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VMS Installation and Operations:
VAXstation I, II, II/GPX and MicroVAX I, II

VMS Installation and Operations: VAXstation I, II, II/GPX and MicroVAX I and II

April 1988

This guide describes the VMS installation procedure for the VAXstation I, II, II/GPX and MicroVAX I and II. It also explains the startup, shutdown, and backup operations for these VAX computers.

April 1988

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Preface

The *VMS Installation and Operations: VAXstation I, II, II/GPX and MicroVAX I and II* contains specific installation and operations information for the VAXstation I, II, II/GPX and the MicroVAX I and II. All references to the MicroVAX II apply to the MicroVAX I and the VAXstation I and II except as noted.

This guide refers to the following products by their abbreviated names:

- The VAXstation I, VAXstation II, VAXstation II/GPX, MicroVAX I, and MicroVAX II computers are referred to collectively as the VAXstation I, II, II/GPX and MicroVAX I and II.

- The VAXstation I computer is referred to as the VAXstation I.

- The VAXstation II computer is referred to as the VAXstation II.

- The VAXstation II/GPX computer is referred to as the VAXstation II/GPX.

- The MicroVAX I computer is referred to as the MicroVAX I.

- The MicroVAX II computer is referred to as the MicroVAX II.

Store this installation and operations guide in the binder that contains the current version of the *VMS Release Notes*. Place it in the section after the *VMS Release Notes*.

Intended Audience

This guide is intended for system managers, operators, and users of the VAXstation I, II, II/GPX and the MicroVAX I and II.

Document Structure

The *VMS Installation and Operations: VAXstation I, II, II/GPX and MicroVAX I and II* is organized in two parts. Part I provides an overview of the system and covers both the installation and post-installation procedures. Part II describes operations that you perform frequently on the system, such as system startup, shutdown, and backup.

Part I

- Chapter 1 describes the VMS installation, upgrade, and update procedures.

- Chapter 2 describes system hardware used during the installation.

- Chapter 3 contains instructions for using tape cartridges and diskettes.

- Chapter 4 summarizes the basic information you need to know before installing the VMS operating system.

- Chapter 5 describes how to install the VMS operating system from magnetic tape or tape cartridge.

- Chapter 6 describes how to install the VMS operating system using floppy diskettes.

- Chapter 7 describes how to install the VMS operating system from CD ROM.

- Chapter 8 lists the tasks you should perform after you install the VMS operating system.

- Chapter 9 explains the User Environment Test Package (UETP) program and how you can use it to test the system.

Part II

- Chapter 10 contains instructions for starting up the system. It also describes procedures for shutting down the system.

- Chapter 11 describes backup procedures that you should perform on a regular basis.

- Appendix A describes loading the operating system into memory from a disk on a second mass storage control protocol (MSCP) controller.

- The Glossary lists and defines terms.

Associated Documents

The following documents may be useful:

- The *VMS Release Notes*—provides notes on various aspects of the VMS operating system. Most importantly, the release notes contain a description of the upgrade and update procedures. In addition, the release notes contain the latest information regarding your VAX computer. You should read the release notes before installing, upgrading, or updating the VMS operating system or using your VAX computer.

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

Conventions

Conventions	Meaning
RET	In examples, a key name (usually abbreviated) shown within a box indicates that you press a key on the keyboard; in text, a key name is not enclosed in a box. In this example, the key is the RETURN key. (Note that the RETURN key is not usually shown in syntax statements or in all examples; however, assume that you must press the RETURN key after entering a command or responding to a prompt.) VT200-series terminal key names appear first in text and examples in this guide. Key names that are different on the VT100-series terminal keyboard are shown in parentheses after the VT200-series key names.
CTRL/C	A key combination, shown in uppercase with a slash separating two key names, indicates that you hold down the first key while you press the second key. For example, the key combination CTRL/C indicates that you hold down the key labeled CTRL while you press the key labeled C. In examples, a key combination is enclosed in a box.
$ SHOW TIME 05-JUN-1988 11:55:22	In examples, system output (what the system displays) is shown in black. User input (what you enter) is shown in red.
$ TYPE MYFILE.DAT . . .	In examples, a vertical series of periods, or ellipsis, means either that not all the data that the system would display in response to a command is shown or that not all the data a user would enter is shown.
input-file, . . .	In examples, a horizontal ellipsis indicates that additional parameters, values, or other information can be entered, that preceding items can be repeated one or more times, or that optional arguments in a statement have been omitted.
[logical-name]	Brackets indicate that the enclosed item is optional. (Brackets are not, however, optional in the syntax of a directory name in a file specification or in the syntax of a substring specification in an assignment statement.)
quotation marks apostrophes	The term quotation marks is used to refer to double quotation marks ("). The term apostrophe (') is used to refer to a single quotation mark.

Preface

Conventions	Meaning
Delete key	The key on the VT200 series terminal keyboard that performs the DELETE function is labeled ⟨X⟩. Assume that DELETE in text and examples refers to both the VT100 and VT200 series delete keys.

New and Changed Features

Before VMS Version 5.0 the *VAX/VMS System Manager's Reference Manual* included specific information on booting and installing standalone BACKUP on the different VAX computers. The *Guide to VAX/VMS Software Installation* provided information on console subsystems, disk and tape drives, and booting during installation. There were also 19 separate booklets with step-by-step instructions for installing the VMS operating system.

With VMS Version 5.0 DIGITAL is providing one guide for each family of VAX computers. Each guide provides a single source of information on the following:

- Disk and tape drives and the console subsystem

- Installing the VMS operating system on your particular VAX computer

- Testing the system with UETP

- Startup and shutdown operations

- Installing and booting standalone BACKUP

- Backing up and restoring the system disk

- Backing up the console media (if applicable)

The guide for your VAX computer provides all the specific information you need to install the VMS operating system and perform daily startup, shutdown, and backup operations.

Note the following Version 5.0 restrictions for installing the VMS operating system:

- Dual system disks are no longer supported.

- The entire VMS operating system will not fit on an RC25 or RD52 system disk. DIGITAL suggests that you add more disk storage to your system.

- The VAX–11/782 is no longer supported.

Part I

Part I describes installation and post-installation procedures.

1 The Installation, Upgrade, and Update Procedures

This chapter describes what happens during the installation, upgrade, and update procedures. It also tells you when you should do an installation, an upgrade, or an update and refers you to the appropriate documentation.

Before you install or upgrade the VMS operating system, read this chapter.

1.1 What Happens During an Installation

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

- Initializes the system disk, erasing its contents

- Creates a system directory structure

- Transfers the VMS files from the distribution media to the system disk

Use the installation procedure under the following conditions:

- If your VAX computer is new (it has never had any version of the VMS operating system running on it).

- If your VAX computer is running a version of the VMS operating system and you want to destroy the contents of the system disk (both VMS and user files).

- If you are running the VMS operating system, but are not able to perform an upgrade. For example, if you do not have a standard version of the VMS operating system on your system disk, the upgrade procedure will not work correctly.

If you are going to install the VMS operating system, read Chapters 1 through 4 of this guide and follow the appropriate installation procedure.

CAUTION: **The installation procedure initializes the system disk, erasing 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.**

1.2 What Happens During an Upgrade

When you upgrade the VMS operating system, the upgrade procedure does the following:

- Makes room for the upgrade by purging and deleting some VMS files, but leaves some of the VMS files and all the user files intact

- Transfers the VMS files from the distribution media to the system disk

- Merges the old VMS files and the new VMS files

- Cleans up files and structures used only during the upgrade

The Installation, Upgrade, and Update Procedures

In most cases, if you are already running a standard version of the VMS operating system, you can use the upgrade procedure to obtain a higher version. The upgrade procedure does not initialize the system disk.

CAUTION: **The upgrade procedure will not work correctly if you have changed the names of system directories on your system disk or if you have deleted VMS files from them. Restore your VMS system disk to a standard system before attempting an upgrade.**

Because not all the VMS operating system files can fit on an RC25 system disk, you cannot upgrade an RC25 system disk. You will have to perform an installation to get the next highest version of the VMS operating system. Before installing the new version, make a backup copy of your current system disk.

To perform an upgrade, see the current version of the *VMS Release Notes* for a step-by-step description of the upgrade procedure.

1.3 What Happens During an Update

You use the update procedure to make minor fixes to the operating system. When you update the VMS operating system, the update procedure does the following:

- Applies patches to some VMS files

- Replaces some VMS files

After performing an installation or an upgrade, you perform an update. This update is referred to as the *mandatory update*. The directions for an installation or an upgrade indicate when to perform the mandatory update.

Some maintenance releases of the VMS operating system are also applied with the update procedure. The directions for a maintenance update are in the *VMS Release Notes*.

CAUTION: **The update procedure will not work correctly if you have changed the names of system directories on your system disk or if you have deleted VMS files from them. Restore your VMS system disk to a standard system before attempting an update.**

2 MicroVAX I and II Hardware

Before you install the VMS operating system, you must be familiar with your system's hardware. This chapter describes hardware similarities and differences and includes illustrations of the four MicroVAX models. It also describes the following MicroVAX I and II hardware components:

- Processor control panel (all models except the BA200 series)

- CPU panel (all models except the BA200 series)

- Controls and indicators on the BA200 series model

- Console terminal

- Tape cartridge drive and tape cartridges

- Diskette drive and diskettes

Your system's hardware differs depending on the following two factors:

- Whether it is a MicroVAX I or MicroVAX II

- If it is a MicroVAX II, whether it is a 630QY, 630QZ, 630QB, 630QE, or a BA200 series model

All MicroVAX I systems can be horizontal or vertical. Vertical systems stand on a pedestal. Horizontal systems can be mounted in a rack enclosure or on a table top.

This chapter does not include a detailed description of MicroVAX hardware; it is a description of the hardware you need to be familiar with to perform system management operations. For a detailed description of MicroVAX hardware for your configuration, see the hardware manuals supplied with your computer.

2.1 VAXstation I, II, II/GPX and MicroVAX I and II Common Features

The MicroVAX II super-microsystem is a member of the 32-bit VAX family of computers that is configured using the extended Q-bus. It is compatible with larger VAX computers.

The MicroVAX II performs a wide range of applications, including real-time applications, office automation, and general-purpose programming.

The MicroVAX II can be integrated into a network by using a DECnet or an Ethernet local area network interface. With the MicroVAX II, these options can send, share, and store files from systems in your department or in your organization.

Additional features include the following:

- 1Mb of on-board memory (except MicroVAX I)

MicroVAX I and II Hardware
2.1 VAXstation I, II, II/GPX and MicroVAX I and II Common Features

- Memory management
- Time-of-year clock with battery backup (except MicroVAX I)

2.2 VAXstation I, II, II/GPX and MicroVAX I and II Differences

The VAXstation II, which is based on the MicroVAX II CPU, is a high-powered, single-user graphics workstation. It provides 2 Mb of memory and can be upgraded to 9 Mb. The VAXstation II is compatible with other VAX computers.

The VAXstation II/GPX color graphics workstation, which uses the MicroVAX II CPU with the GPX accelerator chipset, provides the same features as the VAXstation II. In addition, the VAXstation II/GPX offers increased speed and color graphics. Memory can be expanded to 9 Mb.

2.3 MicroVAX Models

This section contains illustrations of the four MicroVAX models.

Figure 2–1   The MicroVAX I 610QY and MicroVAX II 630QY, 630QZ Models

ZK-6129-HC

Figure 2–2   The MicroVAX II 630QB Model
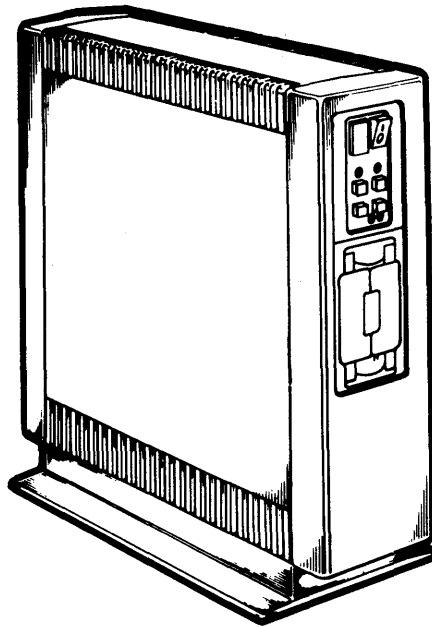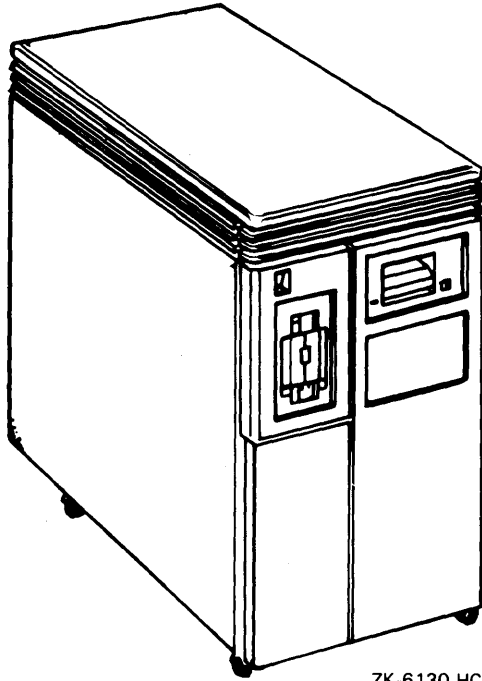
ZK-6130-HC

MicroVAX I and II Hardware
2.3 MicroVAX Models

Figure 2–3   The MicroVAX II 630QE Model
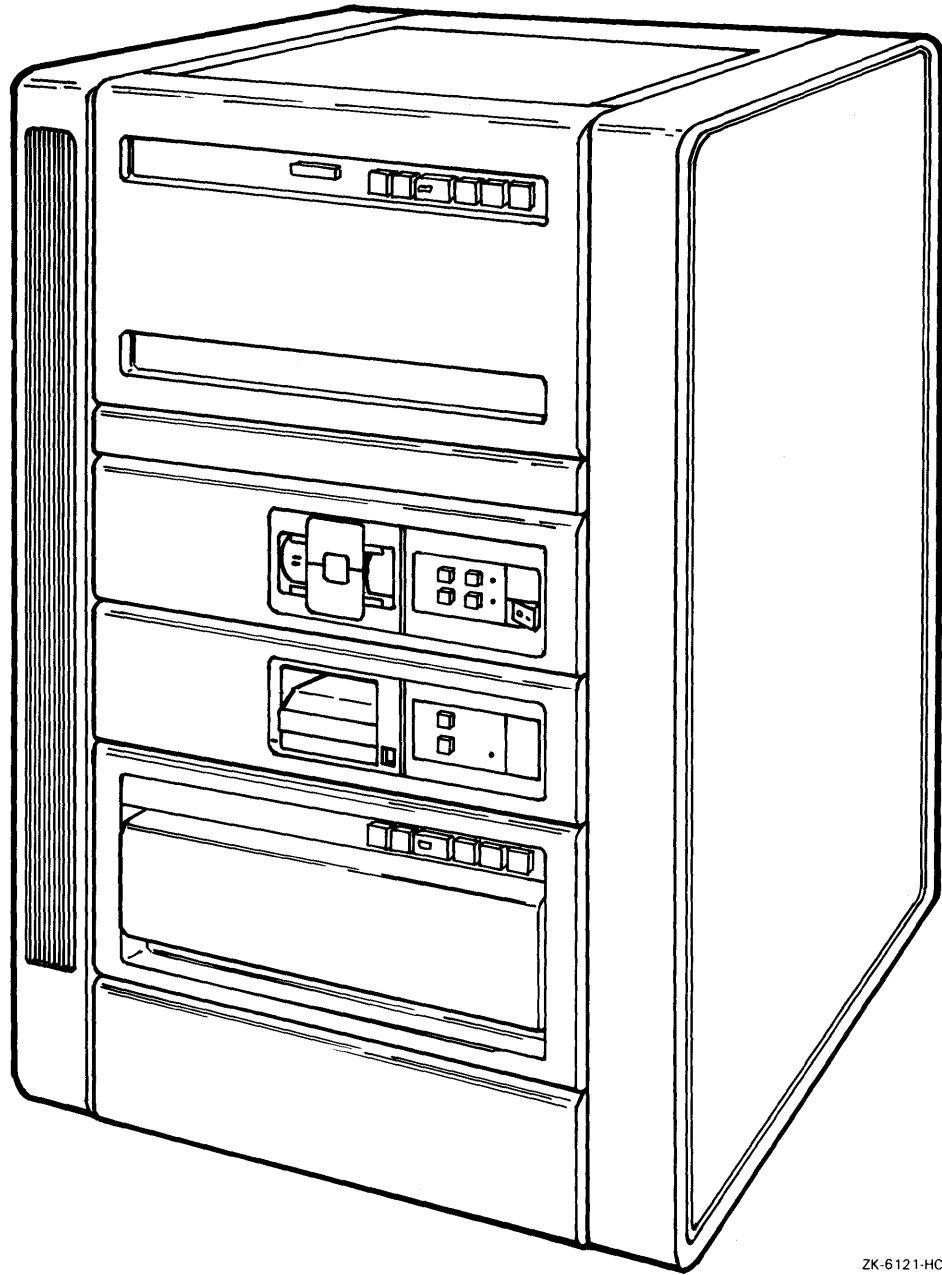
ZK-6121-HC

Figure 2–4 The MicroVAX II BA200 series Model

ZK-6124-HC
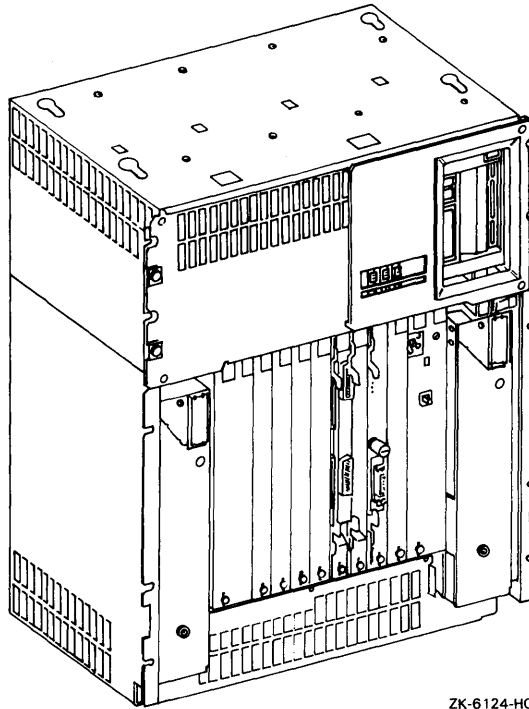
2.4　Processor Control Panel

The processor control panel is located on the front of all MicroVAX processors except the BA200 series model. It consists of controls and indicator lights. (Section 2.6 describes and illustrates the controls and indicator lights on the BA200 series model.)

Figure 2–5 is an illustration of the processor control panels on the MicroVAX I 610QY and the MicroVAX II 630QY and 630QZ models.

Figure 2–6 is an illustration of the processor control panel on the MicroVAX II 630QB model. Note that there may be additional write-protect and ready lights for additional fixed disks.

Figure 2–7 is an illustration of the processor control panel on the MicroVAX II 630QE model.

MicroVAX I and II Hardware

2.4 Processor Control Panel

Figure 2–5   The MicroVAX I 610QY and MicroVAX II 630QY and 630QZ Models Processor Control Panels

ZK-1739-84

ZK-4147-85

Figure 2–6 The MicroVAX II 630QB Model Processor Control Panel
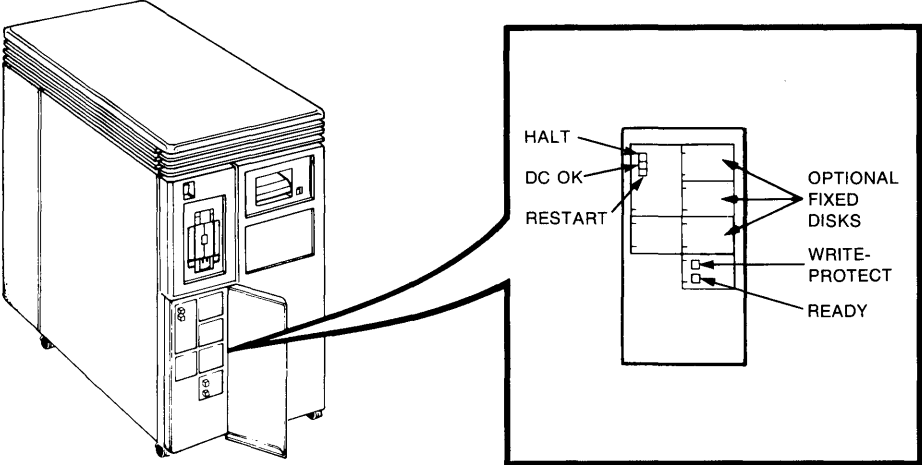
ZK-4206-85

Figure 2–7 The MicroVAX II 630QE Model Processor Control Panel
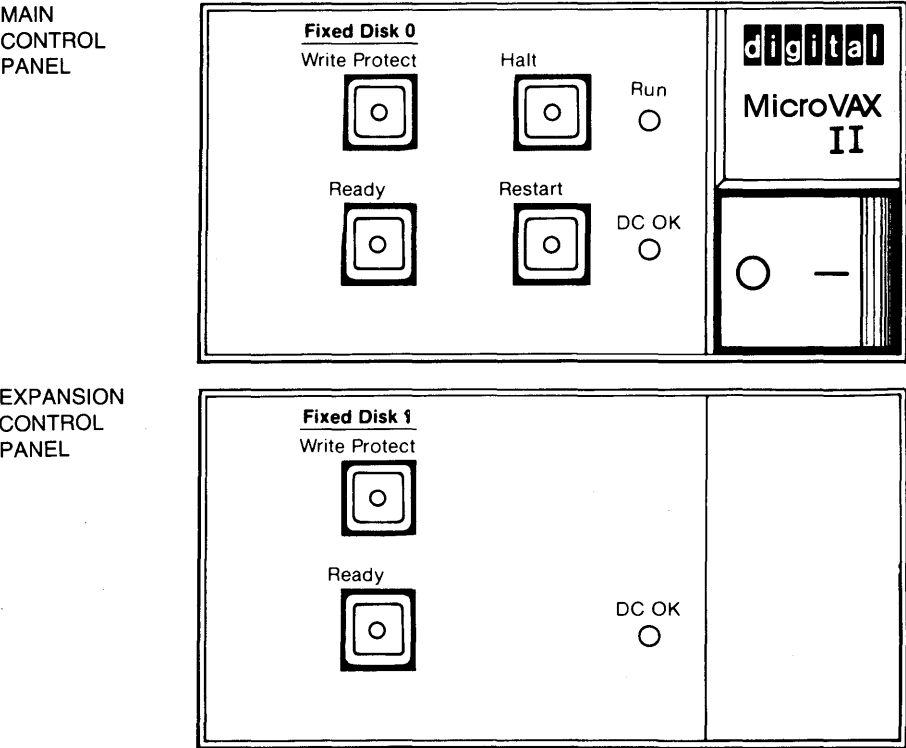
ZK-5002-86

MicroVAX I and II Hardware
2.4 Processor Control Panel

Table 2–1 describes the controls and indicator lights on the processor control panel.

Table 2–1   Controls and Indicator Lights on the Processor Control Panel

Control/Indicator Light	Description
Power switch	Setting this switch to 1 turns on the power; setting it to 0 turns off the power. Most MicroVAX power switches contain an orange light that glows when power to the system is turned on.
Run light	This light glows green when the processor is running.
DC OK light	This light glows green if all DC voltages are present and within tolerance levels.
Halt button	This button stops the processor. It contains a red light. When you push the HALT button in, the light on the button glows red and the button stays pushed in. When you release the HALT button, by pressing it again, the system enters console mode. On MicroVAX II processors, the Halt Enable/Disable switch on the CPU panel must be set to the Enable position for the HALT button to stop the processor. If the Halt Enable /Disable switch is set to the Disable position, pressing the HALT button causes the light on the button to glow red, but does not stop the system. Note that the F5 (BREAK) key on the console terminal works the same way as the HALT button.
Restart button	This button causes a simulated power down/up sequence to restart CPU operation. Pressing this button has no effect if the system is stopped.
Write Protect button	This button prevents writing to a fixed disk. When this button is pushed in, the light on the button glows orange on a MicroVAX I and red on a MicroVAX II.
Ready button	This button prevents writing to or reading from a fixed disk. When this button is pushed in, the disk is protected from reading or writing. When the button is released, the light on the button glows green; the disk is available for reading and writing. The light on the ready button blinks when data are read from or written to the fixed disk.
Diskette write-protect lights	Each diskette drive on a MicroVAX I system has a corresponding write-protect light. These lights are located above the drive on a vertical system and to the right of the drive on a horizontal system. These lights glow red when a write-protected diskette is in the drive. MicroVAX II systems do not have write-protect lights.

2.5   CPU Panel

The CPU panel is located on the back of all MicroVAX processors except the BA200 series model. (See Section 2.6 for a description of the controls and indicators on the BA200 series model.) The appearance of the panel differs depending on whether you have a MicroVAX I or a MicroVAX II.

