] YES
```

   Type Y and press the Return key.

3. The procedure installs the DECwindows options that you specified and displays messages similar to the following:

```
%MOUNT-I-MOUNTED, DEC060 mounted on _MUA0:

    Restoring DECwindows base support save set ...
%BACKUP-I-STARTVERIFY, starting verification pass

    Restoring DECwindows workstation support save set ...
%BACKUP-I-STARTVERIFY, starting verification pass

    Restoring DECwindows 75 dots per inch fonts save set ...
%BACKUP-I-STARTVERIFY, starting verification pass

    Restoring DECwindows 100 dots per inch fonts save set ...
%BACKUP-I-STARTVERIFY, starting verification pass
```

4. After restoring the DECwindows files, the procedure displays a message similar to the following:

```
You can now remove the DECwindows distribution kit from MUA0:
```

5. If your distribution media is tape cartridges or magnetic tape, remove the media containing the DECwindows files from the drive.

   If your distribution media is compact disc, leave the compact disc in the drive.

Upgrade Phase 3

What the Procedure Does

At the beginning of Phase 3, the procedure displays a message similar to the following:

```
Continuing with OpenVMS VAX V6.0 Upgrade Procedure

    Upgrade Phase 3                    18-JUN-1993 16:45:18.35
```

During Phase 3, the upgrade procedure does the following:

1. Merges the OpenVMS VAX distributed files that are commonly edited by system managers with new OpenVMS VAX files.

2. Merges all the miscellaneous user files in the old system directories into a new set of system directories, temporarily called SYSF.SYSEXE, SYSF.SYSMGR, SYSF.SYSLIB, and so on.

3. Removes the directory entries for page, swap, dump, and authorization files from the old directory tree.

4. Deletes all the remaining accounting data files, operator logs, and all files in the SYSERR directory.

5. Merges the old and new versions of the following files: HELP, DCLTABLES, IMAGELIB.OLB, and STARLET.OLB.

6. Moves all remaining files from the old directory tree [VMS$COMMON] to the new directory tree.

7. Deletes the old directory tree [VMS$COMMON].

Upgrade Phase 4

What the Procedure Does

At the beginning of Phase 4, the procedure displays a message similar to the following:

Continuing with OpenVMS VAX V6.0 Upgrade Procedure.

    Upgrade Phase 4   18-JUN-1993 17:14:34.12

During Phase 4, the upgrade procedure does the following:

1. Corrects back pointers for system directories.

2. Shuts down the system.

3. Reboots the system, or requires that you manually reboot the system.

What You Do

If the procedure requires that you manually reboot the system from the original system root (usually SYS0), do the following:

1. If you are upgrading a VAX 8530, 8550, 8810, or 8820-N computer, do the following:

   a. Restore the original copies of DEFBOO and *ddd*GEN to boot from the original root directory.

   b. In the preupgrade procedure (Chapter 5), you made copies of the boot command procedures, DEFBOO.SAV and *ddd*GEN.SAV. To restore the original names to these files, enter the following commands and press the Return key after each one:

   ```
   >>> EXIT
   $ COPY DEFBOO.SAV DEFBOO.COM
   $ COPY dddGEN.SAV dddGEN.COM
   ```

2. For most MicroVAX and VAXstation computers, use the BOOT command in the following format and substitute the device name of the system disk for *ddcu*:

   ```
   >>> B ddcu
   ```

For more information about booting your system, see the upgrade and installation supplement for your VAX computer.

Where to Go Next

When the system reboots, the procedure displays a message similar to the following:

OpenVMS VAX Version BC60-xxx Major version id = 1 Minor version id = 0

After the system reboots, the procedure continues with upgrade Phase 5. Do not move the system disk to a different drive. The system disk must remain in the same drive for the procedure to continue with Phase 5.

Upgrade Phase 5

What the Procedure Does

At the beginning of Phase 5, the procedure displays a message similar to the following:

```
Continuing with OpenVMS VAX V6.0 Upgrade Procedure.

    Upgrade Phase 5              18-JUN-1993 17:45:24.03
```

During Phase 5, the upgrade procedure does the following:

1. Deletes the temporary [SYSF] directory tree.

2. Cleans up files used only during the upgrade procedure.

3. Converts all VAXVMSSYS.PAR parameter files found in system roots to Version 6.0 format.

4. Checks the security of DECnet for OpenVMS objects and images.

5. Displays messages listing tasks that you can perform after the upgrade procedure is completed. Chapter 8 explains these tasks.

Upgrade Phase 6

Introduction

At the beginning of Phase 6, the procedure displays a message similar to the following:

```
Continuing with OpenVMS VAX V6.0 Upgrade Procedure.

    Upgrade Phase 6        18-JUN-1993 17:45:25.03

Configuring all devices on the system...
%STDRV-I-STARTUP, VMS startup begun at 18-NOV-1991 17:45:25.03
```

Restoring System Files

The procedure restores SYS$SPECIFIC and SYS$COMMON versions of the following system files that were renamed with .COM_OLD_SPECIFIC extensions during Phase 1:

SYSTARTUP_VMS.COM
SYCONFIG.COM
SYPAGSWPFILES.COM
SYSECURITY.COM
SYSHUTDWN.COM
SYLOGIN.COM
LOGIN.COM
SYLOGICALS.COM
LAT$SYSTARTUP.COM
TFF$STARTUP.COM

You might not have site-specific versions of all of these files. The procedure will display a message listing each file as it is restored.

You might receive any of the following network messages, which can be ignored:

```
%NCP-W-UNRCMP, Unrecognized component, Object
```

Or:

```
%NCP-I-SUCCESS, Success
Object = X$X0
%NML-I-RECDELET, Database entry deleted
```

Registering Licenses

The upgrade procedure also gives you the opportunity to register any additional licenses.

The procedure displays the following message:

```
If you have Product Authorization Keys (PAKs) to register, you can
register them now.
```

* Do you want to register any Product Authorization Keys? (Y/N):

You do not have to reregister your OpenVMS VAX license or licenses for the following system integrated products:

    VAXclusters
    DECnet for OpenVMS
    RMS Journaling
    Volume Shadowing

If you want to register a *new* Product Authorization Key, type Y and press the Return key. Otherwise, type N and press Return.

For more information on registering licenses, see the description of VMSLICENSE.COM in Appendix A and in the *OpenVMS License Management Utility Manual*.

Running AUTOGEN

Next, the procedure displays the following message and runs AUTOGEN:

```
Running AUTOGEN to compute the new SYSTEM parameters...
```

If AUTOGEN encounters any problems, it displays the following message:

```
%AUTOGEN-W-REPORT, Warnings were detected by AUTOGEN. Please review the
        information given in the file SYS$SYSTEM:AGEN$PARAMS.REPORT.
```

If AUTOGEN displays this message, be sure to check AGEN$PARAMS.REPORT as one of your postupgrade tasks. This task is described in the section Examining AGEN$PARAMS.REPORT in Chapter 8.

Shutting Down the System

After AUTOGEN finishes, the procedure displays a sequence of shutdown messages that begins like this:

```
The system is shutting down to allow the system to boot with the
generated site-specific parameters and installed images.
```

```
The system will automatically reboot after the shutdown and the
upgrade will be complete.
```

```
        SHUTDOWN -- Perform an Orderly System Shutdown
    .
    .
    .
```

The system shuts down and will reboot automatically if your system is set up to do so. If the system does not reboot automatically, reboot it manually. For more information on booting your system, see the upgrade and installation supplement for your VAX computer.

Booting Voting Nodes

If you are upgrading a standalone system, go to the next step.

If you are upgrading a VAXcluster system, the system might hang when you try to reboot the upgraded system disk. This is because the total cluster value is less than the cluster quorum value. To remedy this situation, boot voting members that run from the system disk you just upgraded. (For more information about quorum values and voting members, see *VMScluster Systems*

for OpenVMS.) All nodes that are booted at this time will run AUTOGEN and reboot.

Executing STARTUP

After the system reboots, the procedure displays the following message:

```
**************************************************************

OpenVMS VAX V6.0

You have SUCCESSFULLY installed the OpenVMS operating system.

The system is now executing the STARTUP procedure. Please
wait for the completion of STARTUP before logging in to the
system.

**************************************************************
```

Finally, the procedure displays informational messages as well as accounting information. For example:

```
%STDRV-I-STARTUP, OpenVMS startup begun at 18:xx:xx
    .
    .
    .
%SET-I-INTSET, login interactive limit=64, current interactive value = 0

 SYSTEM        job terminated at 18-JUN-1993 18:30:00.00

Accounting information:
 Buffered I/O count:        133   Peak working set size:       401
 Direct I/O count:           12   Peak virtual size:          2379
 Page faults:               325   Mounted volumes:               0
 Charged CPU time 0 00:00:55.23   Elapsed time       0 00:01:31.24
```

At this point the OpenVMS VAX operating system is running.

Logging In

Press the Return key. The system asks for the user name and password. Log in to the SYSTEM account so that you can perform the postupgrade procedures described in Chapter 8.

```
     Welcome to OpenVMS VAX V6.0
USERNAME: SYSTEM
PASSWORD:
    .
    .
    .
```

If you forget the password, follow the instructions for performing an emergency startup in the *OpenVMS System Manager's Manual: Essentials.*

Where to Go Next

Go to Chapter 8 to perform the required postupgrade tasks.

8

After Upgrading OpenVMS VAX

Overview

After you upgrade the OpenVMS VAX operating system, you need to perform several important tasks before you can use the system. This chapter describes the following tasks in the order you perform them:

- Restoring the preferred node list
- Replacing SYSUAF.DAT
- Examining AGEN$PARAMS.REPORT
- Checking the size of system files
- Examining your command procedures
- Changing MODPARAM.DAT
- Updating your DECnet for OpenVMS configuration
- Updating your console media
- Decompressing system libraries
- Testing the system with UETP (the User Environment Test Package)
- Increasing free space on your system disk
- Purging system files
- Restoring your modifications to the system password dictionary
- Customizing DECwindows support software
- Reinstalling VAX Workstation Support (VWS)
- Backing up the system disk
- Running AUTOGEN
- Completing the postupgrade checklist

If you are an experienced system manager, you can use the checklist at the end of this chapter to complete the necessary postupgrade tasks.

If you are a less-experienced system manager, you should read the entire chapter and then use the checklist to make sure you have completed all the postupgrade tasks.

Information about licensing is provided in the Upgrade Phase 6 section of Chapter 7 and in Appendix A.

If your system communicates with systems in other time zones, you can use the time conversion service and the Coordinated Universal Time (UTC) system services to compensate for differences in time stamps because of differing time zones. For more information, see the *OpenVMS System Manager's Manual: Essentials*.

Restoring the Preferred Node List

Background   After the upgrade completes, the queuing system on the upgraded
nodes is enabled, and you must restore the preferred node list for
the queue manager.

To Restore the Preferred Node List

Enter the following command from any node:

START/QUEUE/MANAGER/ON=(node1, node2 . . . node*n*)

For **node1**, **node2**, and so forth, supply the names of the
nodes—separated by commas—that you want to restore to the
preferred node list.

Replacing SYSUAF.DAT

Background

If you permanently store SYSUAF.DAT on the system disk, go to the section Examining AGEN$PARAMS.REPORT.

If you do not permanently store SYSUAF.DAT on the system disk, you copied it to the system disk before you did the upgrade. The upgrade procedure updates SYSUAF.DAT with the new passwords for the system accounts.

Note: If you did a rolling upgrade, the shared version of SYSUAF.DAT was not updated.

To Replace SYSUAF.DAT

Copy the updated version of SYSUAF.DAT from the system disk to the directory where you usually keep it.

Examining AGEN$PARAMS.REPORT

Background

When AUTOGEN runs, it writes informational and, if necessary, warning messages to the file SYS$SYSTEM:AGEN$PARAMS.REPORT. You can view the contents of this report file to examine these messages.

To View this Report

To display AGEN$PARAMS.REPORT on your screen, enter the following command and press the Return key:

```
$ TYPE SYS$SYSTEM:AGEN$PARAMS.REPORT
```

If the report includes a message similar to the following, you can modify the size of the PAGE, SWAP, or DUMP file:

```
*****************
%AUTOGEN-W-DSKSPC, The disk on which DISK$OpenVMS060:[SYS0.SYSEXE]PAGEFILE.SYS
        resides would be over 95% full if it were modified to hold 20000
        blocks.
*****************
```

For more information about modifying the sizes of the PAGE, SWAP, and DUMP files, see Checking the Size of System Files.

Checking the Size of System Files

Background   AUTOGEN sets the following files at sizes appropriate for your
                        system:

        [SYSEXE]SYSDUMP.DMP
        [SYSEXE]PAGEFILE.SYS
        [SYSEXE]SWAPFILE.SYS

To Modify Size   For special workloads or configurations, you can specify different
of System Files   sizes for these files. Check the sizes of these files to be sure they
                        meet your needs. Log into the SYSTEM account and enter the
                        following command:

                        $ @SYS$UPDATE:SWAPFILES

                        For more information, see the *OpenVMS System Manager's
                        Manual: Essentials.*

Examining Your Command Procedures

Background The upgrade procedure places a new version of WELCOME.TXT on your system disk. If your system uses a site-specific version of this file, you must modify the new version of the file with your changes.

Files to Examine The upgrade procedure restores your site-specific version of the following files with *.COM_OLD_SPECIFIC extensions:

SYSTARTUP_VMS.COM
SYCONFIG.COM
SYPAGSWPFILES.COM
SYSECURITY.COM
SYSHUTDWN.COM
SYLOGIN.COM
LOGIN.COM
SYLOGICALS.COM
LAT$SYSTARTUP.COM
TFF$STARTUP.COM

The upgrade procedure provides new templates for some of these files with the .TEMPLATE extension. The new templates can include features that are not in your site-specific files. Check the templates against your site-specific files and edit your files as necessary.

Remember, you do not need a START/QUEUE/MANAGER command in your startup file because the queue manager automatically starts up when you boot the system.

Changing MODPARAMS.DAT

Background

Review the file SYS$SYSTEM:MODPARAMS.DAT. The upgrade procedure created a new version of this file. The old version is named SYS$SYSTEM:MODPARAMS.DAT_OLD. Modify the new file, if necessary, for your system.

What to Look For

If you are upgrading a VAXcluster, you must update the MODPARAMS.DAT file for each VAX computer that boots from the system disk. Make sure the EXPECTED_VOTES value is correct. The value is the sum of all VOTES in the cluster. For example, if there are five VAX computers in the cluster, and each has one VOTE, the value is five. As you reboot each VAX computer, AUTOGEN runs automatically. The cluster forms when you have booted enough computers to attain cluster quorum.

For more information, refer to the *OpenVMS System Manager's Manual: Tuning, Monitoring, and Complex Systems*.

Updating Your DECnet for OpenVMS Configuration

Introduction

If you are not running DECnet for OpenVMS software, skip this section and go to the section Updating Your Console Media.

If you are running DECnet for OpenVMS software, do the following:

Check Network Security Level

Overview

The security of DECnet for OpenVMS objects and images on your system are checked during Phase 5 of the upgrade procedure. If your DECnet configuration does not meet the default level of security, the procedure displays the following message recommending that you run the NETCONFIG_UPDATE command procedure.

```
The upgrade has detected items which should be reviewed to ensure that
DECnet for OpenVMS will operate properly and securely.

Once the upgrade completes, you should manually review the items listed
above.  Failure to do so could leave your node vulnerable to certain
forms of attack.  For more information, consult the OpenVMS VAX Guide
to System Security.

You can execute the command procedure SYS$UPDATE:NETCONFIG_UPDATE.COM
to update the security of your existing DECnet configuration. For more
information on NETCONFIG_UPDATE.COM see the OpenVMS VAX Upgrade and
Installation Manual.
```

NETCONFIG_UPDATE.COM is a command procedure introduced with VMS Version 5.2 that implements several security measures that affect default access to your system. When you run NETCONFIG_UPDATE.COM, your configuration database does not change, except for the changes you might make to the default DECNET account or to the accounts you can create for specific objects.

You can use NETCONFIG_UPDATE.COM to *increase* your level of network security only. The procedure does not prompt you for input if your network configuration meets the minimum level established with VMS Version 5.2.

NETCONFIG_UPDATE.COM generates passwords for each account that you decide to keep in your configuration database. For example, if you currently have a default DECNET account and decide to keep it, NETCONFIG_UPDATE.COM generates a new password for it and replaces the existing password with the new one.

Run the Network Configuration Update Command Procedure

The following is an example of how to run NETCONFIG_ UPDATE.COM:

Note: Depending on your network configuration, the procedure might not display all of the questions shown in this example.

1. Enter the following command:

   ```
   $ @SYS$UPDATE:NETCONFIG_UPDATE
   ```

   The procedure displays the following message:

   ```
   DECnet for OpenVMS node configuration upgrade procedure

   This procedure will allow you to create, display and
   optionally execute the necessary commands to update your
   executor and object database characteristics so that
   they will be compatible with V5.2 of DECnet for OpenVMS.

   Getting Executor Information
   Getting Object Information

   Modifying Executor node 6.36 (KRUP)
   Do you wish a default nonprivileged DECnet account?  [NO]:
   ```

2. The default DECnet account, named DECNET, allows all network objects general access to the system. It is only appropriate for networks with very low security requirements. For networks with greater security requirements, Digital recommends separate default accounts for specific network objects. After you respond to this prompt, the procedure displays the following message:

   ```
   Do you wish to disable the TASK object?  [YES]:
   ```

3. The TASK object, by means of the default DECnet account (DECNET), allows user-written command procedures— including those that can be used in attempted break-ins—to be executed on your system. You can disable default access to the TASK object and still allow remote user-written command procedures to run on your system by using access control strings or proxy access. After you respond to this prompt, the procedure displays the following message:

   ```
   Do you want a default account for the MAIL object?  [YES]:
   ```

4. MAIL is an image that provides personal mail services for VMS systems. To receive MAIL, you must create a default account for the MAIL object. An account named MAIL$SERVER will be created on your system if you reply YES to this query. After you respond to this prompt, the procedure displays the following message:

   ```
   Do you want a default account for the FAL object?  [NO]:
   ```

5. FAL (File Access Listener) is the remote file access facility. FAL is an image that receives and processes remote file access requests for files at the local node. A default account for FAL allows network access, by any remote user, to any files marked world accessible. It also allows any remote user to create files in any directory with world WRITE access. An account named

FAL$SERVER will be created on your system if you reply YES to this query. After you respond to this prompt, the procedure displays the following message:

```
Do you want a default account for the PHONE object?  [YES]:
```

6. PHONE is an image that allows online conversations with users on remote OpenVMS systems. A default account for this object lets anyone in the network get a list of users currently logged in to the local system. A user can then attempt to log in using the list of user names. An account named PHONE$SERVER will be created on your system if you reply YES to this query. After you respond to this prompt, the procedure displays the following message:

```
Do you want a default account for the NML object?  [YES]:
```

7. NML is the Network Management Listener. A default account for this object lets remote users issue NCP TELL commands to gather and report network information from your volatile DECnet for OpenVMS databases. An account named NML$SERVER will be created on your system if you reply YES to this query. After you respond to this prompt, the procedure displays the following message:

```
Do you want a default account for the VPM object?  [YES]:
```

8. VPM is the VMS Performance Monitor. To use the cluster monitoring features of the Monitor Utility (MONITOR), you must create a default VPM account. An account named VPM$SERVER will be created on your system if you reply YES to this query. After you respond to this prompt, the procedure displays the following message:

```
Do you want a default account for the MIRROR object?  [YES]:
```

9. MIRROR is an image that is used for most types of loopback tests, including those run during the DECnet phase of the UETP. To run most loopback tests, you must create a default account for the MIRROR object. An account named MIRRO$SERVER will be created on your system if you reply YES to this query.

10. Next the procedure displays a series of commands and the following message:

```
Do you wish to execute these commands now?  [YES]:
```

11. If you execute the commands, the procedure displays the following message:

```
        The DECnet for OpenVMS database has been updated
```

For More Information

For a description of the network configuration procedure, NETCONFIG.COM, refer to the *DECnet for OpenVMS Guide to Networking* or to the *DECnet for OpenVMS Networking Manual.*

**Run the Cluster
Member
Update
Command
Procedure**

When you run NETCONFIG_UPDATE.COM on a
member of a VAXcluster environment, the NETCONFIG_
UPDATE.COM procedure creates the secondary procedure
named SYS$COMMON:[SYSMGR]UPDATE_CLUSTER_
MEMBERS.COM. The NETCONFIG_UPDATE.COM procedure
instructs you to run UPDATE_CLUSTER_MEMBERS.COM
on the other VAXcluster members. This secondary procedure
modifies the default access of each VAXcluster member exactly as
you modified that of the first member.

To run UPDATE_CLUSTER_MEMBERS.COM using SYSMAN,
do the following:

```
$ RUN SYS$SYSTEM:SYSMAN
SYSMAN> SET ENVIRONMENT/CLUSTER/USER=SYSTEM
    Remote Password:

    %SYSMAN-I-ENV, current command environment:
            Clusterwide on local cluster
            Username SYSTEM will be used on nonlocal nodes
SYSMAN> DO @SYS$COMMON:[SYSMGR]UPDATE_CLUSTER_MEMBERS.COM
SYSMAN> EXIT
```

Updating Your Console Media

If your computer does not use console media, skip this section and go to the Decompressing the System Libraries section.

If your computer uses console media, you must copy the Version 6.0 VMB.EXE onto your system's console media. The procedure for accomplishing this differs depending on the VAX series computer you have. Follow the instructions in the section that applies to your VAX computer.

VAX 8530, 8550, 8810 (8700), 8820-N (8800) Computers

If you have one of the VAX 8000 series computers listed to the left, do the following:

1. Place a blank RX50 diskette in one of the console diskette drives. The console refers to the upper (or left-hand) diskette drive as DZ1 while the OpenVMS VAX operating system refers to it as CSA1. The console refers to the lower (or right-hand) drive as DZ2 while the OpenVMS VAX operating system refers to it as CSA2.

2. Make sure the diskette drives have been connected to the OpenVMS VAX operating system, as follows:

```
$ SHOW DEVICE CSA
Device            Device       Error    Volume
 Name             Status       Count    Label
CSA0:   (SYSTEM)  Online         0
CSA1:   (SYSTEM)  Online         0
CSA2:   (SYSTEM)  Online         0
```

If the drives are not connected, the following message is displayed:

```
%SYSTEM-W-NOSUCHDEV, no such device available
```

If this message is displayed, enter the following commands (you need CMKRNL privilege):

```
$ RUN SYS$SYSTEM:SYSGEN
SYSGEN> CONNECT CONSOLE
SYSGEN> EXIT
```

3. To initialize the diskette, enter a command in the following format:

```
$ INITIALIZE/STRUCTURE=1 device-name: volume-label
```

Substitute CSA1 or CSA2 for *device-name*. Substitute a 1- to 12-character name for *volume-label*. For example:

```
$ INITIALIZE/STRUCTURE=1 CSA1: V60CONSOLE
```

4. Enter the following commands to mount the diskette, create the required directories, and copy the new VMB.EXE to the diskette. Substitute CSA1 or CSA2 for *device-name*.

```
$ MOUNT/OVERRIDE=ID device-name:
$ CREATE/DIRECTORY device-name:[TRANSFER]
$ COPY SYS$SYSTEM:VMB.EXE device-name:[TRANSFER]
```

5. Once you have copied all the files, enter the following command to dismount the diskette. (Leave the diskette in the drive.) Substitute CSA1 or CSA2 for *device-name*.

```
$ DISMOUNT device-name:
```

6. To enter console mode, press Ctrl/P. To exit from the console program, enter the following command:

```
>>> EXIT
```

7. Open the diskette drive door, pause for a moment, and close it. The red indicator light will flash.

8. To copy VMB.EXE from the diskette to the console fixed disk drive, enter the following command:

```
$ COPY DZu:[TRANSFER]VMB.EXE   LB0:[CONSOLE]
```

Substitute DZ1 or DZ2 for DZu.

The fixed drive in the console is known by two names, DW2 and LB0. Most console files are stored using the name LB0. If the system displays a message that describes a protection violation on the output device, copy the files using the device name DW2 rather than LB0.

9. When you have finished copying the files, remove the diskette from the drive.

10. Restart the console program by entering the following command and pressing Return:

```
$ RUN CONTROL
```

11. Return to the operating system by entering the following command and pressing Return:

```
>>> SET TERMINAL PROGRAM
```

VAX 11/730, 750, 780, 785 and VAX 8200, 8250, 8300, 8350, 8600, 8650 Computers

If you have one of the VAX 700 or 8000 series computers listed to the left, follow the instructions in this section.

The procedure does the following:

- Checks to see if you have enough space for the new VMB.EXE

- Copies the new VMB.EXE to the console media

- Updates the BOOT58 file for the VAX 11/750, 8200, 8250, 8300 and 8350 computers

To update the console media, use the following procedure:

1. Log into the SYSTEM account.

2. Enter the following commands to check if there is enough space for the new VMB.EXE. You need 120 blocks. If you are updating a VAX–11/730 system, use CSA2 for *device-name*; if you are updating one of the other VAX computers, use CSA1 for *device-name*.