On a MicroVAX I, the CPU panel contains only one control that you can set. This is the baud-rate control knob. Figure 2–8 shows the MicroVAX I CPU panel.

2.5 CPU Panel

Figure 2–8   The MicroVAX I CPU Panel

Rear
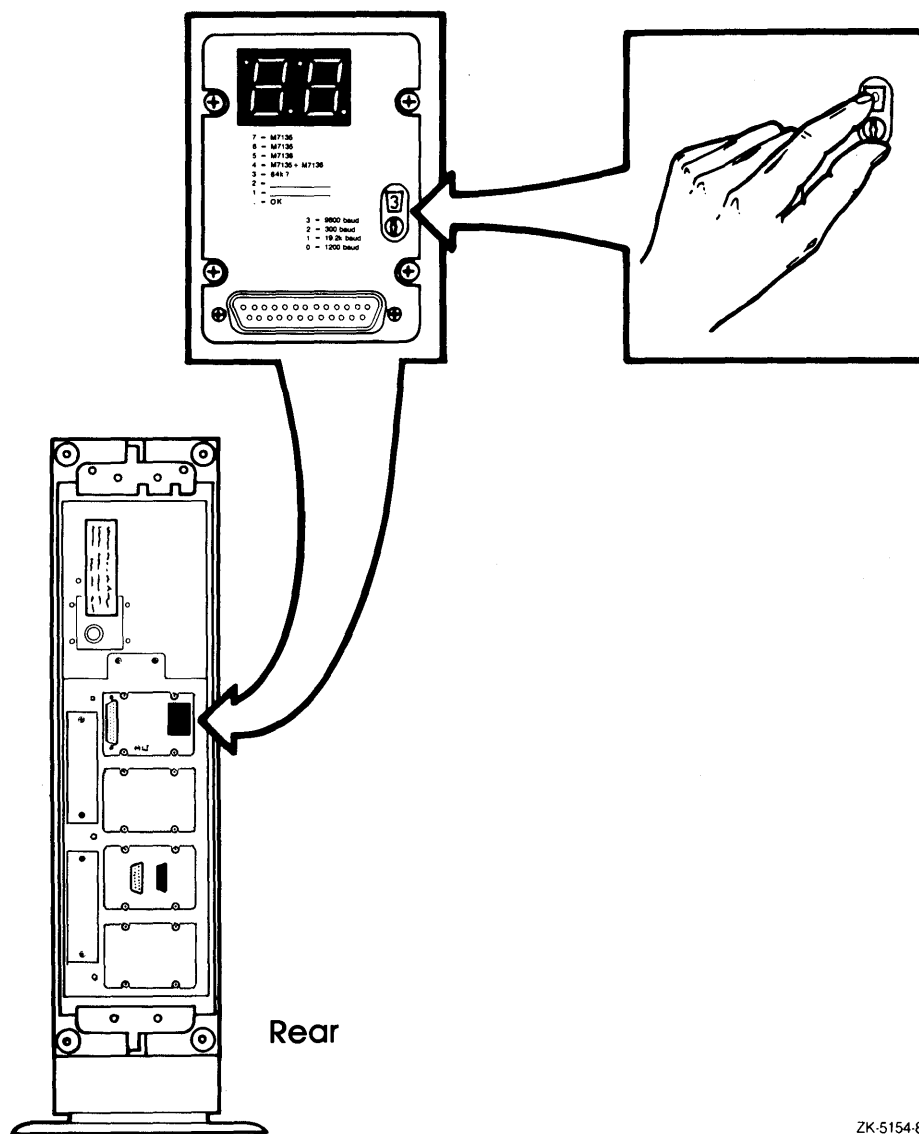
ZK-5154-86

On a MicroVAX II system, the CPU panel contains the following three controls you can set:

- Baud-rate control knob

- Halt Enable/Disable switch

- Power-up mode switch

The CPU panels on both the MicroVAX I and II also contain the port used for the console terminal.

Figure 2–9 shows the MicroVAX II CPU panel.

Figure 2–9   The MicroVAX II CPU Panel

Halt Enable/Disable
(Disable Position)

Power Up Mode

Baud Rate

Baud
300
600
1200
2400
4800
9600
19200
38400
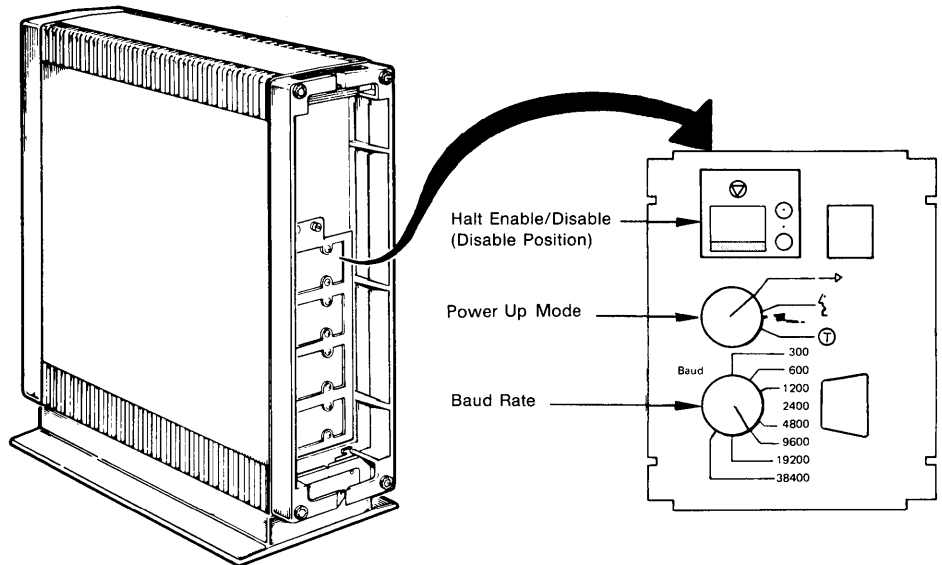
ZK-4099-85

2.5.1   Baud-Rate Control Knob

On a MicroVAX I system, the baud-rate control knob is a small plastic knob in the middle of the CPU panel. Next to the knob is a small window through which you can see a number indicating the baud rate. A table next to the knob shows the baud rate associated with each number.

The baud-rate control knob determines the speed at which characters are received from and transmitted to the console terminal. The baud rates set on the terminal and on the computer must be identical for the console terminal to communicate with the system. DIGITAL recommends that you set the baud rate for both the console terminal and the system to 9600 baud. Section 2.8 contains instructions for checking the baud rate of the console terminal.

Figure 2–8 shows the CPU panel on a MicroVAX I with the baud-rate control knob set to 3 (9600 baud).

On a MicroVAX II system, the baud-rate control knob is located at the bottom of the CPU panel (or on the left of a horizontal model). The different baud rate positions are displayed on the panel. Figure 2–9 shows the CPU panel on a MicroVAX II with the baud-rate control knob set to 9600 baud.

2.5.2 Halt Enable/Disable Switch

The Halt Enable/Disable switch is located at the top of the CPU panel (or on the right of a horizontal computer). It is labeled with an encircled triangle, the international symbol for halt. You enable or disable halts as follows:

- You *enable* halts when the switch is pushed toward the encircled triangle and aligned with the circle with the dot inside it.

- You *disable* halts when the switch is pushed away from the encircled triangle and aligned with the circle with the dot outside it.

The Halt Enable/Disable switch on a MicroVAX II system controls whether the system can be stopped. The Halt Enable/Disable switch must be set to the ENABLE position for the HALT button on the processor control panel or the F5 (BREAK) key to stop the system.

For normal system operations, set the Halt Enable/Disable switch to the DISABLE position. This prevents the system from being stopped if the HALT button on the system control panel is pressed accidentally. Also, if you disable halts, a system boots automatically when the system power is turned on. In addition, if you disable halts, the light on the HALT button glows if the HALT button is pressed.

Figure 2–9 illustrates the Halt Enable/Disable switch on the CPU panel.

2.5.3 Power-Up Mode Switch

The power-up mode switch is located in the middle of the CPU panel. This switch allows you to select one of three symbols that indicates a power-up mode. Table 2–2 describes the settings on the power-up mode switch.

Table 2-2 Settings on the Power-Up Mode Switch

Setting	Description
Arrow	This is the original factory setting and the setting for normal system operations. The system performs full diagnostics when it is turned on at this setting. After the diagnostics complete, if you enable halts, the console-mode prompt ($>>>$) appears on the console terminal screen. If you disable halts, your system boots automatically. If the system has been turned off for many days, however, you might be asked to choose the console-mode language you want to use. To select a language, turn the switch to the language-inquiry setting (face in profile). DIGITAL recommends that this switch be set to the arrow during installation.
Face in profile	This is the language inquiry setting. The system performs full diagnostics when it is turned on at this setting. After the diagnostics complete, if the console terminal supports the DEC Multinational Character Set, the console-mode language prompt is displayed. After you choose the language, you enable halts, and the console-mode prompt ($>>>$) appears on the console terminal screen. If you disable halts, your system boots automatically. First, select a console-mode language. Second, turn the power-up mode switch to the arrow.
Encircled T	This is the test setting. Do not use this setting. It is reserved for use by DIGITAL Field Service.

If your console terminal supports the DEC Multinational Character Set and does not respond in the language you want to use, do the following:

* Press the system power switch to 0 (OFF).

* Reset the power-up mode switch to the language inquiry setting (face in profile).

* Press the system power switch to 1 (ON).

At the prompt, select the language and turn the power-up mode switch to the arrow setting.

Figure 2-9 illustrates the power-up mode switch.

2.6 Controls and Indicators on the BA200 series Model

All controls and indicator lights on the BA200 series model are located on the front of the system. All BA200 series models have a power supply on both the right and the left. All models also have two sets of power supply controls and indicator lights. Figure 2-10 illustrates in detail the front of the BA200 series model.

Figure 2-10 Front View of the BA200 series Chassis

ZK-6128-HC
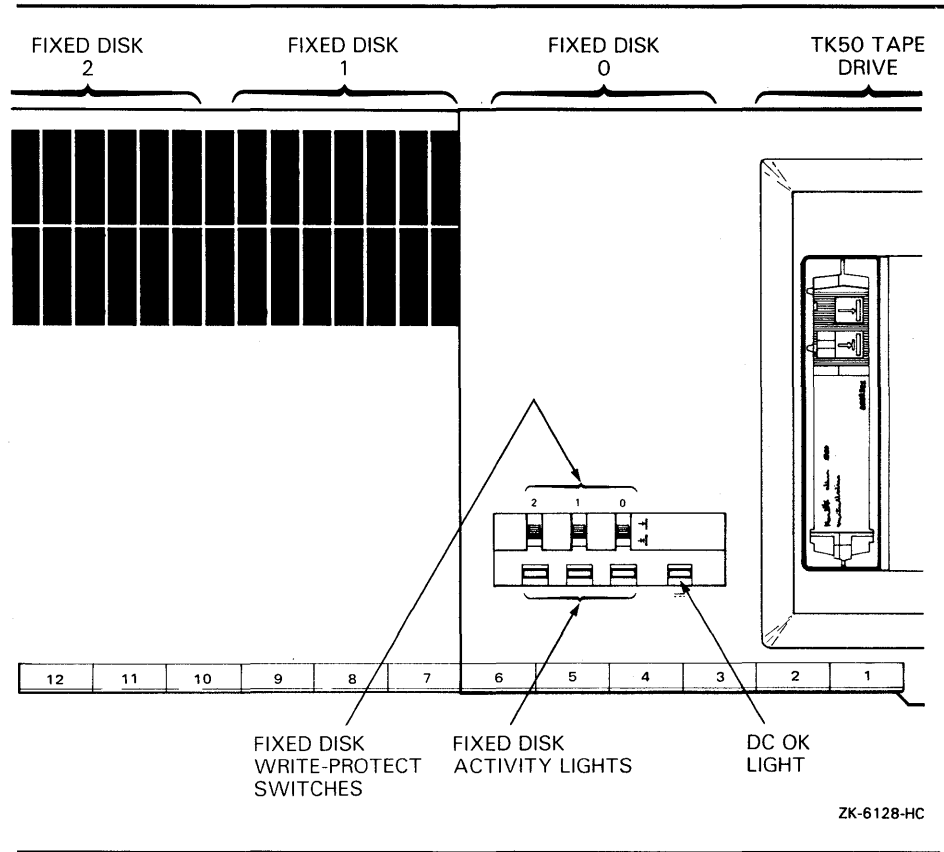
2.6 Controls and Indicators on the BA200 series Model

Table 2-3 describes the controls on the BA200 series model.

Table 2-3 Controls on the BA200 series Model

Control	Description
Power switch	Setting this switch to 1 turns on the power; setting it to 0 turns off the power. This switch is located below the tape drive. The power switch glows orange when power to the system is turned on.
Halt button	The BA200 series model has *no* HALT button. If you enable halts, press the F5 (BREAK) key on the console terminal keyboard to stop the system.
Fixed disk write-protect switches	These switches are located on the mass storage tray next to the tape drive, above the fixed disk activity lights. When these switches are set to the down position, the disk is write-protected. The system can read data from the fixed disk but cannot modify data or write new data to the fixed disk.
Tape drive LOAD/UNLOAD button	This button is located above the cartridge-release handle on the tape drive. It contains a red light. When this button is pressed in, it is in the LOAD position. When this button is released, it is in the UNLOAD position.
Power supply reset button	This button enables you to restart the system after a power interruption without turning off the 1/0 system power switch. You also can use this recessed reset button to restart the power system if the circuit breaker is tripped. Use the eraser end of a pencil or a non-conductive small tool to press this button.
Power supply circuit breaker	This circuit breaker is located near the bottom of the power supply. It protects the system from electrical surges. When tripped, the circuit breaker is in the out position. To reset, press the circuit breaker in. Then press the power supply reset button.
Halt Enable/Disable switch	This switch is located on the upper left side of the CPU cover panel. It is labeled with an encircled triangle, the international symbol for halt. When the switch is down (dot outside the circle), halts are disabled. When the switch is up (dot inside the circle), halts are enabled. When you enable halts, press the F5 (BREAK) key on the console terminal keyboard to stop the system and transfer control to the console program.

Table 2–3 (Cont.)   Controls on the BA200 series Model

Control	Description
Baud rate control knob	The BA200 series model has no baud rate control knob. The baud rate is preset to 9600 baud. DIGITAL recommends that you do not change the baud rate setting. If it is absolutely necessary for you to change the baud rate, see the technical information shipped with your system for instructions.
Power-up mode switch	This switch is located on the CPU cover panel to the right of the Halt Enable/Disable switch. This rotary switch lets you select one of three settings that indicates a power-up mode. Table 2–5 describes these settings.

Table 2–4 describes the indicator lights on the BA200 series model.

Table 2–4   Indicator Lights on the BA200 series Model

Control	Description	
DC OK light	This light is located on the mass storage tray to the right of the fixed disk activity lights.	
	Glows	The DC voltages are within tolerance levels.
	Does not glow	There is a problem with one of the power supplies. Check the DC OK light on each power supply to determine which power supply has failed.
Power supply DC OK light	This light glows green if the DC voltages to the power supply are present and within tolerance levels. If this light does not glow, there is a problem with the power supply. Turn off your system and call DIGITAL Field Service.	
Fixed disk activity lights	There are three green activity lights, one for each fixed disk. These lights are located on the mass storage tray next to the tape drive, below the fixed disk write-protect switches.	
	Steady glow	Power to the system is turned on.
	Quick blink	Data are being read from or written to the corresponding fixed disk.

2.6 Controls and Indicators on the BA200 series Model

Table 2–4 (Cont.) Indicator Lights on the BA200 series Model

Control	Description	
Tape drive activity light	This green light is located below the tape drive cartridge-release handle.	
	Blink	Drive is active. Data are being written to or read from the tape.
	Steady glow	Drive is either empty or inactive and positioned at the beginning of the tape. If a tape is in the drive and this light does not glow, the drive is inactive but the tape is not positioned at its beginning.

Figures 2–11, 2–12, and 2–13 are detailed illustrations of the controls and indicator lights described in Tables 2–3 and 2–4.

Figure 2–11 Mass Storage Tray - BA200 series
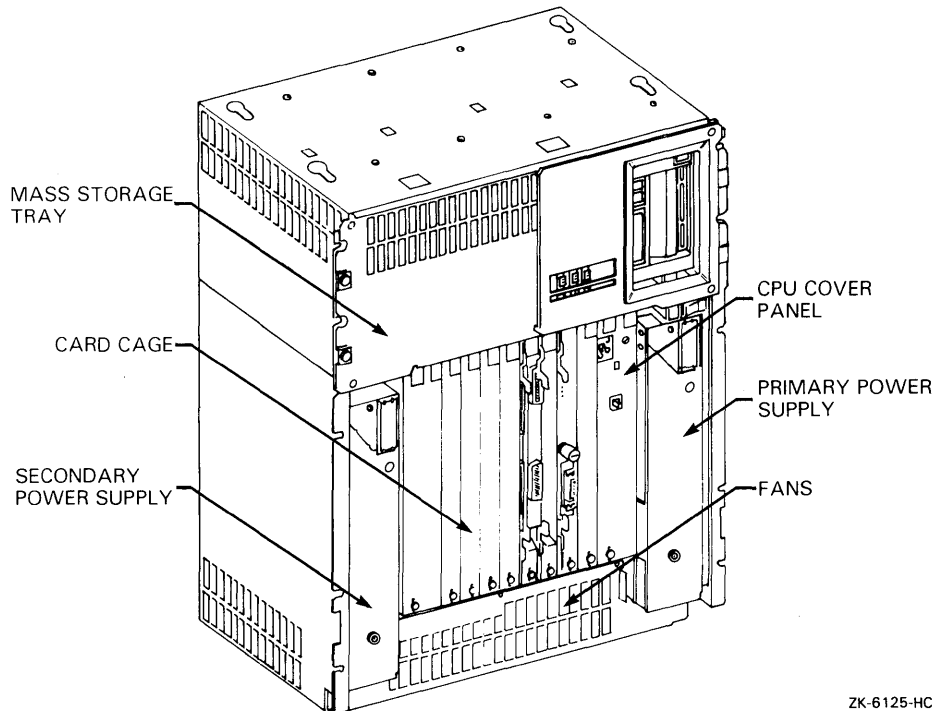
ZK-6125-HC

2.6 Controls and Indicators on the BA200 series Model

Figure 2–12 CPU Cover Panel - BA200 series
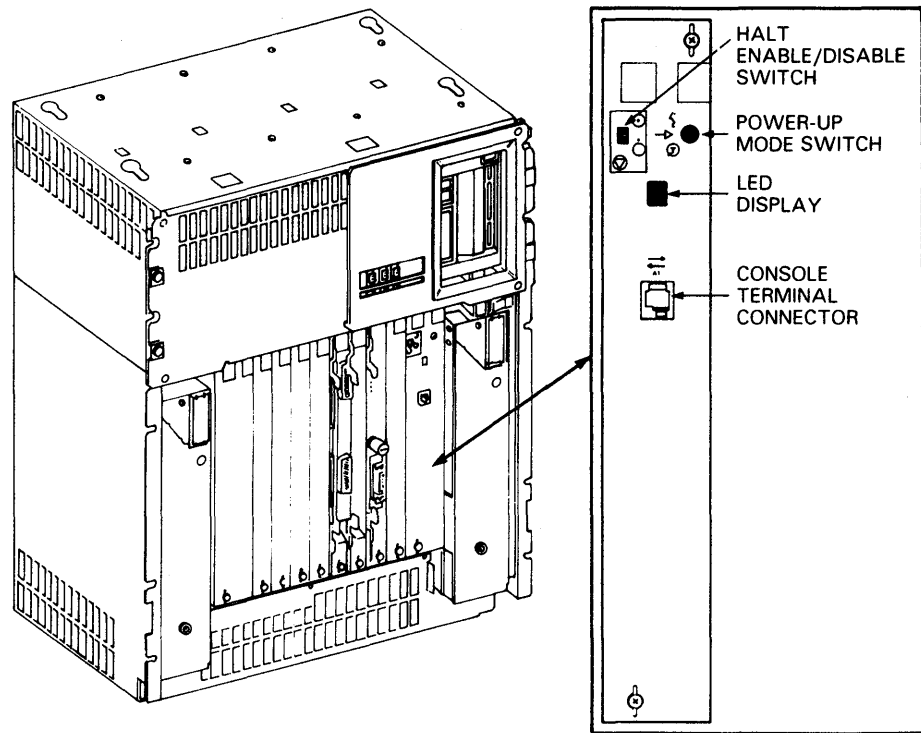
HALT
ENABLE/DISABLE
SWITCH

POWER-UP
MODE SWITCH

LED
DISPLAY

CONSOLE
TERMINAL
CONNECTOR

ZK-6126-HC

Figure 2–13   Power Supply - BA200 series
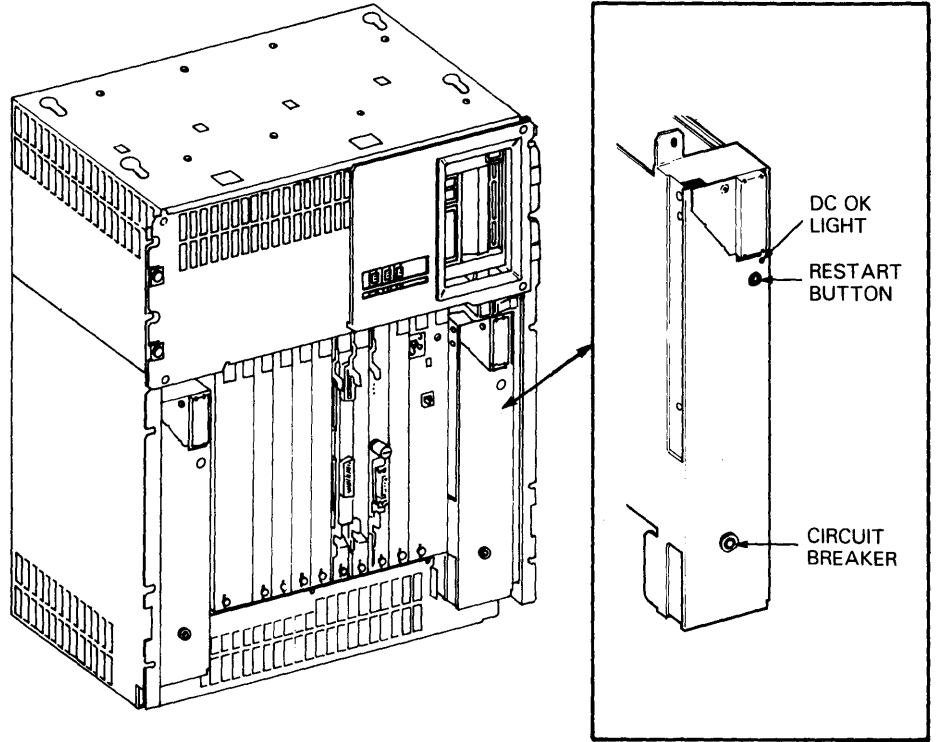
DC OK
LIGHT

RESTART
BUTTON

CIRCUIT
BREAKER

ZK-6127-HC

Table 2–5 describes the settings of the power-up mode switch on the BA200 series model.

Table 2–5   Settings of the Power-Up Mode Switch on the BA200 series Model

Setting	Description
Arrow	This is the original factory setting and the setting for normal system operations. The system performs full diagnostics when it is turned on at this setting. After the diagnostics complete, if you enable halts, the console-mode prompt (> > >) (> > >) appears on the console terminal screen. If you disable halts, your system boots automatically. If the system has been turned off for many days, however, you might be asked to choose the console-mode language you want to use.
Face in profile	This is the language-inquiry setting. The system performs full diagnostics when it is turned on at this setting. After the diagnostics complete, if the console terminal supports the DEC Multinational Character Set, the console-mode language prompt appears. After you choose the language, you enable halts and the console-mode prompt (> > >) appears on the console terminal screen. If you disable halts, your system boots automatically. First, select a console-mode language. Second, turn the power-up mode switch to the arrow.
Encircled T	This is the test setting. Do not use this setting. It is reserved for use by DIGITAL Field Service.

2.7   The Console Terminal

In general, use the console terminal to examine and deposit data in memory or processor registers, to stop the computer, and to boot the operating system. During installation, use the console terminal to boot the computer and monitor the installation process.

- There is only one console terminal for each MicroVAX system. If your terminal is the only one on the system, it is the console terminal. If your system has several terminals attached to it, the console terminal is the one attached to the port located on the CPU panel.

  On the BA200 series model, the console terminal is connected directly to the CPU cover panel at the modified modular jack labeled A-1.

- If you have a VAXstation, the workstation display monitor is the console terminal.

The console terminal runs in two different modes: console mode and program mode.

- Console mode—When the console terminal is in console mode, the VMS operating system is not running and the CPU is stopped. The console-mode prompt (> > >) is displayed. You can control and monitor system operations.

To go from console mode to program mode, boot the VMS operating system as described in Chapter 10.

- Program mode—When the console terminal is in program mode, the VMS operating system is running and the dollar-sign prompt ($) is displayed. You can enter DCL commands, run programs, and receive system messages.

If the VMS operating system is running and you want to go to console mode, follow the shutdown procedure described in Chapter 10.

2.8 Turning On the Console Terminal

Turn on the power to the console terminal before turning on the power to the MicroVAX system. To turn on the console terminal, use the following procedure:

1 Make sure that the cable between the console terminal and the system is connected properly.

2 Make sure that the power cable is connected to the terminal and plugged in to a wall outlet.

3 Turn the terminal power switch to the ON position.

The terminal power switch is located in different positions on different types of console terminals. Table 2–6 describes how to turn the power on to some supported terminals and how each terminal should respond. If your terminal is not listed, see the owner's manual for your terminal.

MicroVAX I and II Hardware
2.8 Turning On the Console Terminal

Table 2-6   Turning on the Console Terminal

Terminal Type	Power Switch Location	Terminal Response
VT100-series terminal	The power switch is located on the back left.	The terminal beeps and a blinking cursor (either a rectangle or an underscore) is visible on the screen.
VT220 terminal	The power switch is located on the back left.	The terminal beeps and displays VT220 OK in the middle of the screen.
VT240 terminal	The power switch is located on the left corner at the front of the accompanying terminal box. (On VT200-series graphics terminals, there also is a power switch on the back right of the terminal screen.)	The terminal beeps and displays VT240 OK in the middle of the screen.
LA34 hardcopy terminal	The power switch is located on the back left.	The type head moves to the first position on a line.
LA120 hardcopy terminal	The power switch is located on the front left, halfway down the stand.	The type head moves to the first position on a line.

Note: **If you have a VAXstation, the workstation display monitor is the console terminal.**

2.8.1   Checking the Baud Rate on the Console Terminal

If you are booting with a VT100-series or VT200-series terminal, you must check the baud rate of the console terminal using the terminal set-up screens.

Both the transmit speed and receive speed should be set to 9600 baud. For any other type of console terminal, see the owner's manual to determine the values of the transmit and receive speeds. Reset both speeds if they are not equal to 9600 baud.

On a VT100-series terminal, use the following procedure to check the baud rate on the console terminal:

1   Press the SET-UP key once.

2   Press the 5 key that is located above the letter T on the keyboard.

   The fields T SPEED and R SPEED appear on the bottom right-hand corner of your terminal.

3   If the transmit and receive speeds are 9600 baud, press the SET-UP key once.

4 If the values for T SPEED and R SPEED are not 9600 baud, see the owner's manual for your terminal for instructions on setting the baud rate.

Note: **If your console terminal is an LA120, it must be set to 8 bits, no parity transmit, and no parity receive. See the owner's manual provided with your LA120 terminal for instructions on checking these settings.**

On a VT200-series terminal, use the following procedure to check the baud rate on the console terminal:

1 Press the F3 key once.

2 Press the right arrow twice.

3 Press the ENTER key once.

This causes the communications set-up screen, which includes the fields Transmit=X and Receive=X, to appear on your terminal.

4 If the transmit and receive are 9600 baud, press F3 once.

5 If the transmit and receive speeds are not 9600 baud, see the owner's manual for your terminal for instructions on setting the baud rate.

2.9   The Tape Cartridge Drive

A tape drive is located on the front of some MicroVAX II computers. The tape drive is either horizontal or vertical depending on the system model.

The device name of the tape drive is MUA0.

Figure 2–14 shows a vertical tape drive.

2.9 The Tape Cartridge Drive

Figure 2-14 A Vertical Tape Cartridge Drive

TK50 LOAD/UNLOAD
SWITCH AND LIGHT

TK50 CARTRIDGE
RELEASE HANDLE
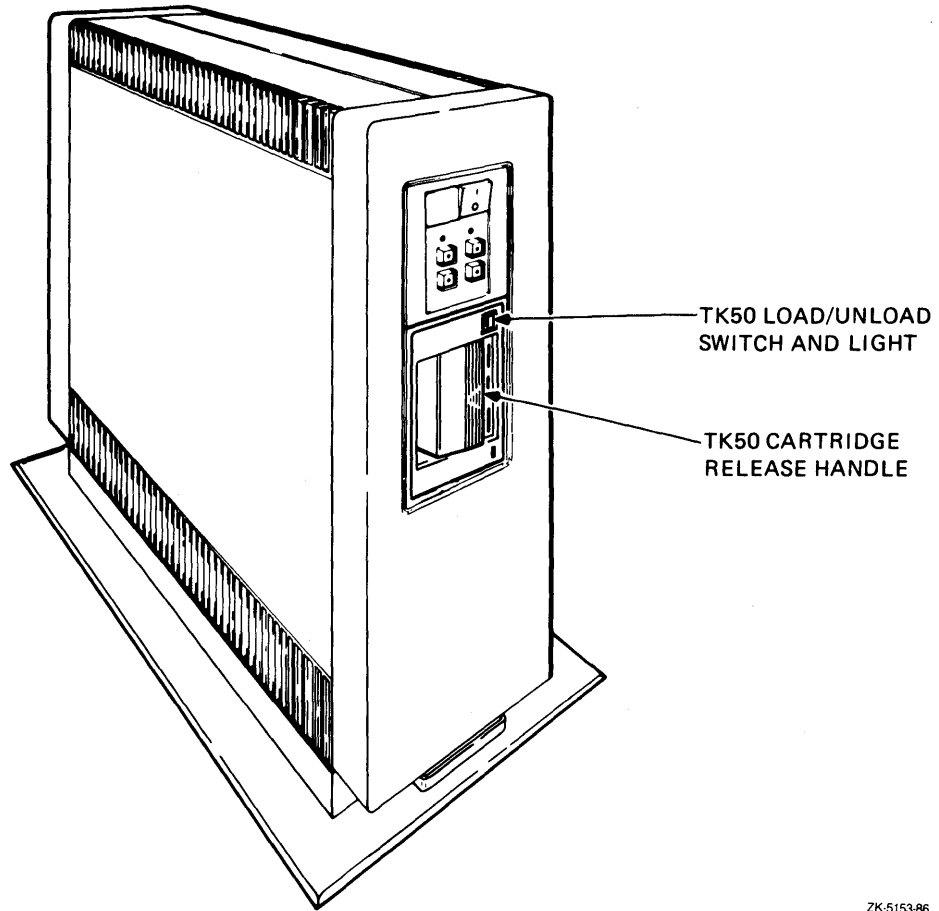
ZK-5153-86

When using the tape drive shown in Figure 2-14, you should be aware of the following:

- The green light blinks when the tape in the drive is actually moving (being read from or written to). If a tape cartridge is in the drive and this light is off, the drive is inactive and the tape is not positioned at its beginning. *Never* attempt to remove a tape cartridge when the green light is blinking or when it is off; this damages the tape and may damage the drive.

  The green light glows when the drive is empty. It also glows when the drive is inactive and positioned at the beginning of a tape. The only time you can remove a tape is when the green light is glowing.

- The LOAD/UNLOAD button controls the loading of the tape.

  When the button is pressed in, it is in the LOAD position. The red light on this button glows red when the tape is loaded. It blinks slowly when the tape is rewinding. It blinks quickly when there is a tape error (for some reason the tape could not be read). To clear a tape error, press the button four times.

Note: *Never* attempt to remove a tape cartridge while the LOAD/UNLOAD button is in the LOAD (in) position (the red light is on); this damages the tape and might damage the drive.

When the LOAD/UNLOAD button is released, it is in the UNLOAD (out) position. The only time you can remove a tape is when the button is in the UNLOAD (out) position (the red light is off).

• The cartridge-release handle is located below the tape access slot (to the right of the slot on a horizontal drive). This handle controls the position of the tape drive spindle. Pull the handle open to insert or remove a tape cartridge.

CAUTION: Pull the cartridge-release handle open *only* when all three of the following are true:

• The green light is glowing

• The LOAD/UNLOAD button is in the UNLOAD (out) position

• The red light on the LOAD/UNLOAD button is off

Otherwise, you might damage both the tape and the drive.

Table 2–7 summarizes the TK50 tape-cartridge drive controls. Table 2–8 describes the TK50 tape-cartridge drive lights.

Table 2–7   TK50 Controls

Control	Position	Function
LOAD/UNLOAD button	In	Loads the tape (15 seconds – 3 1/2 minutes).
	Out	Rewinds and unloads the tape.
Cartridge release handle	Open	Lets you insert or remove a tape after rewind and unload operations are complete.
	Closed	Locks tape in operating position.

2.9 The Tape Cartridge Drive

Table 2–8 TK50 Indicator Lights

Red Light	Green Light	Condition
Off	Off	No power to the tape drive.
Off	On	Safe to move cartridge release handle. Power is turned on.
On	Off	Do not move the cartridge release handle. One of the following conditions exists: • Power-on self test is occurring. • Cartridge is inserted but handle is still in the open position. • Tape is loading or unloading. • Tape is stopped.
On	On	Tape loaded successfully.
On	Blinking	Tape is moving (except rewind). Read/write commands are being processed. Irregular fast blinking means tape calibration is occurring.
Blinking	Blinking	Tape is rewinding.
Rapid Blinking	Off	A fault is occurring. Press and release the LOAD/UNLOAD button four times. If the problem persists, do not attempt to remove the tape cartridge. Call DIGITAL Field Service.

2.10 The Diskette Drive

All MicroVAX I systems and most MicroVAX II systems come with diskette drives. Diskette drives let you store data on or copy data from removable diskettes.

Two types of diskettes drives are available:

• The RX50 diskette drive

• The RX33 diskette drive

CAUTION: **Use an RX33 diskette only in an RX33 diskette drive. Because RX33 and RX50 diskettes have incompatible formats, using an RX33 diskette in an RX50 diskette drive might destroy the data on the diskette and might damage the diskette. You can use an RX50 diskette in an RX33 diskette drive.**

This guide describes only the RX33 diskette drive. See the hardware information for your system for a description of the RX50 diskette drive.

The RX33 diskette drive is a single drive. It has an access slot with a diskette-drive lever that lets you insert and remove floppy diskettes. The device name of the diskette drive is DUA2.

Figure 2–15 shows the RX33 diskette drive.

Figure 2–15   The RX33 Diskette Drive

DISKETTE

DIRECTION ARROW

FRONT PANEL LEVER (LOCK POSITION)

RED INDICATOR LIGHT
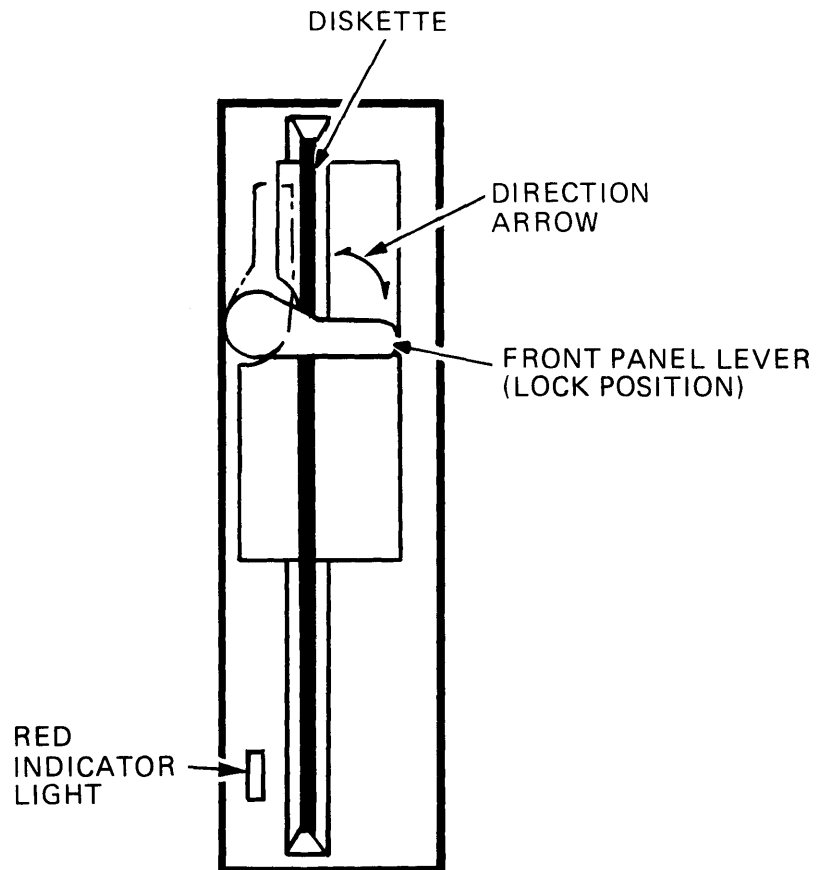
ZK-6686-HC

When using the diskette drive shown in Figure 2–15, you should be aware of the following:

* The activity light glows red when the floppy diskette in the drive is moving (being read from or written to).

CAUTION: *Never* attempt to remove a floppy diskette from the drive when this light glows; this damages the floppy diskette and might damage the drive.

MicroVAX I and II Hardware

2.10 The Diskette Drive

- The diskette-drive lever holds the floppy diskette in the drive. After you insert the floppy diskette in the drive, turn the lever until it is perpendicular to the access slot. When you turn the lever until it is parallel to the access slot, the floppy diskette pops out of the drive. When the activity light glows red, do not turn the lever until it is parallel to the access slot.

3 Using Tape Cartridges and Floppy Diskettes

This chapter describes how to use the tape cartridge and floppy diskette drives. All MicroVAX I systems have floppy diskette drives. If you have a MicroVAX II system, you can have either a floppy diskette or tape cartridge drive or both.

3.1 Tape Cartridges

Follow these guidelines when using tape cartridges:

- Tape cartridges come in clear plastic protective cases. You should keep tape cartridges in these cases when you are not using them.

- The label slot holds the label that provides information about the contents of the tape cartridge. Label a tape cartridge if you will copy files to it (distribution tape cartridges are labeled already).

  To label a tape cartridge, insert a slide-in label into the slot located on the front of the tape cartridge. Figure 3–1 shows how to insert a label on a tape cartridge.

CAUTION: **Use only the label slot provided to label a tape cartridge. Applying adhesive labels or writing on the tape cartridge can damage it.**

Using Tape Cartridges and Floppy Diskettes
3.1 Tape Cartridges

Figure 3-1   Inserting a Label on a Tape Cartridge
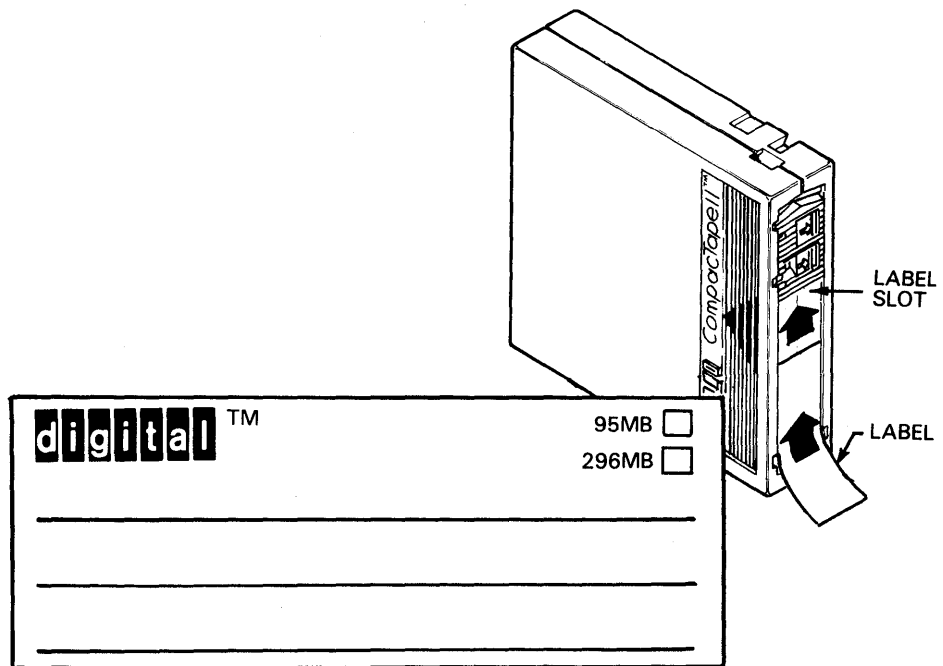
ZK-6520-HC

- The write-protect switch is a movable switch on the tape cartridge that controls whether you can write to the tape. To write-protect a tape cartridge, slide the write-protect switch toward the label slot. An orange rectange is visible if the tape-cartridge is write-protected.

  Always write-protect the distribution tape cartridge before an installation. Figure 3-2 shows how to write-protect a tape cartridge.

Figure 3–2   Positioning the Write-Protect Switch

NOT WRITE-
PROTECTED

WRITE-
PROTECTED
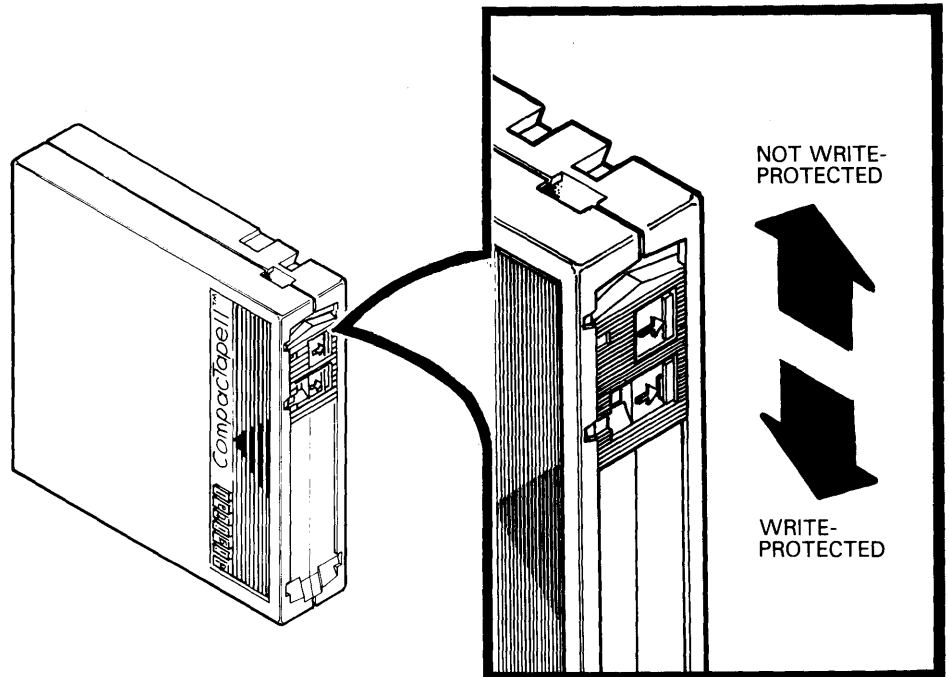
ZK-6521-HC

3.1.1   Inserting a Tape Cartridge

To insert a tape cartridge in the drive, use the following procedure:

1   Make sure the tape cartridge drive is empty. If the VMS operating system is not running, go to step 2.

If the VMS operating system is running and if a tape cartridge is in the drive already, enter the following command and press RETURN:

```
$ SHOW DEVICE MUA0
```

If the display indicates that the device status of the tape cartridge is MOUNTED, you must dismount the tape cartridge before removing it from the drive. Follow the directions in Section 3.1.4 to dismount the tape cartridge. Then follow the directions in Section 3.1.5 to remove a tape cartridge.

2   Press the LOAD/UNLOAD button so that it is in the UNLOAD (out) position. The green light glows steadily and the red light is off.

CAUTION: **Never pull open the cartridge-release handle unless the green light glows, the red light is off, and the LOAD/UNLOAD button is in the UNLOAD (out) position; you might damage the drive.**

3   Pull open the cartridge-release handle.

Using Tape Cartridges and Floppy Diskettes
3.1 Tape Cartridges

4 Remove the tape cartridge from its plastic case. You should write-protect a tape cartridge containing software that you will install on your system. You should write-enable a tape cartridge if you are going to copy or back up files to it.

5 Hold the tape cartridge with the label facing you and with the large arrow on the top of the tape cartridge pointing into the drive. Insert the tape cartridge in the drive. Push the tape cartridge into the drive until it locks into place. The green light turns off and the red light glows.

6 Push the handle closed until it locks into place. The red light turns off and the green light glows.

7 Press the LOAD/UNLOAD button so that it is in the LOAD (in) position. The red light glows. The tape cartridge goes through a load process that takes between 15 seconds and 3 1/2 minutes. During this time the green light blinks. When the tape is ready, the green light glows.

Figure 3–3 illustrates steps 4 through 7 of the procedure.

Figure 3–3 Inserting a Tape Cartridge
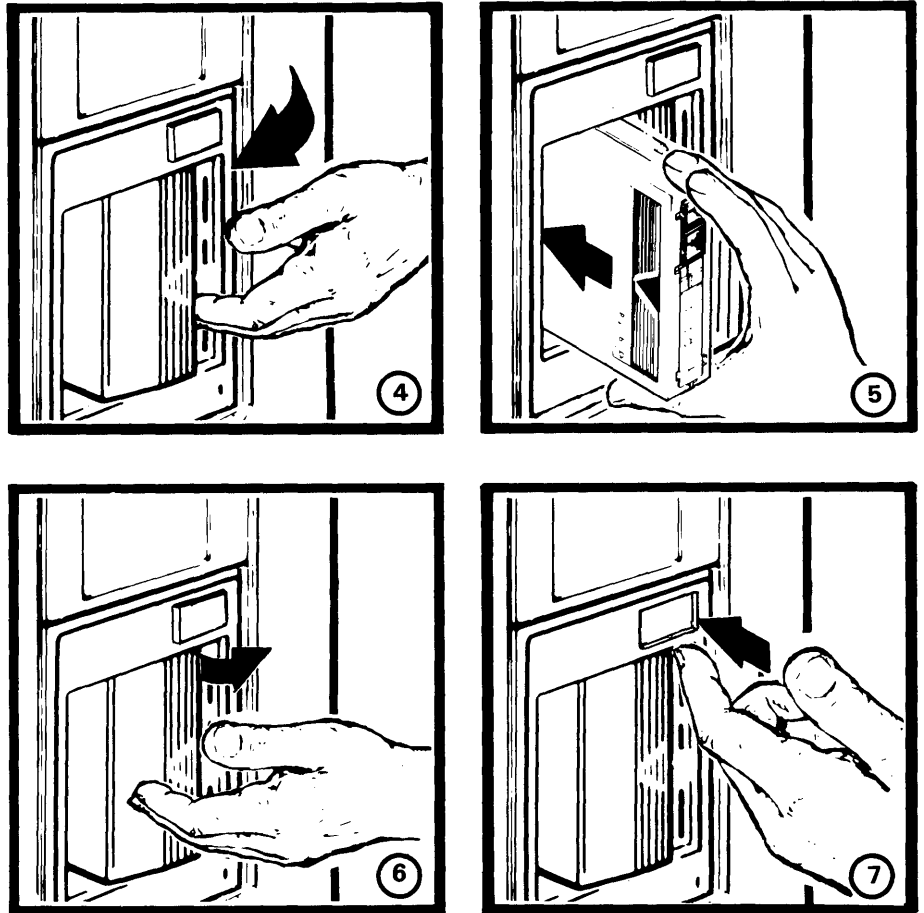
ZK-6622-HC

3.1.2   Initializing a Tape Cartridge

Note: **You do not need to initialize any tape cartridges when you install the VMS operating system.**

Initializing a tape cartridge does the following:

- Erases any data stored on the tape cartridge

- Assigns a volume label to the tape cartridge

- Prepares the tape cartridge to store VMS files

You should initialize a tape cartridge before using it for the first time. Initialize an old tape cartridge to erase its contents.

Using Tape Cartridges and Floppy Diskettes

3.1 Tape Cartridges

Before you initialize a tape cartridge, make sure that the account you are logged into has the volume protection (VOLPRO) privilege. Make sure the tape cartridge is write-enabled.

CAUTION: **Do not initialize a tape cartridge that contains operating system software or files that you want to save. The INITIALIZE command erases the contents of the tape cartridge.**

To initialize a tape cartridge, enter the INITIALIZE command in the following format and press RETURN:

```
$ INITIALIZE MUAO volume-label
```

where *volume-label* is a one-to-six character name. Write the volume label of the tape cartridge on the tape label. You will need to know the volume label when you use the tape.

For example, the following command initializes a tape cartridge and labels it DEC88:

```
$ INITIALIZE MUAO DEC88
```

3.1.3 Mounting a Tape Cartridge

Note: **You do not need to mount any tape cartridges when you install the VMS operating system. The installation procedure does this automatically.**

After you insert a tape cartridge (and initialize it, if it is new), you must mount it to make it available to the system. To mount a tape cartridge, enter the MOUNT command in the following format and press RETURN:

```
$ MOUNT MUAO volume-label
```

where *volume-label* is a one-to-six character name.

If you do not specify the correct volume label when you mount the tape cartridge, the system displays the following message:

```
%MOUNT-F-INCVOLLABEL, incorrect volume label
```

If you do not remember the volume label, enter the MOUNT command in the following format and press RETURN:

```
$ MOUNT/OVERRIDE=IDENTIFICATION MUAO
```

Then enter the following command to determine the volume label of the tape cartridge:

```
$ SHOW DEVICE MUAO
```

The system displays the volume label.

3.1.4 Dismounting a Tape Cartridge

Note: You do not need to dismount any tape cartridges when you install the VMS operating system. The installation procedure does this automatically.