```
$ RUN SYS$SYSTEM:SYSGEN
SYSGEN> CONNECT CONSOLE
SYSGEN> EXIT
$ EXCHANGE DIRECTORY device-name:VMB.EXE

Directory of RT-11 volume TINES$CSA1:     19-OCT-1991 14:04

  VMB.EXE       80   19-Oct-1991

Total of 1 file, 80 blocks.  Free space 43 blocks, largest 23.
```

If the size of the current VMB, plus the free space, does not equal at least 120 blocks, delete unneeded files on the console until you have 120 blocks available. In the above example, the size of the current VMB.EXE (80 blocks) plus the free space (43 blocks) equals 123 blocks, so files do not have to be deleted.

3. Enter the following command and press the Return key:

```
$ @SYS$UPDATE:UPDATE_CONSOLE.COM
```

4. If you are updating the console medium for a VAX 8600 or VAX 8650 computer, the new VMB.EXE is copied onto the console medium.

If you are updating the console medium for one of the other VAX computers, the procedure uses the EXCHANGE procedure to copy the contents of the existing console medium, merge the new files onto the copy of the console medium, and create a new version of the console medium. When the computer is ready to create the new version, it displays a message asking you to insert a scratch tape cassette or diskette. Take out the original console medium and insert a new one.

VAX 9000 Computers

VAX 9000 computers use a special version of VMB.EXE named VMB9AQ.EXE. The upgrade procedure automatically copies a new version of this file to the console hard disk. However, if for some reason you need to update the console hard disk, use the UPDATE_CONSOLE.COM command procedure described for the VAX 11/730, 750, 780, 785 and VAX 8200, 8250, 8300, 8350, 8600, 8650 computers. The device name for the VAX 9000 console hard disk is CSA1.

Decompressing the System Libraries

Background

Decompressing the system libraries gives the system faster access to the libraries. You can decompress all the system libraries or just some of them. Table 8–1 gives the number of blocks consumed by each library after decompression.

Table 8–1 Sizes of Decompressed System Libraries

Library	Blocks	Library	Blocks
HELPLIB.HLB	8145	EDFHLP.HLB	37
STARLET.OLB	6007	TPUHELP.HLB	1036
VAXCCURSE.OLB	91	ACLEDT.HLB	109
VAXCRTL.OLB	476	INSTALHLP.HLB	62
VAXCRTLG.OLB	11	MNRHELP.HLB	80
DECCCURSE.OLB	132	PATCHHELP.HLB	82
DECCRTL.OLB	1419	PHONEHELP.HLB	32
DECCRTLG.OLB	49	SDA.HLB	109
ERFLIB.TLB	97	SHWCLHELP.HLB	150
MAILHELP.HLB	232	SYSGEN.HLB	171
EDTHELP.HLB	229	TECO.HLB	67
DBG$HELP.HLB	1826	UAFHELP.HLB	333
EXCHNGHLP.HLB	117	EVE$HELP.HLB	1197
NCPHELP.HLB	535	EVE$KEYHELP.HLB	145
ANLRMSHLP.HLB	16	STARLET.MLB	2341
DISKQUOTA.HLB	12	LIB.MLB	2120

The additional amount of disk space required to decompress all system libraries is about 10,500 blocks. To find out how much disk space you have, enter the following command and press the Return key:

```
$ SHOW DEVICE SYS$SYSDEVICE
```

How to Decompress Libraries

You execute the LIBDECOMP.COM command procedure to decompress the system libraries. To run LIBDECOMP, log into the SYSTEM account, enter the following command, and press Return:

```
$ @SYS$UPDATE:LIBDECOMP.COM
```

The following information is displayed:

```
            VMS Library Decompression Utility

Options:

  1  HELPLIB.HLB       12  DBG$HELP.HLB      23  PHONEHELP.HLB
  2  STARLET.OLB       13  EXCHNGHLP.HLB     24  SDA.HLB
  3  VAXCCURSE.OLB     14  NCPHELP.HLB       25  SHWCLHELP.HLB
  4  VAXCRTL.OLB       15  ANLRMSHLP.HLB     26  SYSGEN.HLB
  5  VAXCRTLG.OLB      16  DISKQUOTA.HLB     27  TECO.HLB
  6  DECCCURSE.OLB     17  EDFHLP.HLB        28  UAFHELP.HLB
  7  DECCRTL.OLB       18  TPUHELP.HLB       29  EVE$HELP.HLB
  8  DECCRTLG.OLB      19  ACLEDT.HLB        30  EVE$KEYHELP.HL
  9  ERFLIB.TLB        20  INSTALHLP.HLB     31  STARLET.MLB
 10  MAILHELP.HLB      21  MNRHELP.HLB       32  LIB.MLB
 11  EDTHELP.HLB       22  PATCHHELP.HLB

or    A    ALL libraries to be decompressed
      E    EXIT this procedure

* Enter letter or number(s) of libraries to be decompressed
  (Separate multiple entries with a comma)
```

Enter the appropriate letter or the numbers of the libraries you want to decompress. To decompress all libraries, the process takes approximately one half hour.

If you prefer, you can execute LIBDECOMP interactively or as a batch job. If you use either of these methods, you can decompress up to 8 libraries each time you execute LIBDECOMP by listing the names of the libraries you want to decompress as parameters on the command line. Be sure to separate the library names with commas and do not include the file extension. For example, to decompress the VAXCRTL.OLB, DISKQUOTA.HLB, and LIB.MLB libraries as a batch job, enter the following command:

```
$ SUBMIT/NOTIFY/PARAMETERS=(VAXCRTL, DISKQUOTA, LIB)-
_$ SYS$UPDATE:LIBDECOMP
```

To decompress these same libraries interactively, enter the following command:

```
$ @SYS$UPDATE:LIBDECOMP VAXCRTL, DISKQUOTA, LIB
```

Note that, when you type the command for a batch job, you enclose the list of library names within parentheses. You do not use parentheses on the interactive command line.

Testing the System with UETP

Background

UETP (the User Environment Test Package) is a software package that tests whether the OpenVMS VAX operating system is installed correctly. As part of the postinstallation procedure, you should run UETP to verify your upgrade.

Note that UETP needs at least 1200 free blocks on the system disk.

**Where to
Find More
Information**

For complete information about UETP, see Chapter 9.

Increasing Free Space on the System Disk

Background

This section describes how to increase the amount of free space on your system disk. You can gain free space by removing optional OpenVMS VAX files that you do not need from the system disk or by purging old versions of some system files.

Using VMSTAILOR and DECW$TAILOR

To remove files you do not need from the system disk, use VMSTAILOR. For example, if you are not running DECnet for OpenVMS, you do not need the network support files. For complete information about using VMSTAILOR to remove files, see Chapter 11.

If you are running DECwindows Motif, use DECW$TAILOR to add or remove DECwindows base support, workstation support, and fonts.

Note: Files installed on alternate devices cannot be tailored.

Purging System Files

In most cases, you can purge the following OpenVMS system files to free space on your system disk. However, before you purge any of these files, read Appendix F to make sure you do not purge a file version you might want to keep.

```
SYS$SYSTEM:SHUTDOWN.COM
SYS$SYSTEM:STARTUP.COM
SYS$LIBRARY:ENCRYPSHR.EXE
SYS$LIBRARY:*RTL*.EXE
SYS$LIBRARY:*SHR.EXE
SYS$MANAGER:EDTINI.EDT
SYS$MANAGER:DBLSTRTUP.COM
SYS$MANAGER:*.TEMPLATE
SYS$EXAMPLES:XADRIVER.MAR
SYS$LIBRARY:CDDSHR.EXE
SYS$LIBRARY:EPC$FACILITY.TLB
SYS$LIBRARY:EPC$MSG.EXE
SYS$STARTUP:VMS$LAYERED.DAT
```

To purge a file, enter the PURGE command followed by the file specification. For example:

```
$ PURGE SYS$SYSTEM:SHUTDOWN.COM
```

Restoring Your System Password Dictionary

Background

The OpenVMS VAX operating system screens potential passwords for acceptability. The DCL command SET PASSWORD takes the user's proposed password, converts it to lowercase (if necessary), and compares it to entries in a system dictionary. If the proposed password is found in the dictionary, it is rejected as a valid user password, and the user must suggest another. Many system managers modify the system password dictionary to include words of significance to their site.

During the upgrade, the procedure replaces the existing system password dictionary with a new one. If you had modified the dictionary and want to restore your local additions, you must merge the file containing your additions with the new system file.

How to Restore Your Passwords

To add your site-specific passwords to the new system password dictionary, enable SYSPRV and merge your local additions by entering the following commands, where LOCAL_PASSWORD_DICTIONARY.DATA is the file that contains your additions:

```
$ SET PROCESS/PRIVILEGE=SYSPRV
$ CONVERT/MERGE/PAD LOCAL_PASSWORD_DICTIONARY.DATA -
_$ SYS$LIBRARY:VMS$PASSWORD_DICTIONARY.DATA
```

Customizing DECwindows Support and Reinstalling VWS

**Customize
DECwindows
Support
Software**

If you have installed DECwindows support software, there are several steps that you must take to customize the DECwindows environment. Depending on your configuration, DECwindows customization tasks include the following:

- Customizing the server startup

- Using the Transmission Control Protocol/Internet Protocol (TCP/IP) as a DECwindows transport

- Using transports for DECwindows other than those supplied by Digital

**How to
Customize
DECwindows
Support**

Go to Chapter 10 for complete instructions for customizing your DECwindows support software.

After you complete the tasks described in Chapter 10, return to this chapter to continue with the remaining postupgrade tasks.

**Reinstall Your
VWS Software**

VAX Workstation Support (VWS) software is one of the layered products that you must reinstall after an upgrade. If you were running VWS prior to upgrading to OpenVMS VAX Version 6.0 and you have workstations that need VWS, you must reinstall the VWS layered product.

Backing Up the System Disk

Background

Digital recommends that you protect your work by performing the following operations:

- Use SYS$UPDATE:CONSCOPY.COM to back up the console media (if applicable).

- Make a standalone BACKUP kit on removable media and on the system disk.

  Note: If your console media is a TU58 tape cartridge or an RX01 diskette, use the standalone BACKUP copy you made before you began the upgrade. (See the section How to Back Up Console Media in Chapter 5.)

- Back up the system disk.

For More Information

For complete information about these operations, see the upgrade and installation supplement for your VAX computer.

Running AUTOGEN

Background

When you upgraded the OpenVMS VAX operating system, the procedure executed AUTOGEN to set the values of system parameters and the sizes of the page and swap files according to the system's workload.

In many cases, AUTOGEN can improve system performance by using dynamic feedback information from the running system. As a postinstallation task, you should run AUTOGEN again using the feedback mechanism to make further adjustments to system parameters.

When AUTOGEN runs after an upgrade, it uses the parameter values in SYS$SYSTEM:MODPARAMS.DAT. Note that hard-coded values in MODPARAMS.DAT affect AUTOGEN's calculations of the feedback parameters. For AUTOGEN to properly calculate minimum values, you should replace the hard-coded values in MODPARAMS.DAT with MIN_ values. The MIN_ prefix specifies the minimum value to which a parameter can be set by AUTOGEN.

If you are not satisfied with the parameter settings calculated by AUTOGEN, you can modify the parameter values by editing MODPARAMS.DAT as explained in the *OpenVMS System Manager's Manual: Tuning, Monitoring, and Complex Systems.*

When to Run AUTOGEN

After you have upgraded the operating system, run AUTOGEN again using the following procedure:

1. After 24 hours of operation, run AUTOGEN in feedback mode and reboot the system.

2. Run AUTOGEN in this same way, again, two working days later.

   Note: For the VAX 9000 computer, AUTOGEN's initial parameter calculations are conservative. To obtain parameter values that match your system workload, you can run AUTOGEN in feedback mode a number of times. For more information, see the upgrade and installation supplement for your VAX 9000 computer.

3. Digital recommends that you run AUTOGEN from SAVPARAMS through TESTFILES on a weekly basis and examine AGEN$PARAMS.REPORT to determine the need for additional changes.

For information about using AUTOGEN, see the *OpenVMS System Manager's Manual: Tuning, Monitoring, and Complex Systems.*

Postupgrade Checklist

Introduction   Use the following checklist to make sure you perform all the necessary postupgrade tasks.

Did you . . .

☐ Restore the preferred node list for the queue manager? (Described in the section Restoring the Preferred Node List.)

☐ Replace SYSUAF.DAT? (Described in the section Replacing SYSUAF.DAT.)

☐ Examine AUTOGEN output stored in the file AGEN$PARAMS.REPORT? (Described in the section Examining AGEN$PARAMS.REPORT.)

☐ Examine the command procedure templates supplied with OpenVMS VAX Version 6.0? (Described in the section Examining Your Command Procedures.)

☐ Examine MODPARAMS.DAT? (Described in the section Changing MODPARAMS.DAT.)

☐ Start DECnet for OpenVMS? (Described in the section Updating Your DECnet for OpenVMS Configuration.)

☐ Update your console media? (Described in the section Updating Your Console Media.)

☐ Decompress the system libraries using LIBDECOMP.COM? (Described in the section Decompressing the System Libraries.)

☐ Run UETP (the User Environment Test Package) to test the system? (Described in Chapter 9.)

☐ Remove unwanted files and check the sizes of system files? (Described in the section Increasing Free Space on the System Disk.)

☐ Restore your local additions to the system password dictionary? (Described in the section Restoring Your System Password Dictionary.)

☐ Customize your DECwindows environment? (Described in the section Customizing DECwindows Support and Reinstalling VWS.)

☐ Reinstall your VWS software if you were running it prior to the upgrade? (Described in the section Customizing DECwindows Support and Reinstalling VWS.)

☐ Build a standalone BACKUP kit? (Described in the section Backing Up the System Disk.)

☐ Back up the console media? (Described in the section Backing Up the System Disk.)

☐ Back up the system disk? (Described in the upgrade and installation supplement for your computer.)

☐ Run AUTOGEN and reboot the system after the first 24 hours of operation? (Described in the section Running AUTOGEN.)

9

Running the User Environment Test Package

Overview

This chapter explains how to use UETP (the User Environment Test Package) to test whether your OpenVMS VAX operating system has been installed correctly. The first section describes what UEPT does and summarizes how you use it. The remaining sections provide detailed instructions for setting up your system for testing, running the tests, and troubleshooting errors.

What Is UETP?

Introduction

UETP is an OpenVMS software package designed to test whether the OpenVMS VAX operating system is installed correctly. UETP puts the system through a series of tests that simulate a typical user environment, by making demands on the system that are similar to demands that can occur in everyday use.

UETP is not a diagnostic program; it does not attempt to test every feature exhaustively. When UETP runs to completion without encountering nonrecoverable errors, the system being tested is ready for use.

UETP exercises devices and functions that are common to all OpenVMS VAX systems, with the exception of optional features such as high-level language compilers. The system components tested include the following:

- Most standard peripheral devices
- System's multiuser capability
- DECnet for OpenVMS software
- Clusterwide file access and locks

Summary of How to Use UETP

This section summarizes the procedure for running all phases of UETP with default values. If you are familiar with the test package, refer to this section. If you need further information, refer to the section Preparing to Use UETP.

1. Log into the SYSTEST account as follows:

   ```
   Username: SYSTEST
   Password:
   ```

   Caution: Because the SYSTEST and SYSTEST_CLIG accounts have privileges, unauthorized use of these accounts can compromise the security of your system.

2. Make sure no user programs are running and no user volumes are mounted.

   Caution: By design, UETP assumes and requests the exclusive use of system resources. If you ignore this restriction, UETP can interfere with applications that depend on these resources.

3. After you log in, check all devices to be sure that the following conditions exist:

   - All devices you want to test are powered up and are on line to the system.
   - Scratch disks are mounted and initialized.

- Disks contain a directory named [SYSTEST] with OWNER_UIC=[1,7]. (You can create this directory with the DCL command CREATE/DIRECTORY.)

- Scratch magnetic tape reels are *physically* mounted on each drive you want tested and are initialized with the label UETP (using the DCL command INITIALIZE). Make sure magnetic tape reels contain at least 600 feet of tape.

- Scratch tape cartridges have been inserted in each drive you want to test and are initialized with the label UETP.

- Line printers and hardcopy terminals have plenty of paper.

- Terminal characteristics and baud rate are set correctly (see the user's guide for your terminal).

Note that some communication devices need to be set up by Digital Services (see the section Setting Up the Devices to be Tested).

If you encounter any problems in preparing to run UETP, read the section Setting Up the Devices to be Tested before proceeding.

4. To start UETP, enter the following command and press Return:

```
$ @UETP
```

UETP responds with the following question:

```
Run "ALL" UETP phases or a "SUBSET" [ALL]?
```

Press Return to choose the default response enclosed in brackets. UETP responds with the following sequence of questions:

```
How many passes of UETP do you wish to run [1]?
How many simulated user loads do you want [4]?
Do you want Long or Short report format [Long]?
```

Press Return after each prompt. After you answer the last question, UETP initiates its entire sequence of tests, which run to completion without further input. The final message should look like the following:

```
*****************************************************
*                                                   *
   END OF UETP PASS 1 AT 18-JUN-1993 16:30:09.38
*                                                   *
*****************************************************
```

5. After UETP runs, check the log files for errors. If testing completes successfully, the OpenVMS VAX operating system is in proper working order.

   Note: After a run of UETP, you should run the Error Log utility to check for hardware problems that can occur during a run of UETP. For information on running the Error Log utility, refer to the *OpenVMS System Management Utilities Reference Manual*.

If UETP does not complete successfully, refer to the
section Troubleshooting: An Overview for information on
troubleshooting.

If you want to run UETP without using the default responses,
refer to the section Starting UETP, which explains the options.

Preparing to Use UETP

Introduction

This section contains detailed instructions for running UETP, including:

- Logging in
- Using the [SYSTEST] directory

Logging in to SYSTEST

Obtain the SYSTEST password from your system manager. Log in to the SYSTEST account from the console terminal as follows:

```
Username: SYSTEST
Password:
```

Note: Because SYSTEST has privileges, unauthorized use of this account can compromise the security of your system.

UETP will fail if you do not run the test from the SYSTEST account. Also, if you try to run UETP from a terminal other than the console terminal, the device test phase displays an error message stating that the terminal you are using is unavailable for testing. You can ignore this message.

After you log in to the SYSTEST account, enter the command SHOW USERS to make sure no user programs are running and no user volumes are mounted. UETP requires exclusive use of system resources. If you ignore this restriction, UETP can interfere with applications that depend on these resources.

Note: The information contained in the Wrong Quotas, Privileges, or Account section is intended to help you identify and solve problems, including wrong quotas, privileges, or accounts, that could occur when you are running UETP. Refer to this section before you run UETP.

Using the SYSTEST Directories

If you logged in successfully, you are in the root directory [SYSTEST] on the system disk. UETP uses directories named [SYSTEST] to hold all the files used by UETP command procedure (UETP.COM) and temporary files used by UETP during testing.

On a typical system, the DCL command SHOW LOGICAL displays the translation of the logical name SYS$TEST:

```
$ SHOW LOGICAL SYS$TEST
   "SYS$TEST" = "SYS$SYSROOT:[SYSTEST]"   (LNM$SYSTEM_TABLE)
```

To use UETP to test a particular disk, such as a scratch disk, create either a [SYSTEST] directory or a [SYS0.SYSTEST] directory on that disk. The section How UETP Works on Disks discusses setting up scratch disks for testing.

Setting Up the Devices to be Tested

Introduction

After you log in, set up the devices on the system for UETP testing, as described in the following sections. Note that your system might not have all the devices described in this section.

Check Your Devices

Examine all devices to be sure that the following conditions exist:

- All devices you want to test are turned on and are on line.

- Scratch disks are initialized and mounted.

- Disks contain a directory named [SYSTEST] with OWNER_ UIC=[1,7]. Use the CREATE/DIRECTORY command if the [SYSTEST] directory does not exist on the disk.

- Scratch magnetic tape reels are *physically* mounted on each drive you want tested and are initialized with the label UETP (using the DCL command INITIALIZE). Make sure magnetic tape reels contain at least 600 feet of tape.

- Scratch tape cartridges have been inserted in each drive you want to test and are mounted and initialized with the label UETP.

- Line printers and hardcopy terminals have plenty of paper.

- Terminal characteristics and baud rate are set correctly (see the user's guide for your terminal).

Note that some communications devices discussed in this section need to be set up by Digital Services.

System Disk Space Required

Before running UETP, be sure that the system disk has at least 1200 blocks available. Note that systems running more than 20 load test processes can require a minimum of 2000 available blocks. If you run multiple passes of UETP, log files will accumulate in the default directory and further reduce the amount of disk space available for subsequent passes.

If disk quotas are enabled on the system disk, disable them before you run UETP.

How UETP Works on Disks

The disk test phase of UETP uses most of the available free space on each testable disk in the following manner:

- On each testable disk, the device test phase tries to create two files. The size of these files depends on how much free space is available on the disk. Usually the test creates each file with 5% of the free space on the disk. However, if the disk is almost full, the test creates files that are 5 blocks. If the test cannot create 5 block files, it fails. Only the initial file creation can cause the device test to fail because it lacks disk space.

- The test randomly reads and writes blocks of data to the files. After every multiple of 20 writes for each file, the test tries to extend the file. The size of this extension is either 5% of the free disk space, or 5 blocks if the file was created with 5 blocks. This process of extension continues until the combined space of the files reaches 75% of the free disk space.

By creating and extending fragmented files in this way, UETP exercises the disk. This allows the test to check for exceeded quotas or a full disk, and to adjust for the amount of available disk space.

Prepare Disk Drives

To prepare each disk drive in the system for UETP testing, use the following procedure:

1. Place a scratch disk in the drive and spin up the drive. If a scratch disk is not available, use any disk with a substantial amount of free space; UETP does not overwrite existing files on any volume. If your scratch disk contains files that you want to keep, do not initialize the disk; go to Step 3.

2. If the disk does not contain files you want to save, initialize it. For example:

   ```
   $ INITIALIZE DUA1: TEST1
   ```

   This command initializes DUA1, and assigns the volume label TEST1 to the disk. All volumes must have unique labels.

3. Mount the disk. For example:

   ```
   $ MOUNT/SYSTEM DUA1: TEST1
   ```

   This command mounts the volume labeled TEST1 on DUA1. The /SYSTEM qualifier indicates that you are making the volume available to all users on the system.

4. UETP uses the [SYSTEST] directory when testing the disk. If the volume does not contain the directory [SYSTEST], you must create it. For example:

   ```
   $ CREATE/DIRECTORY/OWNER_UIC=[1,7] DUA1:[SYSTEST]
   ```

   This command creates a [SYSTEST] directory on DUA1 and assigns a user identification code (UIC) of [1,7]. The directory must have a UIC of [1,7] to run UETP.

If the disk you have mounted contains a root directory structure, you can create the [SYSTEST] directory in the [SYS0.] tree.

Magnetic Tape Drives

Set up magnetic tape drives that you want to test by performing the following steps:

1. Place a scratch magnetic tape with at least 600 feet of magnetic tape in the tape drive. Make sure that the write-enable ring is in place.

2. Position the magnetic tape at the beginning-of-tape (BOT) and put the drive on line.

3. Initialize each scratch magnetic tape with the label UETP. For example, if you have physically mounted a scratch magnetic tape on MTA1, enter the following command and press Return:

```
$ INITIALIZE MTA1: UETP
```

Magnetic tapes must be labeled UETP to be tested. As a safety feature, UETP does not test tapes that have been mounted with the MOUNT command.

If you encounter a problem initializing the magnetic tape, or if the test has a problem accessing the magnetic tape, refer to the description of the INITIALIZE command in the *OpenVMS DCL Dictionary*.

Tape Cartridge Drives

Set up tape cartridge drives that you want to test by doing the following:

1. Insert a scratch tape cartridge in the tape cartridge drive.

2. Initialize the tape cartridge. For example:

```
$ INITIALIZE MUA0: UETP
```

Tape cartridges must be labeled UETP to be tested. As a safety feature, UETP does not test tape cartridges that have been mounted with the MOUNT command.

If you encounter a problem initializing the tape cartridge, or if the test has a problem accessing the tape cartridge, refer to the description of the DCL INITIALIZE command in the *OpenVMS DCL Dictionary*.

TLZ04 Tape Drives

During the initialization phase, UETP sets a time limit of 6 minutes for a TLZ04 unit to complete the UETTAPE00 test. If the device does not complete the UETTAPE00 test within the allotted time, UETP displays a message similar to the following:

```
-UETP-E-TEXT, UETTAPE00.EXE testing controller MKA was stopped ($DELPRC) at 16:23:23.07
        because the time out period (UETP$INIT_TIMEOUT) expired or
        because it seemed hung or because UETINIT01 was aborted.
```

To increase the timeout value, type a command similar to the following before running UETP:

```
$ DEFINE/GROUP UETP$INIT_TIMEOUT "0000 00:08:00.00"
```

This example defines the initialization timeout value to 8 minutes.

Compact Disc Drives

To run UETP on an RRD40 or RRD50 compact disc drive, you must first load the test disc that you received with your compact disc drive unit.

Optical Disk Drives

To run UETP on an RV60 drive, set up the RV64 optical disk-storage system, by doing the following:

1. Use the Jukebox Control Software (JCS) to load an optical disk in each of the RV60 drives. JCS is a layered product on the OpenVMS VAX operating system that comes with the RV64 and is responsible for controlling the robot arm that loads and unloads the disks.

2. Initialize the optical disks with the label UETP, but do not mount them.

UETP tests all the RV60s present in the RV64 simultaneously. Unlike the tape tests, UETP does not reinitialize the optical disks at the end of the test.

Terminals and Line Printers

Terminals and line printers must be turned on to be tested by UETP. They must also be on line. Check that line printers and hardcopy terminals have enough paper. The amount of paper required depends on the number of UETP passes that you plan to execute. Each pass requires two pages for each line printer and hardcopy terminal.

Check that all terminals are set to the correct baud rate and are assigned appropriate characteristics (see the user's guide for your terminal).

Spooled devices and devices allocated to queues fail the initialization phase of UETP and are not tested.

Ethernet Adapters

Make sure that no other processes are sharing the Ethernet adapter device when you run UETP.

Note: UETP will not test your Ethernet adapter if DECnet for OpenVMS or some other application has the device allocated.

Because either DECnet for OpenVMS or the LAT terminal server can try to use the Ethernet adapter (a shareable device), you must shut down DECnet and the LAT terminal server before you run the device test phase, if you want to test the Ethernet adapter.

DR11–W Data Interface

The DR11–W data interface uses an internal logical loopback mode that tests all features except that of module connectors, cables, and transceivers.

Caution: Only Digital Services personnel can set up the DR11–W for UETP testing.

Because random external patterns are generated during this operation, the user device or other processor might need to be isolated from the DR11–W being tested until the testing is completed.

To test the DR11–W properly, the E105 switchpack must be set as follows:

Switch 1	Switch 2	Switch 3	Switch 4	Switch 5
Off	On	Off	Off	On

When UETP testing is completed, restore the DR11–W to the proper operating configuration.

DRV11–WA Data Interface

The DRV–WA data interface is a general-purpose, 16-bit, parallel, direct memory access (DMA) data interface.

Caution: Only Digital Services personnel should set up the DRV11–WA for UETP testing.

To prepare the DRV11–WA driver on a MicroVAX computer for UETP testing, be sure the following conditions exist:

- The jumpers on the DRV11–WA board are set to W2, W3, and W6.

- A loopback cable is connected to the DRV11–WA board.

- The DRV11–WA board occupies slots 8 to 12. If the DRV11–WA is in another location, timeout errors can occur.

When UETP testing is completed, restore the DRV11–WA to the proper operating configuration.

DR750 or DR780 (DR32 Interface)

The DR32 is an interface adapter that connects the internal memory bus of a VAX processor to a user-accessible bus called the DR32 device interconnect (DDI).

Caution: Only Digital Services personnel should set up the DR750 or DR780 for UETP testing.

To prepare the DR750 or the DR780 for UETP testing, use the following procedure:

1. Copy the DR780 microcode file, XF780.ULD, from the diagnostic medium to SYS$SYSTEM. Use the procedure described in the documentation provided with the DR780 Microcode Kit.

2. Turn off the power to the DR780.

3. Make the following DR780 backplane jumper changes:

   - Remove the jumper from W7 and W8

   - Add a jumper from E04M1 to E04R1

   - Add a jumper from E04M2 to E04R2

4. Disconnect the DDI cable from the DR780. This cable is either a BC06V–nn cable, which can be disconnected, or a BC06R–nn cable, which requires that you remove its paddle card from the backplane of the DR780.

5. Restore power to the DR780.

When UETP testing is completed, restore the DR750 or the DR780 to the proper operating configuration.

Second LPA11–K Device

If you have two LPA11–Ks, be sure that each is given a systemwide logical name in the SYS$MANAGER:LPA11STRT.COM file. The logical name for the first LPA11–K should be LPA11$0, and the logical name for the second LPA11–K should be LPA11$1.

Devices Not Tested

UETP does not test the following devices; their status has no effect on UETP execution:

- Devices that require operator interaction (such as card readers)

- Software devices (such as the null device and local memory mailboxes)

UETP does not have specific tests for UDA, HSC, or CI devices; they are tested implicitly by the disk, magnetic tape, and DECnet for OpenVMS tests.

UETP also does not test the console terminal or console drives. If you boot the system, log in, and start UETP, you have shown that these devices can be used.

VAXcluster Testing

Before you run UETP in a VAXcluster environment, you should check the SYSTEST_CLIG account. The SYSTEST_CLIG account parallels SYSTEST except that it is dedicated to running the cluster-integration test. The requirements for the SYSTEST_CLIG account are as follows:

- The account should be present in the user authorization file, exactly as distributed by Digital on each system in your VAXcluster.

  Note: The SYSTEST_CLIG account could have been disabled during the OpenVMS VAX upgrade procedure. If it was disabled, you can reenable the SYSTEST_CLIG account and give it a null password before you run UETP.

  To reenable the SYSTEST_CLIG account, enter the following commands:

```
$  SET DEFAULT SYS$SYSTEM
$  RUN AUTHORIZE
UAF>  MODIFY /FLAGS=NODISUSER  /NOPASSWORD SYSTEST_CLIG
UAF>  EXIT
```

  Note: Digital recommends that you disable the SYSTEST_CLIG account after testing has completed.

To disable the SYSTEST_CLIG account, enter the following commands:

```
$  SET DEFAULT SYS$SYSTEM
$  RUN AUTHORIZE
UAF>  MODIFY /FLAGS=DISUSER SYSTEST_CLIG
UAF>  EXIT
```

- The privileges and quotas of the SYSTEST_CLIG account must match those of the SYSTEST account.

UETP requires little additional preparation for the cluster-integration test phase beyond the requirements for other UETP test phases. The additional requirements for cluster integration testing are as follows:

1. Your system must be a member of a VAXcluster. If it is not, UETP displays a message and does not attempt to run the test.

2. Your system must use the same deadlock detection interval as the other systems in the VAXcluster. (The deadlock detection interval is set by the SYSGEN parameter DEADLOCK_WAIT. It is normally not changed from the default value, which is 10 seconds.)

3. The files UETCLIG00.COM and UETCLIG00.EXE, located in SYS$TEST, are necessary for each system included in the test.

4. DECnet for OpenVMS must be set up between the VAXcluster nodes; UETP uses DECnet–VAX to create a process on those nodes. All checks that the test makes depend on its ability to create the SYSTEST_CLIG processes and to communicate with them using DECnet for OpenVMS software.

5. All operator terminals (OAP0:) should accept broadcast messages. To set the BROADCAST characteristic, enter the following command:

   ```
   $ SET TERM/BROADCAST/PERM OPA0:
   ```

   Nodes on which the operator's terminal (OPA0) is set to the NO BROADCAST terminal characteristic will generate the following error message during the cluster test:

```
**********************
*  UETCLIG00master   *
*  Error count =  1  *
**********************
-UETP-E-TEXT, 0 operator consoles timed out on the cluster test warning
     and 1 operator console rejected it.
-UETP-E-TEXT, Status returned was,
     "%SYSTEM-F-DEVOFFLINE, device is not in configuration or not
available"
```

6. There must be a [SYSTEST] or [SYS0.SYSTEST] directory on some disk available to the VAXcluster for each node (both OpenVMS VAX and HSC) in the cluster. The test uses the same directory as the UETP disk test to create a file on each cluster node and to see if some other OpenVMS VAX node

in the cluster can share access to that file. There must be one such directory per node; the test continues with the next cluster node once it has finished with a file.

Testing A Small-Disk System

After you install the OpenVMS VAX operating system on a small system disk (for example, an RD53), you might not have the 1200 blocks of free disk space required to run UETP successfully. If you do not have 1200 free blocks on your system disk, use VMSTAILOR to remove some files from the system disk before you run UETP. For instructions on using VMSTAILOR, see Chapter 11.

DECnet for OpenVMS Phase

The DECnet for OpenVMS phase of UETP uses more system resources than other tests. You can, however, minimize disruptions to other users by running the test on the least busy node.

By default, the file UETDNET00.COM specifies the node from which the DECnet test will be run. To run the DECnet test on a different node, enter the following command before you invoke UETP:

`$ DEFINE/GROUP UETP$NODE_ADDRESS node_address`

This command equates the group logical name UETP$NODE_ ADDRESS to the node address of the node in your area on which you want to run the DECnet phase of UETP.

For example:

`$ DEFINE/GROUP UETP$NODE_ADDRESS 9.999`

You can also run the DECnet for OpenVMS test on a different node by entering the following command before you invoke UETP:

`$ DEFINE/GROUP UETP$NODE_NAME "node""username password"`

Note: When you use the logical name UETP$NODE_ADDRESS, UETP tests only the first active circuit found by NCP. Otherwise, UETP tests all active testable circuits.

When you run UETP, a router node attempts to establish a connection between your node and the node defined by UETP$NODE_ADDRESS or UETP$NODE_NAME. Occasionally, the connection between your node and the router node can be busy or nonexistent. When this happens, the system displays the following error messages:

```
%NCP-F-CONNEC, Unable to connect to listener
-SYSTEM-F-REMRSRC, resources at the remote node were insufficient
```

```
%NCP-F-CONNEC, Unable to connect to listener
-SYSTEM-F-NOSUCHNODE, remote node is unknown
```

Vector Processors and the VVIEF

UETP automatically loads all installed and enabled vector processors during the load phase, and automatically tests all installed and enabled vector processors during the device test phase.

If vector processors are available on the system, check for the VP number by entering the following commands:

```
$ x = F$GETSYI ("VP_NUMBER")
$ SHOW SYMBOL x
```

Multiply the value of x by 3. If the result is greater than the account PRCLM value, then you must increase the SYSTEST account PRCLM quota to match the returned result. For more information see *OpenVMS System Manager's Manual: Tuning, Monitoring, and Complex Systems*.

However, UETP cannot load the VAX Vector Instruction Emulation Facility (VVIEF) during the load phase, and will not automatically test VVIEF. To test VVIEF, you must do the following before running UETP:

1. Edit the file UETCONT00.DAT to add the following line:

   ```
   Y   Y   UETVECTOR.EXE   "DEVICE_TEST"
   ```

2. Make sure VVIEF was activated when the system was booted. To determine if the VVIEF was activated, enter the following DCL commands:

   ```
   $ X = F$GETSYI("VECTOR_EMULATOR")
   $ SHOW SYMBOL X
   ```

   If the system displays a value of 1, VVIEF is loaded; if the system displays a value of 0, VVIEF is not loaded.

The VVIEF test can be executed as an individual test using the RUN command, as described in the Device Test Phase section.

Starting UETP

Introduction

When you have logged in and prepared the system and devices, you are ready to begin the test.

To start UETP, enter the following command and press Return:

```
$ @UETP
```

UETP displays the following prompt:

```
Run "ALL" UETP phases or a "SUBSET" [ALL]?
```

Throughout the startup dialog, brackets indicate the default value, which you can choose by pressing Return.

When running UETP for the first time, it is a good idea to choose the default value (ALL) and run all the phases. If you choose ALL, UETP displays three more questions, which are described in the section Single Run Versus Multiple Passes through the section Report Formats. If you want to run all the test phases, skip the next section.

Running a Subset of Phases

You can run a single phase by entering SUBSET or S in response to the following prompt:

```
Run "ALL" UETP phases or a "SUBSET" [ALL]?
```

If you enter S or SUBSET, UETP prompts you for the phase you want to run as follows:

```
You can choose one or more of the following phases:

       DEVICE, LOAD, DECNET, CLUSTER

Phases(s):
```

There is no default; enter one or more phase names from the list. Separate two or more phases with spaces or commas.

If your choice includes the LOAD phase, UETP displays three prompts:

```
How many passes of UETP do you wish to run [1]?
How many simulated user loads do you want [n]?
Do you want Long or Short report format [Long]?
```

If you exclude the LOAD phase from your list of choices, UETP responds with only two prompts—the first and the third.

The next three sections discuss how you can respond to these questions. After you have answered the questions, the phase you have selected runs to completion.

Single Run Versus Multiple Passes

If you specified the default ALL or a subset of phases at the last prompt, UETP displays the following message:

How many passes of UETP do you wish to run [1]?

You can repeat the test run as many times as you want. If you enter 1 in response to the prompt (or press Return for the default), UETP stops after completing a single run. If you specify a number greater than 1, UETP restarts itself until it completes the specified number of passes.

You can run UETP once to check that the system is working, or many times to evaluate the system's response to continuous use. For example, a service technician who is interested only in verifying that a newly installed system works can run UETP once or twice. A manufacturing technician can let the system run for several hours as part of the system integration and test.

When you specify multiple UETP runs, you can request a short console log (see the section Report Formats). Ensure that all line printers and hardcopy terminals have enough paper, because each run requires two pages.

Defining User Load for Load Test

After you specify the number of passes, UETP prompts you as follows:

How many simulated user loads do you want [n]?

Note: UETP displays this prompt only if you choose to run the LOAD phase, either implicitly (by running all phases) or explicitly (by running a subset and specifying the LOAD phase).

The load test simulates a situation in which a number of users (detached processes) are competing for system resources. In response to this prompt, enter the number of users you want to simulate for this test. The number in brackets is the default value that UETP computed for your system. The default value depends on the amount of memory and the paging and swapping space that your system has.

Although the given default value is the best choice, you can increase or decrease the user load by entering your own response to the prompt. However, be aware that an increase can cause the test to fail because of insufficient resources.

If you want to see UETP display the user-load equation as it runs, see the section Interpreting UETP Output.

Report Formats

The following prompt allows you to choose between long or short report formats:

Do you want Long or Short report format [Long]?

Long Report Format

If you choose the long report format (the default), UETP sends all error messages as well as information on the beginning and end of all phases and tests to the console terminal. UETP records all its output in the UETP.LOG file, regardless of your response to this question.

In many cases, it might not be convenient to have UETP write the bulk of its output to the terminal. For example, if you run UETP from a hardcopy terminal, the output printing can slow the progress of the tests. This delay might not be a problem if you have requested only one run; however, you might prefer to use the short format if you intend to run multiple passes of UETP from a hardcopy terminal.

Short Report Format

If you request the short format, UETP displays status information at the console, such as error messages and notifications of the beginning and end of each phase. This information enables you to determine whether UETP is proceeding normally. If the short console log indicates a problem, you can look at the file UETP.LOG for further information. UETP.LOG contains all the output generated by the various phases, as well as the status information displayed at the console.

After you choose the report format, UETP initiates its sequence of tests and runs to completion. If UETP does not complete successfully, refer to the section Troubleshooting: An Overview for troubleshooting information.

Stopping a UETP Operation

Introduction

At the end of a UETP pass, the master command procedure UETP.COM displays the time at which the pass ended. In addition, UETP.COM determines whether UETP needs to be restarted. (You can request multiple passes when you start up the test package; see the section Single Run Versus Multiple Passes.)

At the end of an entire UETP run, UETP.COM deletes temporary files and does other cleanup activities.

Pressing Ctrl/Y or Ctrl/C lets you terminate a UETP run before it completes normally. Normal completion of a UETP run, however, includes the deletion of miscellaneous files that have been created by UETP for the purpose of testing. The use of Ctrl/Y or Ctrl/C can interrupt or prevent these cleanup procedures.

The effect of these control characters depends on what part of UETP you are executing. For an explanation of the organization of UETP and its components, refer to the UETP Tests and Phases section.

Using Ctrl/Y

Press Ctrl/Y to abort a UETP run. Note, however, that cleanup of files and network processes in the [SYSTEST] directory might not be complete.

If you are running an individual test image, pressing Ctrl/Y interrupts the current UETP test and temporarily returns control to the command interpreter. While the test is interrupted, you can enter a subset of DCL commands that are executed within the command interpreter and do not cause the current image to exit.

Using DCL Commands

The *OpenVMS User's Manual* contains a table of commands that you can use within the command interpreter. In addition, you can enter any of the following commands:

- The CONTINUE command continues the test from the point of interruption (except during execution of the cluster test).

- The STOP command terminates the test; the test aborts and control returns to the command interpreter.

  Note: Using the STOP command can prevent cleanup procedures from executing normally. You should use the EXIT command if you want the image to do cleanup procedures before terminating.

- The EXIT command executes cleanup procedures and terminates the test (except during execution of the cluster test); control returns to the command interpreter.

If you enter any DCL command other than CONTINUE, STOP, and EXIT, the test does cleanup procedures and terminates, and the DCL command executes.

Using Ctrl/C

Press Ctrl/C to interrupt a UETP run. You cannot continue the same test phase after you press Ctrl/C. UETP automatically goes to the next phase in the master command procedure.

Some UETP phases react to Ctrl/C by cleaning up all activity and terminating immediately. Such tests display the following message:

```
%UETP-I-ABORTC, 'testname' to abort this test, type ^C
```

The phases that do not display the previous message terminate all processes they have started. These processes might not have a chance to complete normal cleanup procedures.

If you are running an individual test image, however, you can use Ctrl/C to terminate the execution of the image and complete cleanup procedures.

Note that Ctrl/C does not complete cleanup procedures for the cluster test.

Troubleshooting: An Overview

Introduction

This section explains the role of UETP in interpreting operational errors in an OpenVMS VAX operating system. See the section Troubleshooting: Possible UETP Errors for a discussion of common errors that can appear in a UETP run and describes how to correct them.

Error Logging and Diagnostics

When UETP encounters an error, it reacts like a user program. It either returns an error message and continues, or it reports a fatal error and terminates the image or phase. In either case, UETP assumes the hardware is operating properly and it does not attempt to diagnose the error.

If the cause of an error is not readily apparent, use the following methods to diagnose the error:

* *OpenVMS Error Log utility*—Run the Error Log utility to obtain a detailed report of hardware and system errors. Error log reports provide information about the state of the hardware device and I/O request at the time of each error. For information about running the Error Log utility, refer to the *OpenVMS System Management Utilities Reference Manual.*

* *Diagnostic facilities*—Use the diagnostic facilities to test exhaustively a device or medium to isolate the source of the error.

Interpreting UETP Output

You can monitor the progress of UETP tests at the terminal from which they were started. This terminal always displays status information, such as messages that announce the beginning and end of each phase and messages that signal an error.

The tests send other types of output to various log files, depending on how you started the tests (see the section Log Files). The log files contain output generated by the test procedures. Even if UETP completes successfully, with no errors displayed at the terminal, it is good practice to check these log files for errors. Furthermore, when errors are displayed at the terminal, check the log files for more information about their origin and nature.

Each test returns a final completion status to the test controller image, UETPHAS00, using a termination mailbox. This completion status is an unsigned longword integer denoting a condition value. As a troubleshooting aid, UETPHAS00 displays the test's final completion status using the $FAO and $GETMSG system services.

Sometimes, however, the $FAO service needs additional information that cannot be provided using the termination mailbox. When this happens, UETP displays an error message similar to the following:

```
UETP-E-ABORT, !AS aborted at !%D
```

When UETP displays these types of error messages, check the log files for more information. You can also run the individual test to attempt to diagnose the problem.

The error messages that appear at the terminal and within the log files have two basic sources:

- UETP tests

- System components that are tested

If you need help interpreting the messages, use the OpenVMS Help Message utility or refer either to the *OpenVMS System Messages and Recovery Procedures Reference Manual* or to the manual that describes the individual system component.

Displaying Information on Your Screen

Several parts of UETP, such as some device tests, UETINIT00.EXE, UETCLIG00.EXE, and UETDNET00.COM, let you obtain additional information concerning the progress of the test run or the problems it encounters. Because this information is usually insignificant, it is not displayed on the screen. To view the information, enter the following command to define the logical name MODE and run the program:

```
$ DEFINE MODE DUMP
```

**Example
Screen Display**

The following example shows the output for UETINIT00.EXE on a MicroVAX 3600 system:

```
$ RUN UETINIT00

        Welcome to VAX/VMS UETP Version V6.0

%UETP-I-ABORTC, UETINIT00 to abort this test, type ^C

You are running on a MicroVAX 3600 Series CPU with 65536 pages of memory.
The system was booted from _DUA0:[SYS0.].

Run "ALL" UETP phases or a "SUBSET" [ALL]?
How many passes of UETP do you wish to run [1]?

The default number of loads is the minimum result of

1) CPU_SCALE * ((MEM_FREE + MEM_MODIFY) / (WS_SIZE * PER_WS_INUSE))
        2.50 * ((  28126 +      312) / (  1024 *         0.20))  = 347

2) Free process slots                                             = 197

3) Free page file pages / Typical use of page file pages per process
                96920 /                                    1000 = 96

How many simulated user loads do you want [96]?
Do you want Long or Short report format [Long]?

UETP starting at  18-JUN-1993 09:08:26.71 with parameters:
DEVICE LOAD DECNET CLUSTER  phases, 1 pass, 96 loads, long report.
$
```

This program does not initiate any phase; it displays the equation used by UETP to determine user load and the specific factors that are employed in the current run.

You should respond to the questions by pressing Return. After you respond to the first prompt, the program displays the expressions that determine the default number of simultaneous processes. The following definitions apply:

- CPU_SCALE refers to the relative processing power of the CPU in relation to a VAX 11/780 computer. For example, a MicroVAX 3600 computer has a CPU_SCALE of 2.5 because it has 2.5 times the processing power of a VAX 11/780 (1.0) computer.

- MEM_FREE represents memory in pages available to users.

- MEM_MODIFY represents memory pages on the modified page list.

- WS_SIZE represents working set size.

- PER_WS_INUSE represents typical percentage of the working set in active use for each process.

UETINIT00 also displays the specific values represented by the expressions. In this example, UETP selects 96 as the default for simulated user loads, because 96 is the minimum result of the three expressions.

You should deassign the logical name MODE before running UETP, unless you prefer to see the previous breakdown every time you run UETP.

Defining a Remote Node for UETP Ethernet Testing

Occasionally during the UETUNAS00 test, it is difficult to determine whether the problem reports concern the device under test or the remote device. The easiest way to ensure proper error reporting is to define a *good turnaround*. A good turnaround is a remote node that you know turns around Ethernet packets correctly and is up and waiting in the ready state.

You can make the UETUNAS00 test use a known good turnaround by performing the following actions. In the commands that follow, assume that the *good* device is on node BETA, and that node BETA is already defined in the network database.

1. Find the address of the good Ethernet node by using the Network Control Program (NCP). To use NCP, the following conditions must apply:

   - DECnet for OpenVMS must be up and running on the system.

   - The account you are using must have TMPMBX and NETMBX privileges.

   Enter the following commands and press Return:

   ```
   $ RUN SYS$SYSTEM:NCP
   NCP> TELL PARROT SHOW EXECUTOR STATUS
   ```

   If node PARROT has not been defined in your network database, NCP displays an error message. In this event, specify another good node and retry the command. Otherwise, see your system or network manager.

   NCP displays information similar to the following:

   ```
   Node Volatile Status as of  18-JUN-1993 16:13:02

   Executor node = 19.007 (PARROT)

   State                   = on
   Physical address        = AA-00-03-00-76-D3
   Active links            = 6
   Delay                   = 1
   ```

2. Use the displayed *physical address* (in this case, AA00030076D3) to define the logical name TESTNIADR to point to the good turnaround. Note that you do *not* specify the hyphens (-).

   First, log in to the SYSTEST account. Then enter the following command:

   ```
   $ DEFINE/SYSTEM TESTNIADR AA00030076D3
   ```

3. Run UETP.

4. When UETP has completed, deassign the logical name
TESTNIADR by entering the following command:

```
$ DEASSIGN/SYSTEM TESTNIADR
```

Log Files

UETP stores all information generated by all UETP tests and
phases from its current run in one or more UETP.LOG files, and
it stores the information from the previous run in one or more
OLDUETP.LOG files. If a run of UETP involves multiple passes,
there will be one UETP.LOG or one OLDUETP.LOG file for each
pass.

At the beginning of a run, UETP deletes all OLDUETP.LOG files,
and renames any UETP.LOG files to OLDUETP.LOG. Then UETP
creates a new UETP.LOG file and stores the information from
the current pass in it. Subsequent passes of UETP create higher
versions of UETP.LOG. Therefore, at the end of a run of UETP
that involves multiple passes, there is one UETP.LOG file for
each pass. In producing the files UETP.LOG and OLDUETP.LOG,
UETP provides the output from the two most recent runs.

The cluster test creates a NETSERVER.LOG file in SYS$TEST
for each pass on each system included in the run. If the test is
unable to report errors (for example, if the connection to another
node is lost), the NETSERVER.LOG file on that node contains
the result of the test run on that node. UETP does not purge or
delete NETSERVER.LOG files; therefore, you must delete them
occasionally to recover disk space.

If a UETP run does not complete normally, SYS$TEST can
contain other log files. Ordinarily these log files are concatenated
and placed within UETP.LOG. You can use any log files that
appear on the system disk for error checking, but you must delete
these log files before you run any new tests. You can delete these
log files yourself or rerun the entire UETP, which checks for old
UETP.LOG files and deletes them.

Troubleshooting: Possible UETP Errors

Introduction

This section is intended to help you identify and solve problems you can encounter running UETP. You should refer to this section if you need help understanding a system failure and isolating its cause. This section is not intended as a repair manual and is not expected to diagnose any flaws in your system. It should, however, help you to interpret and act upon the information in the error messages.

If you are unable to correct an error after following the steps in this section, you should contact your Digital Services representative. Any information you can supply about the measures you have taken to isolate the problem will help your Digital Services representative diagnose the problem.

**Summary
of Common
Failures**

The following are the most common failures encountered while running UETP:

- Wrong quotas, privileges, or account
- UETINIT01 failure
- UETVECTOR failure
- Ethernet device allocated or in use by another application
- Insufficient disk space
- Incorrect VAXcluster setup
- Problems during the load test
- DECnet for OpenVMS error
- Lack of default access for the FAL object
- Errors logged but not displayed
- No PCB or swap slots
- Hangs
- Bug checks and machine checks

The sections that follow describe these errors and offer the best course of action for dealing with each one.

**Wrong Quotas,
Privileges, or
Account**

If your assigned quotas or privileges do not match standard quotas and privileges for the SYSTEST account, UETP displays the following error message:

```
*********************
*  UETINIT00        *
*  Error count = 1  *
*********************
-UETP-W-TEXT,   The following:
```

```
                                   OPER privilege,
                                   BIOLM  quota,
                                   ENQLM  quota,
                                   FILLM  quota,
```

are nonstandard for the SYSTEST account and may result in UETP errors.

This message informs you that the OPER privilege and the BIOLM, ENQLM, and FILLM quotas either are not assigned correctly or are not assigned at all.

Note: UETP displays a similar message if you run the cluster integration test phase, and the privileges and quotas for the SYSTEST_CLIG account are incorrect. The SYSTEST and SYSTEST_CLIG accounts require the same privileges and quotas. Take the action described in this section for both accounts.

Solution

To correct the problem, use the following procedure:

1. Display all privileges and quotas in effect for the SYSTEST account using the Authorize utility as follows:

```
$ RUN SYS$SYSTEM:AUTHORIZE
UAF> SHOW SYSTEST

Username: SYSTEST                        Owner:  SYSTEST-UETP
Account: SYSTEST                         UIC:    [1,7] ([SYSTEST])
CLI:     DCL                             Tables: DCLTABLES
Default: SYS$SYSROOT:[SYSTEST]
LGICMD:  LOGIN
Login Flags:
Primary days:   Mon Tue Wed Thu Fri Sat Sun
Secondary days:
No access restrictions
Expiration:            (none)    Pwdminimum:  8   Login Fails:     0
Pwdlifetime:        14 00:00     Pwdchange:   18-JUN-1993 10:12
Last Login:            (none) (interactive),          (none) (non-interactive)
Maxjobs:        0  Fillm:      100  Bytlm:       32768
Maxacctjobs:    0  Shrfillm:     0  Pbytlm:          0
Maxdetach:      0  BIOlm:      300  JTquota:      1024
Prclm:          8  DIOlm:      300  WSdef:         256
Prio:           4  ASTlm:      100  WSquo:         512
Queprio:        0  TQElm:      100  WSextent:     2048
CPU:          (none)  Enqlm:    300  Pgflquo:     45000
Authorized Privileges:
  CMKRNL CMEXEC SYSNAM GRPNAM DETACH DIAGNOSE LOG_IO GROUP
  PRMCEB PRMMBX SETPRV TMPMBX NETMBX VOLPRO PHY_IO SYSPRV
Default Privileges:
  CMKRNL CMEXEC SYSNAM GRPNAM DETACH DIAGNOSE LOG_IO GROUP
  PRMCEB PRMMBX SETPRV TMPMBX NETMBX VOLPRO PHY_IO SYSPRV
UAF>) SHOW SYSTEST_CLIG
        .
        .
        .
UAF> EXIT
```

2. Make sure the default privileges and quotas assigned to the account match the following:

Privileges

CMKRNL CMEXEC NETMBX DIAGNOSE

DETACH PRMCEB PRMMBX PHY_IO

GRPNAM TMPMBX VOLPRO LOG_IO

SYSNAM SYSPRV SETPRV GROUP

Quotas

BIOLM: 18	PRCLM: 12
DIOLM: 55	ASTLM: 100
FILLM: 100	BYTLM: 65536
TQELM: 20	CPU: no limit
ENQLM: 300	PGFLQUOTA: 20480
WSDEFAULT: 256	WSQUOTA: 512
WSEXTENT: 2048	

3. If any privileges or quotas are incorrect, run the Authorize utility (AUTHORIZE) to add them. (AUTHORIZE is explained in the *OpenVMS System Manager's Manual: Essentials*.)

If you are logged in to the wrong account, the following error message asks you to log in to the SYSTEST account:

```
$ @UETP

**********************
*  UETINIT00         *
*  Error count =  1  *
**********************
-UETP-E-ABORT, UETINIT00 aborted at  18-JUN-1993 14:24:10.13
-UETP-E-TEXT, You are logged in to the wrong account.
                Please log in to the SYSTEST account.
$
```

You must run UETP from the SYSTEST account.

UETINIT01 Failure

UETINIT01 failures are related to peripheral devices; this type of error message can indicate any of the following:

- Device failure
- Device not supported or not mounted
- Device allocated to another user
- Device write locked
- Lost vacuum on a magnetic tape drive
- Drive off line

In some cases, the corrective action is specified explicitly in the error message. For example, you can receive a message from the Operator Communication Facility (OPCOM) process informing you of a problem and recommending a corrective measure:

```
%OPCOM,  18-JUN-1993 14:10:52.96, request 1, from user SYSTEST
Please mount volume UETP in device _MTA0:
%MOUNT-I-OPRQST, Please mount volume UETP in device _MTA0:
```

Other error messages can relate information in which the solution is specified implicitly:

```
%UETP-S-BEGIN, UETDISK00 beginning at 18-JUN-1993 13:34:46.03

*********************
*  DISK_DRA         *
*  Error count =  1  *
*********************
-UETP-E-TEXT, RMS file error in file DRA0:DRA00.TST
-RMS-E-DNR, device not ready or not mounted
%UETP-S-ENDED, UETDISK00 ended at  18-JUN-1993 13:34:46.80
```

This message tells you that a disk drive is either not ready or not mounted. From this information, you know where to look for the cause of the failure — at the disk drive. If you cannot see the cause of the problem immediately, check the setup instructions in the section Setting Up the Devices to be Tested.

In other cases, the cause of a failure might not be obvious from the information in the message. The problem can be related to hardware rather than software. For example, the Ethernet adapter test may produce one of the following messages if UETP does not have exclusive access to the Ethernet adapter:

• Intermodule cable unplugged

• Self-test failure code 0000000

To run the self-test diagnostic on the Ethernet adapter successfully, UETP needs exclusive access to the adapter. As explained in the Ethernet Adapters section, you must shut down DECnet and the LAT terminal server before running the UETP device test phase if you want to test the Ethernet adapter.

Solution

To determine where or when the failure occurs in the execution of UETP, use the following procedure:

• Run the device test individually (see the section Running a Subset of Phases). By doing this, you can determine if the failure can be recreated. Also, you are isolating the cause of the problem by reproducing it using the least amount of software possible. For example, if the failure occurs only when you run the entire device phase, and not when you run the affected device test individually, you can conclude the problem is related to device interaction. Conversely, if you can recreate the error by running the single device test, then you have proved that the error is not related to device interaction.

- Run the device test with different media. If your run of the single device test succeeded in reproducing the error, the magnetic tape or disk media could be defective. Running the same test with new media determines whether this is the problem.

- Call Digital Services. If you have tried all the previous steps without solving the problem, you should contact your Digital Services representative.

UETVECTOR Failure

UETP displays a message similar to the following to signal a vector processor failure:

```
*********************
*  UETVECTOR        *
*  Error count = 1  *
*********************
%PPL-S-CREATED_SOME, created some of those requested - partial success
-UETP-E-SUBSPNERR, Error spawning subordinate process.
-UETP-E-SCHCTXERR, Error scheduling vector context test subprocess.
-UETP-E-VECCTXERR, Error encountered during vector context testing.
%UETP-I-ENDED, UETVECTOR_0000 ended at 18-JUN-1993 07:37:00.59
```

Solution

See the section Vector Processors and the VVIEF for the correct setup for vector processor testing.

Device Allocated or in Use by Another Application

If DECnet for OpenVMS software or the LAT software is running during the DEVICE phase, the UETUNAS00 test displays the following message:

```
-UETP-W-TEXT, Device is in use by DECnet or another application
```

Other UETP communication device tests display the following message:

```
SYSTEM-W-DEVALLOC, device already allocated to another user
```

Solution

If you want to run the device test on the Ethernet Adapter, shut down DECnet and LAT software before beginning the test.

Insufficient Disk Space

When you run continuous passes of UETP, log files accumulate on the disk from which UETP was run. These files reduce the amount of free disk space available for each successive pass. If the amount of disk space available becomes too small for the current load, the following error message appears:

```
%UETP-S-BEGIN, UETDISK00 beginning at  18-JUN-1993 08:12:24.34
%UETP-I-ABORTC, DISK_DJA to abort this test, type ^C

*********************
*  DISK_DJA         *
*  Error count = 1  *
*********************
-UETP-F-TEXT, RMS file error in file DJA0:DJA00.TST
-RMS-F-FUL, device full (insufficient space for allocation)
```

```
**********************
*  DISK_DJA          *
*  Error count = 2   *
**********************
-UETP-F-TEXT, RMS file error in file DJA0:DJA01.TST
-RMS-F-FUL, device full (insufficient space for allocation)
%UETP-E-DESTP, DISK_DJA stopped testing DJA unit 0 at 08:12:36.91
%UETP-S-ENDED, UETDISK00 ended at  18-JUN-1993 08:12:37.98
```

Solution

Make more space available on the disk. You can do this by using one or more of the following techniques:

- Delete unnecessary files to create more space.

- Purge files, if multiple versions exist.

- Mount a volume with sufficient space.

- Check for disk quotas that might be enabled on the disk. If disk quotas are enabled, either disable or increase them (see the *OpenVMS System Management Utilities Reference Manual* for a description of the Disk Quota utility).

- Run VMSTAILOR if you have a small-disk system. See Chapter 4 for more information.

See the sections Using the SYSTEST Directories and How UETP Works on Disks for a further discussion of disk space.

Incorrect Setup of a VAXcluster

Most problems that can occur during the cluster-integration test are related to improper setup of the VAXcluster or of UETP on the VAXcluster. These problems are most likely to occur at the following stages of the VAXcluster test:

- Near the beginning, when processes on OpenVMS VAX nodes are started

- Toward the end, when cluster file access is checked

The cluster test phase shows that various OpenVMS VAX nodes in your cluster can simultaneously access files on selected nodes in the cluster. First, UETP tries to create a file on a disk drive that is accessible to the other selected nodes in the cluster. The following are the requirements for creating a file in the cluster test phase:

- There must be a [SYSTEST] directory on the disk in either the master file directory (MFD) or in the root directory [SYS0.].

- The [SYSTEST] directory must be protected so that the SYSTEST account can create a file in it.

If UETP is unable to find a suitable device on a certain node, the test displays a warning message and proceeds to the next cluster node.

Nodes on which the operator's terminal (OPA0) is set to the NO BROADCAST terminal characteristic will generate the following error message during the cluster test:

```
*********************
*  UETCLIG00master   *
*  Error count =  1  *
*********************
-UETP-E-TEXT, 0 operator consoles timed out on the cluster test warning
        and 1 operator console rejected it.
-UETP-E-TEXT, Status returned was,
        "%SYSTEM-F-DEVOFFLINE, device is not in configuration or not
        available"
```

Disregard this message if OPA0 is set to "No broadcast."

Solution

Whenever you suspect a problem, examine the SYS$TEST:NETSERVER.LOG file that was created when the SYSTEST_CLIG process was created. This file can contain additional error information that could not be transmitted to the node running the test. If it was not possible to create the SYSTEST_CLIG process on some node, the system accounting file for that node might contain a final process status in a process termination record.

The following problems can occur during a cluster test:

- Logging in at other nodes—This problem is due to incorrect setup for the cluster test at the remote OpenVMS VAX node. For example, if you specified a password for the SYSTEST_ CLIG account or if you disabled the SYSTEST_CLIG account, the test displays the following message:

  ```
  %SYSTEM-F-INVLOGIN, login information invalid at remote node
  ```

  Refer to the sections VAXcluster Testing and Defining a Remote Node for UETP Ethernet Testing for information on preparing for VAXcluster testing.

- Communicating with other nodes—A message indicates a DECnet problem. Check the NETSERVER.LOG file on the affected node to determine the cause.

- Taking out locks or detecting deadlocks—The most likely cause of this problem is that you are not logged in to the SYSTEST account. Another possibility is that your cluster is not configured properly.

- Creating files on VAXcluster nodes—This problem is due to incorrect setup for the cluster test; refer to the section VAXcluster Testing for information on preparing for VAXcluster testing.

**Problems
During the
Load Test**

A variety of errors can occur during the load test because the command procedures that are started during the tests run several utilities and do many functions. Tracking a problem can be difficult because UETP deletes the log files that are generated during the load test (see the section System Load Test Phase).

Solution

If a problem occurs during the load test and the cause is not obvious, you can modify UETP.COM to preserve the log files as follows:

1. Add the /NODELETE qualifier to the following line:

   ```
   $ TCNTRL UETLOAD00.DAT/PARALLEL_COUNT='LOADS/REPORT_TYPE='REPORT
   ```

2. Delete or comment out the following line:

   ```
   $ DELETE UETLO*.LOG;*
   ```

Rerun the load test with these changes to try to recreate the problem.

If you recreate the problem, look at the contents of the appropriate log file. You can determine which log file to read by understanding the scheme by which the load test names its processes and log files. (The log file names are derived from the process names.)

The load test creates processes that are named in the following format:

UETLOAD*nn_nnnn*

For example:

```
%UETP-I-BEGIN, UETLOAD00 beginning at 18-JUN-1993 15:45:08.97
%UETP-I-BEGIN, UETLOAD02_0000 beginning at 18-JUN-1993 15:45:09.42
%UETP-I-BEGIN, UETLOAD03_0001 beginning at 18-JUN-1993 15:45:09.63
%UETP-I-BEGIN, UETLOAD04_0002 beginning at 18-JUN-1993 15:45:10.76
%UETP-I-BEGIN, UETLOAD05_0003 beginning at 18-JUN-1993 15:45:11.28
%UETP-I-BEGIN, UETLOAD06_0004 beginning at 18-JUN-1993 15:45:12.56
%UETP-I-BEGIN, UETLOAD07_0005 beginning at 18-JUN-1993 15:45:13.81
%UETP-I-BEGIN, UETLOAD08_0006 beginning at 18-JUN-1993 15:45:14.94
%UETP-I-BEGIN, UETLOAD09_0007 beginning at 18-JUN-1993 15:45:16.99
%UETP-I-BEGIN, UETLOAD10_0008 beginning at 18-JUN-1993 15:45:19.32
%UETP-I-BEGIN, UETLOAD11_0009 beginning at 18-JUN-1993 15:45:19.94
%UETP-I-BEGIN, UETLOAD02_0010 beginning at 18-JUN-1993 15:45:20.20
%UETP-I-BEGIN, UETLOAD03_0011 beginning at 18-JUN-1993 15:45:21.94
%UETP-I-BEGIN, UETLOAD04_0012 beginning at 18-JUN-1993 15:45:22.99
```

Note that if more than 10 processes are created, the numbering sequence for the UETLOAD*nn* portion of the process name starts over at UETLOAD02; however, the 4 digits of the *_nnnn* portion continue to increase.

Each load test process creates two log files. The first log file is created by the test controller; the second log file is created by the process itself. The log file that you need to look at for error information on any given load test process is the one that was created by the test controller (the first log file).

The load test log file derives its file name from the process name, appending the last four digits of the process name (from the _nnnn portion) to UETLO. The test-controller log file and the process log file for each process use the same file name; however, the process log file has the higher version number of the two. For example, the log files created by the process UETLOAD05_0003 would be named as follows:

> UETLO0003.LOG;1 (test-controller log file)

> UETLO0003.LOG;2 (process log file)

Make sure that you look at the log file with the lower version number; that file contains the load test commands and error information.

After you have isolated the problem, restore UETP.COM to its original state and delete the log files from the load test (UETL0*.LOG;*); failure to delete these files can result in disk space problems.

DECnet for OpenVMS Error

A DECnet error message can indicate that the network is unavailable.

Solution

- If DECnet for OpenVMS software is included in your system, register the product authorization key (PAK). For instructions, see Appendix A.

- If DECnet for OpenVMS software is not included in your system, ignore the message; it is normal and does not affect the UETP run.

If you encounter other DECnet-related errors, you should do the following:

- Run DECnet for OpenVMS software as a single phase (see the section Running a Subset of Phases) to determine whether the error can be recreated.

- Use the OpenVMS Help Message utility or refer to the *OpenVMS System Messages and Recovery Procedures Reference Manual*.

Errors Logged but Not Displayed

If no errors are displayed at the console terminal or reported in the UETP.LOG file, you should run the Error Log utility to see if any errors were logged in the ERRLOG.SYS file. See the *OpenVMS System Management Utilities Reference Manual* for information about running the Error Log utility.

**No PCB or
Swap Slots**

The following error message indicates that no process control
block (PCB) or swap slots are available:

```
%UETP-I-BEGIN, UETLOAD00 beginning at  18-JUN-1992 07:47:16.50
%UETP-I-BEGIN, UETLOAD02_0000 beginning at  18-JUN-1993 07:47:16.76
%UETP-I-BEGIN, UETLOAD03_0001 beginning at  18-JUN-1993 07:47:16.92
%UETP-I-BEGIN, UETLOAD04_0002 beginning at  18-JUN-1993 07:47:17.13
%UETP-I-BEGIN, UETLOAD05_0003 beginning at  18-JUN-1993 07:47:17.35
%UETP-I-BEGIN, UETLOAD06_0004 beginning at  18-JUN-1993 07:47:17.61
%UETP-W-TEXT, The process -UETLOAD07_0005- was unable to be created,
  the error message is
-SYSTEM-F-NOSLOT, no pcb or swap slot available
%UETP-W-TEXT, The process -UETLOAD08_0006- was unable to be created,
  the error message is
-SYSTEM-F-NOSLOT, no pcb or swap slot available
%UETP-W-TEXT, The process -UETLOAD09_0007- was unable to be created,
  the error message is
-SYSTEM-F-NOSLOT, no pcb or swap slot available
%UETP-W-TEXT, The process -UETLOAD10_0008- was unable to be created,
  the error message is
-SYSTEM-F-NOSLOT, no pcb or swap slot available
%UETP-W-TEXT, The process -UETLOAD11_0009- was unable to be created,
  the error message is
-SYSTEM-F-NOSLOT, no pcb or swap slot available
%UETP-W-ABORT, UETLOAD00 aborted at  18-JUN-1993 07:47:54.10
-UETP-W-TEXT, Aborted via a user Ctrl/C.
****************************************************
*                                                  *
   END OF UETP PASS 1 AT  18-JUN-1993 07:48:03.17
*                                                  *
****************************************************
```

Solution

To solve this problem, use the following procedure:

1. Individually rerun the phase that caused the error message
   (the LOAD phase in the previous example) to see if the error
   can be reproduced.

2. Increase the size of the page file, using either the command
   procedure SYS$UPDATE:SWAPFILES.COM or the System
   Generation utility (see the *OpenVMS System Management
   Utilities Reference Manual*).

3. Increase the SYSGEN parameter MAXPROCESSCNT, if
   necessary, and reboot the system.

4. Increase both the page file size and the MAXPROCESSCNT, if
   necessary.

**No Keyboard
Response or
System Disk
Activity**

If there is no keyboard response or system disk activity, the
system might be hung.

Solution

A system hang can be difficult to trace; you should save the dump
file for reference. To learn why the system hung, run the System
Dump Analyzer as described in the *OpenVMS VAX System Dump
Analyzer Utility Manual*.

Reasons for a system hang include the following:

- Insufficient pool space—Increase the value of the SYSGEN parameter NPAGEVIR and reboot the system.

- Insufficient page file space—Increase the page file space using the System Generation utility as described in the *OpenVMS System Management Utilities Reference Manual*.

- I/O device failure causing driver-permanent loop—Call Digital Services.

Lack of Default Access for the FAL Object

With VMS Version 5.2, the network configuration procedure NETCONFIG.COM no longer provides access for the FAL network object by default. UETP, however, still assumes the existence of default access for the FAL object (this assumption will be removed in a future release of OpenVMS VAX). When you install DECnet using the defaults presented by the procedure NETCONFIG.COM, the UETP DECnet phase might produce error messages that were not seen in earlier versions.

If default FAL access is disabled at the remote node selected by UETP for DECnet testing (the adjacent node on each active circuit, or a node defined by the group logical name UETP$NODE_ADDRESS), messages similar to the following will appear:

```
%UETP-W-TEXT, The process -SVA019841_0001- returned a final status of:
%COPY-E-OPENOUT, error opening !AS as output
```

These messages are followed by:

```
%COPY-E-OPENOUT, error opening 9999""::SVA019841.D1; as output
-RMS-E-CRE, ACP file create failed
-SYSTEM-F-INVLOGIN, login information invalid at remote node
%COPY-W-NOTCOPIED, SYS$COMMON:[SYSTEST]UETP.COM;2 not copied
%UETP-E-TEXT, Remote file test data error
```

These messages can be ignored.

Bugchecks and Machine Checks

When the system aborts its run, a bugcheck message appears at the console.

Solution

Call Digital Services. Often a hardware problem causes bugchecks and machine checks; there is no easy way to solve bugchecks or machine checks. It is important, however, that you save the SYS$SYSTEM:SYSDUMP.DMP and ERRLOG.SYS files so that they are available for examination. It is also important to know whether the failure can be recreated; you can verify this by running UETP again.

UETP Tests and Phases

Introduction

This section explains, in detail, the organization of UETP and the individual components within the test package. You run UETP by starting a master command procedure containing commands to start each test phase. The procedure begins by prompting you for information needed by the various test phases. (See the section Starting UETP for a detailed description of starting UETP.)

The master command procedure, UETP.COM, contains commands that initiate each test phase. UETP.COM also contains commands that do such tasks as defining logical names and manipulating files generated by the tests.

The UETP.COM procedure also issues commands to start the test controlling program UETPHAS00.EXE, which, in turn, controls each test phase. The test controller starts up multiple detached processes. It also reports their completion status and other information the processes report to it.

The sections that follow describe the various UETP test phases.

Initialization Phase

The following occurs during the initialization phase:

- The image UETINIT00.EXE prompts you for information (see the section Starting UETP). Your information defines variables that affect the execution of UETP tests.

- The image UETINIT01.EXE gathers information on all the controllers in the system and on their associated devices. This image writes the information into a file called UETINIDEV.DAT.

- Using the information in UETSUPDEV.DAT, UETINIT01.EXE verifies which devices in the configuration are operable by running the appropriate device test. Each device test completes a simple read/write operation to each device. If a device fails this test, the device's entry in UETINIDEV.DAT specifies that the device cannot be tested. As a result, subsequent UETP tests ignore that device.

- For each testable controller, UETINIT01.EXE writes a line into a file called UETCONT00.DAT. The line associates a test file with the controller it tests.

A summary of UETINIDEV.DAT always exists in UETP.LOG, and UETINIT01.EXE sends that summary to the console if you have requested the long report format.

Device Test Phase

The device test phase includes separate tests for each type of device, such as disk, magnetic tape, line printer, and terminal. This section explains the device test phase and presents instructions for testing a single device. If you want to run the entire device test phase individually, refer to the section Running a Subset of Phases.

How the Device Phase Works

The UETP device test phase starts an executable image, the phase controller UETPHAS00, which creates a detached process for every device controller to be tested. For example, if a system includes three terminal controllers, one line printer controller, and two disk controllers, the image creates six detached processes. In parallel, the detached processes execute images that test the various types of devices.

The initialization phase of UETP creates a file called UETINIDEV.DAT and a file called UETCONT00.DAT. UETINIDEV.DAT contains data on the controllers in the system supported by OpenVMS VAX and their associated devices; UETCONT00.DAT associates a device test image with each testable controller.

UETPHAS00 uses the information in UETCONT00.DAT to find a device controller name to pass to each detached process that it creates. UETPHAS00 passes the controller name by writing it to a mailbox that is SYS$INPUT to individual tests. Each detached process uses that data to determine which controller to test. The test image then searches UETINIDEV.DAT for the device controller and for all testable units on that controller. The phase controller terminates when all devices on all controllers have completed testing.

Because UETCONT00.DAT is deleted automatically at the end of a UETP run, you cannot run the device phase unless you start UETP.COM; you can run only individual test images. UETINIDEV.DAT exists in SYS$TEST unless you delete it.

Running a Single Device Test

You must be logged in to the SYSTEST account to run the individual tests as described in this section. Also, a copy of UETINIDEV.DAT must exist. If a copy of the file is not present from a previous run (a run of the entire UETP or a run of the device test phase creates UETINIDEV.DAT), you can create it. Note that when you run a single test, no log file is created; the test sends all its output to your terminal.

If you do not want to test all the device types, you can test a specific controller by choosing a test image name from Table 9–1 and executing it as in the following example:

```
$ RUN UETTTYS00
Controller designation?: TTB
```

UETP prompts you for the controller designation and the device code. Unless you are testing your own terminal, you must explicitly designate a controller name. If you are running the terminal test, you can press Return to test your terminal only.

If you plan to repeat the run several times, it could be more convenient to define the logical name CTRLNAME as follows:

```
$ DEFINE CTRLNAME TTB
$ RUN UETTTYS00
```

When you define the controller name in this way, the logical name CTRLNAME remains assigned after the test completes. To deassign this logical name, use the DCL command DEASSIGN as follows:

```
$ DEASSIGN CTRLNAME
```

Format of UETINIDEV.DAT

The UETINIDEV.DAT file is an ASCII sequential file that you can type or edit if necessary. The contents of this file are shown in the following command sequence:

```
$ TYPE UETINIDEV.DAT

DDB x ddd
UCB y uuuuu nnnnnnnnn.nnn
END OF UETINIDEV.DAT
```

The symbols in this example are defined as follows:

Symbol	Value
x	T, if there are any testable units for this controller; N, if this controller is not to be tested
y	T, if this unit is testable; N, if this unit is not testable
ddd	Device controller name, for example DUA
uuuuu	Device unit number, for example 25
nnnnnnnnn.nnn	UETP device test name for the unit, for example, UETDISK00.EXE

UETINIDEV.DAT contains a DDB (device data block) line for each controller connected or visible to your system. After the DDB line there is a UCB (unit control block) line for each unit connected to that controller. A device test can test a particular device only if both the DDB line and the UCB line indicate that the device is testable.

Running a Test in Loop Mode

If you want to put extra stress on a device, you can run the device test in loop mode, which causes the test to run indefinitely. For example:

```
$ DEFINE MODE LOOP
$ RUN UETDISK00
Controller designation?: DRA
%UETP-I-TEXT, End of pass 1 with 980 iterations at 18-JUN-1993 16:18:51:03

^C
```

You must use Ctrl/C to terminate the test run. If you use Ctrl/Y, UETP does not complete cleanup procedures.

Functions of Individual Device Tests

For each disk in the system, the disk test allocates two files into which it randomly writes blocks of data. The test then checks the data, reports any errors to SYS$OUTPUT, and deletes the disk files.

When you run the disk test phase in a cluster environment, the test accesses all disks that are mounted by the system being tested, and users of the disk being tested can encounter an insufficient disk space problem. You should warn users on remote nodes (who share disks with users on the local system) that UETP might be testing a disk they are using.

The magnetic tape test exercises all the magnetic tape drives in the system. The test creates a large file on each mounted magnetic tape, into which it writes multiple sequential records of varying sizes. After writing the records, the test rewinds the magnetic tape, validates the written records, and reinitializes the magnetic tape.

The terminal and line printer test generates several pages or screens of output, in which each page or screen contains a header line and a test pattern of ASCII characters. A header line contains the test name, the device name, the date, and the time.

For the laboratory peripheral accelerator (LPA11–K), the test image determines the configuration on the LPA11–K's I/O bus. The image loads all types of microcode to the LPA11–K and reads or writes data for each device on the LPA11–K I/O bus.

The communications device tests fill the transmit message buffer with random data; then, using loopback mode, the tests transmit and receive the message several times. To check that the looped-back data is correct, an AST routine is associated with a $QIO read to compare the received message against the transmitted message. The procedure is repeated using messages of different lengths.

The interface device tests put the devices they are testing in maintenance mode, write random data, and then verify the data.

The Ethernet adapter test does self-test diagnostics on the device. It also does read and write tasks with test data that uses various adapter modes (such as internal loopback and external loopback).

The vector processor device test performs simple vector-scalar and vector-vector arithmetic operations and compares the results with expected values. The test also uses vector-related system service extensions and forces the system to generate arithmetic and memory management exceptions.

Table 9–1 lists the device test images and the devices to be tested.

Table 9–1 Device Tests

Test Image Name	Devices Tested
UETDISK00.EXE	Disks
UETTAPE00.EXE	Magnetic tape drives and tape cartridge drives
UETTTYS00.EXE	Terminals and line printers
UETLPAK00.EXE	LPA11–K
UETCOMS00.EXE	DMC11, DMR11
UETDMPF00.EXE	DMF32, DMP11
UETDR1W00.EXE	DR11–W
UETDR7800.EXE	DR780, DR750
UETCDRO00.EXE	RRD40, RRD50
UETUNAS00.EXE	Ethernet Adapters
UETVECTOR.EXE	Vector Processor, VVIEF

System Load Test Phase

The purpose of the system load test is to simulate a number of terminal users who are demanding system resources simultaneously. The system load tests, directed by the file UETLOAD00.DAT, create a number of detached processes that execute various command procedures. Each process simulates a user logged in at a terminal; the commands within each procedure are the same types of commands that a user enters from a terminal. The load test creates the detached processes in quick succession, and the processes generally execute their command procedures simultaneously. The effect on the system is analogous to an equal number of users concurrently issuing commands from terminals. In this way, the load test creates an environment that is similar to normal system use.

The load test uses the logical name LOADS to determine the number of detached processes to create. When you initiate the UETP command procedure, it prompts for the number of users to be simulated (see the section Defining User Load for Load Test) and consequently the number of detached processes to be created.

Your response, which depends on the amount of memory and the swapping and paging space in your system, defines the group logical name LOADS.

The UETP master command procedure deassigns all group logical names assigned by its tests as part of the termination phase. The group logical name LOADS remains assigned only if the UETP package does not complete normally.

The command procedures executed by the load test can generate a large amount of output, depending on the number of detached processes created. For each detached process (or user), the test creates a version of an output file called UETLOnnnn.LOG ("nnnn" represents a string of numeric characters). The console displays only status information as the load test progresses.

Whether the load test runs as part of the entire UETP or as an individual phase, UETP combines the UETLOnnnn.LOG files, writes the output to the file UETP.LOG, and deletes the individual output files.

You can run the system load test as a single phase by selecting LOAD from the choices offered in the startup dialog (see the section Running a Subset of Phases).

DECnet for OpenVMS Test Phase

If DECnet for OpenVMS software is included in your OpenVMS VAX system, a run of the entire UETP automatically tests DECnet hardware and software. Because communications devices are allocated to DECnet and the DECnet devices cannot be tested by the UETP device test, UETP will not test the Ethernet adapter if DECnet or another application has allocated the device. The DECnet node and circuit counters are zeroed at the beginning of the DECnet test to allow for failure monitoring during the run.

As with other UETP phases, you can run the DECnet for OpenVMS phase individually by following the procedure described in the section Running a Subset of Phases.

Environment

The DECnet for OpenVMS test will work successfully on OpenVMS VAX systems connected to all DECnet-supported node types, including routing and nonrouting nodes and several different types of operating systems (such as RSTS, RSX, TOPS, and RT). There must be some sort of default access on remote systems to copy files between systems. The DECnet phase tests the following:

- The node on which UETP is running.

- All circuits in sequence, unless you have defined the logical name UETP$NODE_ADDRESS to be the remote node that you want to run the test on. If you have defined a remote node, the DECnet phase tests only one circuit.

- All adjacent or first-hop nodes and all circuits in parallel.

There is no limit on the number of communication lines supported by the tests. A test on one adjacent node should last no more than two minutes at normal communications transfer rates.

Note: UETP assumes your system has default access for the FAL object, even though the network configuration command procedure NETCONFIG.COM does not provide access for the FAL object by default. When you install DECnet software with the defaults presented by NETCONFIG.COM, the UETP DECnet phase can produce error messages. You can ignore these error messages. See the section Lack of Default Access for the FAL Object for more information.

How the DECnet Phase Works

UETP (under the control of UETPHAS00.EXE) reads the file UETDNET00.DAT and completes the following steps during the DECnet for OpenVMS phase:

1. Executes a set of Network Control Program (NCP) LOOP EXECUTOR commands to test the node on which UETP is running.

2. Uses NCP to execute the command SHOW ACTIVE CIRCUITS. The results are placed in UETININET.TMP, from which UETP creates the data file UETININET.DAT. The UETININET.TMP file contains the following information for any circuit in the ON state but not in transition:

   - Circuit name

   - Node address

   - Node name (if one exists)

   The UETININET.TMP file is used throughout the DECnet phase to determine which devices to test.

3. Uses the UETININET.TMP file to create an NCP command procedure for each testable circuit. Each command procedure contains a set of NCP commands to zero the circuit and node counters and to test the circuit and adjacent node by copying files back and forth.

   Note: If you do not want the counters zeroed, do not test the DECnet for OpenVMS software.

4. Executes the command procedures from Step 3 in parallel to simulate a heavy user load. The simulated user load is the lesser of the following values:

   - The number of testable circuits, multiplied by two

   - The maximum number of user-detached processes that can be created on the system before it runs out of resources (determined by UETINIT00)

5. Executes a program, UETNETS00.EXE, that uses the UETININET.DAT file to check the circuit and node counters for each testable circuit. If a counter indicates possible degradation (by being nonzero), its name and value are reported to the console. All counters are reported in the log file, but only the counters that indicate degradation are reported to the console. Following is an example of UETNETS00 output:

```
%UETP-S-BEGIN, UETNETS00 beginning at  18-JUN-1993 13:45:33.18
%UETP-W-TEXT, Circuit DMC-0 to (NODENAME1) OK.
%UETP-I-TEXT, Node  (NODENAME2) over DMC-1 response timeouts = 1.
%UETP-I-TEXT, Circuit DMC-1 to (NODENAME2) local buffer errors = 34.
%UETP-I-TEXT, Node  (NODENAME3) over DMP-0 response timeouts = 3.
%UETP-S-ENDED, UETNETS00 ended at 18-JUN-1993 13:45:36.34
```

Because degradation is not necessarily an error, the test's success is determined by you, not by the system. The following counters indicate possible degradation:

For Circuits

- Arriving congestion loss

- Corruption loss

- Transit congestion loss

- Line down

- Initialization failure

- Data errors inbound

- Data errors outbound

- Remote reply timeouts

- Local reply timeouts

- Remote buffer errors

- Local buffer errors

- Selection timeouts

- Remote process errors
- Local process errors
- Locally initiated resets
- Network initiated resets

For Nodes

- Response timeouts
- Received connect resource errors
- Node unreachable packet loss
- Node out of range packet loss
- Oversized packet loss
- Packet format error
- Partial routing update loss
- Verification reject

Cluster-Integration Test Phase
The cluster-integration test phase consists of a single program and a command file that depend heavily on DECnet for OpenVMS software. This phase uses DECnet for OpenVMS software to create SYSTEST_CLIG processes on each OpenVMS VAX node in the cluster and to communicate with each node. SYSTEST_CLIG is an account that is parallel to SYSTEST, but limited so that it can only be used as part of the cluster-integration test. The following restrictions on the SYSTEST_CLIG account are necessary for a correct run of the cluster test phase:

- The account must be enabled and the password must be null. For more information, see the VAXcluster Testing section.

- The UIC must be the same as that of the SYSTEST account.

- The account must have the same privileges and quotas as the SYSTEST account. For more information, see the Wrong Quotas, Privileges, or Account section.

- The account can allow login only through DECnet software.

- The account must be locked into running UETCLIG00.COM when it logs in.

These items are necessary to ensure the security and privacy of your system. If the test cannot create a SYSTEST_CLIG process on an OpenVMS VAX node, it gives the reason for the failure and ignores that node for the lock tests and for sharing access during the file test. Also, the test does not copy log files from any node on which it cannot create the SYSTEST_CLIG process. If there is a problem communicating with a SYSTEST_CLIG process after the process has been created, the test excludes it from further lock and file sharing tests. At the end of the cluster-integration test, an attempt is made to report any errors seen by that node.

UETCLIG00.EXE has two threads of execution: the primary and the secondary. The first, or primary thread, checks the cluster configuration (OpenVMS VAX nodes, HSC nodes, and the attached disks that are available to the node running the test). For selected OpenVMS nodes, the primary thread attempts to start up a SYSTEST_CLIG process through DECnet software. If the primary thread was able to start a SYSTEST_CLIG process on a node, the node runs the command file UETCLIG00.COM, which starts up UETCLIG00.EXE and runs the secondary execution thread.

The process running the primary thread checks to see that it can communicate with the processes running the secondary threads. It then instructs them to take out locks so that a deadlock situation is created.

The primary thread tries to create a file on some disk on selected OpenVMS VAX and HSC nodes in the cluster. It writes a block, reads it back, and verifies it. Next, it selects one OpenVMS VAX node at random and asks that node to read the block and verify it. The primary thread then extends the file by writing another block and has the secondary thread read and verify the second block. The file is deleted.

The secondary processes exit. They copy the contents of their SYS$ERROR files to the primary process, so that the UETP log file and console report show all problems in a central place. DECnet software automatically creates a NETSERVER.LOG in SYS$TEST as the test is run, so that if necessary, you can read that file later from the node in question.

During the test run, the primary process uses the system service SYS$BRKTHRU to announce the beginning and ending of the test to each OpenVMS VAX node's console terminal.

You can define the group logical name MODE to the equivalence string DUMP to trace most events as they occur. Note that the logical name definitions apply only to the node on which they were defined. You must define MODE on each node in the VAXcluster on which you want to trace events.

10

Customizing DECwindows Support Software

Overview

This chapter describes the tasks you must perform to customize
DECwindows support software. The DECwindows components
provided on the OpenVMS Version 6.0 kit supply DECwindows
base support and workstation support files only. If you have not
installed either of these DECwindows components on your system,
skip this chapter.

Depending on your configuration, DECwindows customization
tasks include the following:

* Customizing the server startup

* Using the Transmission Control Protocol/Internet Protocol
  (TCP/IP) as a DECwindows transport

* Using transports with DECwindows other than those supplied
  by Digital

Note: The OpenVMS VAX operating system no longer includes
the VMS DECwindows product. To get full DECwindows support,
you must also install the separate DECwindows Motif for
OpenVMS VAX layered product, which supports both the Motif
and XUI environments.

Customizing the Server Startup

Note	By default, the DECwindows server no longer logs successful connect/disconnect messages to the DECW$SERVER_#_ERROR.LOG file. To enable these messages, define the symbol DECW$SERVER_CONNECT_LOG in the DECW$PRIVATE_SERVER_SETUP.COM file to be "T" and restart the server. Note that abnormal or unsuccessful connect/disconnect messages are still logged by the server.
Assumptions	The startup command procedures automatically determine most of the configuration variables for the DECwindows display server. However, there are items that the command procedures cannot determine, so they make the following assumptions:

* The startup procedures assume that you have a 75 dots/inch monitor (such as a VR260 or VR290). However, if you are installing on a VAXstation 4000, the startup procedures assume that you have a 100 dots/inch monitor.

* If you have a GPX, SPX, or LCG workstation, the startup procedures assume that you have a color monitor.

* The startup procedures assume that you have a North American keyboard layout (you have an LK201–AA or an LK201–LA keyboard). If you are installing on a VAXstation 4000, the startup procedures assume that you have an LK401–AA keyboard.

* The startup procedures assume that the server will use only DECnet for OpenVMS software and local transports.

How to Override Incorrect Assumptions	If any of these assumptions is incorrect, you must override them as follows:

1. Make a copy of the file SYS$MANAGER:DECW$PRIVATE_SERVER_SETUP.TEMPLATE and rename it to a .COM file type. The comments in this file show how to customize individual workstations by adding a section of DCL commands for each workstation. You can also add DCL commands to the common section of the server startup file. By doing this, you ensure that the customizations you make affect all workstations that use the server startup file.

2. If your screen supports 100 dots/inch, add the following line:

    ```
    $ DECW$SERVER_DENSITY == 100
    ```

    Add this line to the section for each workstation that has a 100 dots/inch monitor, or add it to the common section for all workstations (if all the workstations have 100 dots/inch monitors).

3. The section for any workstation with color graphics and a monochrome screen should contain the following lines:

```
$ DECW$COLOR == "FALSE"
$ DECW$BITONAL == "FALSE"
```

4. To override the default keyboard layout, determine the correct name from the model number of your LK201 keyboard, as follows:

   a. Turn the keyboard upside down, and look for a label which specifies the model number. The model number should be in a format similar to LK201-xx.

   If the model number is listed as LK201 without any additional characters, the information you need is on another part of the label. Look for a number that has the following format:

   ```
   nn-nnnnn-xx.
   ```

   b. Use the *xx* part of this number to choose a keymap name from Table 10–1. The table is arranged based on the dialect that each keyboard is designed for. Choose the keymap ending in _DP for the data processing keyboard layout, or the keymap ending in _TW for the typewriter layout.

Table 10–1 DECwindows Keymap

Dialect	Model	DECwindows Keymap Name
Austrian/German	LK201-(AG,LG,BG,MG)	AUSTRIAN_GERMAN_LK201LG_DP
		AUSTRIAN_GERMAN_LK201LG_TW
	LK201-(NG,PG)	AUSTRIAN_GERMAN_LK201NG_DP
		AUSTRIAN_GERMAN_LK201NG_TW
	LK401-(AG)	AUSTRIAN_GERMAN_LK401AG_TW
Belgian/French	LK201-(AP,LP,BP,MP)	BELGIAN_FRENCH_LK201LP_DP
		BELGIAN_FRENCH_LK201LP_TW
Belgian/French	LK401-(AP)	BELGIAN_FRENCH_LK401AP_DP
		BELGIAN_FRENCH_LK401AP_TW
British	LK201-(AE,LE,BE,ME)	BRITISH_LK201LE_DP
		BRITISH_LK201LE_TW
British	LK401-(AA,PA)	BRITISH_LK401AA_DP
		BRITISH_LK401AA_TW
Canadian/French	LK201-(AC,LC,BC,MC)	CANADIAN_FRENCH_LK201LC_DP

Table 10–1 (Cont.) DECwindows Keymap

Dialect	Model	DECwindows Keymap Name
Canadian/French	LK401-(AC,LC,BC,MC)	CANADIAN_FRENCH_LK201LC_TW
		CANADIAN_FRENCH_LK401AC_DP
		CANADIAN_FRENCH_LK401AC_TW
Danish	LK201-(AD,LD,BD,MD)	DANISH_LK201LD_DP
		DANISH_LK201LD_TW
	LK201-(ED,RD,FD)	DANISH_LK201RD_DP
		DANISH_LK201RD_TW
Danish	LK401-(AD,LD,BD,MD)	DANISH_LK401AD_DP
		DANISH_LK401AD_TW
Dutch	LK201-(AH,LH,BH,MH)	DUTCH_LK201LH_DP
		DUTCH_LK201LH_TW
	LK201-(NH,PH)	DUTCH_LK201NH
	LK401-(NH,PH)	DUTCH_LK401AH
Finnish	LK201-(AF,LF,BF,MF)	FINNISH_LK201LF_DP
		FINNISH_LK201LF_TW
	LK201-(NX,PX)	FINNISH_LK201NX_DP
		FINNISH_LK201NX_TW
Finnish	LK401-(AF,LF,BF,MF)	FINNISH_LK401AF_DP
		FINNISH_LK401AF_TW
Flemish	LK201-(AB,LB,BB,MB)	FLEMISH_LK201LB_DP
		FLEMISH_LK201LB_TW
Flemish	LK401-(AB,LB,BB,MB)	FLEMISH_LK401AB_DP
		FLEMISH_LK401AB_TW
Icelandic	LK201-(AU,LU,BU,MU)	ICELANDIC_LK201LU_DP
		ICELANDIC_LK201LU_TW
Italian	LK201-(AI,LI,BI,MI)	ITALIAN_LK201LI_DP
		ITALIAN_LK201LI_TW
Italian	LK401-(AI,LI,BI,MI)	ITALIAN_LK401AI_DP
		ITALIAN_LK401AI_TW
North American	LK201-(AA,LA,BA,MA)	NORTH_AMERICAN_LK201LA
North American	LK401-(AA,LA,BA,MA)	NORTH_AMERICAN_LK401AA

Table 10–1 (Cont.) DECwindows Keymap

Dialect	Model	DECwindows Keymap Name
Norwegian	LK201-(AN,LN,BN,MN)	NORWEGIAN_LK201LN_DP
		NORWEGIAN_LK201LN_TW
	LK201-(EN,RN,FN)	NORWEGIAN_LK201RN_DP
		NORWEGIAN_LK201RN_TW
Norwegian	LK401-(AN,LN,BN,MN)	NORWEGIAN_LK401AN_DP
		NORWEGIAN_LK401AN_TW
Portuguese	LK201-(AV,LV,BV,MV)	PORTUGUESE_LK201LV
Portuguese	LK401-(AV,LV,BV,MV)	PORTUGUESE_LK401AV
Spanish	LK201-(AS,LS,BS,MS)	SPANISH_LK201LS_DP
		SPANISH_LK201LS_TW
Spanish	LK401-(AS,LS,BS,MS)	SPANISH_LK401AS_DP
		SPANISH_LK401AS_TW
Swedish	LK201-(AM,LM,BM,MM)	SWEDISH_LK201LM_DP
		SWEDISH_LK201LM_TW
	LK201-(NM,PM)	SWEDISH_LK201NM_DP
		SWEDISH_LK201NM_TW
Swedish	LK401-(AM,LM,BM,MM)	SWEDISH_LK401AM_DP
		SWEDISH_LK401AM_TW
Swiss/French	LK201-(AK,LK,BK,MK)	SWISS_FRENCH_LK201LK_DP
		SWISS_FRENCH_LK201LK_TW
Swiss/French	LK401-(AK,LK,BK,MK)	SWISS_FRENCH_LK401AK_DP
		SWISS_FRENCH_LK401AK_TW
Swiss/German	LK201-(AL,LL,BL,ML)	SWISS_GERMAN_LK201LL_DP
		SWISS_GERMAN_LK201LL_TW
Swiss/German	LK401-(AL,LL,BL,ML)	SWISS_GERMAN_LK401AL_DP
		SWISS_GERMAN_LK401AL_TW
Combined US/UK	LK201-(EE,RE,PE)	UK_LK201RE
		US_LK201RE
Combined US/UK	LK401-(EE,RE,PE)	UK_LK401AA
		US_LK401AA

c. After you choose a keymap name, modify the server startup file. For example, to change the keyboard layout to a Dutch typewriter layout, add the following line to the server startup file:

```
$ DECW$DEFAULT_KEYBOARD_MAP == "DUTCH_LK201LH_TW"
```

Add a line similar to this for each workstation that does not have a North American keyboard layout, or add it to the common section for all workstations (if all the workstations use the same keyboard layout).

5. To add support for the Transmission Control Protocol/Internet Protocol (TCP/IP) transport using the DEC TCP/IP Services for VMS product, add the following line:

```
$ DECW$SERVER_TRANSPORTS == "DECNET,LOCAL,TCPIP"
```

Add this line to the section for each workstation that will be using TCP/IP, or add it to the common section for all workstations.

To include support for other transports, add the last part of the transport image name to the list of transports. For example, suppose you want to add support for a customer-written transport that has the following image name:

SYS$SHARE:DECW_TRANSPORT_FOO

You would add the following line:

```
$ DECW$SERVER_TRANSPORTS == "DECNET,LOCAL,FOO"
```

6. Reboot the workstations for which you customized the server startup.

7. Customize security as described in the *VMS DECwindows Motif User's Guide*.

After you start the server, a per-server logical name table is created on your system but is not added to the default logical name table search lists.

Using DEC TCP/IP Services for VMS with DECwindows

Overview

DECwindows contains support for the TCP/IP transport. This support requires DEC TCP/IP Services for VMS, a Digital layered product. Before you can use DECwindows TCP/IP transport interface, you must install DEC TCP/IP Services for VMS.

Note: Other vendors' implementation of TCP/IP transports use different call interfaces. For this reason, DECwindows support for TCP/IP is compatible only with DEC TCP/IP Services for VMS.

You can conserve memory and process slots by configuring DEC TCP/IP Services for VMS software for the minimum DECwindows requirement to support the X protocol. DECwindows only requires that INET_ACP be running. DECwindows does not require that the NFS server, the FTPD server, or the remote terminal servers be running.

For More Information

For more information about TCP/IP concepts, see the *DEC TCP/IP Services for VMS System Management Guide.*

For information on how to configure the TCP/IP software, see the *DEC TCP/IP Services for VMS Installation and Configuation Guide.*

Using Other Transports with DECwindows

Introduction

DECwindows supports DECnet for OpenVMS, local, and TCP/IP transports. However, you can use other transports, such as new transports for layered products and transports from third party vendors, with DECwindows by writing a DECwindows transport interface layer.

Writing a Transport Interface

For information about writing a transport interface, see the *VMS DECwindows Transport Manual.*

The transport interface image's filename must have the following format where *name* is the unique transport name:

DECW$TRANSPORT_name (for transports supplied by Digital)
DECW_TRANSPORT_name (for customer-written transports)

Installing the Transport Interface Image

Install the image as a protected image in the SYS$SHARE directory (as defined by an executive mode logical name). Digital recommends that you install the image by adding the following line to SYS$MANAGER:SYSTARTUP_VMS.COM:

```
$ INSTALL CREATE SYS$SHARE:DECW_TRANSPORT_name/OPEN/SHARED/HEADER_RESIDENT/PROTECTED
```

You can also include this command in a startup file that SYSTARTUP_VMS calls.

To use this transport with the DECwindows server, customize the server startup as described in the Customizing the Server Startup section of this chapter.

Using the Example Transport

Introduction

DECwindows has an example transport interface based upon the DEC TCP/IP Services for VMS layered product. It is similar to the DECwindows TCP/IP transport interface, except it includes its own source files and it uses a different port number (5000). You can run the example transport interface simultaneously with the TCP/IP transport interface.

How to Use the Example Transport

If you have installed DEC TCP/IP Services for VMS software, you can install and use the example transport by doing the following:

1. Copy the example transport to the SYS$SHARE directory as follows:

```
$ COPY DECW$EXAMPLES:DECW$TRANSPORT_EXAMPLE.EXE SYS$SHARE:/PROT=W:RE
```

2. Add the following line to SYS$MANAGER:SYSTARTUP_VMS.COM:

```
$ INSTALL CREATE SYS$SHARE:DECW$TRANSPORT_EXAMPLE /OPEN /SHARED/ HEADER_RESIDENT /PROTECTED
```

3. Customize the private server startup as described in the section Customizing the Server Startup for TCP/IP, except use the transport name "EXAMPLE". For example, you could add the following line:

   ```
   $ DECW$SERVER_TRANSPORTS == "DECNET,LOCAL,TCPIP,EXAMPLE"
   ```

4. Reboot the workstation, or restart DECwindows.

5. Customize security as described in the *VMS DECwindows Motif User's Guide* for TCP/IP, but use the transport name "EXAMPLE" instead of "TCPIP".

6. Create a DECterm window on the workstation and enter the following command:

   ```
   $ SET DISPLAY /CREATE /NODE=your_node /TRANSPORT=EXAMPLE
   ```

   Substitute the node name of your workstation for *your_node*.

   Remember that the same transport must be running on both the client and server. It is not necessary, however, for the client and the server to be on the same system.

7. Run any DECwindows application from the DECterm window. It will now use the example transport to display graphics on your workstation screen. For example, you would enter the following command to run the clock:

   ```
   $ RUN SYS$SYSTEM:DECW$CLOCK
   ```

11

Using VMSTAILOR and DECW$TAILOR

Overview

This chapter describes how to add or remove optional OpenVMS
VAX files and DECwindows support files from your system disk
using VMSTAILOR and DECW$TAILOR. You will need your
OpenVMS VAX Version 6.0 software media kit to tailor on files.
Any site-specific customization that has been done to a class will
be lost when that class is tailored off.

Using VMSTAILOR

When to Use VMSTAILOR

To add or remove unwanted OpenVMS VAX files from the system disk, use VMSTAILOR. For example, if you are not running DECnet for OpenVMS, and you do not need the network support files, you can remove those files using VMSTAILOR. If you later decide you want to run DECnet for OpenVMS, you can add the necessary files at any time using VMSTAILOR and your OpenVMS VAX Version 6.0 distribution media. (Note that you cannot tailor files on or off an alternate device.)

How VMSTAILOR Works

VMSTAILOR has three phases:

1. VMSTAILOR asks if you want to tailor your system by adding files (tailor on) or by deleting files (tailor off).

2. If you choose to tailor files on, VMSTAILOR lists each class of OpenVMS VAX files and asks if you want to include them on the system disk. If you choose to tailor files off, VMSTAILOR lists each class of files and asks if you want to delete them from the system disk.

3. VMSTAILOR adds or deletes the files you indicated from the system disk. If you are tailoring files on, you must load your OpenVMS VAX Version 6.0 distribution media in a drive available to the system. If your distribution media consists of more than one piece, put the first piece of the media into the drive.

The following is a list of classes and subclasses of OpenVMS VAX files that can be added or deleted by using VMSTAILOR. For a complete list of OpenVMS VAX files and their functions, see the *OpenVMS System Manager's Manual: Tuning, Monitoring, and Complex Systems*.

- Network Support

    Incoming Remote File Access files
    Incoming Remote Terminal files
    Network Test files
    Remote Task Loading

- Programming Support

    Debugger utility (DEBUG)
    Image Dump utility (ANALYZE/PROCESS_DUMP)
    RMS Analyze and FDL Editor utilities (ANALYZE/RMS, ANALYZE/FDL)
    Message utility (MESSAGE)
    Object and Shareable Image libraries
    Macro libraries
    Macro assembler
    SDL intermediary form of STARLET.MLB

FORTRAN required files
VAX C object libraries

- OpenVMS RMS Journaling Files

- System Programming Support

Files–11 ODS-1,ISO 9660, High Sierra ACPs
Monitor utility
Analyze Object File utility (ANALYZE/IMAGE, ANALYZE
/OBJECT)
Delta debugger
System Dump Analyzer utility (ANALYZE/SYSTEM,
ANALYZE/CRASH)
System Symbol Table file (SYS.STB)
Miscellaneous Symbol Table files

- Secure User's Environment

File Access Control List utilities
Print and Batch Queue utilities
Input Queue Symbiont (Card Reader)
Accounting Log Report Generator utility
DECdtm

- Utilities

MAIL utility
DUMP utility
RUNOFF utility
PHONE utility
OpenVMS HELP library
OpenVMS System Messages Help Library
Foreign Terminal Support
LAT-11 terminal server (via Ethernet)
Standalone BACKUP
Error Log Report Generator utility (ANALYZE/ERROR)
VAXTPU utility
Terminal Fallback facility
TECO editor
EDT documentation
National Character Set utility (NCS)

- VMS Workstation Support (VWS)

Workstation device support

- BLISS require files

- Miscellaneous Files

System map
LPA-11 support

- User Environment Test Package

- Example Files

Removing OpenVMS VAX Files

To remove unwanted files using VMSTAILOR, perform the following steps:

1. Log in to the SYSTEM account.

2. Enter the following command and press the Return key:

   `$ RUN SYS$UPDATE:VMSTAILOR`

   VMSTAILOR displays a description of the VMSTAILOR program and displays the following message:

   `Do you want to tailor files "ON" or "OFF"?`

3. Enter OFF to remove unwanted files and press the Return key.

   The VMSTAILOR program lists each group, or *class*, of files and its size in blocks. Files are grouped according to their function. For example, all the files required for network support are in one class. A file class is made up of many smaller groups called *subclasses*. You can eliminate an entire class of files, or you can eliminate one or more of its subclasses. For example:

   ```
   CLASS - Network support
           Size of entire class (with subclasses): 1499
           Size of common files required for any subclass: 1249
           Do you wish to select the entire class (default = NO)?
               .
               .
               .
   ```

4. Decide which file classes or subclasses you do not need to support your system. The VMSTAILOR program displays step-by-step instructions. Follow these instructions to specify which classes or subclasses of files you want to remove.

5. VMSTAILOR deletes the files you selected and displays the names of those files. After it finishes, AUTOGEN runs automatically to make the adjustments that are necessary after system files are deleted. AUTOGEN also reboots the system.

   Caution: To cancel VMSTAILOR during the first and second phases, press Ctrl/C, Ctrl/Y, or Ctrl/Z. Canceling VMSTAILOR during the third phase can cause a partially tailored disk. For a description of each phase, see Using VMSTAILOR.

Adding OpenVMS VAX Files

To add optional OpenVMS VAX files that you previously removed, or that you chose not to install during the OpenVMS VAX installation procedure, do the following:

1. Log in to the SYSTEM account.

2. Load your distribution media in a drive available to the system. For example, if your distribution media is on a TK50 tape cartridge, load the tape cartridge labeled *VMS V6.0 BIN TK50 1/2 VMS BINARY* in a TK50 drive available to the system. Make sure the drive is online and ready.

If you are adding files from a compact disc on an InfoServer, first determine whether the SYSGEN parameter SCSNODE is defined on your system (see the section Preparing Your System Disk in Chapter 5) or start the DECnet software, and then refer to Step 2 of the Beginning the Upgrade Procedure section in Chapter 7.

3. Enter the following command and press the Return key:

   `$ RUN SYS$UPDATE:VMSTAILOR`

   VMSTAILOR displays a description of the VMSTAILOR program and displays the following message:

   `Do you want to tailor files "ON" or "OFF"?`

4. Enter ON to add files and press the Return key.

   The VMSTAILOR program lists each group, or *class*, of files and its size in blocks. Files are grouped according to their function. For example, all the files required for network support are in one class. A file class is made up of many smaller groups called *subclasses*. You can add an entire class of files, or you can add one or more of its subclasses. For example:

   ```
   CLASS - Network support
           Size of entire class (with subclasses): 1499
           Size of common files required for any subclass: 1249
           Do you wish to select the entire class (default = NO)?
        .
        .
        .
   ```

5. Decide which file classes or subclasses you need to add. VMSTAILOR displays step-by-step instructions. Follow these instructions to specify which classes or subclasses of files you want to add.

6. VMSTAILOR adds the files you specified and displays the names of the files. After the files have been added, AUTOGEN runs automatically to make the adjustments that are necessary after system files are deleted. AUTOGEN also reboots the system.

Caution: To cancel VMSTAILOR during the first and second phases, press Ctrl/C, Ctrl/Y, or Ctrl/Z. Canceling VMSTAILOR during the third phase can cause a partially tailored disk. For a description of each phase, see Using VMSTAILOR.

After adding files to the system disk, apply any updates that affect them. OpenVMS VAX update procedures create a .TXT file that contains a description of patched files. This file usually has the following format: SYS$UPDATE:VMSUn06n.TXT.

For example, suppose you do not need the OpenVMS VAX Version 6.0 Phone utility (PHONE) and you run VMSTAILOR to remove those files. Later, you decide you want to use PHONE. Run VMSTAILOR to return the PHONE files to the system disk; then, apply any OpenVMS VAX update that has occurred since Version 6.0 that affected the PHONE utility.

Sample Session

Example 11–1 illustrates how to add all Network Support files and selected Programming Support files to a system disk.

Example 11–1 Sample VMSTAILOR Session

```
$ RUN SYS$UPDATE:VMSTAILOR
     .
     .
     .
 Do you want to tailor files "ON" or "OFF"? ON

TAILOR-ON
----------
 You will now be prompted with a list of the classes and subclasses
 of OpenVMS VAX files that are optional. The size of each class and subclass is included
 in the list. This will help you decide whether or not you want to add
 a class or subclass to your system.