When you finish using a tape cartridge, you must dismount it. To dismount a tape cartridge, enter the DISMOUNT command in the following format and press RETURN:

```
$ DISMOUNT MUAO
```

After you dismount a tape cartridge, you can remove it from the drive.

3.1.5 Removing a Tape Cartridge

To remove a tape cartridge from the drive, use the following procedure:

1 Press the LOAD/UNLOAD button so that it is in the UNLOAD (out) position. If the tape is not rewound, the red and green lights blink slowly as the tape rewinds. When the tape is completely unloaded, the red light turns off and the green light glows.

CAUTION: Never pull open the cartridge-release handle unless the green light glows, the red light is off, and the LOAD/UNLOAD button is in the UNLOAD (out) position; you might damage the tape drive.

2 Pull open the cartridge-release handle. The tape cartridge ejects partially.

3 Remove the tape cartridge and put it in its plastic case.

4 Push the handle closed until it locks firmly into place.

3.2 Floppy Diskettes

You can use either RX33 or RX50 diskettes in the RX33 diskette drive. Table 3–1 shows the differences between these two types of diskettes.

Table 3–1   Differences Between RX33 and RX50 Diskettes

Diskette	Description	Storage Capacity	Preformatted?
RX33	Grey or black plastic jacket; no arrow	2400 blocks	No
RX50	Black plastic jacket; red arrow	800 blocks	Yes

Figure 3–4 shows an RX33 diskette.

CAUTION: Use an RX33 diskette only in an RX33 diskette drive. Because RX33 and RX50 diskettes have incompatible formats, using an RX33 diskette in an RX50 diskette drive might destroy the data on the diskette and might damage the diskette. You can use an RX50 diskette in an RX33 diskette drive.

Also, format an RX50 diskette using only Field Service diagnostic tools. Consider discarding an RX50 diskette rather than formatting it. For more information, contact DIGITAL Field Service.

Figure 3–4   The RX33 Diskette

DISKETTE
LABEL

WRITE PROTECT
NOTCH

PLASTIC
JACKET

DISKETTE
SURFACE
DO NOT
TOUCH
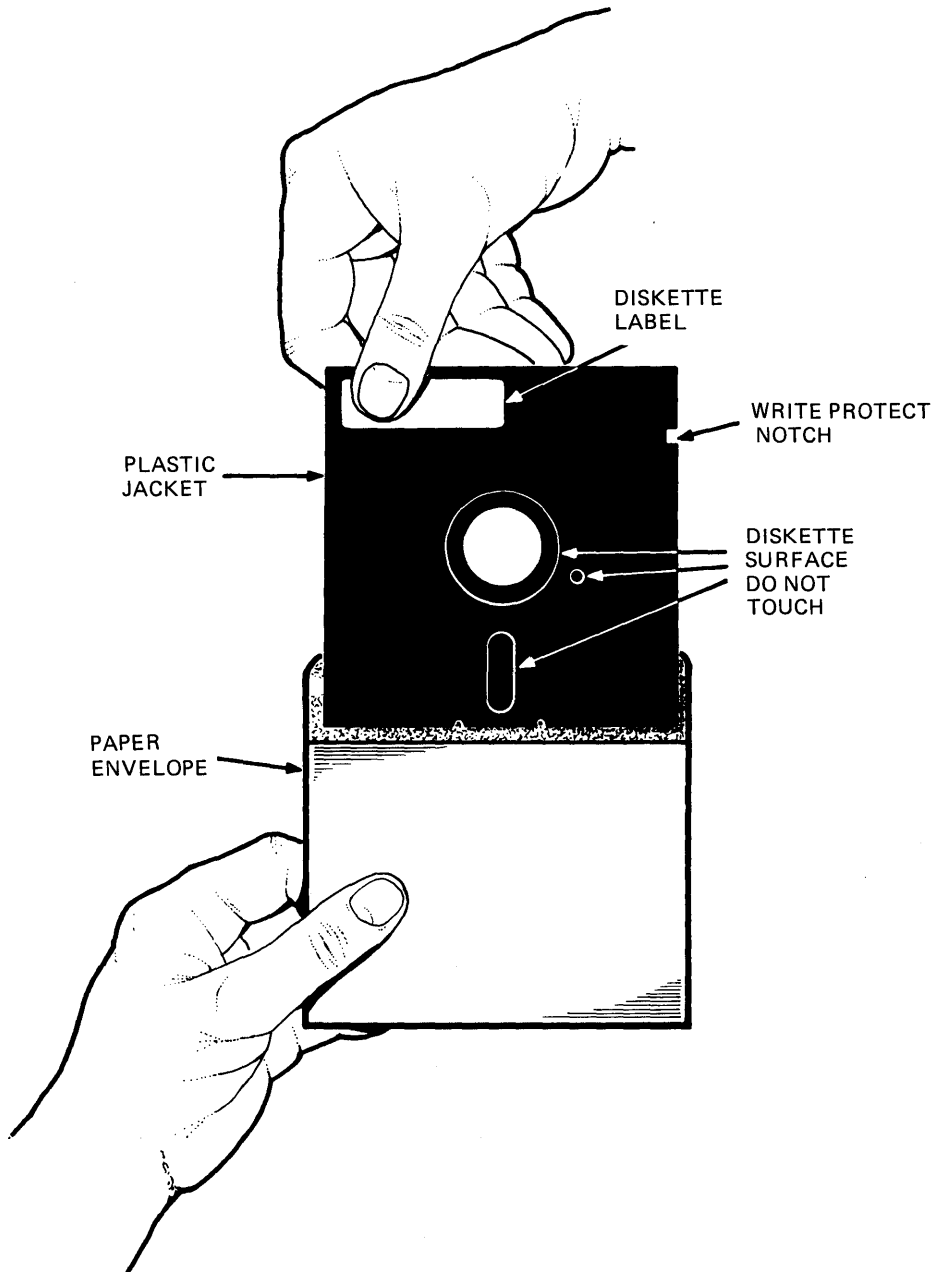
PAPER
ENVELOPE

ZK-7464-HC

When using the diskette shown in Figure 3–4, you should be aware of the following:

- Each diskette comes in a protective paper envelope. You should keep the diskettes in their paper envelopes when you are not using them.

Using Tape Cartridges and Floppy Diskettes

3.2 Floppy Diskettes

- The diskette label provides information about the contents of the diskette. Label a floppy diskette if you will copy files to it (distribution floppy diskettes are labeled already). You should write on the diskette label before you affix it to the diskette. To write on a diskette label after you affix it to a diskette, use a felt-tipped pen because if you use a pen or a pencil, you might damage the diskette.

- The plastic diskette jacket is the protective cover for the diskette surface. There are slots in the cover through which the drive head accesses the diskette. You should avoid touching the diskette surface at these openings.

- The write-protect notch is a square-shaped cut in the side of the diskette that controls whether you can write to the diskette.

  To write-protect a diskette, place one of the adhesive foil tabs supplied with your diskettes over the write-protect notch on the side of the plastic cover (see Figure 3–5). Write-protecting diskettes guards against loss of data or accidental overwriting. *Always* write-protect distribution diskettes before an installation.

  To write-enable a diskette, make sure that no adhesive foil tab covers the diskette write-protect notch. When the write-protect notch is uncovered, you can add, change, or delete information on the diskette. You should write-enable a floppy diskette if you will copy or back up files to it.

Figure 3–5   The Diskette Write-Protect Tab

WRITE-
PROTECT
TAB

ZK-5796-HC

3.2.1 Inserting an RX33 Diskette

To insert a diskette in the diskette drive, use the following procedure:

1 Make sure that the diskette drive is empty. If the VMS operating system is not running, go to step 2.

If the VMS operating system is running and if a diskette is in the drive already, enter the following command and press RETURN:

`$ SHOW DEVICE DUA2`

If the display indicates that the device status of the floppy diskette is MOUNTED, you must dismount the floppy diskette before removing it from the drive. See Section 3.2.4 to dismount the floppy diskette. Turn the diskette-drive lever until it is parallel to the access slot. Remove the diskette from the drive and place the diskette in its paper envelope.

CAUTION: **Never attempt to remove a floppy diskette from the drive when the red light glows or blinks; you might damage the diskette drive.**

2 Remove the diskette to be inserted in the diskette drive from its paper envelope. When you remove the diskette, make sure you handle only the edges. Do not remove the plastic cover and do not touch exposed surfaces of the diskette.

3 Write-protect a floppy diskette that contains software you will install on your system. Write-enable a floppy diskette if you will copy or back up files to it.

4 Hold the diskette so that the write-protect notch is to your left and the diskette label faces up. Slide the diskette in the drive until it clicks in place. If the diskette is aligned incorrectly, the system might display the following message:

`%INIT-F-MEDOFL, medium is offline`

If the system displays this message, remove the diskette from the drive and reinsert it.

5 Turn the diskette-drive lever until it is perpendicular to the access slot.

Figure 3–6 illustrates the procedure.

Figure 3–6   Inserting an RX33 Diskette
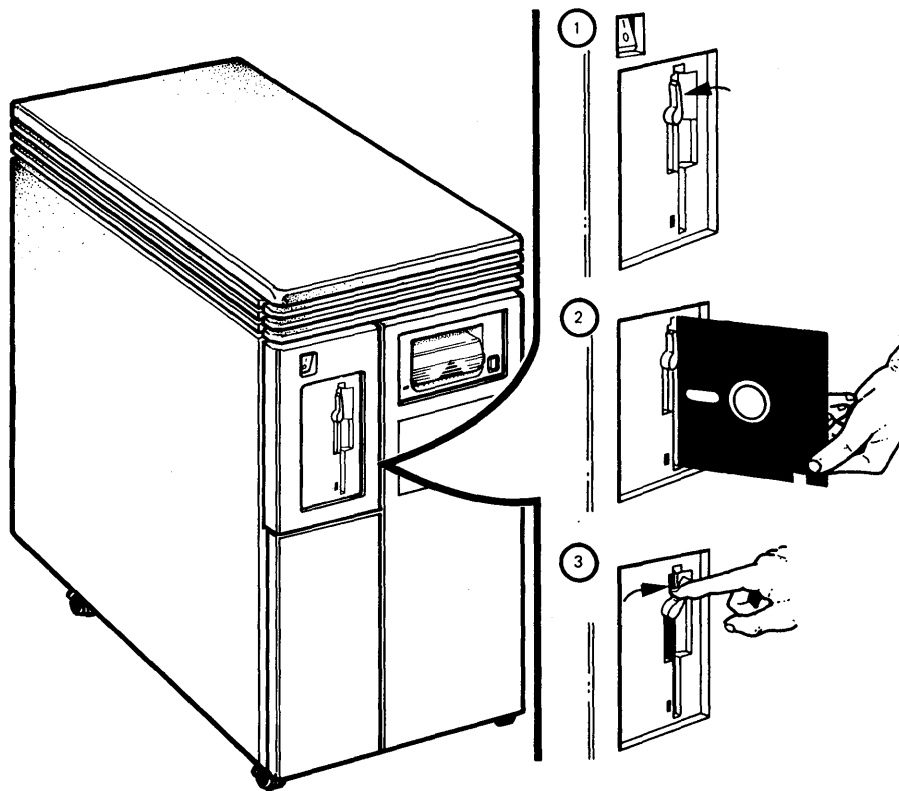
ZK-7463-HC

3.2.2   Initializing and Formatting an RX33 Diskette

Note: You do not need to initialize and format any floppy diskettes when you install the VMS operating system.

The INITIALIZE command does the following:

- Erases any data stored on the floppy diskette

- Assigns a volume label to the floppy diskette

- Prepares the floppy diskette to store VMS files

You should initialize and format a new floppy diskette before using it the first time. You should initialize and format an old floppy diskette to erase its contents.

Before you initialize and format a floppy diskette, make sure that the account you are logged into has the volume protection (VOLPRO) privilege. Make sure the floppy diskette is write-enabled.

CAUTION: Do not initialize and format an RX33 floppy diskette that contains operating system software or files that you want to save. The INITIALIZE command erases the contents of the diskette.

To initialize and format an RX33 floppy diskette, enter the INITIALIZE command in the following format and press RETURN:

```
$ INITIALIZE/DENSITY=DOUBLE DUcu volume-label
```

where:

- c is the *controller designation*. A controller designation can be one of the alphabetic letters A through Z. The controller designation, along with the unit number, identifies the location of the diskette drive.

- u is the *unit number*. A unit number is a decimal number that, along with the controller designation, identifies the location of the diskette drive.

- *volume-label* is a one-to-six character name.

For example, the following command initializes and formats the diskette in drive 1 (DUA2) and labels it TEST.

```
$ INITIALIZE/DENSITY=DOUBLE DUA2 TEST
```

3.2.3 Mounting an RX33 Diskette

Note: You do not need to mount any floppy diskettes when you install the VMS operating system. The installation procedure does this automatically.

After you insert a floppy diskette (and initialize it if it is new), you must mount it to make it available to the system. To mount a floppy diskette, enter the MOUNT command in the following format and press RETURN:

```
$ MOUNT DUcu volume-label
```

where:

- c is the *controller designation*. A controller designation can be one of the alphabetic letters A through Z. The controller designation, along with the unit number, identifies the location of the diskette drive.

- u is the *unit number*. A unit number is a decimal number that, along with the controller designation, identifies the location of the diskette drive.

- *volume-label* is a one-to-six character name.

For example, the following command mounts the floppy diskette in diskette drive 1 (DUA2) and labels it DEC88:

```
$ MOUNT DUA2 DEC88
```

If you do not specify the correct volume label when you mount the diskette, the system displays the following message:

```
%MOUNT-F-INCVOLLABEL, incorrect volume label
```

If you do not remember the volume label, enter the MOUNT command in the following format and press RETURN:

```
$ MOUNT/OVERRIDE=IDENTIFICATION DUcu
```

To determine the volume label of the floppy diskette, enter a command in the following format and press RETURN:

```
$ SHOW DEVICE DUcu
```

The system displays the volume label.

3.2.4 Dismounting an RX33 Diskette

Note: **You do not need to dismount any floppy diskettes when you install the VMS operating system. The installation procedure does this automatically.**

When you finish using a floppy diskette, you should dismount it. To dismount a floppy diskette, enter the DISMOUNT command in the following format and press RETURN:

```
$ DISMOUNT DUcu
```

where:

- *c* is the *controller designation*. A controller designation can be one of the alphabetic letters A through Z. The controller designation, along with the unit number, identifies the location of the diskette drive.

- *u* is the *unit number*. A unit number is a decimal number that, along with the controller designation, identifies the location of the diskette drive.

For example, the following command dismounts the floppy diskette that is mounted in drive 1 (DUA2).

```
$ DISMOUNT DUA2
```

After you have dismounted the floppy diskette, you can remove it from the diskette drive.

3.2.5 Removing an RX33 Diskette

To remove an RX33 floppy diskette from the drive, use the following procedure:

1 Make sure the activity light on the diskette drive is off.

CAUTION: **Never turn the diskette-drive lever if the activity light glows or blinks; you might damage the diskette drive.**

2 Turn the diskette-drive lever until it is parallel to the access slot.

3 Gently remove the floppy diskette from the drive. Make sure you handle only the edges of the floppy diskette.

4 Put the floppy diskette in its paper envelope.

4   Before Installing VMS

This chapter describes the following:

- Terms and procedures you need to know before you do an installation

- Information you need to install the VMS operating system in a VAXcluster environment

4.1   The Distribution Media and the System Disk

When you install the VMS operating system, you work primarily with the distribution media and the system disk. The *distribution media* are the floppy diskettes or tapes that the VMS operating system is supplied on. The VMS operating system is supplied on the distribution media in a format that the system cannot readily use.

The installation procedure transfers the VMS operating system from the distribution media to your system disk and puts it in a format that the system can use. A *system disk* is the disk that contains (or will contain) the VMS operating system in a usable format.

4.2   Device Names

At different times during the installation, you must tell the system which drive contains the distribution media and which drive contains the system disk. You do this by referring to the diskette or tape-cartridge drive that holds the distribution media, and to the fixed disk that you want to be your system disk. You refer to a drive with its *device name*. A device name has the following format:

ddcu

where:

- *dd* is the *device code*. The device code tells what type of device you are using.

- *c* is the *controller designation*. A controller designation can be one of the alphabetic letters A through Z. The controller designation, along with the unit number, identifies the location of the device.

- *u* is the *unit number*. A unit number can be a decimal number in the range of 0 to *n*. The unit number, along with the controller designation, identifies the location of the device.

Note: **The only part of the name you can modify is the unit number. The device code is fixed, and the controller designation is created when the hardware is installed.**

Section 4.3 lists the device names for the different drives that can be part of the MicroVAX II system.

4.3   MicroVAX Devices

Your MicroVAX system may contain one or many fixed disks, removable hard disks, one console port (which can be connected to a video or printing terminal), and a dual diskette drive or a tape cartridge drive. Options are available for additional terminals (video or printing) and for additional disk or tape drives.

You can use any of the disk drives to hold the system disk. When choosing a system disk, you need to be aware of the capacity of the disk as well as the size of the VMS operating system. Keep in mind that a system disk in a VAXcluster environment needs more space for the operating system than a system disk for a standalone system.

Due to space limitations, the RC25 and RD52 might not be good choices for system disks. Depending on the size of the processor's memory, all the VMS files might not fit on one RC25 or RD52 disk.

Note: **If your MicroVAX system has more than one fixed disk, DIGITAL recommends that you use the drive with device name DUA0 as your system disk; whenever the system starts up, it attempts to boot the system from DUA0 before attempting to boot the system from any other fixed disks.**

The system uniquely names each device attached to it. Before you begin the installation procedure, make sure you know the device names for both the drive that will hold the distribution media and the drive that will hold the system disk. Note that the device name of a disk or diskette drive depends on the number of fixed disks.

4.3.1   MicroVAX II System Without RA-series Disks

The following tables list the device names of disks and diskettes attached to a system that does *not* include RA-series disks (RA60, RA81, and RA82). Only MicroVAX II 630QE systems contain RA-series disks.

Device on System without RA Disks	Device Name with One Fixed Disk
Fixed disk RD52, RD53, or RD54	DUA0
Diskette	DUA1
Diskette	DUA2
CD ROM drive	DUBu
Magnetic tape	MUA0

Device on System without RA Disks	Device Name with Two Fixed Disks
Fixed disk RD52, RD53, or RD54	DUA0
Fixed disk RD52, RD53, or RD54	DUA1
Diskette	DUA2
Diskette	DUA3
CD ROM drive	DUBu
Magnetic tape	MUA0

4.3.2 MicroVAX II System with RA-series Disks

Some MicroVAX II 630QE systems contain RA-series disks (RA60, RA81, or RA82). If you have a MicroVAX II system with RA-series disks, use the conventions described in the following paragraphs to determine the device names for disk and diskette drives.

Every MicroVAX II 630QE system contains a KDA50 disk controller (for RA60, RA81, or RA82 disks). Some MicroVAX II 630QE systems also contain an RQDX disk controller (for RD52/RD53 disks and diskettes). If your configuration does *not* have either diskette drives or RD52/RD53 disks, your system does not contain an RQDX disk controller. The device names of disks on a 630QE system depend on whether your system contains an RQDX disk controller.

If your system does *not* contain an RQDX disk controller, then the device names are as follows:

Disk (without RQDX Disk Controller)	Device Name
RA60	DJAu
RA70, RA81, RA82	DUAu
CD ROM drive	DUBu

If your system *does* contain an RQDX disk controller, then the device names are as follows:

Disk (with RQDX Disk Controller)	Device Name
RA60	DJBu
RA70, RA81, RA82	DUBu
RD52, RD53	DUAu[1]
diskette	DUAu[2]
CD ROM drive	DUBu

[1] If *n* equals the number of RD52 or RD53 fixed disk, then *u* ranges from zero to *n*-1.

[2] The floppy diskette drives are numbered DUAn and DUAn+1.

For example, if your MicroVAX II has two RD53 fixed disks, a diskette drive, one RA60 disk (with a unit number 0), and one RA81 disk (with a unit number 1), then the device names are as follows:

Disk	Device Name
First RD53 fixed disk	DUA0
Second RD53 fixed disk	DUA1
RX33 diskette	DUA2
RA60 disk	DJB0
RA81 disk	DUB1

If your MicroVAX II has one RA60 and one RA81 disk, no RD52 or RD53 disks, and no diskette drives, then the device names are as follows:

Disk	Device Name
RA60 disk	DJA0
RA81 disk	DUA1

There are many possible configurations of MicroVAX II systems with RA disks, and all the possible device names cannot be listed here. Use the information in the preceding paragraphs to determine the device names for the disks or diskette drives in your configuration.

4.3.3 Additional Device Names

The following tables list device names that are the same on all MicroVAX systems.

Device	Device Name
Console	OPA0
Optional terminal	TTA0 or TXA0
Optional terminal	TTA1 or TXA1
Optional terminal	TTA2 or TXA2
Optional terminal	TTA3 or TXA3[1]

[1]There can be more than three terminals attached to your system; additional terminals are named according to this scheme.

Device	Device Name
RC25 disk	DAuu
Ethernet controller	XQuu
DMV11 synchronous communication device	XDuu

Device	Device Name
DRV11-WA synchronous communication device	XAuu
MSCP controller	PUxx
TMSCP controller	PTuu
TK50 tape cartridge drive	MUA0
CD ROM drive	DUBu

The SHOW DEVICES command displays status information on the specified device or, if no device is specified, on all devices. In the following example, the SHOW DEVICES command is entered without specifying a device. The resulting display shows basic information on all devices attached to a system:

$ SHOW DEVICES

Your system may not contain all of the devices shown, or it may contain additional devices.

```
Device    Device      Error    Volume    Free   Trans  Mnt
Name      Status      Count    Label     Blocks Count Cnt
DUAO:     Mounted       0      VMS       84242    32   1
DUA1:     Online        0
DUA2:     Online        0

Device    Device      Error    Volume    Free   Trans Mnt
Name      Status      Count    Label     Blocks Count Cnt
MUAO:     Online        0

Device    Device      Error
Name      Status      C   ount
OPAO:     Online        0
RTAO:     Online        0
RTBO:     Online        0

Device    Device      Error
Name      Status      Count
PUAO:     Online        0
XQAO:     Online        0
XQA1:     Online        0
```

To display all information on a specified device or all devices, use the /FULL qualifier to the SHOW DEVICES command.

4.4   Information on VAXcluster Environments

If you are installing the VMS operating system in a VAXcluster environment, the installation procedure will ask you for information about your VAXcluster environment. Before proceeding, you must read the *VMS VAXcluster Manual*. If you have a clear understanding of VAXclusters before you do an installation, you are less likely to enter incorrect information during the installation. Entering incorrect information during the installation might force you to repeat the entire procedure.

Following is a list of the VAXcluster information you need to obtain. For a complete explanation of each item, see the *VMS VAXcluster Manual*.

Determine what type of configuration you want: CI-only, local area, or mixed-interconnect. These configuration types are distinguished by the interconnect device that the VAX computers in the cluster use to communicate with one another (CI, Ethernet, or both).

Note: **The VAXstation I, II, II/GPX and MicroVAX I and II family of computers cannot be part of a CI-only VAXcluster.**

You need to know the *DECnet node name* and *node address* for the VAX computer on which you are installing the VMS operating system. The network or system manager determines the DECnet node name and node address for each VAX computer on the network. See your system or network manager for this information.

During the installation procedure you will be asked for the ALLOCLASS value of the VAX computer you are installing VMS on. For example:

```
Enter a value for ALICE's ALLOCLASS parameter:
```

Enter the appropriate allocation class value for the VAX computer that you are installing the VMS operating system on. Refer to the *VMS VAXcluster Manual* for the rules on specifying allocation class values. Note that in a mixed-interconncect 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 ALLOCLASS, a SYSGEN parameter.

If you are going to set up either a local area or a mixed-interconnect cluster, determine the *cluster group number* and the *cluster password*. Use the following rules to determine the cluster group number and password:

- Cluster group number—A number in the range from 1 to 4095 or 61440 to 65535.

- Cluster password—Must be from 1 to 31 alphanumeric characters in length and may include dollar signs ($) and underscores (_).

5 Installing VMS from a Magnetic Tape or Tape Cartridge

This chapter describes installing the VMS operating system on a VAXstation I, II, II/GPX and on a MicroVAX I and II from 1/2-inch magnetic tape or tape cartridge. To install the VMS operating system from diskettes, see Chapter 6. To install the VMS operating system from CD ROM, see Chapter 7.

All references to the MicroVAX II apply to the MicroVAX I and the VAXstation I and II except as noted.

CAUTION: **The software installation procedure overwrites the contents of the system disk. Use the VMS installation procedure only if your processor is new or if you want to destroy the contents of the system disk. If your system disk contains files that you want to save, you should upgrade to the new version of the VMS operating system. For a detailed description of the upgrade procedure, see the current version of the *VMS Release Notes*.**

If your system disk is an RC25 or RD52 disk, you should be aware that not all the VMS operating system files can fit on an RC25 or RD52 system disk. This causes performance problems on the system. DIGITAL suggests that you add disk storage to your system.

5.1 Before You Start

Before you install the VMS operating system, do the following:

- Make sure the hardware has been installed and checked for proper operation. For detailed information on the hardware, see the hardware manual for the MicroVAX II.

- Make sure you have all the items listed on the bill of materials in the distribution kit. The tape cartridge distribution kit should contain the following:

  — A tape cartridge that contains standalone BACKUP and the VMS *required, library,* and *optional* save sets

  — A tape cartridge that contains the mandatory update

  The 1/2-inch magnetic tape distribution kit should contain the following:

  — A 1/2-inch magnetic tape that contains the VMS *required, library,* and *optional* save sets

  — A tape cartridge that contains standalone BACKUP

  — A 1/2-inch magnetic tape that contains the mandatory update

  If your kit is incomplete, notify the DIGITAL Software Distribution Center. Request priority shipment of any missing items.

- If you are installing the VMS operating system on a computer in a VAXcluster environment, determine whether you want to create a local area or a mixed-interconnect configuration. For a complete description of configurations, see the *VMS VAXcluster Manual*. If you are installing the VMS operating system in a local area or mixed-interconnect configuration,

Installing VMS from a Magnetic Tape or Tape Cartridge

5.1 Before You Start

you need to obtain the following information from either the network or VAXcluster manager:

— Allocation class value

— DECnet node name and node address for the computer

— Cluster group number and password

The installation procedure transfers the VMS files from the distribution tape cartridge to the system disk. The procedure consists of the following stages:

1 Turning on the system

2 Preparing the system disk

3 Booting standalone BACKUP

4 Creating the system disk

5 Installing the mandatory update and running AUTOGEN

The procedure takes approximately two to three hours.

Note: **The screen displays and examples depict the installation of VMS Version 5.0. Your screen displays reflect the version that you are installing.**

5.2 Turning On the System

This procedure assumes that the system is not turned on when you start the installation. The following steps describe turning on the system and setting the switches on the CPU panel.

1 Turn on the console terminal. If you do not know how to determine if the terminal is online, see the owner's manual for your terminal.

During the software installation, enter all commands from the console terminal.

Make sure that the baud rate (transmit and receive speed) of the console terminal and the system is 9600 baud. To check the baud rate on the terminal, see Section 2.8.1. To check the baud rate setting for all MicroVAX systems except the BA200 series model, see Section 2.5.1. The baud rate for all BA200 series models is preset to 9600 baud.

Your console terminal must be set to 8 bits, no parity transmit, and no parity receive. This is the default for most terminals, except the LA120. For instructions on checking these settings, see the owner's manual provided with your LA120 terminal.

2 For all systems except the BA200 series model, make sure that the HALT, RESTART, WRITE-PROTECT, and READY buttons on the processor control panel are popped out. (If a button is pressed in, press it in again to make it pop out.) The BA200 series model does not have the HALT, RESTART, WRITE-PROTECT, and READY buttons.

3 If you have a MicroVAX II processor, set the Halt Enable/Disable switch to ENABLE.

4   Turn on the computer. Push the power switch to the 1 (ON) position. The switch on all models except the MicroVAX II 630QB glows orange. The fan inside the processor box goes on.

Every time a MicroVAX I computer is turned on, the system should display the following verification messages for the microcode:

```
MICROVERIFY STARTED
```

```
MICROVERIFY PASSED
```

The first time a MicroVAX II processor is turned on, the system should display the language-mode selection menu. (If you have selected a language already, the processor proceeds directly to the diagnostic tests.)

If you are prompted to select a language from the list of languages that appears on your terminal screen, select the language you want to use by entering the number associated with that language and pressing RETURN. To save the language that you have selected, turn the power-up mode switch on the CPU panel counterclockwise to the → (arrow) position.

After you select the language and set the power-up mode switch on a MicroVAX II system, the system performs diagnostic tests. During these self-tests, the system begins a countdown sequence, starting with the number 7. When it reaches 3, the console-mode prompt (> > >) should appear on your terminal screen.

If the computer does not turn on properly—for example, if you receive the message MICROVERIFY FAILED—check the processor control panel before beginning any troubleshooting procedures. The problem may be something simple such as the HALT button being pushed in.

When the system tests complete on MicroVAX I and MicroVAX II computer, your computer should be running with the console terminal in console mode; that is, the console-mode prompt (> > >) should appear on the terminal screen. If you do not receive the console-mode prompt (> > >), press either the HALT button or the F5 (BREAK) key twice.

5   Check the processor control panel lights again. Only the following lights should be glowing: the READY button light, the DC OK light, and the power switch. The power switch on a MicroVAX II model 630QB does not contain a light. If one of these buttons is not glowing, press it.

6   Make sure that the Halt Enable/Disable switch is set to ENABLE.

At this point, your system should be running with the console terminal in console mode; that is, the console-mode prompt (> > >) should appear on the screen.

7   To prepare the system disk, go to Section 5.3.

5.3 Preparing the System Disk

To set up the system disk you use during the installation, use the following procedure:

1 If your system consists of more than one fixed disk, decide which one you want to be the system disk. DIGITAL recommends that you use the drive with device name DUA0 as the system disk; whenever the system starts up, it attempts to boot the system from DUA0 before attempting to boot the system from any other fixed disk.

Remember that not all the VMS operating system files can fit on an RD52 system disk. This might cause performance problems on the system.

2 If your MicroVAX II has not run operating system software previously, your fixed disk(s) might not be formatted. You *must* format the fixed disk(s) before installing the VMS operating system. For instructions on formatting fixed disks, see the owner's manual for your computer.

CAUTION: **Do not format a disk after the installation; if you do, you will erase the disk.**

3 To boot standalone BACKUP, go to Section 5.4.

5.4 Booting Standalone BACKUP

This section describes the steps for booting standalone BACKUP. Standalone BACKUP lets you transfer the VMS *required* save set from the distribution tape cartridge to your system disk. You need the tape cartridge from the VMS distribution kit that is labeled as follows:

Paper Label[1]	Volume Label[2]
VAX/VMS V5.0 BIN TK50	SYSTEM
VAX/VMS V5.0 BIN 16MT9	SYSTEM

[1] A paper label is a label affixed to a tape cartridge or magnetic tape.

[2] A volume label is the name the VMS operating system uses to refer to a tape cartridge or magnetic tape. During the installation, the procedure displays the volume label, not the paper label, in messages.

Booting standalone BACKUP takes approximately 20 minutes.

1 Insert the VMS distribution media into the tape drive. If you are installing the VMS operating system from 1/2-inch magnetic tape, spin up the magnetic tape.

2 To boot standalone BACKUP, enter the following command and press RETURN:

```
>>> B MUA0
```

Note: **Ignore any error messages about missing drivers that might resemble the following:**

```
%SYSGEN-I-OPENIN, error opening SYS$SYSROOT:[SYSEXE]VADRIVER.EXE; as input
%SYSGEN-E-FNF, file not found
```

These messages might be displayed during the installation.

3 A few minutes later standalone BACKUP displays the following message:

```
VAX/VMS Version V5.0 Major version id = 01 Minor version id = 00
```

4 A few minutes later the procedure might ask for the date and time. Enter the date and time using the 24-hour clock format and press RETURN. For example:

```
PLEASE ENTER DATE AND TIME (DD-MMM-YYYY HH:MM) 31-DEC-1988 13:00
```

5 The procedure displays a list of local devices on your system and, if you have them, HSC and MSCP-served devices. For example:

```
Available device MUA0:    device type TK50
    .
    .
    .
```

Check the list of devices. If the list is incomplete, make sure that all the drives are connected properly to the system. See your hardware manuals for details.

6 When standalone BACKUP finishes booting, the procedure displays an identification message followed by the dollar-sign prompt ($):

```
%BACKUP-I-IDENT, Stand-alone BACKUP V5.0; the date is 31-DEC-1988 13:00
$
```

7 To create a system disk, go to Section 5.5.

5.5 Creating a System Disk

The VMS files are stored on the distribution tape cartridge as three save sets: *required, library,* and *optional.* This section describes the steps for transferring the *required, library,* and *optional* save sets from the distribution media to your system disk.

The instructions refer to the *target-drive.* The *target-drive* is the drive that holds the system disk.

1 Determine the device name of the system disk(s).

- If your MicroVAX system has only one hard disk, the system disk is named DUA0.

- If your MicroVAX system has more than one hard disk, you can choose the system disk.

Section 4.3 contains a list of device names for all MicroVAX devices. Write these names on a piece of paper. You will need this information throughout the installation.

2 To transfer the *required* save set to your system disk, enter the BACKUP command in the following format:

```
$ BACKUP/VERIFY/IMAGE/BUFFER=5 MUA0:VMS050.B/SAVE_SET target-drive:
```

Substitute the device name of your system disk for *target-drive.* Make sure you put a colon (:) after each device name and that you use zeros in the device names and in VMS050.

The *required* save set is transferred from the distribution media to the
system disk. [1] This takes approximately 25 minutes. During the process
the procedure displays the following message:

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

This message indicates that the *required* save set has been transferred to
the system disk and the files are being checked for errors. Approximately
25 minutes later, the procedure displays the following message:

```
%BACKUP-I-PROCDONE, operation completed. Processing finished at 31-DEC-1988 13:00
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:
```

3 If your system has a HALT button, press it twice. If your system does not
have a HALT button, press the F5 (BREAK) key.

4 To boot the system disk, enter the BOOT command in the following
format:

```
>>> B ddcu
```

Substitute the device name of the system disk for *ddcu*. Section 4.3
contains a list of device names for all MicroVAX devices.

5 When the boot is complete, the procedure displays a message and asks
for the date and time. Enter the date and time using the 24-hour clock
format and press RETURN. For example:

**Note: The procedure displays warning messages, similar to the following,
that the VMS license is not registered. Continue with the installation
procedure. Follow the instructions for registering the VMS license
after you finish the installation.**

```
VAX/VMS Version BI50 Major version = 01 Minor version = 00

    VAX/VMS Version 5.0 Installation Procedure

%LICENSE-F-EMTLDB, License database contains no license records
%LICENSE-E-NOAUTH, DEC VAX-VMS use is not authorized on this node

%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...

Please enter the date and the time (DD-MMM-YYYY HH:MM): 31-DEC-1988 13:00
```

**Note: If you have an RC25 or RD52 system disk, the procedure displays the
following message:**

```
The full VMS kit will not fit on your system disk . . .
The OPTIONAL save set will not be restored.
If you wish to restore files from this save set,
execute the following command after you finish the installation procedure:

$ RUN SYS$UPDATE:VMSTAILOR
```

**Continue with the installation procedure. Follow the instructions for
small system disks in Section 8.2 after you finish the installation.**

---

[1] The BACKUP command creates a system disk that includes a DIGITAL-provided set of volume parameters,
including a CLUSTER_SIZE (disk access scheme) of 1. For more information, see the note at the end of
Section 11.2.1.

6 The procedure asks for the volume label of the system disk. A volume label is the name the VMS operating system uses to refer to the system disk. If you have a VAXcluster environment, each system disk must have a unique volume label.

You can press RETURN to accept the default volume label, VMSRL5, or you can enter a volume label of your choice. The volume label can be 1 to 12 characters long; spaces are not allowed. 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 may indicate a volume label of 1 to 12-characters in length. If you
wish to use the default name of VMSRL5 just press RETURN in response to
the next question.

Enter the volume label for this system disk (no spaces) [VMSRL5]: SYSDSK
```

7 The procedure asks which drive holds the distribution media. Type MUA0 and press RETURN:

```
Enter the name of the drive holding the distribution media (DDcu): MUA0
```

8 Several minutes later the system displays the following messages:

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

Restoring LIBRARY saveset.
```

If you are installing the VMS operating system from 1/2-inch magnetic tape, the system might display the following messages:

```
%MOUNT-I-MOUNTED, VMS050 mounted on _MUA0:

Restoring LIBRARY saveset.
```

Note: **If you have an RC25 or RD52 system disk, the procedure does not restore the _optional_ save set. Continue with the installation. When the installation procedure finishes, follow the instructions for small system disks in Section 8.2.**

9 The installation procedure now transfers the _library_ and _optional_ save sets to the system disk. It takes approximately 60 minutes.

During this time the procedure displays the following messages:

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

Restoring OPTIONAL saveset.
%BACKUP-I-STARTVERIFY, starting verification pass

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 the VMS operating system on a standalone system, type N (for NO), press RETURN, and go to step 12.

If you are installing the VMS operating system in a VAXcluster environment, type Y (for YES), press RETURN, and go to step 10.

Note: **If you answer YES to the VAXcluster question, you must have a VAXcluster license.**

10 The procedure displays the following message:

```
Now configuring system to be a cluster member.
```

11 Table 5–1 lists the questions you are asked if you want either a local area or a mixed-interconnect configuration. Typical responses are explained in the table.

Table 5–1   Installation Questions for Local Area and Mixed-Interconnect Configurations

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 DECnet node name—for example, JUPITR. The DECnet node name may be from 1 to 6 alphanumeric characters in length and may not include dollar signs or underscores.
What is the node's DECnet node address?	Enter the 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 configurations.
Enter this cluster's group number:	Enter a number in the range from 1-4095 or 61440-65535.
Enter this cluster's password:	Enter the cluster password. The password must be from 1 to 31 alphanumeric characters in length and may include dollar signs and underscores.
Re-enter this cluster's password for verification:	Re-enter the password.
Will JUPITR be a disk server (Y/N)?	Enter Y. In local area and mixed-interconnect configurations, the system disk is always served to the cluster. Refer to *VMS VAXcluster Manual* for information on served cluster disks.
Will JUPITR serve HSC disks (Y)?	Enter a response appropriate for your configuration.
Enter a value for JUPITR's ALLOCLASS parameter:	Enter the appropriate allocation class value. If you have a mixed-interconnect configuration, the value must be between 1 and 255; you cannot enter 0.
Does this cluster contain a quorum disk [N]?	Enter Y or N, depending on your configuration. If you enter Y, the procedure will prompt for the name of the quorum disk. Enter the device name of the quorum disk.

12 The procedure displays the following message:

```
You may now remove the distribution kit from _MUA0:
```

Remove the distribution media from the drive.

If you have chosen a system disk other than DUA0, press in the READY light on the DUA0 drive. Pressing in the READY button takes DUA0 offline and prevents it from being booted in the sniffer boot mentioned in step 7 of Section 5.6.

13 The procedure asks you for new passwords for the SYSTEM, SYSTEST, and FIELD accounts. Passwords must be at least eight characters in length; they do not appear on the display. Press RETURN after you enter each one. After you enter the passwords, the procedure checks each one to make sure it meets the requirements for a good password. For example:

```
Now we will ask you for passwords for the following accounts:
           SYSTEM, SYSTEST, FIELD

Enter new password for account SYSTEM:PANCAKES
Re-enter the password for account SYSTEM for verification:PANCAKES

%UAF-I-MDFYMSG, user record(s) updated

Enter new password for account SYSTEST:BRATWURST
Re-enter the password for account SYSTEST for verification:BRATWURST

%UAF-I-MDFYMSG, user record(s) updated

Enter new password for account FIELD:ZIRHUMBA
Re-enter the password for acount FIELD for verification:ZIRHUMBA

%UAF-I-MDFYMSG, user record(s) updated

The procedure will now check and verify passwords for the
following accounts:

     SYSTEM, SYSTEST, FIELD

Passwords that can be guessed easily will not be accepted.
```

If the procedure verifies the passwords, it displays the following messages:

```
%VMS-I-PWD_OKAY, account password for SYSTEM verified
%VMS-I-PWD_OKAY, account password for SYSTEST verified
%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 SYSTEM 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 (for NO) and press RETURN. When the procedure asks if you want to enter a new password, type Y (for YES) 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 SYSTEM account. The
password you select must be at least 8 characters in length and may not be the
same as the name of the account.

New password: WILLIWAW
Verification: WILLIWAW

%UAF-I-MDFMSG, user record(s) updated
%VMS-I-PWD-SET, primary password for account SYSTEM set
```

14 After you have entered the passwords, the procedure creates your RIGHTS database and displays the following message:

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



%UAF-I-RDBDONEMSG, rights database modified
```

15 After the procedure creates your RIGHTS database, go to Section 5.6 to install the mandatory update.

5.6 Installing the Mandatory Update and Running AUTOGEN

Follow the directions in this section to install the mandatory update and run AUTOGEN. AUTOGEN evaluates your hardware configuration and estimates typical workloads. It then sets system parameters, the sizes of the page, swap, and dump files, and the contents of VMSIMAGES.DAT. When AUTOGEN finishes, the installation procedure is complete.

1 After the procedure creates the RIGHTS database, the procedure displays the following messages:

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

- DECOMPRESS THE SYSTEM LIBRARIES - For space considerations, many of the system
libraries are shipped in a data compressed format. If you have enough disk
space, you may decompress them for faster access. Use SYS$UPDATE:LIBDECOMP.COM
to data expand the libraries. If you choose not to decompress these libraries
there will be a negative impact on the performance of the HELP and LINK
commands.

- BUILD A STANDALONE BACKUP KIT - You can build a standalone backup kit
using the procedure described in your VMS installation and operations
guide which is supplied with your VAX processor.

Continuing with VAX/VMS V5.0 Installation Procedure

Configuring all devices on the system.

You must now install the MANDATORY UPDATE, which can be found
on a separate distribution volume.

        VAX/VMS Software Product Installation Procedure V5.0

It is 31-DEC-1988 at 13:00
Enter a (?) at any time for help.
```

2 The procedure asks you for the device name of the drive that contains the mandatory update. Enter the following and press RETURN:

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

The procedure displays the following series of messages:

```
Please mount the first volume of the set on MUAO:
*Are you ready?
```

3 Insert the distribution media in the tape drive. If you are installing the mandatory update from magnetic tape, spin up the magnetic tape. When you are ready to continue, type Y (for YES) and press RETURN. The procedure displays the following messages and asks if you want to purge files:

```
%MOUNT-I-MOUNTED, VMSMUP mounted on _MUAO:

The following products will be processed:

    VMSMUP V5.0

        Beginning installation of VMSMUP V5.0 at 13:00

%VMSINSTAL-I-RESTORE, Restoring product saveset A

Installing VMS V5 mandatory update

Do you want to purge files replaced by this installation [YES]?
```

Press RETURN (for YES) and go to the next step.

4 Depending on the version of VMS that you are installing, the mandatory update procedure might ask for certain information. Read the screen displays for instructions.

The procedure displays the following message:

```
VMSINSTAL procedure done at 13:00
```

5 AUTOGEN runs and displays the following series of messages:

```
Running AUTOGEN to compute the new SYSGEN parameters.

An attempt may be made to re-size the pagefile or swapfile. If
there is insufficient room on the disk, the recommended size is
displayed with a message that the file should be created or
extended manually by the system manager later on.

Running AUTOGEN - Please wait.

          .
          .
          .
```

Note: **Check the display on the console terminal. If your system disk is an RC25 or RD52 disk, AUTOGEN may display error messages in the following format:**

```
******************
%AUTOGEN-W-DSKSPC, The disk on which DISK$VAXVMSRL5:[SYSO.SYSEXE]PAGEFILE.SYS
        resides would be over 95% full if it were modified to hold 20000
        blocks.
******************

%AUTOGEN-I-NOCHANGE, DISK$VAXVMSRL5:[SYSO.SYSEXE]PAGEFILE.SYS
        will not be modified.
```

If AUTOGEN displays messages of this type, refer to the instructions in step 10.

6 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
```

7 After the system shuts down, the procedure does a sniffer boot. If the system does not do a sniffer boot, enter the BOOT command as described in step 4 of Section 5.5.

8 After the system reboots, the procedure displays the following message:

Note: The procedure might display warning messages that the VMS and VAXcluster licenses must be registered. Be sure to register these licenses when the installation procedure finishes.

```
            VAX/VMS Version BI50 Major version id = 01 Minor version id = 00

You have successfully installed the VMS operating system.
The system is now executing the STARTUP procedure.
Please await the completion of STARTUP before logging
into the system (approximately three minutes).
```

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

```
Startup processing continuing...

%SET-I-INTSET, login interactive limit=64, current interactive value = 0
 31-DEC-1988 13:00:00.00
 SYSTEM         job terminated at 31-DEC-1988 13:00:00.00

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 VMS operating system is running.

If you pressed in the READY button on DUA0, release it.

9 Press RETURN. The system asks for the user name and password. Log in to the SYSTEM account so that you can perform certain post-installation procedures.

```
      Welcome to VAX/VMS V5.0
USERNAME: SYSTEM
PASSWORD: PANCAKES

       .

       .

       .

       Welcome to VAX/VMS V5.0
```

When you press RETURN, the VMS operating system prompt ($) is displayed.

If you forget the password, follow the instructions for breaking into the system in *Guide to Setting Up a VMS System*.

10 Check the display on the console terminal. If your system disk is an RC25 or RD52 disk, AUTOGEN might have displayed error messages in the following format:

```
*****************
%AUTOGEN-W-DSKSPC, The disk on which DISK$VAXVMSRL5:[SYS0.SYSEXE]PAGEFILE.SYS
        resides would be over 95% full if it were modified to hold 20000
        blocks.
*****************

%AUTOGEN-I-NOCHANGE, DISK$VAXVMSRL5:[SYS0.SYSEXE]PAGEFILE.SYS
        will not be modified.
```

If AUTOGEN displays any messages of this type, you need to free some space on the system disk, as follows:

a. Because of space limitations, the dump file information must be saved in the page file. You need to run SYSGEN and set the SAVEDUMP parameter to one. While you are logged into the SYSTEM account, enter the following commands:

```
$ RUN SYS$SYSTEM:SYSGEN
SYSGEN> USE CURRENT
SYSGEN> SET SAVEDUMP 1
SYSGEN> WRITE CURRENT
SYSGEN> EXIT
```

For more information, see Section 7.1 in the *Guide to Maintaining a VMS System*.

b. After completing the instructions in this chapter, follow the instructions in Section 8.2 in this guide.

11 There are several things you must do before you can use the system. For complete information, see Chapter 8.

6 Installing VMS from Diskettes

This chapter describes installing the VMS operating system on a VAXstation I, II, II/GPX and on a MicroVAX I and II using diskettes. To install the VMS operating system from magnetic tape or tape cartridge, see Chapter 5. To install the VMS operating system from CD ROM, see Chapter 7.

All references to the MicroVAX II apply to the MicroVAX I and the VAXstation I and II except as noted.

CAUTION: **The software installation procedure overwrites the contents of the system disk. Use the VMS installation procedure only if your processor is new or if you want to destroy the contents of the system disk. If your system disk contains files that you want to save, you should upgrade to the new version of the VMS operating system. For a detailed description of the upgrade procedure, see the current version of the *VMS Release Notes*.**

If your system disk is an RC25 or RD52 disk, you should be aware that not all the VMS operating system files can fit on an RC25 or RD52 system disk. This causes performance problems on the system. DIGITAL suggests that you add disk storage to your system.

6.1 Before You Start

Before you install the VMS operating system, do the following:

- Make sure the hardware has been installed and checked for proper operation. For detailed information on the hardware, see the hardware manual for the MicroVAX II.

- Make sure you have all the items listed on the bill of materials in the distribution kit. The MicroVAX II diskette distribution kit should contain the following:

  — Twenty-five RX33 floppy diskettes that contain the VMS *required* (10 diskettes), *library* (11 diskettes), and *optional* (4 diskettes) save sets

  — One RX33 floppy diskette that contains standalone BACKUP

  — One RX33 floppy diskette that contains the mandatory update

  If your kit is incomplete, notify the DIGITAL Software Distribution Center. Request priority shipment of any missing items.

- If you are installing the VMS operating system on a computer in a VAXcluster environment, determine whether you want to create a local area or a mixed-interconnect configuration. For a complete description of configurations, see the *VMS VAXcluster Manual*. If you are installing the VMS operating system in a local area or mixed-interconnect configuration, you need to obtain the following information from either the network or VAXcluster manager:

  — Allocation class value

  — DECnet node name and node address for the computer

Installing VMS from Diskettes
6.1 Before You Start

— Cluster group number and password

The installation procedure transfers the VMS files from the distribution RX33 diskettes to the system disk. The procedure consists of the following stages:

1 Turning on the system

2 Preparing the system disk

3 Booting standalone BACKUP

4 Creating the system disk

5 Installing the mandatory update and running AUTOGEN

The procedure takes approximately two hours.

Note: **The screen displays and examples in this manual depict the installation of VMS Version 5.0. Your screen displays reflect the version that you are installing.**

6.2 Turning On the System

This procedure assumes that the system is not turned on when you start the installation. The following steps describe turning on the system and setting the switches on the CPU panel.

1 Turn on the console terminal. If you do not know how to determine if the terminal is online, see the owner's manual for your terminal.

During the software installation, enter all commands from the console terminal.

Make sure that the baud rate (transmit and receive speed) of the console terminal and the system is 9600 baud. To check the baud rate on the terminal, see Section 2.8.1. To check the baud rate setting for all MicroVAX systems except the BA200 series model, see Section 2.5.1. The baud rate for all BA200 series models is preset to 9600 baud.

Your console terminal must be set to 8 bits, no parity transmit, and no parity receive. This is the default for most terminals except the LA120. For instructions on checking these settings, see the owner's manual provided with your LA120 terminal.