 Under some classes, there is a set of common files that is required in order
 for any subclasses to work. These files are added when you ask
 for either the entire class or any of its subclasses.

Total size of the system disk is 2376153 blocks.
Total space used on the system disk is 2241252 blocks.
Total space left on the system disk is 134901 blocks.

CLASS - Network support
        Size of entire class (with subclasses): 1499
        Size of common files required for any subclass: 1249
        Do you wish to select the entire class (default = NO)? YES

CLASS - Programming Support
        Size of entire class (with subclasses): 14706
        Size of common files required for any subclass: 0
        Do you wish to select the entire class (default = NO)?
        Do you wish to select any of its subclasses (default = NO)? )YES
        Select the subclasses that you wish to provide:
            SUBCLASS - Debugger utility (DEBUG) (4690 blocks) [NO]: YES
            SUBCLASS - Image Dump utility (ANALYZE/PROCESS_DUMP) (48 blocks) [NO]: YES
            SUBCLASS - RMS Analyze and FDL Editor utilities (ANALYZE/RMS, ANALYZE/FDL)-
            (374 blocks) [NO]:YES
            SUBCLASS - Message utility (MESSAGE) (49 blocks) [NO]:
            SUBCLASS - Object and Shareable Image libraries (4311 blocks) [NO]: YES
            SUBCLASS - Macro libraries (2293 blocks) [NO]:
            SUBCLASS - Macro assembler (457 blocks) [NO]:
            SUBCLASS - SDL intermediary form of STARLET.MLB (1957 blocks) [NO]:
            SUBCLASS - FORTRAN require files (51 blocks) [NO]:
            SUBCLASS - VAX-C object libraries (471 blocks) [NO]:

CLASS - RMS journaling files
        Size of entire class (with subclasses): 155
        No subclasses in this tailor class.
        Do you wish to select the entire class (default = NO)?
```

Example 11–1 (Cont.) Sample VMSTAILOR Session

```
CLASS - System programming Support
        Size of entire class (with subclasses): 2286
        Size of common files required for any subclass: 93
        Do you wish to select the entire class (default = NO)?
        Do you wish to select any of its subclasses (default = NO)? )

CLASS - Secure User's Environment
        Size of entire class (with subclasses): 919
        Size of common files required for any subclass: 0
        Do you wish to select the entire class (default = NO)?

        Do you wish to select any of its subclasses (default = NO)?

    .
    .
    .

Files have been selected
Do you wish to add all of the options selected? YES
Creating temporary command file, please wait...
* Enter device containing OpenVMS distribution media: mua0:

    .
    .
    .
```

Using DECW$TAILOR

**When to Use
DECW$TAILOR**

You can use DECW$TAILOR to add or remove some or all DECwindows X11 display server and fonts files from the system disk. For example, if you are not planning to use the DECwindows PEX (PHIGS Extensions to X) support, you can remove those files. Later, if you decide you want DECwindows programming support, you can add the files to the system disk using DECW$TAILOR and your DECwindows distribution media. (Note that you cannot tailor files on or off an alternate device.)

Note: To add or remove VMS DECwindows Motif files, refer to the *VMS DECwindows Motif Installation Guide.* DECW$TAILOR will only tailor on or off those DECwindows device support and font files, with the exception of the required files, supplied in the OpenVMS VAX kit.

**How
DECW$TAILOR
Works**

DECW$TAILOR has three phases:

*   DECW$TAILOR asks if you want to tailor your system by adding files (tailor on) or by deleting files (tailor off).

*   If you choose to tailor files on, DECW$TAILOR lists each class of DECwindows files and asks if you want to include them on the system disk. If you choose to tailor files off, DECW$TAILOR lists each class of DECwindows files and asks if you want to delete them from the system disk.

*   DECW$TAILOR adds or deletes the files you indicated from the system disk. If you are tailoring files on, you must load your DECwindows distribution media in a drive available to the system. For example, if your OpenVMS VAX Version 6.0 DECwindows distribution kit is on a TK50 tape cartridge, load the tape cartridge labeled "VMS V6.0 BIN TK50 2/2 S/A BKUP - DECWINDOWS" into a TK50 drive available to the system.

**DECwindows
Files You Can
Tailor**

The following is a list of classes and subclasses of DECwindows files that you can add or delete using DECW$TAILOR. For a list of DECwindows files and their functions, see Appendix D.

*   DECwindows base support files—If you plan to install the separate DECwindows Motif for OpenVMS VAX layered product, you must add the base support files.

*   DECwindows device support files—If you are installing DECwindows support on a workstation or in a cluster that includes workstations or if you intend to install the DECwindows Motif for OpenVMS VAX layered product, you need the device support files. Otherwise, you do not need them.

Note: If you tailor device support files ON or OFF, the system reboots.

- 100 dots/inch video font files—By default, some workstation monitors (for example, a VR150, VR160, or VR295) display 100 dots/inch, which gives you a more readable display when you run DECwindows applications. If your workstation monitor cannot display 100 dots/inch fonts (for example, a VR260 or VR290), you can save disk space by not selecting this option. For more information about the capabilities of your particular monitor, see the owner's guide for your monitor.

- 75 dots/inch video font files—If your workstation monitor cannot display 75 dots/inch, you can save disk space by not selecting this option. For more information about the capabilities of your particular monitor, see the owner's guide for your monitor.

Removing DECwindows Files

To remove DECwindows files from the system disk, do the following:

1. Log in to the SYSTEM account.

2. Type the following command, and press Return:

   `$ RUN SYS$UPDATE:DECW$TAILOR`

   DECW$TAILOR displays information about the DECW$TAILOR program and displays the following message:

   `Do you want to tailor files "ON" or "OFF"?`

3. Type OFF to remove unwanted files, and press Return.

   The DECW$TAILOR program lists each group, or *class*, of files and its size in blocks. Files are grouped according to their function. For example, all the files required for DECwindows device support are in one class. A file class is made up of many small subclasses. You can eliminate an entire class of files, or you can eliminate one or more of its subclasses. For example:

   ```
   CLASS - DECwindows workstation support files
           Size of entire class (with subclasses): 12376
           Size of common files required for any subclass: 8916
           Do you wish to select the entire class (default = NO)?
        .
        .
        .
   ```

4. Decide which file classes or subclasses you do not need to support your system. DECW$TAILOR displays step-by-step instructions. Follow these instructions to specify which of the classes or subclasses you want to remove.

5. DECW$TAILOR deletes the files you selected and displays the names of those files. If you deleted device support files, the system automatically shuts down and reboots.

Caution: To cancel DECW$TAILOR during the first and second phases, press Ctrl/C, Ctrl/Y, or Ctrl/Z. Canceling DECW$TAILOR during the third phase can cause a partially tailored disk. For a description of each phase, see the Using DECW$TAILOR section.

Adding DECwindows Files

To install DECwindows device support and font files after the OpenVMS VAX installation or to add optional DECwindows files that you previously chose not to install or that you removed, do the following:

1. Log in to the SYSTEM account.

2. Load the OpenVMS VAX Version 6.0 distribution media containing the DECwindows save sets in a drive available to your system. For example, if your distribution media is a TK50 tape cartridge, load the tape cartridge labeled *VMS V6.0 BIN TK50 2/2 DECwindows & S/A BKUP* in a TK50 drive available to the system. Make sure the drive is online and ready.

    If you are adding files from a compact disc on an InfoServer, first determine whether the SYSGEN parameter SCSNODE is defined on your system (see the section Preparing Your System Disk in Chapter 5) or start the DECnet software, and then refer to Step 2 of Beginning the Upgrade Procedure in Chapter 7.

3. Enter the following command, and press Return:

    ```
    $ RUN SYS$UPDATE:DECW$TAILOR
    ```

    DECW$TAILOR displays information about the DECW$TAILOR program, and displays the following message:

    ```
    Do you want to tailor files "ON" or "OFF"?
    ```

4. Type ON to add files, and press Return.

    The DECW$TAILOR program lists each group, or *class*, of files and its size in blocks. Files are grouped according to their function. For example, all the files required for DECwindows device support are in one class. A file class is made up of many small subclasses. You can add an entire class of files, or you can add one or more of its subclasses. For example:

    ```
    CLASS - DECwindows workstation support files
            Size of entire class (with subclasses): 12376
            Size of common files required for any subclasses: 8916
            Do you wish to select the entire class (default = NO)?
         .
         .
         .
    ```

5. Decide which file classes or subclasses you do not need to support your system. The DECW$TAILOR program displays step-by-step instructions. Follow these instructions to specify which of the classes or subclasses you want to add.

6. DECW$TAILOR installs the files you selected and displays the names of those files. If you added device support files, the system automatically shuts down and reboots.

Caution: To cancel DECW$TAILOR during the first and second phases, press Ctrl/C, Ctrl/Y, or Ctrl/Z. Canceling DECW$TAILOR during the third phase can cause a partially tailored disk. For a description of each phase, see the Using DECW$TAILOR section.

After adding files to the system disk, apply any updates that affect them. For example, suppose you delete the Version 6.0 DECwindows 100 dots/inch video font files. Later on, you are able to use the 100 dots/inch fonts, so you run DECW$TAILOR to return the files to the system disk. You must then apply any OpenVMS VAX update that has occurred since Version 6.0 that affected the 100 dots/inch video font files. OpenVMS VAX update procedures create a .TXT file that contains a description of modified files. This file is usually named with the following format: SYS$UPDATE:VMSUn05n.TXT[1].

Sample Session

Example 11–2 illustrates how to add the files for DECwindows 100 dots/inch font files.

Example 11–2 Sample DECW$TAILOR Session

```
$ RUN SYS$UPDATE:DECW$TAILOR
   .
   .
   .
 Do you want to tailor files "ON" or "OFF"? ON

TAILOR-ON
---------
 You will now be prompted with a list of the classes and subclasses
 of DECwindows files that are optional. The size of each class and subclass is
 included in the list. This will help you decide whether or not you want to add
 a class or subclass to your system.

 Under some classes, there is a set of common files that is required in order
 for any subclasses to work. These files are added when you ask
 for either the entire class or any of its subclasses.

Total size of the system disk is 2376153 blocks.
Total space used on the system disk is 1728072 blocks.
Total space left on the system disk is 648081 blocks.

CLASS - DECwindows base support files
          Size of entire class (with subclasses): 3066

          No subclasses in this tailor class.
          Do you wish to select the entire class (default = NO)?
```

---

[1] Examine this file to determine if the update patched the 100 dots/inch font files

Example 11–2 (Cont.) Sample DECW$TAILOR Session

```
CLASS - DECwindows workstation support files
        Size of entire class (with subclasses): 12376
        Size of common files required for any subclass: 8916
        Do you wish to select the entire class (default = NO)? NO
        Do you wish to select any of its subclasses (default = NO)?

CLASS - 75 dots per inch video font files
        Size of entire class (with subclasses): 4537

        No subclasses in this tailor class.
        Do you wish to select the entire class (default = NO)?


CLASS - 100 dots per inch video font files
        Size of entire class (with subclasses): 3693
        No subclasses in this tailor class.
        Do you wish to select the entire class (default = NO)? YES

Files have been selected
Do you wish to add all of the options selected? YES
Creating temporary command file, please wait...
* Enter device containing DECwindows distribution media: MUA0:
    .
    .
    .
```

A

License Management Notes

Overview

This appendix contains supplemental information to the license instructions of the installation and upgrade procedures and *OpenVMS License Management Utility Manual*. Although most of the information in this appendix pertains to managing OpenVMS and System Integrated Product (SIP) licenses, some of the information pertains to managing layered product licenses.

This appendix covers the following information:

- Registering your licenses
- Using the License Unit Requirement Table (LURT)
- License Management Facility (LMF) notes
- Volume Shadowing for OpenVMS license
- Other System Integrated Product (SIP) licenses

Registering Your Licenses

This section provides an overview of the license registration procedure.

When to Register

After you install the OpenVMS VAX operating system, you must register an OpenVMS VAX license. An OpenVMS VAX license lets you use the operating system. You must also register the licenses for any of the following SIPs you have purchased:

- VAXclusters
- DECnet for OpenVMS
- OpenVMS RMS Journaling
- Volume Shadowing for OpenVMS

After you upgrade the OpenVMS VAX operating system, in most cases there is no need to reregister licenses for the operating system or for SIPs.

In addition to the OpenVMS VAX operating system and the SIPs, many layered products—including DECwindows Motif for OpenVMS VAX—that run on OpenVMS VAX Version 6.0 also require license registration. See the *OpenVMS License Management Utility Manual* for a full explanation of license registration.

How to Register

To register a license, you need to obtain a Product Authorization Key (PAK). A typical PAK is a piece of paper provided by Digital Equipment Corporation that contains the appropriate information to authorize access to software on a VAX computer or in a VAXcluster environment. You can obtain a PAK from a Digital representative the same way as you obtain software.

See Table A–1 for a complete list of the versions of the OpenVMS VAX operating system and the VAX computers that were first supported by these versions.

Table A–1 The First VMS Version That Supports VAX Computers

VMS Version	First Computer Support
Version 5.0	VAX 6000 Model 2xx, VAX 8820–8840
Version 5.0–2A	MicroVAX 3300/3400
Version 5.1	VAX 6000 Model 3xx, MicroVAX 3800/3900
Version 5.1–B	VAXstation 3100, Model 30/40
Version 5.1–1	VAXstation 3520/3540

Table A-1 (Cont.) The First VMS Version That Supports VAX Computers

VMS Version	First Computer Support
Version 5.2	VAX 6000 Model 4*xx*, MicroVAX 3100
Version 5.2-1	VAXstation 3100, Model 38/48
Version 5.3	No CPUs introduced
Version 5.3-1	No CPUs introduced
Version 5.3-2	VAX 4000 Model 300
Version 5.4	VAXstation 3100 Model 76, VAX 9000, VAX 6000 Model 5*xx*, VAXft 310
Version 5.4-1	No CPUs introduced
Version 5.4-2	VAX 4000 Model 200
Version 5.4-3	VAXft Models 410, 610, 612
Version 5.5	VAXstation 4000 VLC, MicroVAX 3100 Models 30, 40, and 80, VAX 6000 Model 600, VAX 4000 Model 500, VAXstation 4000 Model 60, and VAXft Model 110
Version 5.5-2	VAX 4000 Model 100, VAXstation 4000 Models 90 and 100, MicroVAX 3100 Model 90, VAX 4000 Model 400, VAX 4000 Model 600, VAX 7000 Model 600, and VAX 10000 Model 600

Using the License Unit Requirement Table (LURT)

Introduction

Many PAKs contain a table name in the availability or activity fields. This name refers to a column in the License Unit Requirement Table (LURT).

For more information on using the LURT, see the *OpenVMS License Management Utility Manual*.

License Unit Requirement Table

Table A–2 has seven lettered columns (A, B, C, D, E, F, and I; G and H are reserved by Digital and therefore are not listed). The numbers listed in these columns indicate the number of license units required for each processor listed in the System Marketing Model column. For example, if your PAK specifies *availability = F*, you would require 100 license units to load the license on a VAX 11/780 computer, or 4800 license units to load the license on a VAX 9000-430 computer.

Note that some PAKs specify MOD_UNITS in the options field. The MOD_UNITS option allows the system manager to use the DCL command LICENSE MODIFY/UNITS to temporarily increase the size of the PAK. This permits a product to be used, in certain emergency situations, on a processor larger than the processor size specified in the license. Check your license terms and conditions before modifying license units. Reset the PAK size to its original size after the emergency situation is resolved.

Table A–2 License Unit Requirement Table (LURT)

| | License Types by Code | | | | | | |
| | OpenVMS | | | | SIP | | LP |
System Marketing Model	**A**	**B**	**C**	**D**	**E**	**F**	**I**
VAX 11/730	10	NA	NA	NA	230	50	50
VAX 11/750	12	NA	NA	NA	230	100	100
VAX 11/780, 785	13	NA	NA	NA	230	100	100

Key to License Type Codes and Values

A—OpenVMS Capacity or OpenVMS Unlimited or Base
B—OpenVMS Server
C—OpenVMS Concurrent user
D—OpenVMS Workstations
E—System integrated products
F—Layered products
G—Reserved (not listed)
H—OpenVMS reserved (not listed)
I—Layered products
NA—Not applicable

Table A–2 (Cont.) License Unit Requirement Table (LURT)

System Marketing Model	License Types by Code						
	OpenVMS				SIP	LP	
	A	B	C	D	E	F	I
VAX 6000-210, 6000-310	58	NA	NA	NA	230	300	300
VAXft 110	60	NA	NA	NA	230	100	100
VAXft 310, 410, 610	58	NA	NA	NA	230	300	300
VAX 6000-220, 6000-320, 6000-410	69	NA	NA	NA	230	600	600
VAX 6000-230, 6000-330, 6000-510	81	NA	NA	NA	400	900	900
VAX 6000-240, 6000-340, 6000-350, 6000-420, 7000-610, 10000-610	93	NA	NA	NA	400	1200	1200
VAX 6000-540, 6000-640	170	NA	NA	NA	600	2400	2400
VAX 6000-550, 6000-650	195	NA	NA	NA	600	2400	2400
VAX 6000-560, 6000-660	220	NA	NA	NA	600	2400	2400
VAX 6000-610	81	NA	NA	NA	400	1200	1200
VAX 8200, 8250	20	NA	NA	NA	230	100	100
VAX 8300, 8350	25	NA	NA	NA	230	200	200
VAX 8500	63	NA	NA	NA	230	400	400
VAX 8530	65	NA	NA	NA	230	400	400
VAX 8550, 8700, 8810	72	NA	NA	NA	400	600	600
VAX 8600, 8650	28	NA	NA	NA	230	400	400
VAX 8800, 8820	93	NA	NA	NA	400	1200	1200
VAX 8830, 6000-360, 6000-430, 6000-520, 6000-620	119	NA	NA	NA	600	1800	1800
VAX 7000-620, 10000-620	145	NA	NA	NA	600	1800	1800

Key to License Type Codes and Values

A—OpenVMS Capacity or OpenVMS Unlimited or Base
B—OpenVMS Server
C—OpenVMS Concurrent user
D—OpenVMS Workstations
E—System integrated products
F—Layered products
G—Reserved (not listed)
H—OpenVMS reserved (not listed)
I—Layered products
NA—Not applicable

Table A–2 (Cont.) License Unit Requirement Table (LURT)

| | License Types by Code | | | | | | |
| System Marketing Model | OpenVMS | | | | SIP | LP | |
	A	B	C	D	E	F	I
VAX 6000-440, 6000-450, 6000-460, 6000-530	143	NA	NA	NA	600	2400	2400
VAX 7000-630, 10000-630,	167	NA	NA	NA	600	2400	2400
VAX 7000-640, 10000-640,	197	NA	NA	NA	600	2400	2400
VAX 6000-630, 9000-210, 9000-410	143	NA	NA	NA	600	2400	2400
9000-420	241	NA	NA	NA	800	4800	4800
VAX 9000-430	330	NA	NA	NA	800	4800	4800
VAX 9000-440	386	NA	NA	NA	800	4800	4800
MicroVAX II	18	NA	100	NA	230	50	50
MicroVAX 2000, 3100-10e, 3100-20e, 3100-30, 3100-40, 3100-80,	18	NA	100	NA	230	20	20
MicroVAX 3100-90	60	NA	100	NA	230	20	20
MicroVAX 3500, 3600, 3800, 3900, 4000-200	60	NA	100	NA	230	200	200
MicroVAX 3300, 3400, 4000-100	60	NA	100	NA	230	100	100
VAX 4000-300, 4000-400	60	NA	100	NA	230	300	300
VAX 4000-500, 4000-600	60	NA	100	NA	400	900	900
VAXstation II, II/GPX	NA	NA	NA	100	50	10	10
VAXstation 2000, 2000 /GPX	NA	NA	NA	100	50	10	10
VAXstation 3100, 3200, 3500, 3520, 3540, 4000-60, 4000 VLC, 4000-90	NA	NA	NA	100	50	10	10

Key to License Type Codes and Values

A—OpenVMS Capacity or OpenVMS Unlimited or Base
B—OpenVMS Server
C—OpenVMS Concurrent user
D—OpenVMS Workstations
E—System integrated products
F—Layered products
G—Reserved (not listed)
H—OpenVMS reserved (not listed)
I—Layered products
NA—Not applicable

Table A–2 (Cont.) License Unit Requirement Table (LURT)

| | License Types by Code | | | | | | |
| System Marketing Model | OpenVMS | | | | SIP | LP | |
	A	B	C	D	E	F	I
VAXserver 2000	NA	52	NA	NA	50	10	10
VAXserver 3300, 3400, 3500, 3600, 3900, 4000-200, 4000-300	NA	100	NA	NA	50	10	10
VAXserver 6000-210, 6000-310	NA	1443	NA	NA	230	200	200
VAXserver 6000-220, 6000-320, 6000-410, 6000-420	NA	1737	NA	NA	230	400	400
VAXserver 6000-510	NA	600	NA	NA	230	400	400
VAXserver 6000-520	NA	890	NA	NA	230	400	400
VAXserver 9000-110, 9000-310	143	143	NA	NA	600	900	900
VAXserver 9000-320	241	241	NA	NA	800	1200	1200
VAXserver 9000-330	330	330	NA	NA	800	1200	1200
VAXserver 9000-340	386	386	NA	NA	800	1200	1200

Key to License Type Codes and Values

A—OpenVMS Capacity or OpenVMS Unlimited or Base
B—OpenVMS Server
C—OpenVMS Concurrent user
D—OpenVMS Workstations
E—System integrated products
F—Layered products
G—Reserved (not listed)
H—OpenVMS reserved (not listed)
I—Layered products
NA—Not applicable

License Management Facility Notes

Common Concerns and Questions About LMF

The following list is offered to help new users with some common concerns and questions regarding the License Management Facility (LMF).

- If you do not have a valid OpenVMS VAX license that is registered and activated, the system displays a warning message as part of system startup and restricts system use to the operator's console, OPA0.

- If a checksum error is displayed when you register a license, check *all* the fields of data that you entered, including the checksum itself.

- After your PAKs are registered, they are activated (loaded) automatically as part of each system startup.

- If an OpenVMS VAX availability license is registered with insufficient license units for the specified VAX computer, the system displays a warning message at system startup but allows normal system use at the console level only.

- If an OpenVMS VAX activity license is registered with insufficient license units to meet your user requirements, the system displays the following message when the user (process) attempts to log in:

```
%LICENSE-F-EXCEEDED, licensed product has exceeded current license limits
```

  A user can always log in to the operator's console, OPA0, however.

- The default LICENSE database is located in the file SYS$COMMON:[SYSEXE]LMF$LICENSE.LDB. You can move the database, although Digital does not recommend doing so. If you move the database, you must either define the logical name LMF$LICENSE at the system level to point to the new database or use the /DATABASE=*filespec* qualifier with all LICENSE commands. To redirect LMF to another database location on a more permanent basis, add the following line to the command procedure SYS$MANAGER:SYLOGICALS.COM:

```
$ DEFINE/SYSTEM LMF$LICENSE device:[directory]LMF$LICENSE.LDB
```

  If you specify a device other than SYS$SYSDEVICE, you must also mount the specified disk from the SYLOGICALS.COM command procedure.

- Each OpenVMS VAX license is restricted to a single node for
  permanent PAKs. You must assign a System Communications
  Services (SCS) name to the license when you register with the
  VMSLICENSE.COM command procedure, or you must enter a
  LICENSE MODIFY/INCLUDE=*node-name* command after you
  register the license. Although you can successfully activate an
  unassigned OpenVMS VAX license on a standalone system,
  you cannot activate one in a VAXcluster environment.

  Note: The SCS node name is not necessarily the DECnet
  node name. SCSNODE is a system parameter; it can be a
  maximum of 6 alphabetic characters.

Volume Shadowing for OpenVMS License

When to Register

After you *install* OpenVMS Version VAX 6.0, you *must* register your Volume Shadowing for OpenVMS license before you can use Volume Shadowing. If you *upgraded* to OpenVMS VAX Version 6.0, you do not need to reregister this license.

Volume Shadowing Phase I and Phase II

Please note that, with the introduction of VMS Version 5.4, the name of the VAX Volume Shadowing product changed to VMS Volume Shadowing. HSC controller-based volume shadowing is now referred to as VMS Volume Shadowing Phase I. Host-based volume shadowing, introduced with VMS Version 5.4, is referred to as VMS Volume Shadowing Phase II. The same VMS Volume Shadowing license applies for both Phase I and Phase II.

To access Phase I shadow sets, which reside on HSC controllers, a license is required for every VAX computer that needs to access a shadow set and is directly connected to the same CI as the HSC controllers. If the license is not installed, a MOUNT/SHADOW command generates the following error message:

```
%MOUNT-F-SHADOWFAIL, failed to create (or add to) the shadow set
-LICENSE-F-NOLICENSE, no license is active for this software product
```

Nodes that use a MSCP server to access Phase I shadow sets do not require a license.

Every node that needs to access a Phase II shadow set must have a license installed, regardless of the access path to the members of the shadow set.

Other System Integrated Product Licenses

After you *install* OpenVMS VAX Version 6.0, you *must* register licenses for any system integrated product. If you *upgraded* to OpenVMS VAX Version 6.0, you do not need to reregister licenses for system integrated products.

B

Booting from [SYSF] During an Upgrade

Booting Procedures

Introduction

You must boot from the [SYSF] root during phases 2, 3, and 4 of the upgrade procedure. Different VAX computers require that you use different booting procedures. This appendix describes how to boot the various VAX computers from [SYSF].

Go to the section that describes your VAX computer and follow the instructions for booting from [SYSF]. If you need more information about booting, refer to the upgrade and installation supplement for your VAX computer.

MicroVAX and VAXstation Computers

The information in this section applies to the following VAX computers:

    VAXstation II, VAXstation II/GPX, and MicroVAX II
    VAXstation 2000 and MicroVAX 2000
    VAXstation 3100 and MicroVAX 3100 series
    VAXstation 3200 and 3500
    VAXstation 3520 and 3540
    VAXstation 4000
    VAXft 110, 310, 410, 610, and 612
    MicroVAX 3300, 3400, 3500, 3600, 3800, and 3900

To boot from [SYSF], enter the BOOT command in the following format and press the Return key:

```
>>> B/F0000000 device-name
```

Substitute the device name of the system disk for *device-name*.

VAX 8530, 8550, 8810 (8700), 8820-N (8800) Computers

To boot from [SYSF], use the following procedure:

1. Press Ctrl/P. Enter the following command at the console-mode prompt (>>>) and press the Return key:

```
>>> HALT
```

2. Enter the BOOT command at the console-mode prompt (>>>) in the following format:

```
>>> B dddn /R5:F0000000
```

Substitute BCI, BDA, or UDA for *ddd*. Substitute the unit number of the drive holding the system disk for *n*.

VAX 8820, 8830, and 8840 Computers

To boot from [SYSF], use the following procedure:

1. Enter the following command at the PS-OS-0> prompt and press Return:

    ```
    PS-OS-0> HALT/CPU=ALL
    ```

2. Enter the BOOT command at the PS-CIO-0> prompt in the following format:

    ```
    PS-CIO-0> B dddn /R5=F0000000
    ```

    Substitute BCI or BDA for *ddd*. Substitute the unit number of the drive holding the system disk for *n*.

VAX–11/750, 8200, 8250, 8300, and 8350 Computers

To boot from [SYSF], create a command procedure named SYFBOO.CMD before the upgrade is started.

To create SYFBOO.CMD, use the following procedure:

Note: This procedure assumes that you have installed and booted the OpenVMS VAX operating system and are logged into the SYSTEM account.

1. Log in to the SYSTEM account.

2. Make sure that the console media is in the console drive.

3. To connect the console drive to the system, enter the following commands and press the Return key after each one:

    ```
    $ RUN SYS$SYSTEM:SYSGEN
    SYSGEN> CONNECT CONSOLE
    SYSGEN> EXIT
    ```

4. Use the Exchange utility to copy the appropriate boot command procedure from the console media to your current directory on the system disk. If the system disk is on an HSC drive and you have created DEFBOO.CMD, enter the following command and press Return:

    ```
    $ EXCHANGE COPY CSA1:DEFBOO.CMD *
    ```

    On the VAX 11/750 computer, if the system disk is on a local drive, copy the boot command procedure that matches the drive that holds the system disk. For example, suppose the system disk is on an RP06 drive and has a controller designation of A and a unit number of one. Enter the following command and press the Return key:

    ```
    $ EXCHANGE COPY CSA1:DA1BOO.CMD *
    ```

5. Edit the boot command procedure. Change the line that deposits a value in register 5 (R5). This line contains the comment *!software boot flags*. The value is a hexadecimal number with eight digits. For example:

    ```
    D/G R5 0    !software boot flags
    ```

    Change the left-most digit of the value to reflect the name of the root directory from which you want to boot. For example,

to boot from the [SYSF] root directory, change the line as follows:

```
D/G/L R5 F0000000    !designated root is SYSF
```

6. Rename the boot command procedure to SYFBOO.CMD. For example, if the boot command procedure is DEFBOO.CMD, enter the following command and press the Return key:

```
$ RENAME DEFBOO.CMD SYFBOO.CMD
```

7. Use the Exchange utility to copy SYFBOO.CMD back to the console media. Enter the following command and press Return:

```
$ EXCHANGE COPY SYFBOO.CMD CSA1:SYFBOO.CMD
```

8. When the copy operation completes, enter the following command and press Return:

```
$ DISMOUNT CSA1
```

9. To secure the console media from unauthorized access, you must enter the following command and press Return:

```
$ MOUNT/FOREIGN/SYSTEM/NOWRITE/NOASSIST CSA1
```

To boot from [SYSF], use the following procedure:

1. Make sure the console media is in the console drive. On the VAX 11/750 computers, make sure the keylock switch is set to LOCAL. Set the BOOT DEVICE switch to position A.

   On the VAX 8200 computer, set the upper keylock switch to ENABLE and the lower keylock switch to HALT.

2. Press Ctrl/P.

3. On the VAX 11/750 computer, enter the following command and press the Return key:

```
>>> B/800 DDA0
```

   On the VAX 8200 computer, enter the following command at the console-mode prompt (>>>) and press Return:

```
>>> B/R5:800 CSA1
```

4. At the BOOT58> prompt, enter the following command:

```
BOOT58> @SYFBOO.CMD
```

VAX–11/730, 11/780, 11/785, 8600, and 8650 Computers

To boot from [SYSF], create a command procedure named SYFBOO.CMD (for VAX–11/730, 11/780, and 11/785 computers) or SYFBOO.COM (for VAX 8600 and 8650 computers) before the upgrade is started.

To create SYFBOO.CMD or SYFBOO.COM, use the following procedure:

Note: This procedure assumes that you have installed and booted the OpenVMS VAX operating system and are logged into the SYSTEM account.

1. Log in to the SYSTEM account.

2. Make sure that the console media is in the console drive. On the VAX 8600 computer, make sure the TERMINAL CONTROL switch is set to LOCAL.

3. To connect the console drive, enter the following commands and press the Return key after each one:

```
$ RUN SYS$SYSTEM:SYSGEN
SYSGEN> CONNECT CONSOLE
SYSGEN> EXIT
```

4. Use the Exchange utility to copy DEFBOO.CMD (for VAX 11/730, 11/780, and 11/785 computers) or DEFBOO.COM (for VAX 8600 and 8650 computers) from the console media to your current directory on the system disk. On the VAX 11/780, 11/785, and 8600 computers, enter a command similar to the following and press Return:

```
$ EXCHANGE COPY CSA1:DEFBOO.CMD *
```

On the VAX 11/730 computer, enter the following command and press the Return key:

```
$ EXCHANGE COPY CSA2:DEFBOO.CMD *
```

5. Edit DEFBOO.CMD or DEFBOO.COM. Change the line that deposits a value in register 5 (R5). On the VAX–11/730, 11/780, and 11/785 computers, this line contains the comment *!software boot flags*. On the VAX 8600, this line contains the comment *!Use R5 for optional boot control flags [SYSB.]*. The value is a hexadecimal number with eight bits. For example:

```
DEPOSIT R5 10000000     !software boot flags
```

Change the left-most digit of the value to reflect the name of the root directory from which you want to boot. For example, to boot from [SYSF], change the line as follows:

```
DEPOSIT R5 F0000000     !software boot flags
```

6. Rename DEFBOO.CMD to SYFBOO.CMD (or DEFBOO.COM to SYFBOO.COM), as follows:

```
$ RENAME DEFBOO.CMD SYFBOO.CMD
```

7. Use the Exchange utility to copy SYFBOO.CMD or SYFBOO.COM to the console media. On the VAX 11/780, 11/785, and 8600 computers enter a command similar to the following:

```
$ EXCHANGE COPY SYFBOO.CMD CSA1:SYFBOO.CMD
```

On the VAX 11/730 computer enter the following command and press the Return key:

```
$ EXCHANGE COPY SYFBOO.CMD CSA2:SYFBOO.CMD
```

8. When you are finished, enter a command similar to the following and press Return:

   ```
   $ DISMOUNT CSA1
   ```

9. To secure the console media from unauthorized access, you must enter a command similar to the following and press Return:

   ```
   $ MOUNT/FOREIGN/SYSTEM/NOWRITE/NOASSIST CSA1
   ```

To boot from [SYSF] during an upgrade, use the following procedure:

1. Make sure the console media is in the console drive. On the VAX 11/730, 11/780, and 11/785 computers, make sure the keylock switch is set to LOCAL. On the VAX 8600, make sure the TERMINAL CONTROL switch is set to LOCAL.

2. Press Ctrl/P. On the VAX 11/780, 11/785, and 8600 computers, enter the HALT command at the console-mode prompt (>>>) and press the Return key:

   ```
   >>> HALT
   ```

3. Use SYFBOO.CMD to boot from [SYSF]. Enter the following command and press Return:

   ```
   >>> B SYF
   ```

VAX 6000 Series

To boot from [SYSF], use the following procedure:

1. If you have a CIBCA-A adapter and are booting over the CI, insert the console tape cartridge in the console drive.

2. Press Ctrl/P to put the system in console mode.

3. Enter the BOOT command in the following format:

   ```
   >>> BOOT /R5:F0000000 /XMI:a /BI:b [/R3:c] [/NODE:d] DUu
   ```

   where:

   - a is the XMI node number of the system disk.

   - b is the VAXBI node number of the system disk.

   - c pertains to Volume Shadowing. This qualifier is not required unless you are using Volume Shadowing. For more information, see the *Volume Shadowing for OpenVMS*.

   - d is the HSC node number of the node being accessed. The /NODE qualifier is not necessary if you are booting from a local disk. The HSC node number is in hexadecimal. You can deposit a maximum of two HSC node numbers (if two HSCs are available).

   - u is the unit number of the drive holding the system disk.

For example, suppose you want to boot from [SYSF] on an HSC disk with a unit number of one and your system has the following configuration:

- The disk is connected to the VAXBI at node 2.

- The VAXBI you are using is connected to the XMI at node 3.

- The disk is available to two HSCs, node numbers 0E and 02.

Enter the following command and press the Return key:

```
>>> BOOT/R5:F0000000/XMI:3/BI:2/NODE:0E02 DU1
```

VAX 9000 Series

The upgrade procedure automatically updates DEFBOO.CMD to boot from [SYSF]. If you want to boot a VAX 9000 computer manually from [SYSF] however, you must set up DEFBOO.CMD to boot from the system disk and perform the following procedure:

1. Press Ctrl/P to obtain the console prompt.

2. Enter the following BOOT commands:

```
>>> I/K
>>> BOOT/NOSTART
>>> DEPOSIT R5 F0000000
>>> CONTINUE
```

3. If you set up DEFBOO.CMD properly, the system will boot from the SYSF directory on the system disk and continue with the upgrade procedure.

   If the system does not boot, enter the SHOW CONFIGURATION console command and verify that DEFBOO.CMD contains the correct information for your configuration. For more information, see the *OpenVMS VAX Upgrade and Installation Supplement: VAX 9000 Series.*

C

OpenVMS VAX Save Set Subclasses

Overview

This appendix lists the file subclasses contained in the following save sets:

- VMS060.C—Library save set
- VMS060.D—Optional save set
- VMS060.E—Help Message save set
- VMS060.F—OpenVMS Manuals save set

File Subclasses

**Save Set C
Subclasses**

The following files are contained in the Library save set:

- Network support

   Incoming Remote File Access files
   Incoming Remote Terminal files
   Network Test files
   Remote Task Loading

- Programming Support

   Debugger utility (DEBUG)
   Image Dump utility (ANALYZE/PROCESS_DUMP)
   RMS Analyze and FDL Editor utilities (ANALYZE/RMS,
   ANALYZE/FDL)
   Message utility (MESSAGE)
   Object and Shareable Image libraries
   Macro libraries
   Macro assembler
   SDL intermediary form of STARLET.MLB
   FORTRAN required files
   VAX C object libraries
   OpenVMS RMS journaling files

- System programming Support

   Files–11 ODS–1, ISO 9660, High Sierra ACPs
   Monitor utility
   Analyze Object File utility (ANALYZE/IMAGE, ANALYZE
   /OBJECT)
   Delta debugger
   System Dump Analyzer utility (ANALYZE/SYSTEM,
   ANALYZE/CRASH)
   System Symbol Table file (SYS.STB)
   Misc Symbol Table files

- Secure User's Environment

   File Access Control List utilities
   Print and Batch Queue utilities
   Input Queue Symbiont (Card Reader)
   Accounting Log Report Generator utility
   DECdtm

- Utilities

  MAIL utility
  DUMP utility
  RUNOFF utility
  PHONE utility
  OpenVMS HELP library
  Foreign Terminal Support
  LAT-11 terminal server (via Ethernet)
  Standalone backup
  Error Log Report Generator utility (ANALYZE/ERROR)
  VAXTPU utility
  Terminal Fallback Facility

- TECO editor

- EDT documentation

- National Character Set utility (NCS)

- OpenVMS workstation support

- Workstation device support

Save Set D Subclasses

The following files are contained in the Optional save set:

- Miscellaneous files

- System map

- LPA-11 support

- BLISS required files

- UETP (the User Environment Test Package)

- Example files

Save Set E Subclasses

The following files are contained in the Help Message save set:

- Help Message database

Save Set F Subclasses

The following files are contained in the OpenVMS Manuals save set:

- OpenVMS Master Index

- OpenVMS Master Glossary

- Overview of OpenVMS Documentation

D

DECwindows Display Server and Fonts Components

Overview

This appendix provides a list of files provided by the DECwindows base and workstation support components included on the OpenVMS VAX Version 6.0 distribution kit.

Table of Components

Table D–1 contains the name of the OpenVMS VAX DECwindows display server and fonts components, the directory where the component can be found, a brief description of what the component does, and one of the following component classifications:

- BASE—Indicates that the component is part of all installations.

- WS—Indicates that the component is part of the workstation support.

- FONT—Indicates the component is part of the fonts component.

Table D–1   DECwindows Display Server and Fonts Components

File	Purpose	Component Class
	Files in DECW$KEYMAP Directory	
DECW$KEYMAP		BASE
	Files in SYS$LOADABLE_IMAGES Directory	
GAADRIVER.EXE	VAXstation II/GPX driver	WS
GABDRIVER.EXE	VAXstation 2000/GPX driver	WS
GBBDRIVER.EXE	VAXstation 35x0 driver	WS
GCADRIVER.EXE	VAXstation II monochrome device driver	WS
GCBDRIVER.EXE	VAXstation 2000 monochrome device driver	WS
GEBDRIVER.EXE	Scanproc graphics device driver	WS
GECDRIVER.EXE	Spxg/gt graphics device driver	WS
GFBDRIVER.EXE	Low-cost graphics device driver	WS
IEDRIVER.EXE	Input extension driver	WS
IKDRIVER.EXE	Keyboard decoder driver	WS
IMDRIVER.EXE	Mouse decoder driver	WS
INDRIVER.EXE	Common input function driver	WS
WSDRIVER.EXE	Set display driver	BASE

Table D–1 (Cont.)   DECwindows Display Server and Fonts Components

File	Purpose	Component Class
Files in SYS$SYSTEM Directory		
DECW$FONTCOMPILER.EXE	Font compiler image	FONT
DECW$MKFONTDIR.EXE	Font utility to generate list of fonts and paths	FONT
DECW$SERVER_MAIN.EXE	Server main image	WS
DECW$SETSHODIS.EXE	SHOW DISPLAY command image	BASE
Files in DECW$FONT Directory		
See *VMS DECwindows Xlib Programming Volume*	DECwindows fonts	WS
Files in DECW$EXAMPLES Directory		
DECW$FONT_ALIAS_CHARTER.DAT	Example alias file for Charter fonts	FONT
DECW$FONT_ALIAS_CHARTER_100DPI.DAT	Example alias file for 100 dpi Charter fonts	FONT
DECW$FONT_ALIAS_FILENAMES.DAT	Brief alias name list for shipped fonts	FONT
DECW$FONT_ALIAS_KANJI.DAT	Example alias file for Kanjifonts	FONT
DECW$FONT_ALIAS_LUCIDA.DAT	Example alias file for Lucide fonts	FONT
DECW$FONT_ALIAS_LUCIDA_100DPI.DAT	Example alias file for 100 dpi Lucide fonts	FONT
Files in SYS$LIBRARY Directory		
DECW$DRIVER.MLB	Driver macro library	WS
DECW$FONTCOMPILER.CLD	CLD for font compile commands	FONT
DECW$SERVER_DDX_GA.EXE	Server color device support shareable image	WS
DECW$SERVER_DDX_GB.EXE	Server color device support shareable image	WS
DECW$SERVER_DDX_GC.EXE	Server monochrome device support shareable image	WS
DECW$SERVER_DDX_GE.EXE	Server scanproc device-dependent shareable image	WS

Table D–1 (Cont.) DECwindows Display Server and Fonts Components

File	Purpose	Component Class
Files in SYS$LIBRARY Directory		
DECW$SERVER_DDX_GF.EXE	Server low-cost graphics device-dependent shareable image	WS
DECW$SERVER_DIX.EXE	Server device independent support	WS
DECW$SERVER_XINPUT_IE.EXE	Input extension for handling nonstandard input devices	WS
DECW$SESSIONSHRP.EXE	Support routines for DECwindows Session Manager	BASE
DECW$SVEXT_ADOBE_DPS_EXTENSION.EXE	Display PostScript server extension image	WS
DECW$SVEXT_D2DX_EXTENSIONS.EXE	DECwindows 2D extensions	WS
DECW$SVEXT_DEC_XTRAP.EXE	Input and event recording and playback extention	WS
DECW$SVEXT_MULTI_BUFFERING.EXE	DECwindows multi-buffering extension	WS
DECW$SVEXT_X3D_PEX.EXE	Phigs Extension to X (PEX) for 3D	WS
DECW$SVEXT_X3D_PEX_GB.EXE	PEX for 35x0 systems	WS
DECW$SVEXT_X3D_PEX_GB_UCODE.EXE	PEX micro code for 35x0 systems	WS
DECW$SVEXT_X3D_PEX_GE.EXE	PEX for scanproc systems	WS
DECW$SVEXT_XIE.EXE	DECwindows imaging extention	WS
DECW$SVEXT_XINPUTEXTENSION.EXE	DECwindows input extension	WS
DECW$TRANSPORT_COMMON.EXE	Common transport shareable image	BASE
DECW$TRANSPORT_DECNET.EXE	DECnet transport image	BASE
DECW$TRANSPORT_LOCAL.EXE	Local transport image	BASE
DECW$TRANSPORT_TCPIP.EXE	TCP/IP transport image	BASE
DECW$XPORTCOM.H	Common transport definitions	BASE

Table D–1 (Cont.) DECwindows Display Server and Fonts Components

File	Purpose	Component Class
Files in SYS$LIBRARY Directory		
DECW$XPORTCOM.MAR	Common transport definitions	BASE
DECW$XPORTCOM.R32	Common transport definitions	BASE
DECW$XPORTDEF.H	Transport definitions	BASE
DECW$XPORTDEF.MAR	Transport definitions	BASE
DECW$XPORTDEF.R32	Transport definitions	BASE
DECW$XPORTMAC.R32	Transport BLISS macros	BASE
DECW$XPORTMSG.R32	Transport message symbols	BASE
XDPS$MASTERDPSVM.DAT	Display PostScript support file	WS
Files in SYS$MANAGER Directory		
DECW$DEVICE.COM	Device detection and configuration	BASE
DECW$DEVICE_GE.COM	Scanproc device detection and configuration	WS
DECW$DEVICE_GF.COM	Low-cost graphics device detection and configuration	WS
DECW$DEVICE_GG.COM	Scanproc turbo device detection and configuration	WS
DECW$RGB.DAT	Definitions of the color names used by the XStoreNamedColor and XAllocNamedColor requests	WS
DECW$STARTSERVER.COM	Server initialization and startup	WS
Files in SYS$MESSAGE Directory		
DECW$TRANSPORTMSG.EXE	Transport message image	BASE
Files in SYS$UPDATE Directory		
DECW$MKFONTDIR.COM	Command file to invoke DECW$MKFONTDIR.EXE font utility	FONT

E

Layered Products Availability Table

Overview

Layered product information was not available at press time. For complete information regarding layered product availability, see the *OpenVMS VAX Version 6.0 Release Notes Addendum*.

F

NEW_OVER and NEW_UNDER Files

Overview

This appendix lists files installed either over or under existing files during an upgrade.

Where Files Are Installed

Introduction

During an upgrade, the procedure replaces certain files that exist on your system with new versions of those files from the OpenVMS VAX Version 6.0 distribution kit. For some system files, the upgrade procedure does not replace your existing system files, which might contain customizations for your site. Instead, the procedure retains your existing file and installs the new file from the kit at a version number higher or at a version number lower than your existing file.

You can use the DCL command DIFFERENCES to compare the contents of your existing files and the contents of the new files provided by OpenVMS VAX Version 6.0. Enter the command using the following syntax:

DIFFERENCES/OUTPUT=filespec existing_filename new_filename

The /OUTPUT qualifier causes the DIFFERENCES command to write the list of differences to the output file you specify. This output file will have the default file type .DIF. For more information about using the DIFFERENCES command, refer to the *OpenVMS DCL Dictionary*.

New files that the procedure installs at a version number higher than your existing files are referred to as **new_over** files. You must use these files at least until you complete the upgrade. After you have upgraded your system, you can add your customizations to these files.

New files installed at a version number lower than the existing files are referred to as **new_under** files. This allows you to continue to use your existing files during and after the upgrade.

If you purge a new_over file, you are left with the new version of the file provided by the distribution kit, and any customizations you might have made to the existing file will be lost. If you purge a new_under file, you are left with the file that existed before the upgrade.

In addition to the new_over and new_under files, there are certain files that are intended to contain your site-specific modifications. During an upgrade, the old versions of these files are retained if they were present before the upgrade. The new version of the file is installed only if no old version is present on your system. With the exception of TFF$STARTUP.COM, there is a corresponding .TEMPLATE file for each of the site-specfic files. The new version of the .TEMPLATE file replaces the old version.

NEW_OVER Files

During an upgrade, the following new files are installed over (that is, at a version number higher than) the existing files:

[SYSEXE]SHUTDOWN.COM
[SYSEXE]STARTUP.COM
[SYSHLP]HELPLIB.HLB
[SYSLIB]ADARTL.EXE
[SYSLIB]BASRTL.EXE
[SYSLIB]BASRTL2.EXE
[SYSLIB]BLAS1RTL.EXE
[SYSLIB]COBRTL.EXE
[SYSLIB]DBLRTL.EXE
[SYSLIB]DCLTABLES.EXE
[SYSLIB]ENCRYPSHR.EXE
[SYSLIB]FORRTL.EXE
[SYSLIB]FORRTL2.EXE
[SYSLIB]IMAGELIB.OLB
[SYSLIB]LBRSHR.EXE
[SYSLIB]LIBRTL.EXE
[SYSLIB]LIBRTL2.EXE
[SYSLIB]MTHRTL.EXE
[SYSLIB]PASRTL.EXE
[SYSLIB]PLIRTL.EXE
[SYSLIB]PPLRTL.EXE
[SYSLIB]RPGRTL.EXE
[SYSLIB]SCNRTL.EXE
[SYSLIB]STARLET.OLB
[SYSLIB]UVMTHRTL.EXE
[SYSLIB]VAXCRTL.EXE
[SYSLIB]VAXCRTLG.EXE
[SYSLIB]VBLAS1RTL.EXE
[SYSLIB]VMSRTL.EXE
[SYSLIB]VMTHRTL.EXE
[SYSMGR]DBLSTRTUP.COM
[SYSMGR]WELCOME.TEMPLATE
[SYSMGR]WELCOME.TXT

NEW_UNDER Files

During an upgrade, the following new files are installed under (that is, at a version number lower than) the existing files:

[SYS$LDR]VMS$SYSTEM_IMAGES.DATA
[SYS$STARTUP]ESS$LAST_STARTUP.DAT
[SYS$STARTUP]VMS$LAYERED.DAT
[SYSEXE]VMS$IMAGE_VERSION.DAT
[SYSLIB]CDDSHR.EXE
[SYSLIB]EPC$FACILITY.TLB
[SYSLIB]EPC$SHR.EXE
[SYSLIB]UISSHR.EXE
[SYSMSG]EPC$MSG.EXE

Site-Specific Files

The following files are intended to contain site-specific modifications. Note that, with the exception of TFF$STARTUP.COM, there is a corresponding .TEMPLATE file for each of these files. The new version of the .TEMPLATE file replaces the old version.

[SYSEXE]SYSUAF.DAT
[SYSMGR]AGEN$NEW_NODE_DEFAULTS.DAT
[SYSMGR]AGEN$NEW_SATELLITE_DEFAULTS.DAT
[SYSMGR]LAT$SYSTARTUP.COM
[SYSMGR]LOGIN.COM
[SYSMGR]SYCONFIG.COM
[SYSMGR]SYLOGICALS.COM
[SYSMGR]SYLOGIN.COM
[SYSMGR]SYPAGSWPFILES.COM
[SYSMGR]SYSECURITY.COM
[SYSMGR]SYSHUTDWN.COM
[SYSMGR]SYSTARTUP_VMS.COM
[SYSMGR]TFF$STARTUP.COM

G

Small Capacity System Disks

Overview

This appendix describes some methods you can use to manage small capacity system disks, along with some specific recommendations for installing or upgrading to OpenVMS VAX Version 6.0 and VMS DECwindows Motif Version 1.1 on an RZ23L, RA80, or RM80 system disk.

Note that you can use the methods described in this appendix to free disk space on any space-constrained system.

Limited Space Support

Introduction As the OpenVMS VAX operating system and associated layered products continue to develop and mature, their sizes have grown so that previously acceptable system disk devices might have insufficient capacity for the desired computing environment. Support for added features, conformance to standards, addition of online documentation, and especially, support for a graphical user environment (specifically, VMS DECwindows Motif) have contributed to this growth. Although a single-user workstation system might be perceived as entry level, it does, in fact, have an increased need for system disk capacity to handle the desired graphical environment.

Limited Space Support Option In the past, when the OpenVMS VAX operating system grew too large for a specific disk type, that disk was no longer supported as a system device. The OpenVMS VAX Version 6.0 operating system and the VMS DECwindows Motif Version 1.1 layered product cannot fit, in total, on an RZ23L disk device.

However, to preserve the investment in some user configurations, a *limited space support* option has been introduced that will allow the RZ23L to continue to be used as a system disk but with some features removed. For the most part, these features include new online documentation, programming examples, and programming support files. The most important mechanisms used to provide this environment are the OpenVMS VAX and DECwindows tailoring facilities, VMSTAILOR and DECW$TAILOR. (For more information about these facilities, see Chapter 11).

The limited space support option means that, although the disk (in this case, the RZ23L), is supported as a system device, you must take some explicit action to not install or to remove some portions of the product so the remainder will fit. This option gives small, resource-constrained system users a choice between investing in new hardware or continuing with existing hardware but with (possibly) reduced capabilities.

Configurations Affected The RZ23L disk is now too small for the full OpenVMS VAX Version 6.0 and VMS DECwindows Motif Version 1.1 kits, regardless of user configuration. Other disk devices, such as the RZ24 and RD54 disks, will need to be closely monitored, depending on the system environment and user configuration.

The general disk space guideline for OpenVMS VAX plus VMS DECwindows Motif Version 1.1 is a system disk of at least 150 megabytes (or about 300,000 disk blocks). For nonworkstation, single-user systems, this guideline can be reduced to 100 megabytes because VMS DECwindows Motif support is not necessary. For timesharing systems, a larger disk is usually

necessary due to the need for many layered products and applications. For VAXcluster systems, a larger system disk capacity is also usually required. See the VAXcluster SPD for details.

For specific information about disk space requirements and supported system disks, see the OpenVMS VAX SPD (25.01.37).

While the absolute minimum disk space requirements can make base system support available, layered products, applications, and user files usually make it necessary to manage even large capacity system disks carefully. Therefore, some of the following techniques and ideas can be useful for a broader range of users than can be listed by hardware type.

Dealing with a Small System Disk

You can solve small system disk configuration problems three ways:

*   Upgrade your hardware to a larger capacity disk device.

*   Add additional hardware disk devices (one or more) to the system and redistribute the software contents.

*   Reduce the software contents on the existing disk device.

Upgrading hardware might have the highest monetary cost, but has the benefits of a full environment and the simplest and fastest upgrade mechanism. Adding additional hardware (or using existing extra hardware) can require less money, but requires more time and effort for setting up and maintaining the environment. Reducing the software contents requires the lowest capital expense but, by necessity, removes some features, documentation, or capabilities.

If your major constraint is fiscal, you might want to investigate the tailoring recommendations first. If time or simplicity are more important, you might want to purchase a larger system disk.

Tailoring Considerations

Introduction

Most of this appendix describes the mechanisms for reducing the software contents on the existing disk device, mostly by tailoring. There are also some hints for multiple disk systems. There is nothing specific to recommend for upgrading the hardware device, except that moving up in a single large increment is much more effective than several smaller ones.

The target device in the following sections is the RZ23L disk, which has 237,600 blocks (or 121 megabytes) of disk space. However, you can use these methods on any system that is tight on system disk space.

Configuration Goals

The basic configuration goal for the limited space support option is for an environment that is not used for programming. Typically, this would be a system with a few user applications or a turnkey system. It is possible to build a viable system with a single programming language environment (notably, the C language); however, the space used for this support and for the compiler reduces the amount of available user space.

There are some mechanisms and techniques common to any space-constrained system both for installing new systems and for upgrading existing systems. One of the most important considerations to reduce the disk space consumption of the normal, ongoing system environment before doing an upgrade or as soon as possible during or after an installation. Some methods for accomplishing this are discussed in the section Managing Single or Small System Disk Systems and in the section Managing Multiple Disk Systems.

Note that, during an upgrade or installation, there will be a period of time when the windowing software is likely to be unavailable. This means that, on a workstation, your monitor will function only as an operator console, and you will not be able to use screen-oriented editors.

Controlling the Size of Dump, Page, and Swap Files

One of the primary things to get under control is the sizing of the dump, page, and swap files in AUTOGEN. The tailoring facilities automatically use AUTOGEN to reboot the system, adjusting anything that the tailoring might have affected. Because AUTOGEN normally includes existing disk space in calculating the sizes for these files, unexpected results can occur when tailoring removes some files and AUTOGEN increases the size of others. Fixing the size of these files by adding appropriate lines to the file SYS$SYSTEM:MODPARAMS.DAT will prevent this from occurring during an upgrade or after an installation (and, possibly, while installing layered products).

The following values are suggested as generous for an upgrade:

PAGEFILE = 38000
SWAPFILE = 13500
DUMPFILE = 0

If your system has been running successfully with smaller values, use those instead.

If your windowing system is unavailable, you will not be able to use a screen-oriented editor to add these lines to the SYS$SYSTEM:MODPARAMS.DAT file. You can use the COPY command to add lines to the end of the text file as follows:

```
$ COPY SYS$SYSTEM:MODPARAMS.DAT,SYS$INPUT: SYS$SYSTEM:MODPARAMS.DAT [Return]
newparam1 = value1 [Return]
newparam2 = value2 [Return]
[Ctrl/Z]
```

Note: To be able to use the delete key more effectively when typing input to the console, set the operator terminal to be a scope (assuming it is not a hardcopy device). To set the console terminal to be a scope, enter the following command:

```
$ SET TERM/SCOPE/PERM _OPA0:
```

Make a Backup Copy of Your System Disk

It is important to make a backup copy of your system disk before any system software upgrade. When tailoring and system environment options must be used to fit the required software on the device, it is even more important to make a backup copy before you begin and at major milestones during the procedure. This gives you a fallback to a *last good* position in the event that a subsequent step produces undesired side effects (especially when tailoring software off of the disk) or fails due to unexpectedly running out of space.

Analyze the System Disk

The space used on the system disk might include files that have been only partially deleted (usually, because they were still open when an attempt was made to delete them). To recover this space, enter the following command:

```
$ ANALYZE/DISK/REPAIR SYS$SYSDEVICE:
```

Continue to use the ANALYZE/DISK/REPAIR command after every reboot or before each major step to be sure that all free blocks are available for the upgrade procedure to use.

Tailoring Options

The installation and upgrade procedures (for both OpenVMS VAX Version 6.0 and VMS DECwindows Motif) let you select optional software to install or upgrade only by save set. The tailoring facilities are capable of finer granularity and can usually select files in smaller groups within the save sets.

In the case of DECW$MOTIF_TAILOR, the save sets and tailoring groups are the same. Additionally, DECW$MOTIF_TAILOR can only tailor off. To add files, you must either use the installation or upgrade procedures or use the OpenVMS Backup utility (BACKUP) manually to select the desired files. For the VMSTAILOR and DECW$TAILOR utilities, the tailorable options are subsets of the installation and upgrade save sets and can be tailored either on or off. If there is sufficient space to take an entire save set, it is usually faster to select it during the procedure and then tailor off the undesired pieces, rather than tailor them on later.

If you are doing an upgrade and have a large area of user application files or a large database that is not part of the OpenVMS VAX operating system or VMS DECwindows Motif layered product but resides on the system disk, it might be convenient to backup that data to a separate piece of media, delete it from the system disk before the upgrade, and then restore it after the upgrade. The blocks can be used in the interim, and you can save time and effort in the tailoring and upgrade process.

You can decrease the time needed to perform the tailoring and upgrade tasks by disabling highwater marking on the system disk. To disable highwater marking, enter the following command:

```
$ SET VOLUME/NOHIGHWATER SYS$SYSDEVICE:
```

Depending on the system security you require, you might want to leave highwater marking permanently disabled. Otherwise, you can restore it by entering the following command:

```
$ SET VOLUME/HIGHWATER SYS$SYSDEVICE:
```

Installing OpenVMS VAX Version 6.0 and VMS DECwindows Motif Version 1.1

Introduction

In general, installing OpenVMS VAX Version 6.0 and VMS DECwindows Motif Version 1.1 is easier than doing an upgrade because there are no user files on the disk when you perform the installation. However, because the total size of the two kits is larger than the capacity of the RZ23L disk, you cannot select some options and you might have to do some tailoring.

Install OpenVMS VAX Version 6.0

By itself, the entire OpenVMS VAX Version 6.0 distribution kit fits on the RZ23L system disk. So, the easiest approach might be to select both the library and optional save sets, then use the VMSTAILOR and DECW$TAILOR utilities to increase the free space before installing the VMS DECwindows Motif layered product.

If you plan to run DECnet for OpenVMS, be sure to select the library save set. If you do not perform system programming or BLISS programming, do not have an LPA11 device, do not need any of the OpenVMS example files, and do not need the UETP facility, you can choose not to select the optional save set during the installation. The BLISS support in the optional save set (over 7000 blocks) and the examples (over 8300 blocks) are two of the largest single areas that you can easily tailor off.

You might choose not to install the new Help Message utility (MSGHLP) or OpenVMS manuals because both of these options are also very large. Or, you can select them at the expense of other tailorable options later (or at the expense of reduced user capacity). The Help Message utility consumes 7800 blocks; the OpenVMS manuals consume 7200 blocks.

Once the OpenVMS VAX installation is complete, set up the dump file as required. It is preferable not to have a dump file at all or to use the paging file as described in the section System Dump File. Also, set fixed sizes for the page and dump files so that AUTOGEN does not continually resize them as you proceed with tailoring and installing the VMS DECwindows Motif Version 1.1 layered product. When your environment is complete, you can remove the fixed sizes to allow AUTOGEN to calculate appropriate sizes based on the final space on the disk.

To fit the operating system on an RZ23L disk and have sufficient space to add some layered product or application packages and have user space remaining, you can generally support, at most, one programming language and no online examples or manuals. Use the VMSTAILOR and DECW$TAILOR utilities to remove software you do not need.

Install VMS DECwindows Motif

Depending on the options and setup of your system, you might have sufficient space to install the entire VMS DECwindows Motif Version 1.1 kit. However, it is likely that you again will need to remove support for all but one programming language and not include the examples. Because the programming support save sets for each language are large, choose only the support for languages you really need. In the case of the example files, you might want to install them if you have the space required, and then tailor them off once you have perused them or copied them to another area.

Remember to use the ANALYZE/DISK/REPAIR command to recover any lost space from partially deleted files.

Results

If you make the appropriate selections for a system with no MACRO or BLISS support, no online documentation, no miscellaneous tests or utilities, no examples, no programming support (except for the C language in VMS DECwindows Motif), and have no separate dump file, it is possible to generate a system with at least 35,000 blocks for applications and user files. If you also remove all programming support for all languages, it is possible to get over 60,000 free blocks on the RZ23L disk.

Upgrading from VMS Version 5.5–2 and VMS DECwindows

Introduction

The following sections describe how to upgrade to OpenVMS VAX Version 6.0 and install the VMS DECwindows Motif Version 1.1 layered product from a system running VMS Version 5.5–2 and VMS DECwindows.

Upgrading to OpenVMS VAX Version 6.0 causes more difficult space management problems than an installation because existing application or user files, the system configuration, and any already exercised tailoring options will modify the remaining space for the upgrade.

You must have 40,500 blocks of free space just to start the upgrade. If other techniques do not produce enough free blocks to begin the upgrade, you can tailor off some of the files that the procedure will be replacing during the upgrade. Note that this does not contribute to the total additional space that is required because these files would be deleted during the upgrade process, but it is a mechanism to help you start the upgrade if you do not have sufficient free space to begin. Throughout the upgrade, the procedure evaluates your remaining space and advises you of the options you can choose.

Upgrading to OpenVMS VAX Version 6.0

Before you begin the upgrade, prepare the system environment— especially the dump, page, and swap files as described in the section Controlling the Size of Dump, Page, and Swap Files.

Because the upgrade process requires being booted in a minimum startup environment (the system parameter STARTUP_P1 must be set to "MIN"), no windowing will be available and making further changes will be more difficult because you cannot use an editor in an operator window for a workstation.

Similarly, once the upgrade is complete, no windowing system will be available until you install the VMS DECwindows Motif layered product. Therefore, you will want to take the minimum options necessary during the upgrade and then tailor on any missing pieces.

Note that the DECnet for OpenVMS support is in the library save set, so it is important to install that save set during the upgrade to allow remote terminals to be used (if available) and to allow VMS DECwindows Motif Version 1.1 to start normally after installation.

It is recommended that you not take any of the optional online manuals or MSGHLP (unless you install them on an alternate device) when upgrading an RZ23L disk. You will want to choose the DECwindows device support if you are upgrading a workstation.

When the upgrade is complete, you will likely need to use VMSTAILOR and DECW$TAILOR to tailor off some of the programming support and miscellaneous files you installed.

Install VMS DECwindows Motif

At this point you should be ready to install the VMS DECwindows Motif Version 1.1 layered product. You need to choose which options to install based on the remaining space on your disk. It is recommended that you choose, at most, one language option and do not take the examples.

After you install the VMS DECwindows Motif layered product, you should be able to use an editor to assist you with any further cleanup or tailoring operations. Remember to use the ANALYZE/DISK/REPAIR command after the final reboot.

Results

Using these suggestions, it is possible to upgrade a VMS Version 5.5-2 system with VMS DECwindows to an OpenVMS VAX Version 6.0 system with VMS DECwindows Motif Version 1.1 on an RZ23L disk with up to 35,000 disk blocks reserved by applications and user files.

Upgrading from VMS Version 5.5–2 and VMS DECwindows Motif Version 1.1

Introduction

The following sections describe how to upgrade to OpenVMS VAX Version 6.0 with the VMS DECwindows Motif Version 1.1 layered product from a VMS Version 5.5–2 system running VMS DECwindows Motif Version 1.1.

This option requires the most attention and extra tailoring consideration because the disk blocks used by the VMS DECwindows Motif layered product cannot be used during the OpenVMS VAX upgrade procedure. This means that you might not be able to select even the library save set during the upgrade and that you would need to tailor on portions of it (most notably, the DECnet for OpenVMS support).

Depending on your configuration, it might be necessary to tailor off VMS DECwindows Motif and then reinstall it following the upgrade.

Upgrading to OpenVMS VAX Version 6.0

Before beginning the upgrade procedure, prepare the system environment—notably the dump, page, and swap files (see the section Controlling the Size of Dump, Page, and Swap Files)—and remove as much excess from the system disk as possible. Use the tailoring facilities to remove files that will be replaced or obsoleted by the upgrade procedure. This is a good way to get the necessary space (40,500 blocks) to start the upgrade but probably will not contribute to the final additional capacity required.

Tailor off all the OpenVMS programming files, examples, and miscellaneous utilities and any VMS DECwindows Motif support that is not required. Before upgrading the operating system, keep, at most, one language support option, and do not keep any VMS DECwindows Motif examples unless you have sufficient space to get at least the OpenVMS VAX required and library save sets directly in the upgrade.

If you have sufficient space after tailoring to allow both the OpenVMS VAX required and library save sets to be selected, then the upgrade will include DECnet for OpenVMS support and VMS DECwindows Motif will start normally after the upgrade.

If you cannot select the library save set, the lack of DECnet for OpenVMS support will likely keep VMS DECwindows Motif from starting on your system (at which point you will have only the operator window on your workstation). You can then tailor on the DECnet for OpenVMS support to get VMS DECwindows Motif running again. After you have VMS DECwindows Motif running, tailoring on any other pieces you might not have already acquired from either the library or optional save sets will be easier.

It is recommended that you not take any of the optional online manuals or MSGHLP (unless you install them on an alternate device). You will want to choose the DECwindows device support if you are upgrading a workstation.

Remember to use the ANALYZE/DISK/REPAIR command to clean up any partially deleted files.

Results   Using these suggestions, it is possible to upgrade a VMS Version 5.5-2 system running the VMS DECwindows Motif Version 1.1 layered product to an OpenVMS VAX Version 6.0 system running the VMS DECwindows Motif Version 1.1 layered product on an RZ23L disk with up to 35,000 disk blocks reserved by applications and user files.

Managing Single or Small System Disk Systems

Introduction

The primary goal for this type of environment is to reduce the system disk block usage incurred by the OpenVMS VAX system during normal operation. Both dynamic usage and static requirements can be reduced in various ways. Some system processing overhead can also be reduced or eliminated in this fashion, along with a corresponding reduction in system disk I/O.

System Dump File

One of the best mechanisms for reducing the total block overhead of the system is to carefully define the usage of the system dump file. Normally, this is configured as a separate file, SYS$SYSTEM:SYSDUMP.DMP, to which the contents of memory are written after a detected system failure. Depending on your system requirements, you might be able to reduce or eliminate this disk usage.

One effective technique is to use part of the system paging file, SYS$SYSTEM:PAGEFILE.SYS, as a temporary dump file, so that the space used for dump files is not permanently reserved and gets used only in the event of a crash. To do this, you will need to modify some system parameters in SYS$SYSTEM:MODPARAMS.DAT and delete the actual SYSDUMP.DMP file if it exists. This method is most effective for systems having small or medium memory sizes.

Alternately, you might set the DUMPSTYLE parameter to use the selective dump mechanism to reduce the size of the dump file. This method is typically used for large memory systems that do not need to preserve the entire memory contents in the event of a system failure. Instead of using selective dumps to the paging file, it is recommended that you keep a separate, but smaller, SYSDUMP.DMP file.

If you have no need to preserve dump files or are running in a very stable environment, you might want to clear the DUMPBUG parameter to avoid all dump processing and not write a dump file on failure.

Using PAGEFILE.SYS for the Dump File

To use the system paging file as a dump file, add the following lines to the SYS$SYSTEM:MODPARAMS.DAT file:

```
DUMPBUG = 1   ! Enable system dumps (default)
SAVEDUMP = 1  ! Keep dump in pagefile until analysis
DUMPFILE = 0  ! Disallow AUTOGEN to create or size dump file
```

Then delete the SYSDUMP.DMP file by entering the following command:

```
$ DELETE SYS$SYSTEM:SYSDUMP.DMP;*
```

Because the system currently has the file open, the delete command will not physically remove the file until the system is shutdown and rebooted. Use the AUTOGEN facility to reboot the system. When it has rebooted, enter the following command to clean up and finish the deletion of the file (and any others that were in a similar state):

```
$ ANALYZE/DISK/REPAIR SYS$SYSDEVICE:
```

After a system failure that writes dump information to the pagefile, you can analyze the data by entering the following command:

```
$ ANALYZE/CRASH SYS$SYSTEM:PAGEFILE.SYS
```

When your analysis is complete, you can free the pages to be used for paging once again by entering the following command:

```
$ ANALYZE/CRASH/RELEASE SYS$SYSTEM:PAGEFILE.SYS
```

For more information about the system dump file, see the *OpenVMS VAX System Dump Analyzer Utility Manual*.

Decompressing Libraries

The OpenVMS help libraries (as well as some programming libraries) are distributed in a compressed format. You can use the SYS$UPDATE:LIBDECOMP.COM procedure to decompress the libraries all at once or individually. For a small system disk, it is almost never worth the extra disk blocks consumed to decompress these libraries. The cost of leaving them compressed is a longer access time when you use them.

If you frequently use help or an individual programming library, it might be worthwhile to individually decompress those libraries. If you only infrequently use help or do not mind the slower response time of the libraries in compressed form, leave them compressed.

Disabling Log File Creation

Depending on your environment, there might be system jobs that create log files of no concern to you or that contain more information than you need.

Unless you are a network manager or experiencing network problems, you probably do not need to log network events. By not logging network events, you can save disk space, a process slot, and some memory in the running system. To disable network logging, enter the following commands:

```
$ MCR NCP PURGE KNOWN LOGGING ALL
$ MCR NCP CLEAR KNOWN LOGGING ALL
```

You need to enter these commands only once; they become permanent unless you reset the DECnet logging information.

To reduce the logging information for other tasks (such as OPCOM, Accounting, Security Auditing, Network Monitor Event Listener, and system-created batch log files), you need to add some commands to your system-specific startup command file, SYS$MANAGER:SYSTARTUP_VMS.COM (previously called SYSTARTUP_V5.COM).

The following is an example SYSTARTUP_VMS.COM command file for a single-user workstation:

```
$ SET NOON     ! Continue thru any problems.
$!
$ DEFINE/USER SYS$COMMAND _OPA0:  ! Disable some events from
$ REPLY/DISABLE=(NETWORK,CLUSTER,SECURITY) ! using the operator window.
$ SET TERM/SCOPE/PERM _OPA0:   ! If windows do not start, use as scope.
$!
$ SET AUDIT/ALARM -    ! Log interesting audit events.
 /ENABLE=(AUDIT,AUTHORIZATION,ACL,LOGIN=(LOCAL,DIALUP,NETWORK,REMOTE),-
  LOGFAILURE=ALL,BREAKIN=ALL)
$!
$ IF F$SEARCH("SYS$MANAGER:ACCOUNTNG.DAT;-1") .NES. "" THEN -
    PURGE SYS$MANAGER:ACCOUNTNG.DAT/KEEP=4 ! Purge old accounting info
$!
$ IF F$SEARCH("SYS$MANAGER:OPERATOR.LOG;-1") .NES. "" THEN -
    PURGE SYS$MANAGER:OPERATOR.LOG/KEEP=4 ! Purge old operator info
$!
$ DEFINE/SYSTEM/EXEC SYS$SYLOGIN SYS$MANAGER:SYLOGIN ! Setup system login
$!
$ START/QUEUE/MANAGER    ! Start queue manager
$ START/QUEUE SYS$BATCH   ! Start a batch queue
$!
$ SUBMIT/NOKEEP/NOPRINT SYS$MANAGER:STARTNET ! Start net without batch log
$!
$! ... add other system specific and layered product commands here ...
$!
$ EXIT
```

You might have an environment that can function with even less information than that shown in the example. For example, to disable the operator log file, you would use REPLY/NOLOG, or to disable accounting, you would use SET ACCOUNTING/DISABLE. For more information about using these commands, see the *OpenVMS DCL Dictionary*.

Accessing Example and Documentation Files

If you have network access to another OpenVMS system (especially a timesharing system), you do not need to duplicate the example files distributed in the OpenVMS VAX or VMS DECwindows Motif kits if they are available on the remote system. Similarly, remote access to the online documentation files will also save considerable disk space on any system with constrained disk space.

Managing Multiple Disk Systems

Introduction

The following sections describe techniques for managing multiple disk systems. In addition to the goal of reducing the space requirements on the system device, it is possible to simultaneously reduce some of the I/O load to the system disk by redirecting necessary functions to an alternate device.

Alternate Page and Swap Files

Setting up alternate page and swap files is one of the best ways to reduce both the system disk space usage and I/O overhead. If you set up only a small primary page file on the system disk and install additional page and swap files in the startup command file SYS$MANAGER:SYPAGSWPFILES.COM, you can permanently cause these files to consume the least amount of space on the system device. For more information about setting up alternate page and swap files, see the *OpenVMS System Manager's Manual*.

Copying Dump Files

At startup, you can enhance the use of the paging file as a dump file that will automatically copy dump data for later analysis. This releases the disk space in SYS$SYSTEM:PAGEFILE.SYS to be used for paging automatically as well. Instead of manually invoking the System Dump Analyzer (SDA) to release the pages, you can add the following commands to the SYS$MANAGER:SYSTARTUP_VMS.COM file:

```
$ ANALYZE/CRASH SYS$SYSTEM:PAGEFILE.SYS
COPY alternate_disk:[dir]dumpname.ext
EXIT
```

Note: The dump file, whether it is SYSDUMP.DMP or PAGEFILE.SYS, must reside on the system disk. This might limit the actual savings you can achieve using alternate page files.

Offloading System Logs and Files

There are several system logs and files that can be redirected to another device. For other system logs and files, it might be easier to reset and start a new log file, copy the old file or files to another device, and purge them from the system disk.

Some files that can be redirected are the system authorization file, the queue manager database, the audit log file, and batch log files. Some files that can be reset, copied, and purged are the operator log file, the accounting log file, and network log files. For more information about these facilities see the *OpenVMS System Manager's Manual*, the *OpenVMS DCL Dictionary*, or the utility reference manual for the utility whose files you want to offload.

Offloading Nonessential Files

Some of the online manuals included with OpenVMS VAX Version 6.0 can be redirected to an alternate device during the installation or upgrade procedure. This can save many valuable system disk blocks while providing quick access to the manuals. For a small system disk configuration with multiple disks, this approach is recommended if you want the manuals or help message (MSGHLP) to be available online.

Glossary

boot, bootstrap

The process of loading system software into a processor's main memory. This guide uses the term *boot* to refer to this process.

boot command procedure

A program, stored on the console fixed disk, that is used to boot the OpenVMS operating system from a specified controller. Digital provides a boot command procedure for each controller that the processor supports.

boot name

The abbreviated name of the boot command procedure you use to boot the system.

boot server

A VAX computer that is part of a local area VAXcluster. The boot server is a combination of a MOP server and a disk server for the satellite system disk. See also satellite node.

CI-only VAXcluster

A computer system consisting of a number of VAX computers. It uses only the computer interconnect (CI) to communicate with other VAX computers in the cluster. These computers share a single file system.

computer interconnect (CI)

A type of I/O subsystem. It links VAX computers to each other and to HSC devices. See also *Hierarchical Storage Controller (HSC) device*.

DECW$TAILOR

A software program that lets you add or remove DECwindows files from your system disk.

device name

The name used to identify a device on the system. A device name indicates the device code, controller designation, and unit number.

disk server

A VAX computer that is part of a local area VAXcluster. This computer provides an access path to CI, CSSI, and locally-connected disks for other computers that do not have a direct connection.

Hierarchical Storage Controller (HSC) device

A self-contained, intelligent, mass storage subsystem that lets VAX computers in a VAXcluster environment share disks. Examples are the HSC50 and the HSC70.

HSC drive

Any disk or tape drive connected to an HSC device is called an HSC drive. A system disk on an HSC drive can be shared by several VAX computers in a VAXcluster environment.

InfoServer

A general-purpose disk storage server that allows you to use the distribution compact disc to install the operating system on remote client systems connected to the same LAN (local area network).

local area VAXcluster

A configuration consisting of one or more VAX computers that act as a MOP server and disk server, and a number of low-end VAX computers that act as satellite nodes. The local area network (LAN) connects all of the computers. These computers share a single file system.

local drive

Any drive that is connected directly to a VAX computer.

media

Any packaging agent capable of storing computer software. Examples: compact discs, magnetic tapes, floppy diskettes, disk packs, tape cartridges.

mixed-interconnect VAXcluster

A computer system consisting of a number of VAX computers. It uses both the computer interconnect (CI) and Ethernet to communicate with other VAX computers in the cluster. These computers share a single file system.

MOP server

A computer system running DECnet that downline loads VAXcluster satellites using the DECnet MOP protocol.

satellite node

A VAX computer that is part of a local area VAXcluster. A satellite node is downline loaded from a MOP server and then boots remotely from the system disk served by a disk server in the local area VAXcluster. See also boot server, disk server, MOP server.

save set

The format in which the Backup utility stores files. The OpenVMS operating system is shipped in this format.

scratch disk

A blank disk or a disk with files you no longer need.

source drive

The drive that holds the distribution kit during an upgrade or installation.

spin up, spin down

To spin up means to bring a disk drive up to operating speed; to spin down means to bring it to a gradual stop.

standalone BACKUP

A subset of the BACKUP utility that is booted into main memory instead of running under the control of the OpenVMS operating system. Standalone BACKUP is used to back up and restore the system disk and to install OpenVMS operating system software.

standalone system

A computer system with only one VAX computer.

system disk

The disk that contains or will contain the OpenVMS operating system. A OpenVMS system disk is set up so that most of the OpenVMS files can be shared by several VAX computers. In addition, each computer has its own directory on the system disk that contains its page, swap, and dump files.

target drive

The drive that holds the system disk during an upgrade or installation.

transaction log

A log used by DECdtm services to record information about transactions. The Log Manager Control Program (LMCP) is used to create a transaction log.

UETP (User Environment Test Package)

A software package that tests all the standard peripheral devices on your system, various commands and operating system functions, the system's multiuser capability, DECnet–VAX, and the VAXcluster environment.

VAXcluster environment

A computer system consisting of a number of VAX computers. There are three types of VAXcluster environments: CI-only, local area, and mixed interconnect.

VMSTAILOR

A software program that lets you add or remove optional OpenVMS files from your system disk.

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How to Order Additional Documentation

Technical Support

If you need help deciding which documentation best meets your needs, call 800-DIGITAL (800-344-4825) and press 2 for technical assistance.

Electronic Orders

If you wish to place an order through your account at the Electronic Store, dial 800-234-1998, using a modem set to 2400- or 9600-baud. You must be using a VT terminal or terminal emulator set at 8 bits, no parity. If you need assistance using the Electronic Store, call 800-DIGITAL (800-344-4825) and ask for an Electronic Store specialist.

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[1]Call to request an Internal Software Order Form (EN–01740–07).

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Accuracy (product works as manual says)	☐	☐	☐	☐
Completeness (enough information)	☐	☐	☐	☐
Clarity (easy to understand)	☐	☐	☐	☐
Organization (structure of subject matter)	☐	☐	☐	☐
Figures (useful)	☐	☐	☐	☐
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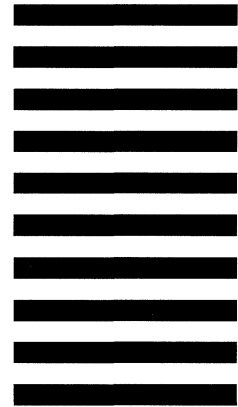
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