2 For all systems except the BA200 series model, make sure that the HALT, RESTART, WRITE-PROTECT, and READY buttons on the system control panel are popped out. (If a button is pressed in, press it in again to make it pop out.) The BA200 series model does not have the HALT, RESTART, WRITE-PROTECT, and READY buttons.

3 If you have a MicroVAX II processor, set the Halt Enable/Disable switch to ENABLE.

4 Turn on the computer. Push the power switch to the 1 (ON) position. The switch on all models except the MicroVAX II 630QB glows orange. The fan inside the processor box goes on.

Every time a MicroVAX I computer is turned on, the system should display the following verification messages for the microcode:

MICROVERIFY STARTED

MICROVERIFY PASSED

The first time a MicroVAX II computer is turned on, the system should display the language-mode selection menu. (If you have selected a language already, the processor proceeds directly to the diagnostic tests.)

If you are prompted to select a language from the list of languages that appears on your terminal screen, select the language you want to use by entering the number associated with that language and pressing RETURN. To save the language that you have selected, turn the power-up mode switch on the CPU panel counterclockwise to the → (arrow) position.

After you select the language and set the power-up mode switch on a MicroVAX II system, the system performs diagnostic tests. During these self-tests, the system begins a countdown sequence, starting with the number 7. When it reaches 3, the console-mode prompt (> > >) should appear on your terminal screen.

If the computer does not turn on properly—for example, if you receive the message MICROVERIFY FAILED—check the processor control panel before beginning any troubleshooting procedures. The problem may be something simple, such as the HALT button being pushed in.

When the system tests complete on MicroVAX I and MicroVAX II processors, your processor should be running with the console terminal in console mode; that is, the console-mode prompt (> > >) should appear on the terminal screen. If you do not receive the console-mode prompt (> > >), press either the HALT button or the F5 (BREAK) key twice.

5   Check the processor control panel lights again. Only the following lights should be glowing: the READY button light, the DC OK light, and the power switch. The power switch on a MicroVAX II model 630QB does not contain a light. If one of these buttons is not glowing, press it.

6   Make sure that the Halt Enable/Disable switch is set to ENABLE.

At this point, your system should be running with the console terminal in console mode; that is, the console-mode prompt (> > >) should appear on the screen.

7   To prepare the system disk, go to Section 6.3.

6.3   Preparing the System Disk

To set up the system disk you use during the installation, use the following procedure:

1   If your system consists of more than one fixed disk, decide which one you want to be the system disk. DIGITAL recommends that you use the drive with device name DUA0 as the system disk; whenever the system starts up, it attempts to boot the system from DUA0 before attempting to boot the system from any other fixed disks.

Remember that not all the VMS operating system files can fit on an RC25 or RD52 system disk. This causes performance problems on the system.

2 If your MicroVAX II has not run operating system software previously, your fixed disk(s) might not be formatted. You *must* format the fixed disk(s) before installing the VMS operating system. For instructions on formatting fixed disks, see the owner's manual for your computer.

CAUTION: Do not format a disk after the installation; if you do, you will erase the contents of the disk.

3 To boot standalone BACKUP, go to Section 6.4.

6.4 Booting Standalone BACKUP

This section describes the procedure for booting standalone BACKUP. Standalone BACKUP lets you transfer the VMS *required* save set from the distribution floppy diskettes to your system disk. You need the floppy diskette from the VMS distribution kit that is labeled as follows:

Paper Label[1]	Volume Label[2]
VAX/VMS V5.0 RX33 S/A BKUP	STANDBACKUP

[1]A paper label is a label affixed to a diskette.

[2]A volume label is the name the VMS operating system uses to refer to a diskette. During the installation, the procedure displays the volume label, not the paper label, in messages.

Booting standalone BACKUP takes approximately three minutes.

1 Insert the floppy diskette labeled VAX/VMS V5.0 RX33 S/A BKUP in the diskette drive.

2 To boot standalone BACKUP, enter the following command and press RETURN:

```
>>> B DUA2
```

Note: Ignore any error messages about missing drivers that might resemble the following:

```
%SYSGEN-I-OPENIN, error opening SYS$SYSROOT:[SYSEXE]VADRIVER.EXE; as input
%SYSGEN-E-FNF, file not found
```

These messages might be displayed during the installation.

3 A few minutes later standalone BACKUP displays the following message:

```
VAX/VMS Version V5.0 Major version id = 01 Minor version id = 00
```

4 A few minutes later the procedure might ask for the date and time. Enter the date and time using the 24-hour clock format and press RETURN. For example:

```
PLEASE ENTER DATE AND TIME (DD-MMM-YYYY HH:MM) 31-DEC-1988 13:00
```

5 The procedure displays a list of the local devices on your system and, if you have them, HSC and MSCP-served devices. For example:

```
Available device MUA0:    device type TK50
        .
        .
        .
```

Check the list of devices. If the list is incomplete, make sure that all the drives are connected properly to the system. See your hardware manuals for details.

6 When standalone BACKUP finishes booting, it displays an identification message followed by the dollar-sign prompt ($):

```
%BACKUP-I-IDENT, Stand-alone BACKUP V5.0; the date is 31-DEC-1988 13:00
$
```

7 Remove the floppy diskette labeled VAX/VMS V5.0 RX33 S/A BKUP from the diskette drive.

8 To create a system disk, go to Section 6.5.

6.5 Creating a System Disk

The VMS files are stored on the distribution floppy diskettes as three save sets: *required, library,* and *optional.* This section describes the steps for transferring the *required, library,* and *optional* save sets from the distribution floppy diskettes to your system disk.

The instructions refer to the *target-drive.* The *target-drive* is the drive that holds the system disk.

1 Determine the device names of the system disk(s).

- If your MicroVAX system has only one hard disk, the system disk is named DUA0.

- If your MicroVAX system has more than one hard disk, you can choose the system disk.

Section 4.3 contains a list of device names for all MicroVAX devices. Write these names on a piece of paper. You will need this information throughout the installation.

2 Insert the floppy diskette labeled VAX/VMS V5.0 RX33 REQUIRED 1/10 in the diskette drive.

3 To transfer the *required* save set on your system disk, enter the BACKUP command in the following format:

```
$ BACKUP/VERIFY DUA2:VMS050.B/SAVE target-drive:
```

Substitute the device name of your system disk for *target-drive.* Make sure you put a colon (:) after each device name and that you use zeros in the device name and in VMS050.

The procedure begins to transfer the *required* save set from the floppy diskettes to the system disk. [1] The entire procedure takes approximately 30 minutes. During the process the procedure displays the following message:

---

[1] The BACKUP command creates a system disk that includes a DIGITAL-provided set of volume parameters, including a CLUSTER_SIZE (disk access scheme) of 1. For more information, see the note at the end of Section 11.2.1.

6.5 Creating a System Disk

```
%BACKUP-I-STARTVERIFY, starting verification pass
%BACKUP-I-RESUME, resuming operation on volume 2
%BACKUP-I-READYREAD, mount volume 2 on _SABKUP$DUA2: for reading
Enter "YES" when ready:
```

Note: **Disregard any error messages similar to the following:**

%BACKUP-W-INCFILATR, incomplete file attribute data for . . .

These messages are normal when installing the VMS operating system from floppy diskettes.

4   Remove the floppy diskette labeled VAX/VMS V5.0 RX33 REQUIRED 1/10 from the diskette drive and insert the floppy diskette labeled VAX/VMS V5.0 RX33 REQUIRED 2/10 in the drive. When you are ready to continue, type Y (for YES) and press RETURN.

The procedure displays a verification and mount message for each floppy diskette in the *required* save set. Each time the procedure displays a mount request, remove the diskette from the drive and insert the next diskette of the save set. Each floppy diskette takes approximately three minutes to process.

5   After the last diskette is processed, the procedure displays the following message:

```
%BACKUP-I-PROCDONE, operation completed. Processing finished at 31-DEC-1988 13:00
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:
```

6   If your system has a HALT button, press it twice. If your system does not have a HALT button, press the F5 (BREAK) key.

Note: **Do not remove the VAX/VMS V5.0 RX33 REQUIRED 10/10 diskette from the drive until you are directed to do so.**

7   To boot the system disk, use the BOOT command in the following format:

```
>>> B ddcu
```

Substitute the device name of the system disk for *ddcu*. Section 4.3 contains a list of device names for all MicroVAX devices.

8   When the boot is complete, the procedure displays some messages and asks for the date and time. Enter the date and time using the 24-hour clock format and press RETURN. For example:

Note: **The procedure displays warning messages, similar to the following, that the VMS license is not registered. Continue with the installation procedure. Follow the instructions for registering the VMS license after you finish the installation.**

```
VAX/VMS Version BI50 Major version = 01 Minor version = 00

    VAX/VMS Version 5.0 Installation Procedure

%LICENSE-F-EMTLDB, License database contains no license records
%LICENSE-E-NOAUTH, DEC VAX-VMS use is not authorized on this node

%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...

Please enter the date and the time (DD-MMM-YYYY HH:MM): 31-DEC-1988 13:00
```

Note: If you have an RC25 or RD52 system disk, the procedure displays the following message:

```
The full VMS kit will not fit on your system disk . . .
The OPTIONAL save set will not be restored.
If you wish to restore files from this save set,
execute the following command after you finish the installation procedure:

$ RUN SYS$UPDATE:VMSTAILOR
```

Continue with the installation procedure. Follow the instructions for small system disks in Section 8.2 after you finish the installation.

9 The procedure asks for the volume label of the system disk. A volume label is the name the VMS operating system uses to refer to the system disk. If you have a VAXcluster environment, each system disk must have a unique volume label.

You can press RETURN to accept the default volume label, VMSRL5, or you can enter a volume label of your choice. The volume label can be 1 to 12 characters long; spaces are not allowed. 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 may indicate a volume label of 1 to 12-characters in length. If you
wish to use the default name of VMSRL5 just press RETURN in response to
the next question.

Enter the volume label for this system disk (no spaces) [VMSRL5]: SYSDS
```

10 The procedure asks which drive holds the distribution floppy diskette. Type DUA2 and press RETURN:

```
Enter the name of the drive holding the distribution media (DDcu): DUA2
```

11 Several minutes later the system displays the following messages:

```
%MOUNT-I-MOUNTED, VMS050 mounted on _DUA2:

Please replace the last floppy from the REQUIRED saveset with
the first floppy from the LIBRARY saveset.

Is the first floppy labeled LIBRARY ready to be mounted [N]?
```

Note: If you have an RC25 or RD52 system disk, the procedure does not restore the *optional* save set. Continue with the installation. When the installation procedure finishes, follow the instructions for small system disks.

12 Remove the floppy diskette labeled VAX/VMS V5.0 RX33 REQUIRED 10/10 from the drive. Insert the floppy diskette labeled VAX/VMS V5.0 RX33 LIBRARY 1/11 into the diskette drive. When you are ready to continue, type Y (for YES) and press RETURN.

The procedure displays the following message:

```
%MOUNT-I-MOUNTED, VMSO5OC mounted on DUA2:

Restoring LIBRARY saveset.
-- please insert the next floppy(s) from the LIBRARY saveset
   in DUA2:, when requested to do so.
%BACKUP-I-STARTVERIFY, starting verification pass

%BACKUP-I-RESUME, resuming operations on volume 2
%BACKUP-I-READYREAD, mount volume 2 on _DUA2: for reading
Enter "YES: when ready:
```

13 Remove the floppy diskette labeled VAX/VMS V5.0 RX33 LIBRARY 1/11 and insert the floppy diskette labeled VAX/VMS V5.0 RX33 LIBRARY 2/11. When you are ready to continue, type Y (for YES) and press RETURN.

The procedure repeats a mount message for each floppy diskette in the *library* save set. Each time the procedure displays a mount request, remove the diskette in the drive and insert the next diskette of the save set. Each floppy diskette takes approximately three minutes to process.

14 After the *library* save set has been transferred to the system disk, the procedure displays the following message:

```
Please replace the last floppy from the LIBRARY saveset with
the first floppy from the OPTIONAL saveset.

Is the first floppy labeled OPTIONAL ready to be mounted [N]?
```

15 Remove the diskette labeled VAX/VMS V5.0 RX33 LIBRARY 11/11 from the diskette drive and insert the diskette labeled VAX/VMS V5.0 RX33 OPTIONAL 1/4. When you are ready to continue, type Y (for YES) and press RETURN.

The procedure displays the following message:

```
%MOUNT-I-MOUNTED, VMSO5OD mounted on _DUA2:
 Restoring OPTIONAL saveset.
 -- please insert the next floppy(s) from the OPTIONAL saveset
    in DUA2:, when requested to do so.

%BACKUP-I-STARTVERIFY, starting verification pass
%BACKUP-I-RESUME, resuming operations on volume 2
%BACKUP-I-READYREAD, mount volume 2 on _DUA2: for reading
Enter "YES: when ready:
```

16 Remove the diskette labeled VAX/VMS V5.0 RX33 OPTIONAL 1/4 and insert the diskette labeled VAX/VMS V5.0 RX33 OPTIONAL 2/4. When you are ready to continue, type Y (for YES) and press RETURN.

The procedure repeats a mount message for each floppy diskette in the *optional save set*. Each time the procedure displays a mount request, remove the diskette from the drive and insert the next diskette of the save set. Each floppy diskette takes approximately three minutes to process.

17 After the *optional* save set has been transferred to the system disk, 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 the VMS operating system on a standalone system, type N (for NO), press RETURN, and go to step 20.

If you are installing the VMS operating system in a VAXcluster environment, type Y (for YES), press RETURN, and go to step 18.

Note: **If you answer YES to the VAXcluster question, you must have a VAXcluster license.**

18 The procedure displays the following message:

```
Now configuring system to be a cluster member.
```

19 Table 6–1 lists the questions you are asked if you want either a local area or a mixed-interconnect configuration. Typical responses are explained in the table.

Table 6–1   Installation Questions for Local Area and Mixed-Interconnect Configurations

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 DECnet node name—for example, JUPITR. The DECnet node name may be from 1 to 6 alphanumeric characters in length and may not include dollar signs or underscores.
What is the node's DECnet node address?	Enter the 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 configurations.
Enter this cluster's group number:	Enter a number in the range from 1-4095 or 61440-65535.
Enter this cluster's password:	Enter the cluster password. The password must be from 1 to 31 alphanumeric characters in length and may include dollar signs and underscores.
Re-enter this cluster's password for verification:	Re-enter the password.
Will JUPITR be a disk server (Y/N)?	Enter Y. In local area and mixed-interconnect configurations, the system disk is always served to the cluster. Refer to the *VMS VAXcluster Manual* for information on served cluster disks.

Table 6–1 (Cont.) Installation Questions for Local Area and Mixed-Interconnect Configurations

Question	How to Respond
Will JUPITR serve HSC disks (Y)?	Enter a response appropriate for your configuration.
Enter a value for JUPITR's ALLOCLASS parameter:	Enter the appropriate class value. If you have a mixed-interconnect configuration, the value must be between 1 and 255; you cannot enter 0.
Does this cluster contain a quorum disk [N]?	Enter Y or N, depending on your configuration. If you enter Y, the procedure will prompt for the name of the quorum disk. Enter the device name of the quorum disk.

20 The procedure displays the following message:

```
You may now remove the distribution kit from _DUA2:
```

Remove the last diskette of the *optional* save set from the drive.

If you have chosen a system disk other than DUA0, press in the READY light on the DUA0 drive. Pressing in the READY button takes DUA0 offline and prevents it from being booted in the sniffer boot mentioned in step 7 of Section 6.6.

21 The procedure asks for new passwords for the SYSTEM, SYSTEST, and FIELD accounts. Passwords must be at least eight characters in length; they do not appear on the display. Press RETURN after you enter each one. After you enter the passwords, the procedure checks each one to make sure it meets the requirements for a good password. For example:

```
Now we will ask you for passwords for the following accounts:
      SYSTEM, SYSTEST, FIELD

Enter new password for account SYSTEM:PANCAKES
Re-enter the password for account SYSTEM for verification:PANCAKES

%UAF-I-MDFYMSG, user record(s) updated

Enter new password for account SYSTEST:BRATWURST
Re-enter the password for account SYSTEST for verification:BRATWURST

%UAF-I-MDFYMSG, user record(s) updated

Enter new password for account FIELD:ZIRHUMBA
Re-enter the password for acount FIELD for verification:ZIRHUMBA

%UAF-I-MDFYMSG, user record(s) updated

The procedure will now check and verify passwords for the
following accounts:

      SYSTEM, SYSTEST, FIELD

Passwords that can be guessed easily will not be accepted.
```

If the procedure verifies the passwords, it displays the following messages:

```
%VMS-I-PWD_OKAY, account password for SYSTEM verified
%VMS-I-PWD_OKAY, account password for SYSTEST verified
%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 SYSTEM 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 (for NO) and press RETURN. When the procedure asks if you want to enter a new password, type Y (for YES) 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 SYSTEM account. The
password you select must be at least 8 characters in length and may not be the
same as the name of the account.

New password: WILLIWAW
Verification: WILLIWAW

%UAF-I-MDFMSG, user record(s) updated
%VMS-I-PWD-SET, primary password for account SYSTEM set
```

22 After you have entered the passwords, the procedure creates your RIGHTS database and displays the following message:

```
Creating RIGHTS database file, SYS$SYSTEM:RIGHTSLIST.DAT
IGNORE ANY "%SYSTEM-F-DUPIDENT, duplicate identifier" errors
                .
                .
                .
%UAF-I-RDBDONEMSG, rights database modified
```

23 After the procedure creates your RIGHTS database, go to Section 6.6 to install the mandatory update.

6.6 Installing the Mandatory Update and Running AUTOGEN

Follow the directions in this section to install the mandatory update and run AUTOGEN. AUTOGEN evaluates your hardware configuration and estimates typical workloads. It then sets system parameters, the sizes of the page, swap, and dump files, and the contents of VMSIMAGES.DAT. When AUTOGEN finishes, the installation procedure is complete.

1 After the procedure creates the RIGHTS database, the procedure displays the following messages:

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

- DECOMPRESS THE SYSTEM LIBRARIES - For space considerations, many of the system
libraries are shipped in a data compressed format. If you have enough disk
space, you may decompress them for faster access. Use SYS$UPDATE:LIBDECOMP.COM
to data expand the libraries. If you choose not to decompress these libraries
there will be a negative impact on the performance of the HELP and LINK
commands.

- BUILD A STANDALONE BACKUP KIT - You can build a standalone backup kit
using the procedure described in your VMS installation and operations
guide which is supplied with your VAX processor.

Continuing with VAX/VMS V5.0 Installation Procedure

Configuring all devices on the system.

You must now install the MANDATORY UPDATE, which can be found
on a separate distribution volume.
```

Installing VMS from Diskettes
6.6 Installing the Mandatory Update and Running AUTOGEN

```
                    VAX/VMS Software Product Installation Procedure V5.0

          It is 31-DEC-1988 at 13:00
          Enter a (?) at any time for help.
```

2 The procedure asks for the device name of the drive that contains the mandatory update. Enter the following and press RETURN:

```
*Where will the distribution volumes be mounted: DUA2
```

The procedure displays the following messages:

```
Please mount the first volume of the set on DUA2:
*Are you ready?
```

3 Insert the RX33 floppy diskette labeled VAX/VMS V5.0 BIN RX33 MANDATORY UPDATE in the drive. When you are ready to continue, type Y (for YES) and press RETURN. The procedure displays the following messages and asks if you want to purge files:

```
%MOUNT-I-MOUNTED, VMSMUP mounted on _DUA2:

The following products will be processed:

VMSMUP V5.0

        Beginning installation of VMSMUP V5.0 at 13:00

%VMSINSTAL-I-RESTORE, Restoring product saveset A

Installing VMS V5 mandatory update

Do you want to purge files replaced by this installation [YES]?
```

Press RETURN (for YES) and go to the next step.

4 Depending on the version of VMS that you are installing, the mandatory update procedure might ask for certain information. Read the screen displays for instructions.

The procedure displays the following message:

```
VMSINSTAL procedure done at 13:00
```

5 AUTOGEN runs and displays the following messages:

```
Running AUTOGEN to compute the new SYSGEN parameters.

An attempt may be made to re-size the pagefile or swapfile. If
there is insufficient room on the disk, the recommended size is
displayed with a message that the file should be created or
extended manually by the system manager later on.

Running AUTOGEN - Please wait.
```

```
                    .
                    .
                    .
```

Note: **Check the display on the console terminal. If your system disk is an RC25 or RD52 disk, AUTOGEN may display error messages in the following format:**

```
******************
%AUTOGEN-W-DSKSPC, The disk on which DISK$VAXVMSRL5:[SYS0.SYSEXE]PAGEFILE.SYS
        resides would be over 95% full if it were modified to hold 20000
        blocks.
******************

%AUTOGEN-I-NOCHANGE, DISK$VAXVMSRL5:[SYS0.SYSEXE]PAGEFILE.SYS
        will not be modified.
```

6–12

If AUTOGEN displays messages of this type, refer to the instructions in step 10.

6 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
```

7 After the system shuts down, the procedure does a sniffer boot. If the system does not do a sniffer boot, enter the BOOT command as described in step 7 of Section 6.5.

8 After the system reboots, the procedure displays the following message:

Note: The procedure might display warning messages that the VMS and VAXcluster licenses must be registered. Be sure to register these licenses when the installation procedure finishes.

```
    VAX/VMS Version BI50  Major version id = 01 Minor version id = 00

You have successfully installed the VMS operating system.
The system is now executing the STARTUP procedure.
Please await the completion of STARTUP before logging
into the system (approximately three minutes).
```

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

```
Startup processing continuing...

%SET-I-INTSET, login interactive limit=64, current interactive value = (
31-DEC-1988 13:00:00.00
SYSTEM        job terminated at 31-DEC-1988 13:00:00.00

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 VMS operating system is running.

If you pressed in the READY button on DUA0, release it.

9 Press RETURN. The system asks for the user name and password. Log in to the SYSTEM account so that you can perform certain post-installation procedures.

```
    Welcome to VAX/VMS V5.0

USERNAME: SYSTEM
PASSWORD: PANCAKES

    .
    .

    .

    Welcome to VAX/VMS Version V5.0
```

When you press RETURN, the VMS operating system prompt ($) is displayed.

If you forget the password, follow the instructions for breaking into the system in the *Guide to Setting Up a VMS System*.

10 Check the display on the console terminal. If your system disk is an RC25 or RD52 disk, AUTOGEN might have displayed error messages in the following format:

```
*****************
%AUTOGEN-W-DSKSPC, The disk on which DISK$VAXVMSRL5:[SYSO.SYSEXE]PAGEFILE.SYS
      resides would be over 95% full if it were modified to hold 20000
      blocks.
*****************

%AUTOGEN-I-NOCHANGE, DISK$VAXVMSRL5:[SYSO.SYSEXE]PAGEFILE.SYS
      will not be modified.
```

If AUTOGEN displays any messages of this type, you need to free some space on the system disk, as follows:

a. Because of space limitations, the dump file information must be saved in the page file. You need to run SYSGEN and set the SAVEDUMP parameter to one. While you are logged in to the SYSTEM account, enter the following commands:

```
$ RUN SYS$SYSTEM:SYSGEN
SYSGEN> USE CURRENT
SYSGEN> SET SAVEDUMP 1
SYSGEN> WRITE CURRENT
SYSGEN> EXIT
```

For more information, see Section 7.1 in the *Guide to Maintaining a VMS System*.

b. After completing the instructions in this chapter, follow the instructions in Section 8.2 in this guide.

11 There are several things you must do before you can use the system. For complete information, see Chapter 8.

7 Installing VMS from CD ROM

If your system has a compact disc reader, you can install the VMS operating system from Compact Disk Read-Only Memory (CD ROM). This chapter describes installing the VMS operating system on a VAXstation I, II, II/GPX and on a MicroVAX I and II from CD ROM. To install the VMS operating system from magnetic tape or tape cartridge, see Chapter 5. To install the VMS operating system from diskettes, see Chapter 6.

All references to the MicroVAX II apply to the MicroVAX I and the VAXstation I and II except as noted.

CAUTION: **The software installation procedure overwrites the contents of the system disk. Use the VMS installation procedure only if your processor is new, or if you want to destroy the contents of the system disk. If your system disk contains files that you want to save, you should upgrade to the new version of the VMS operating system. For a detailed description of the upgrade procedure, see the current version of the *VMS Release Notes*.**

If your system disk is an RC25 or RD52 disk, you should be aware that not all the VMS operating system files can fit on an RC25 or RD52 system disk. This causes performance problems on the system. DIGITAL suggests that you add disk storage to your system.

7.1 Before You Start

Before you install the VMS operating system, do the following:

- Make sure the hardware has been installed and checked for proper operation. For detailed information on the hardware, see the hardware manual for the MicroVAX II.

- Make sure you have all the items listed on the bill of materials in the distribution kit. The MicroVAX II CD ROM distribution kit is a CD ROM that contains standalone BACKUP, the VMS *required, library,* and *optional* save sets, and the mandatory update.

- If you are installing the VMS operating system in a VAXcluster environment, determine whether you want to create a local area or a mixed-interconnect configuration. For a complete description of configurations, see the *VMS VAXcluster Manual.* If you are installing the VMS operating system in a local area or mixed-interconnect configuration, you need to obtain the following information from either the network or VAXcluster manager:

  — Allocation class value

  — DECnet node name and node address for the computer

  — Cluster group number and password

  The installation procedure transfers the VMS files from the distribution CD ROM to the system disk. The procedure consists of the following stages:

Installing VMS from CD ROM

7.1 Before You Start

1 Turning on the system

2 Preparing the system disk

3 Booting standalone BACKUP

4 Creating the system disk

5 Installing the mandatory update and running AUTOGEN

The procedure takes approximately two to three hours.

Note: **The screen displays and examples depict the installation of VMS Version 5.0. Your screen displays reflect the version that you are installing.**

7.2   Turning On the System

This procedure assumes that the system is not turned on when you start the installation. The following steps describe turning on the system and setting the switches on the CPU panel.

1 Turn on the console terminal. If you do not know how to determine if the terminal is online, see the owner's manual for your terminal.

During the software installation, enter all commands from the console terminal.

Make sure that the baud rate (transmit and receive speed) of the console terminal and the system is 9600 baud. To check the baud rate on the terminal, see Section 2.8.1. To check the baud rate setting for all MicroVAX systems except the BA200 series model, see Section 2.5.1. The baud rate for all BA200 series models is preset to 9600 baud.

Your console terminal must be set to 8 bits, no parity transmit, and no parity receive. This is the default for most terminals, except the LA120. For instructions on checking these settings, see the owner's manual provided with your LA120 terminal.

2 For all systems except the BA200 series model, make sure that the HALT, RESTART, WRITE-PROTECT, and READY buttons on the processor control panel are popped out. (If a button is pressed in, press it in again to make it pop out.) The BA200 series model does not have the HALT, RESTART, WRITE-PROTECT, and READY buttons.

3 If you have a MicroVAX II computer, set the Halt Enable/Disable switch to ENABLE.

4 Turn on the computer. Push the power switch to the 1 (ON) position. The switch on all models except the MicroVAX II 630QB glows orange. The fan inside the processor box goes on.

Every time a MicroVAX I computer is turned on, the system should display the following verification messages for the microcode:

```
MICROVERIFY STARTED

MICROVERIFY PASSED
```

The first time a MicroVAX II computer is turned on, the system should display the language-mode selection menu. (If you have selected a language already, the processor proceeds directly to the diagnostic tests.)

If you are prompted to select a language from the list of languages that appears on your terminal screen, select the language you want to use by entering the number associated with that language and pressing RETURN. To save the language that you have selected, turn the power-up mode switch on the CPU panel counterclockwise to the → (arrow) position.

After you select the language and set the power-up mode switch on a MicroVAX II system, the system performs diagnostic tests. During these self-tests, the system begins a countdown sequence, starting with the number 7. When it reaches 3, the console-mode prompt ($>>>$) should appear on your terminal screen.

If the computer does not turn on properly—for example, if you receive the message MICROVERIFY FAILED—check the processor control panel before beginning any troubleshooting procedures. The problem may be something simple such as the HALT button being pushed in.

When the system tests complete on MicroVAX I and MicroVAX II computer, your computer should be running with the console terminal in console mode; that is, the console-mode prompt ($>>>$) should appear on the terminal screen. If you do not receive the console-mode prompt ($>>>$), press either the HALT button or the F5 (BREAK) key twice.

5 Check the processor control panel lights again. Only the following lights should be glowing: the READY button light, the DC OK light, and the power switch. The power switch on a MicroVAX II model 630QB does not contain a light. If one of these buttons is not glowing, press it.

6 Make sure that the Halt Enable/Disable switch is set to ENABLE.

At this point, your system should be running with the console terminal in console mode; that is, the console-mode prompt ($>>>$) should appear on the screen.

7 To prepare the system disk, go to Section 7.3.

7.3 Preparing the System Disk

To set up the system disk you use during the installation, use the following procedure:

1 If your system consists of more than one fixed disk, decide which one you want to be the system disk. DIGITAL recommends that you use the drive with device name DUA0 as the system disk; whenever the system starts up, it attempts to boot the system from DUA0 before attempting to boot the system from any other fixed disk.

Remember that not all the VMS operating system files can fit on an RD52 system disk. This causes performance problems on the system.

2 If your MicroVAX II has not run operating system software previously, your fixed disk(s) might not be formatted. You *must* format the fixed disk(s) before installing the VMS operating system. For instructions on formatting fixed disks, see the owner's manual for your computer.

CAUTION: **Do not format a disk after the installation; if you do, you will erase the disk.**

3 To boot standalone BACKUP, go to Section 7.4.

7.4 Booting Standalone BACKUP

This section describes the steps for booting standalone BACKUP. Standalone BACKUP lets you transfer the VMS *required* save set from the distribution CD ROM to your system disk. The CD ROM is labeled as follows:

Paper Label[1]	Volume Label[2]
VAX/VMS V5.0 BIN CD	VMS050

[1] A paper label is a label affixed to a CD ROM.

[2] A volume label is the name the VMS operating system uses to refer to a CD ROM. During the installation, the procedure displays the volume label, not the paper label, in messages.

Booting standalone BACKUP takes approximately 3 minutes.

1 Insert the CD ROM labeled VAX/VMS V5.0 BIN CD in the compact disc drive.

2 To boot standalone BACKUP, enter the BOOT command in the following format and press RETURN:

```
>>> B DUcu
```

Substitute the controller designation of the drive holding the CD ROM disc for *c*. Substitute the unit number of the drive holding the CD ROM disc for *u*. Section 4.3 contains a list of device names for all MicroVAX devices.

Note: **Ignore any error messages about missing drivers that might resemble the following:**

```
%SYSGEN-I-OPENIN, error opening SYS$SYSROOT:[SYSEXE]VADRIVER.EXE; as input
%SYSGEN-E-FNF, file not found
```

These messages might be displayed during the installation.

3 A few minutes later standalone BACKUP displays the following message:

```
VAX/VMS Version V5.0 Major version id = 01 Minor version id = 00
```

4 A few minutes later the procedure might ask for the date and time. Enter the date and time using the 24-hour clock format and press RETURN. For example:

```
PLEASE ENTER DATE AND TIME (DD-MMM-YYYY HH:MM) 31-DEC-1988 13:00
```

5 The procedure displays a list of the local devices on your system and, if you have them, HSC- and MSCP-served devices. For example:

```
Available device MUA0:    device type TK50
                  .
                  .
                  .
```

Check the list of devices. If the list is incomplete, make sure that all the drives are connected properly to the system. See your hardware manuals for details.

6 When standalone BACKUP finishes booting, the procedure displays an identification message followed by the dollar-sign prompt ($):

```
%BACKUP-I-IDENT, Stand-alone BACKUP V5.0; the date is 31-DEC-1988 13:00
$
```

7 To create a system disk, go to Section 7.5.

7.5 Creating a System Disk

This section describes the steps for transferring the *required, library,* and *optional* save sets from the distribution CD ROM to your system disk. The VMS files are stored on the distribution CD ROM as three save sets: *required, library,* and *optional.*

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

* The *source-drive* is the drive that holds the distribution CD ROM.

* The *target-drive* is the drive that holds the system disk.

1 Determine the device names for the *source-drive* and the *target-drive.*

* If your MicroVAX system has only one hard disk, the system disk is named DUA0.

* If your MicroVAX system has more than one hard disk, you can choose the system disk.

Section 4.3 contains a list of device names for all MicroVAX devices. Write these names on a piece of paper. You will need this information throughout the installation.

2 To transfer the *required* save set to your system disk, enter the BACKUP command in the following format:

```
$ BACKUP/VERIFY source-drive:VMS050.B/SAVE target-drive:
```

Substitute the appropriate device names for the *source-drive* and the *target-drive.* Make sure you put a colon (:) after each device name and that you use zeros in the device names and in VMS050.

The *required* save set is transferred from the distribution CD ROM to the system disk. [1] This takes approximately 25 minutes. During the process the procedure displays the following message:

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

This message indicates that the *required* save set has been transferred to the system disk and the files are being checked for errors. Approximately 15 minutes later, the procedure displays the following message:

---

[1] The BACKUP command creates a system disk that includes a DIGITAL-provided set of volume parameters, including a CLUSTER_SIZE (disk access scheme) of 1. For more information, see the note at the end of Section 11.2.1.

7.5 Creating a System Disk

```
%BACKUP-I-PROCDONE, operation completed. Processing finished at 31-DEC-1988 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:
```

3   If your system has a HALT button, press it twice. If your system does not have a HALT button, press the F5 (BREAK) key.

4   To boot the system disk, enter the BOOT command in the following format:

```
>>> B ddcu
```

Substitute the device name of the system disk for *ddcu*. Section 4.3 contains a list of device names for all MicroVAX devices.

5   When the boot is complete, the procedure displays a message and asks for the date and time. Enter the date and time using the 24-hour clock format and press RETURN. For example:

Note: **The procedure displays warning messages, similar to the following, that the VMS license is not registered. Continue with the installation procedure. Follow the instructions for registering the VMS license after you finish the installation.**

```
VAX/VMS Version BI50 Major version id = 01 Minor version id = 00

   VAX/VMS Version 5.0 Installation Procedure

%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...

Please enter the date and the time (DD-MMM-YYYY HH:MM): 31-DEC-1988 13:00
```

Note: **If you have an RC25 or RD52 system disk, the procedure displays the following message:**

```
The full VMS kit will not fit on your system disk . . .
The OPTIONAL save set will not be restored.
If you wish to restore files from this save set,
execute the following command after you finish the installation procedure:

$ RUN SYS$UPDATE:VMSTAILOR
```

Continue with the installation procedure. Follow the instructions for small system disks in Section 8.2 after you finish the installation.

6   The procedure asks for the volume label of the system disk. A volume label is the name the VMS operating system uses to refer to the system disk. If you have a VAXcluster environment, each system disk must have a unique volume label.

You can press RETURN to accept the default volume label, VMSRL5, or you can enter a volume label of your choice. The volume label can be 1 to 12 characters long; spaces are not allowed. 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 may indicate a volume label of 1 to 12-characters in length. If you
wish to use the default name of VMSRL5 just press RETURN in response to
the next question.
```

```
Enter the volume label for this system disk (no spaces) [VMSRL5]: SYSDSK
```

7 The procedure asks which drive holds the distribution CD ROM. Enter the device name of the *source-drive*. For example, suppose the device name of the *source-drive* is DUB0. Type DUB0 and press RETURN:

```
Enter the name of the drive holding the distribution media (DDcu): DUB0
```

8 Several minutes later the system displays the following messages:

```
%MOUNT-I-MOUNTED, VMS050 mounted on _DUB0:
```

```
Restoring LIBRARY saveset.
```

Note: **If you have an RC25 or RD52 system disk, the procedure does not restore the *optional* save set. Continue with the installation. When the installation procedure finishes, follow the instructions for small system disks.**

9 The installation procedure now transfers the *library* and *optional* save sets to the system disk. It takes approximately 60 minutes.

During this time the procedure displays the following messages:

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

```
Restoring OPTIONAL saveset.
%BACKUP-I-STARTVERIFY, starting verification pass
```

```
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 the VMS operating system on a standalone system, type N (for NO), press RETURN, and go to step 12.

If you are installing the VMS operating system on a computer in a VAXcluster environment, type Y (for YES), press RETURN, and go to step 10.

Note: **If you answer YES to the VAXcluster question, you must have a VAXcluster license.**

10 The procedure displays the following message:

```
Now configuring system to be a cluster member.
```

11 Table 7–1 lists the questions you are asked if you want either a local area or a mixed-interconnect configuration. Typical responses are explained in the table.

Table 7-1   Installation Questions for Local Area and Mixed-Interconnect Configurations

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 DECnet node name—for example, JUPITR. The DECnet node name may be from 1 to 6 alphanumeric characters in length and may not include dollar signs or underscores.
What is the node's DECnet node address?	Enter the 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 configurations.
Enter this cluster's group number:	Enter a number in the range from 1-4095 or 61440-65535.
Enter this cluster's password:	Enter the cluster password. The password must be from 1 to 31 alphanumeric characters in length and may include dollar signs and underscores.
Re-enter this cluster's password for verification:	Re-enter the password.
Will JUPITR be a disk server (Y/N)?	Enter Y. In local area and mixed-interconnect configurations, the system disk is always served to the cluster. Refer to the *VMS VAXcluster Manual* for information on served cluster disks.
Will JUPITR serve HSC disks (Y)?	Enter a response appropriate for your configuration.
Enter a value for JUPITR's ALLOCLASS parameter:	Enter the appropriate allocation class value. If you have a mixed-interconnect configuration, the value must be between 1 and 255; you cannot enter 0.
Does this cluster contain a quorum disk [N]?	Enter Y or N, depending on your configuration. If you enter Y, the procedure will prompt for the name of the quorum disk. Enter the device name of the quorum disk.

12 The procedure displays the following message:

```
You may now remove the distribution kit from _DUB0:
```

Remove the distribution CD ROM from the compact disc drive.

If you have chosen a system disk other than DUA0, press in the READY light on the DUA0 drive. Pressing in the READY button takes DUA0 offline and prevents it from being booted in the sniffer boot mentioned in step 7 of Section 7.6.

13 The procedure asks you for new passwords for the SYSTEM, SYSTEST, and FIELD accounts. Passwords must be at least eight characters in length; they do not appear on the display. Press RETURN after you enter each one. After you enter the passwords, the procedure checks each one to make sure it meets the requirements for a good password. For example:

```
Now we will ask you for passwords for the following accounts:
          SYSTEM, SYSTEST, FIELD

Enter new password for account SYSTEM:PANCAKES
Re-enter the password for account SYSTEM for verification:PANCAKES

%UAF-I-MDFYMSG, user record(s) updated

Enter new password for account SYSTEST:BRATWURST
Re-enter the password for account SYSTEST for verification:BRATWURST

%UAF-I-MDFYMSG, user record(s) updated

Enter new password for account FIELD:ZIRHUMBA
Re-enter the password for acount FIELD for verification:ZIRHUMBA

%UAF-I-MDFYMSG, user record(s) updated

The procedure will now check and verify passwords for the
following accounts:

    SYSTEM, SYSTEST, FIELD

Passwords that can be guessed easily will not be accepted.
```

If the procedure verifies the passwords, it displays the following messages:

```
%VMS-I-PWD_OKAY, account password for SYSTEM verified
%VMS-I-PWD_OKAY, account password for SYSTEST verified
%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 SYSTEM 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 (for NO) and press RETURN. When the procedure asks if you want to enter a new password, type Y (for YES) 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 SYSTEM account. The
password you select must be at least 8 characters in length and may not be the
same as the name of the account.

New password: WILLIWAW
Verification: WILLIWAW

%UAF-I-MDFMSG, user record(s) updated
%VMS-I-PWD-SET, primary password for account SYSTEM set
```

14 After you have entered the passwords, the procedure creates your RIGHTS database and displays the following message:

```
Creating RIGHTS database file, SYS$SYSTEM:RIGHTSLIST.DAT
IGNORE ANY "%SYSTEM-F-DUPIDENT, duplicate identifier" errors
      .
      .
      .
%UAF-I-RDBDONEMSG, rights database modified
```

15 After the procedure creates your RIGHTS database, go to Section 7.6 to install the mandatory update.

7.6   Installing the Mandatory Update and Running AUTOGEN

Follow the directions in this section to install the mandatory update and run AUTOGEN. AUTOGEN evaluates your hardware configuration and estimates typical workloads. It then sets system parameters, the sizes of the page, swap, and dump files, and the contents of VMSIMAGES.DAT. When AUTOGEN finishes, the installation procedure is complete.

1 After the procedure creates the RIGHTS database, the procedure displays the following messages:

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

- DECOMPRESS THE SYSTEM LIBRARIES - For space considerations, many of the system
libraries are shipped in a data compressed format. If you have enough disk
space, you may decompress them for faster access. Use SYS$UPDATE:LIBDECOMP.COM
to data expand the libraries. If you choose not to decompress these libraries
there will be a negative impact on the performance of the HELP and LINK
commands.

- BUILD A STANDALONE BACKUP KIT - You can build a standalone backup kit
using the procedure described in your VMS installation and operations
guide which is supplied with your VAX processor.

Continuing with VAX/VMS V5.0 Installation Procedure

Configuring all devices on the system.

You must now install the MANDATORY UPDATE, which can be found
on a separate distribution volume.

        VAX/VMS Software Product Installation Procedure V5.0

It is 31-DEC-1988 at 13:00
Enter a (?) at any time for help.
```

2 The procedure asks you for the device name of the drive that contains the mandatory update. Enter the device name of the *source-drive*. For example, suppose the device name of the *source-drive* is DUB0. Type DUB0 and press RETURN:

```
*Where will the distribution volumes be mounted: DUB0
```

The procedure displays the following series of messages:

```
Please mount the first volume of the set on DUB0:
*Are you ready?
```

3 When you are ready to continue, type Y (for YES) and press RETURN. The procedure displays the following messages and asks if you want to purge files:

```
%MOUNT-I-MOUNTED, VMSMUP mounted on _DUB0:

The following products will be processed:

        VMSMUP V5.0

                Beginning installation of VMSMUP V5.0 at 13:00

%VMSINSTAL-I-RESTORE, Restoring product saveset A

Installing VMS V5 mandatory update

Do you want to purge files replaced by this installation [YES]?
```

4 Depending on the version of VMS that you are installing, the mandatory update procedure might ask for certain information. Read the screen displays for instructions.

The procedure displays the following message:

```
VMSINSTAL procedure done at 15:01
```

5 AUTOGEN runs and displays the following series of messages:

```
Running AUTOGEN to compute the new SYSGEN parameters.

An attempt may be made to re-size the pagefile or swapfile. If
there is insufficient room on the disk, the recommended size is
displayed with a message that the file should be created or
extended manually by the system manager later on.

Running AUTOGEN - Please wait.
```

        .
        .
        .

Note: **Check the display on the console terminal. If your system disk is an RC25 or RD52 disk, AUTOGEN may display error messages in the following format:**

```
*****************
%AUTOGEN-W-DSKSPC, The disk on which DISK$VAXVMSRL5:[SYS0.SYSEXE]PAGEFILE.SYS
        resides would be over 95% full if it were modified to hold 20000
        blocks.
*****************

%AUTOGEN-I-NOCHANGE, DISK$VAXVMSRL5:[SYS0.SYSEXE]PAGEFILE.SYS
        will not be modified.
```

If AUTOGEN displays messages of this type, refer to the instructions in step 10.

6 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
```

7 After the system shuts down, the procedure does a sniffer boot. If the system does not do a sniffer boot, enter the BOOT command as described in step 4 of Section 7.5.

8 After the system reboots, the procedure displays the following message:

Note: **The procedure might display warning messages that the VMS and VAXcluster licenses must be registered. Be sure to register these licenses when the installation procedure finishes.**

```
        VAX/VMS Version BI50 Major version id = 01 Minor version id = 00

You have successfully installed the VMS operating system.
The system is now executing the STARTUP procedure.
Please await the completion of STARTUP before logging
into the system (approximately three minutes).
```

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

```
Startup processing continuing...

%SET-I-INTSET, login interactive limit=64, current interactive value = 0
31-DEC-1988 13:00:00.00
  SYSTEM        job terminated at 31-DEC-1988 13:00:00.00

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 VMS operating system is running.

If you pressed in the READY button on DUA0, release it.

9 Press RETURN. The system asks for the user name and password. Log in to the SYSTEM account so that you can perform certain post-installation procedures.

```
        Welcome to VAX/VMS Version V5.0

USERNAME: SYSTEM
PASSWORD: PANCAKES

        .

        .

        Welcome to VAX/VMS V5.0
```

When you press RETURN, the VMS operating system prompt ($) is displayed.

If you forget the password, follow the instructions for breaking into the system in *Guide to Setting Up a VMS System*.

10 Check the display on the console terminal. If your system disk is an RC25 or RD52 disk, AUTOGEN might have displayed error messages in the following format:

```
*****************
%AUTOGEN-W-DSKSPC, The disk on which DISK$VAXVMSRL5:[SYS0.SYSEXE]PAGEFILE.SYS
        resides would be over 95% full if it were modified to hold 20000
        blocks.
*****************

%AUTOGEN-I-NOCHANGE, DISK$VAXVMSRL5:[SYS0.SYSEXE]PAGEFILE.SYS
        will not be modified.
```

If AUTOGEN displays any messages of this type, you need to free some space on the system disk, as follows:

a. Because of space limitations, the dump file information must be saved in the page file. You need to run SYSGEN and set the SAVEDUMP parameter to one. While you are logged into the SYSTEM account, enter the following commands:

```
$ RUN SYS$SYSTEM:SYSGEN
SYSGEN> USE CURRENT
SYSGEN> SET SAVEDUMP 1
SYSGEN> WRITE CURRENT
SYSGEN> EXIT
```

For more information, see Section 7.1 in the *Guide to Maintaining a VMS System*.

b. After completing the instructions in this chapter, follow the instructions in Section 8.2 in this guide.

11 There are several things you must do before you can use the system. For complete information, see Chapter 8.

8 After Installing VMS

After you have installed the VMS operating system, you need to perform
several important tasks to prepare the system for operation. This chapter tells
you what the tasks are, whether they are optional or required, and the order
in which you perform them. The following list summarizes the tasks that are
described in this chapter:

1 Registering your licenses—You must register the VMS license(s) that
   came with the software. You also must register the licenses you have for
   any system-integrated products that you purchased.

2 Removing unwanted files—You can free up space on the system disk by
   removing the VMS files that you do not need.

3 Customizing the system—Depending on whether you have a standalone
   system or a system that is part of a VAXcluster environment, there are
   several things you must do.

4 Testing the system—Once you have customized the system, run the VMS
   User Environment Test Program (UETP) to test the system.

5 Decompressing the system libraries—After you test the system, you can
   decompress the system libraries.

6 Backing up the system disk—To protect all the work you have just done,
   make a backup copy of the system disk.

8.1 Registering Your Licenses

The VMS license lets you use the VMS operating system. You must register
this license.

After you register the VMS license, you must register the licenses for any of
the following system-integrated products you have purchased:

- VAXclusters

- DECnet–VAX

- RMS Journaling

- Volume Shadowing

For step-by-step instructions on registering these licenses, see the current
version of the *VMS Release Notes*.

8.2   Small System Disks

Note: **If you have an RC25 or RD52 system disk, you must follow the instructions in this section.**

On an RC25 or RD52 system disk, there is not enough room for all the VMS operating system files and appropriately sized page and swap files. There also might not be enough room to run UETP (UETP needs at least 1200 free blocks on the system disk). To free space on the system disk, use the following procedure:

Note: **This procedure assumes that you are logged into the SYSTEM account.**

1   To check the amount of free space on the system disk, enter the following command and press RETURN:

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

2   To free space on the system disk, use VMSTAILOR to remove any files that you do not need. Enter the following command and press RETURN:

```
$ RUN SYS$UPDATE:VMSTAILOR
```

The VMSTAILOR program asks if you want to tailor files ON or OFF. To remove files, type OFF and press RETURN. Then follow the directions that VMSTAILOR displays on the terminal screen.

3   After you run VMSTAILOR, read Section 6.1.6 in the *Guide to Setting Up a VMS System* to determine and set the appropriate sizes for your page and swap files. After setting the sizes for your page and swap files, go to step 4.

4   If there is enough room on the system disk, you can add files from the *optional* save set. Enter the following command and press RETURN:

```
$ RUN SYS$UPDATE:VMSTAILOR
```

The VMSTAILOR program asks if you want to tailor files ON or OFF. To add files, type ON and press RETURN. Then follow the directions that VMSTAILOR displays on the terminal screen.

8.3   Removing Unwanted Files with VMSTAILOR

Read this section if you want to remove the VMS operating system files that you do not need from the system disk. For example, if you are not running DECnet–VAX, you do not need the network support files. You can remove unwanted files with the VMSTAILOR program. Log into the SYSTEM account, enter the following command, and press RETURN:

```
$ RUN SYS$UPDATE:VMSTAILOR
```

The VMSTAILOR program asks you if you want to tailor files ON or OFF. Type OFF to remove unwanted files.

The VMSTAILOR program lists each group of files and its size in blocks. Files are grouped according to their function. For example, all the files required for cluster support are in one group. A file group is made up of many small subgroups. You can eliminate an entire group of files, or you can eliminate one or more of its subgroups.

Decide which file groups or subgroups you do not need to support your system. The VMSTAILOR program displays step-by-step instructions that are easy to follow.

VMSTAILOR displays the names of the files it deletes. After it finishes, AUTOGEN runs automatically to make the adjustments that are necessary after system files are deleted.

Note: **You can use VMSTAILOR at any time to delete or add groups of VMS files to the system disk. After adding files to the system disk, you should apply any updates that affect them.**

For example, suppose you do not need the VMS Version 5.0 MAIL utility and you run VMSTAILOR to remove those files. Later on, if you decide you want to use MAIL, you can run VMSTAILOR to return the MAIL files to the system disk. You then apply any VMS upgrade or update that has occurred since Version 5.0 that affected the MAIL utility.

8.4 Customizing the System

You must customize the system disk so that it automatically performs certain tasks when you boot. In addition, if your processor is part of a VAXcluster environment, you must prepare the cluster operating environment and build the cluster.

For instructions on customizing the system, read the following documentation (in the order given):

1 Read Chapter 10 in this book. This chapter explains the different ways to boot the system. It also tells you how to shut down the system.

2 If your processor is part of a VAXcluster environment, read the *VMS VAXcluster Manual* for further information on setting up a cluster.

    a. Start by reading Chapter 1, which contains general information on VAXclusters.

    b. Then follow the directions in Chapter 2 to configure the DECnet–VAX network. In addition, Chapter 2 tells you how to coordinate the cluster command procedures and system files.

    c. Follow the directions in Chapter 3 to build the cluster.

3 If you have a standalone system, read the *Guide to Setting Up a VMS System* for instructions on customizing and using your system. You will find information on the following tasks:

    a. Editing the template files SYCONFIG.COM, SYLOGICALS.COM, SYLOGIN.COM, and SYSTARTUP_V5.COM

    b. Setting up user accounts

    c. Adjusting system parameters

8.5   Testing the System with UETP

You must run the User Environment Test Package (UETP) to verify the installation. For complete information, see Chapter 9. Note that UETP needs at least 1200 free blocks on the system disk. If you have a small system disk such as an RC25 or RD52, make sure you run VMSTAILOR to free enough space on the system disk before you try to run UETP.

8.6   Decompressing the System Libraries

Decompressing the system libraries gives the system faster access to the libraries. The decompressed libraries require approximately 5000 additional blocks of disk space. To find out how much disk space you have, enter the following command and press RETURN:

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

If you have enough room on the disk, you can decompress the libraries. The decompression process takes approximately a half hour. Log into the SYSTEM account, enter the following command, and press RETURN:

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

8.7   Backing Up the System Disk

Now that you have spent a lot of time and effort customizing and testing the system, protect your work by making a backup copy of the system disk. DIGITAL recommends that you perform the following operations:

*   Make a standalone backup kit

*   Back up the system disk

For complete information on these operations, see Chapter 11. Once you have backed up the system disk, install any software products that you have purchased. Follow the directions given in the software product manuals.

9 Running UETP

The User Environment Test Package (UETP) is a VMS software package designed to test whether the VMS operating system is installed correctly. UETP puts the system through a series of tests that simulate a typical user environment, making demands on the system that are similar to demands that might 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 VMS systems, with the exception of optional features such as high-level language compilers. The system components tested include the following:

- Most standard peripheral devices
- The system's multiuser capability
- DECnet–VAX
- Clusterwide file access and locks

9.1 Summary of UETP Operating Instructions

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 Section 9.2.

1 Log into the SYSTEST account as follows:

```
Username: SYSTEST
Password:
```

Note: **Because the SYSTEST and SYSTEST_CLIG accounts have privileges, unauthorized use of these accounts might compromise the security of your system.**

2 Make sure no user programs are running or user volumes are mounted. By design, UETP assumes and requests the exclusive use of system resources. Unpredictable results could occur if you ignore this restriction.

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.)

Running UETP

9.1 Summary of UETP Operating Instructions

- Magnetic tape drives that you want to test contain a magnetic tape reel with at least 600 feet of tape. The magnetic tape is initialized with the label UETP (using the DCL command INITIALIZE). You should also mount the magnetic tape to make it available to the system.

- 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 need to be set up by DIGITAL Field Service (see Section 9.3).

If you encounter any problems in preparing to run UETP, read Section 9.3 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 three more questions in the following sequence:

```
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]?
```

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 31-DEC-1988 16:30:09.38
*                                                  *
****************************************************
```

5 After UETP runs, check the log files for errors. If testing completes successfully, the VMS operating system is in proper working order.

Note: **After a run of UETP, you should always 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 *VMS Error Log Utility Manual.***

If UETP does not complete successfully, refer to Section 9.5.

If you want to run UETP without using the default responses, refer to Sections 9.4 through 9.4.4, which explain the options.

9.2 Logging In

Obtain the SYSTEST password from your system manager. Log into the SYSTEST account from the console terminal as follows:

```
Username: SYSTEST
Password:
```

Note: Because SYSTEST has privileges, unauthorized use of this account might 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 into 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 may interfere with applications that depend on these resources.

9.2.1 SYSTEST Directories

If you logged in successfully, you should be 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.

The DCL command SHOW LOGICAL displays the translation of the logical name SYS$TEST on a typical system:

```
$ SHOW LOGICAL SYS$TEST
   "SYS$TEST" = "SYS$SYSROOT:[SYSTEST]"  (LNM$SYSTEM_TABLE)
```

If you want UETP to test a particular disk, such as a scratch disk, create either a [SYSTEST] directory or a [SYS0.SYSTEST] directory on that disk. Section 9.3.2 discusses setting up scratch disks for testing.

9.3 Setting Up for UETP

After you log in, you need to set up the devices on the system for UETP testing.

Note: Your system may not have all the devices described in this section.

You should check 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 mounted and initialized.
- 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 Field Service.

9.3.1   Setting Up the System Disk

Before running UETP, make sure that the system disk has at least 1200 blocks available. Note that large systems, such as systems that run more than 20 load test processes, might require a minimum of 2000 available blocks. Running multiple passes of UETP causes log files to accumulate in the default directory, further reducing the amount of disk space available for subsequent passes.

If disk quotas are enabled on the system disk, you should disable them before you run UETP.

9.3.2   Setting Up Additional Disks

The disk test uses most of the available free space on each testable disk. UETP estimates the space that the disk test uses for normal testing as follows:

- 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 nearly 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 of lack of 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.

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.

9.3.3   Setting Up Magnetic Tape Drives

To set up each magnetic tape drive in the system, use the following procedure:

1   Place a scratch volume 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 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.

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 *VMS DCL Dictionary*.

9.3.4   Setting Up Tape Cartridge Drives

To set up tape cartridge drives that you want to test, use the following procedure:

1   Insert a scratch tape cartridge in the tape cartridge drive.

2   Initialize the tape cartridge. For example:

```
$ INITIALIZE MUAO: UETP
```

Tape cartridges must be labeled UETP to be tested.

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 *VMS DCL Dictionary*.

9.3.5 Setting Up 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.

9.3.6 Preparing Ethernet Adapters for UETP Testing

Make sure that no other processes are sharing the device when you run UETP.

Note: **If your system is part of a local area VAXcluster, you will not be able to test your Ethernet adapter because you need the Ethernet adapter to maintain your cluster connection.**

UETP automatically shuts down DECnet and the LAT–11 server for the duration of the device tests and restarts them when the device tests are completed. You must shut down any local applications.

9.3.7 Preparing the DR11–W for UETP Testing

Note: **Only DIGITAL Field Service personnel should set up the DR11–W for UETP testing.**

The DR11–W uses an internal logical loopback mode that tests all functionality except that of module connectors, cables, and transceivers. 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 complete.

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.

9.3.8 Preparing the DRV11—WA for UETP Testing

Note: Only DIGITAL Field Service personnel should set up the DRV11-WA for UETP testing.

To prepare the DRV11–WA on a MicroVAX for UETP testing, make sure the following conditions exist:

- The jumpers on the DRV–11WA board are set to W2, W3, and W6.

- A loop-back cable is connected to the DRV11–WA board.

- The DRV–11WA board is in a slot from 8 to 12. If the DRV11–WA is in a slot other than 8 to 12, you might get timeout errors.

When UETP testing is completed, restore the DRV11–WA to the proper operating configuration.

9.3.9 Preparing the DR750 or the DR780 for UETP Testing

Note: Only DIGITAL Field Service 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.

9.3.10 Preparing the MA780 for UETP Testing

Make sure that the MA780 is set up according to the guidelines for shared memory in the *Guide to Maintaining a VMS System*.

If you run the MA780 device test individually, the logical name CTRLNAME must be defined as MPM, regardless of the memory name. As an alternative, you can enter "MPM" in response to the controller designation prompt.

9.3.11 Preparing a Second LPA11-K for UETP Testing

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.

9.3.12 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 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.

9.3.13 Preparing for 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:

1. The account should be present in the user authorization file, exactly as distributed by DIGITAL on each system in your VAXcluster.

Note: **You may have disabled the SYSTEST_CLIG account as part of the VMS Version 5.0 upgrade procedure. If you did, you should reenable the SYSTEST_CLIG account before you run UETP.**

To reenable the SYSTEST_CLIG account, enter the following commands and press RETURN after each one:

```
$ SET DEFAULT SYS$SYSTEM
$ RUN AUTHORIZE
UAF> MODIFY /FLAGS=NODISUSER SYSTEST_CLIG
UAF> EXIT
```

2. The account should have a null password.

Note: **You may have supplied a password for the SYSTEST_CLIG account as part of the VMS Version 5.0 upgrade procedure. If you did, you should set the password to the null password before you run UETP.**

To set the password of the SYSTEST_CLIG account to the null password, enter the following commands and press RETURN after each one:

```
$ SET DEFAULT SYS$SYSTEM
$ RUN AUTHORIZE
UAF> MODIFY /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 and press RETURN after each one:

```
$ SET DEFAULT SYS$SYSTEM
$ RUN AUTHORIZE
UAF> MODIFY /FLAGS=DISUSER SYSTEST_CLIG
UAF> EXIT
```

3 The privileges and quotas of the SYSTEST_CLIG account should 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.

3 The files UETCLIG00.COM and UETCLIG00.EXE, located in SYS$TEST, are necessary for each system included in the test.

4 DECnet must be set up between the VAXcluster nodes; UETP uses DECnet 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.

5 There must be a [SYSTEST] or [SYS0.SYSTEST] directory on some disk available to the VAXcluster for each node (both VMS 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 VMS 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.

9.3.14 Preparing a Small-Disk System

You have a small-disk system if your system disk is an RK07, RD52, or RC25.

After you install the VMS operating system on a small-disk system, you may 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 before you run UETP. For instructions on using VMSTAILOR, see Chapter 8.

9.3.15 Preparing DECnet

The DECnet phase of UETP uses more system resources than most. Before you start UETP, you can choose which remote node you want the DECnet phase of the test to run from. By specifying the least busy node to run the DECnet test from, you can minimize disruption to remote system users.

By default, the file UETDNET00.COM chooses the node to run the DECnet test from. If you want to choose the node to run the DECnet test on, 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 2.121
```

When you run UETP, a router node attempts to establish a connection between your node and the node defined by UETP$NODE_ADDRESS. Occasionally the connection between your node and the router node might be busy or non-existent. 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
```

9.4 Starting UETP

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 Sections 9.4.2 through 9.4.4. If you want to run all of the test phases, skip the next section.

9.4.1 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]?
```

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 the three prompts described in the next sections. To run the LOAD phase, refer to the next section.

If you exclude the LOAD phase, UETP responds with only two prompts:

```
How many passes of UETP do you wish to run [1]?
Do you want Long or Short report format [Long]?
```

Sections 9.4.2 and 9.4.4 discuss these questions. After you answer both questions, the phase you have selected runs to completion.

9.4.2 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 continuously until it completes the number of passes (runs) specified.

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 field service technician who is interested only in verifying that a newly installed system works might run UETP once or twice. A manufacturing technician might let the system run for several hours as part of the system integration and test.

When you specify multiple UETP runs, you might want to request a short console log (see Section 9.4.4). Make certain that all line printers and hardcopy terminals have enough paper; each run requires two pages.

9.4.3 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 purpose of the load test is to simulate 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 might cause the test to fail because of insufficient resources.

If you want to see UETP display the user load equation as it runs, see Section 9.5.2.

9.4.4 Long and Short Report Format

The following prompt allows you to choose one of two console report formats:

```
Do you want Long or Short report format [Long]?
```

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 may 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 printing of all the output can slow the progress of the tests. This delay may not be a problem if you have requested only one run; however, you may prefer to use the short format if you intend to run multiple passes of UETP from a hardcopy terminal.

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 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 Section 9.5 for troubleshooting information.

9.4.5 Termination of UETP

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 Section 9.4.2).

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 might 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 Section 9.6.

9.4.5.1 Using CTRL/Y

Press CTRL/Y to abort a UETP run. Note, however, that cleanup of files and network processes in the [SYSTEST] directory may 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. The *VMS DCL Concepts 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 may 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 does 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.

9.4.5.2   **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.

9.5   Troubleshooting

This section explains the role of UETP in interpreting operational errors in a VMS operating system. Section 9.5.4 discusses common errors that can appear in a UETP run and describes how to correct them.

9.5.1   Relationship of UETP to Error Logging and Diagnostics

When UETP encounters an error, it reacts like a user program. Either it returns an error message and continues, or it reports a fatal error and terminates the image or phase. In either case, UETP assumes that the VMS hardware is correctly installed and operating and 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:

- *VMS 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 *VMS Error Log Utility Manual*.

- *Diagnostic facilities*—Use the diagnostic facilities to test exhaustively a device or medium to isolate the source of the error.

9.5.2 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. The log files contain output generated by the actual 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 which 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

To interpret the messages, you might need to refer either to the *VMS System Messages and Recovery Procedures Reference Volume* or to the manual that describes the individual system component.

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 and run the program:

```
$ DEFINE MODE DUMP
```

The following example shows the output for UETINIT00.EXE on a VAX 11/750:

```
$ RUN UETINIT00

        Welcome to VAX/VMS UETP Version V5.0

%UETP-I-ABORTC, UETINIT00 to abort this test, type ^C

You are running on an 11/750 CPU with 8704 pages of memory.
The system was booted from _DRA0:[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))
        0.80 * ((    8704 +        323) / (   350 *         0.20)) = 103

2) Free process slots                                              = 56

3) Free page file pages / Typical use of page file pages per process
                  18040 /                                   1000 = 18

How many simulated user loads do you want [18]?
Do you want Long or Short report format [Long]?

UETP starting at  31-DEC-1988 09:08:26.71 with parameters:
DEVICE LOAD DECNET CLUSTER  phases, 1 pass, 18 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. For example, a VAX-11/785 has a CPU_SCALE of 1.5 because it has 1.5 times the processing power of a VAX-11/780 (1.0).

- 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 18 as the default for simulated user loads, because 18 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.

9.5.2.1 Defining a Remote Node for UETP Ethernet Testing

When the UETUNAS00 test of the UETP executes, it is sometimes difficult to determine whether the problems it reports concern the device under test or the remote device. The easiest way to ensure that the test properly reports errors on the device under test 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). In order to use NCP, the following conditions must apply:

- DECnet 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 BETA SHOW CHARACTERISTICS ACTIVE LINES
```

If node BETA 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:

```
Active Line Volatile Characteristics as of  15-OCT-1986 16:13:02
  Line = UNA-0
  Counter timer           = 28800
  Receive buffers         = 6
  Controller              = normal
  Protocol                = Ethernet
  Service timer           = 4000
  Hardware address        = AA-00-04-00-46-D3
  UNA device buffer size  = 1498
```

2   Use the displayed *hardware address* (in this case, AA00040046D3) 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 AA00040046D3
```

3   Run UETP.

4   When UETP has completed, deassign the logical name TESTNIADR by entering the following command:

```
$ DEASSIGN/SYSTEM TESTNIADR
```

9.5.3   The Log Files

At the end of a UETP run, the directory SYS$TEST contains a log file named UETP.LOG. This file contains all information generated by all UETP tests and phases. If the run involves multiple passes, you will find a version of UETP.LOG for each pass.

Although UETP.LOG contains information from all the passes, only information from the latest run is stored in this file. Information from the previous run is stored in a file named OLDUETP.LOG, which also has a version for each pass. Using these two files, UETP provides the output from its tests and phases 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 might 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 may delete these log files yourself or rerun the entire UETP, which checks for old UETP.LOG files and deletes them.

9.5.4 Possible UETP Errors

This section is intended to help you identify and solve problems you might 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 Field Service representative. Any information you can supply about the measures you have taken to isolate the problem will help your DIGITAL Field Service representative diagnose the problem.

The following are the most common failures encountered while running UETP:

1 Wrong quotas, privileges, or account

2 UETINIT01 failure

3 Insufficient disk space

4 Incorrect VAXcluster setup

5 Problems during the load test

6 DECnet error

7 Errors logged but not displayed

8 No PCB or swap slots

9 Hangs

10 Bugchecks and machine checks

The following sections describe these errors and offer the best course of action for dealing with each one.

9.5.4.1 **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 same action described in this section.**

Solution

To correct the problem, use the following procedure:

1 Display all privileges and quotas in effect for the current account using the DCL commands SHOW PROCESS/PRIVILEGE and SHOW PROCESS /QUOTA as follows:

```
$ SHOW PROCESS/PRIVILEGES

31-DEC-1988 18:06:02.89   OPA0:   User : SYSTEST

Process privileges :

        CMKRNL      may change mode to kernel
        CMEXEC      may change mode to exec
        SYSNAM      may insert in system logical name table
        GRPNAM      may insert in group logical name table
        DETACH      may create detached processes
        DIAGNOSE    may diagnose devices
        LOG_IO      may do logical I/O
        GROUP       may affect other processes in same group
        PRMCEB      may create permanent common event clusters
        PRMMBX      may create permanent mailbox
        SETPRV      may set any privilege bit
        TMPMBX      may create temporary mailbox
        NETMBX      may create network device
        VOLPRO      may override volume protection
        PHY_IO      may do physical I/O
        SYSPRV      may access objects via system protection

  $ SHOW PROCESS/QUOTAS

  31-DEC-1988 18:06:03.36          OPA0:       User: SYSTEST
```

```
Process Quotas:

    Account name: SYSTEST
    CPU limit:                       Infinite    Direct I/O limit:      55
    Buffered I/O byte count quota:      32768    Buffered I/O limit:    18
    Timer queue entry quota:               20    Open file quota:      100
    Paging file quota:                  19543    Subprocess quota:       8
    Default page fault cluster:            64    AST limit:             98
    Enqueue quota:                        300    Shared file limit:      0
    Max detached processes:                 0    Max active jobs:        0
```

2 Check that the 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: 8
DIOLM: 55	ASTLM: 100
FILLM: 100	BYTLM: 32768
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 *VMS Authorize Utility Manual*). As an alternative, you can temporarily assign the correct privileges with the DCL command SET PROCESS /PRIVILEGES.

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  31-DEC-1988 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.

9.5.4.2   **UETINIT01 Failure**

UETINIT01 failures are related to peripheral devices; this type of error message might 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 course of action you should take is explicit in the error message. For example, you might receive a message from the Operator Communication Facility (OPCOM) process informing you of a problem and recommending a corrective measure:

```
%OPCOM,  31-DEC-1988 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 might relate information in which the solution is implicit:

```
%UETP-S-BEGIN, UETDISK00 beginning at 31-DEC-1988 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   31-DEC-1988 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 Section 9.3.

In other cases, the cause of a failure might not be obvious from the information in the message. The problem might 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:

- Inter-module 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. Either DECnet or the LAT terminal server also might also want to use the Ethernet adapter, which is a shareable device. UETP shuts down DECnet and the LAT terminal server for the duration of the device tests and restarts them when the tests are completed.

Solution

To determine where or when the failure occurs in the execution of UETP, use the following procedure:

- Run the device test individually (see Section 9.4.1). By doing this, you can determine if the failure can be re-created. 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 re-create 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 Field Service. If you have tried all the previous steps without solving the problem, you should contact your DIGITAL Field Service representative.

9.5.4.3 **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  31-DEC-1988 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  31-DEC-1988 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 may be enabled on the disk. If disk quotas are enabled, either disable or increase them (see the *VMS SYSMAN Utility Manual* for a description of the Disk Quota Utility).

- Run VMSTAILOR if you have a small-disk system. See Chapter 8 for more information.

See Sections 9.2.1 and 9.3.2 for a further discussion of disk space.

9.5.4.4 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 VMS nodes are started

- Toward the end, when cluster file access is checked

The cluster test phase shows that various VMS 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 either in 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, you should try to recover the SYS$TEST:NETSERVER.LOG file that was created when the SYSTEST_CLIG process was created. This file may 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 may 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 VMS 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 Section 9.3.13 and Section 9.5.2.1 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 Section 9.3.13 for information on preparing for VAXcluster testing.

9.5.4.5 **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 Section 9.6.3).

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 the following line:

```
$ DELETE UETLO*.LOG;*
```

Rerun the load test with these changes to try to re-create the problem.

If you re-create the problem, look at the contents of the appropriate log file. To determine which log file to read, you need to understand 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:

UETLOADnn_nnnn

For example:

```
%UETP-I-BEGIN, UETLOAD00 beginning at 31-DEC-1988 15:45:08.97
%UETP-I-BEGIN, UETLOAD02_0000 beginning at 31-DEC-1988 15:45:09.42
%UETP-I-BEGIN, UETLOAD03_0001 beginning at 31-DEC-1988 15:45:09.63
%UETP-I-BEGIN, UETLOAD04_0002 beginning at 31-DEC-1988 15:45:10.76
%UETP-I-BEGIN, UETLOAD05_0003 beginning at 31-DEC-1988 15:45:11.28
%UETP-I-BEGIN, UETLOAD06_0004 beginning at 31-DEC-1988 15:45:12.56
%UETP-I-BEGIN, UETLOAD07_0005 beginning at 31-DEC-1988 15:45:13.81
%UETP-I-BEGIN, UETLOAD08_0006 beginning at 31-DEC-1988 15:45:14.94
%UETP-I-BEGIN, UETLOAD09_0007 beginning at 31-DEC-1988 15:45:16.99
%UETP-I-BEGIN, UETLOAD10_0008 beginning at 31-DEC-1988 15:45:19.32
%UETP-I-BEGIN, UETLOAD11_0009 beginning at 31-DEC-1988 15:45:19.94
%UETP-I-BEGIN, UETLOAD02_0010 beginning at 31-DEC-1988 15:45:20.20
%UETP-I-BEGIN, UETLOAD03_0011 beginning at 31-DEC-1988 15:45:21.94
%UETP-I-BEGIN, UETLOAD04_0012 beginning at 31-DEC-1988 15:45:22.99
```

Note that if more than ten processes are created, the numbering sequence for the UETLOADnn portion of the process name starts over at UETLOAD02; however, the four 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 (UETLO*.LOG;*); failure to delete these files might result in disk space problems.

9.5.4.6 DECnet Error
A DECnet error message might indicate that the network is unavailable.

Solution

- If DECnet is included in your system, register the authorization key (see the *VMS Release Notes*).

- If DECnet 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 as a single phase (see Section 9.4.1) to determine whether the error can be re-created.

- Refer to the *VMS System Messages and Recovery Procedures Reference Volume.*

9.5.4.7 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 *VMS Error Log Utility Manual* for information about running the Error Log Utility.

9.5.4.8 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  31-DEC-1988 07:47:16.50
%UETP-I-BEGIN, UETLOAD02_0000 beginning at  31-DEC-1988 07:47:16.76
%UETP-I-BEGIN, UETLOAD03_0001 beginning at  31-DEC-1988 07:47:16.92
%UETP-I-BEGIN, UETLOAD04_0002 beginning at  31-DEC-1988 07:47:17.13
%UETP-I-BEGIN, UETLOAD05_0003 beginning at  31-DEC-1988 07:47:17.35
%UETP-I-BEGIN, UETLOAD06_0004 beginning at  31-DEC-1988 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  31-DEC-1988 07:47:54.10
-UETP-W-TEXT, Aborted via a user CTRL/C.
   ************************************************
   *                                              *
       END OF UETP PASS 1 AT  31-DEC-1988 07:48:03.17
   *                                              *
   ************************************************
```

Solution

To solve this problem, use the following procedure:

1 Rerun individually 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 *VMS System Generation Utility 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.

9.5.4.9 Hangs

If there is no keyboard response or system disk activity, the system may be hung.

Solution

A system hang can be difficult to trace; you should always save the dump file for reference. To learn why the system hung, run the System Dump Analyzer as described in the *VMS System Dump Analyzer Utility Manual*. Reasons for a system hang include the following:

- Insufficient pool space—Reboot the system with a larger value for NPAGEVIR.

- Insufficient page file space—Increase the page file space using the System Generation Utility as described in the *VMS System Generation Utility Manual*.

- I/O device failure causing driver-permanent loop—Call DIGITAL Field Service.

9.5.4.10 Bugchecks and Machine Checks

When the system aborts its run, a bugcheck message appears at the console.

Solution

Call DIGITAL Field Service. 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 re-created; you can verify this by running UETP again.

9.6 UETP Tests and Phases

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, which contains commands that start each test phase. The procedure begins by prompting you for information needed by the various test phases. (See Section 9.4 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 following sections describe the various UETP test phases.

Running UETP

9.6.1 Initialization Phase

The following occurs during the initialization phase:

- The image UETINIT00.EXE prompts you for information (see Section 9.4). 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 system 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.

9.6.2 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 Section 9.4.1.

9.6.2.1 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 VMS-supported controllers in the system 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 explicitly delete it.

9.6.2.2 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, you might find it 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
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

Symbol	Value
ddd	device controller name, for example DUA
uuuuu	device unit number, for example 25

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. In addition, if your system uses MA780 memory in a loosely coupled CPU configuration, UETINIDEV.DAT includes one UCB line for each MA780 memory. 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 31-DEC-1988 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 might encounter an insufficient disk space problem. You should warn users on remote nodes (who share disks with users on the local system) that UETP may 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, they transmit and receive the message several times. To check that the looped-back data are 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 their respective devices in maintenance mode, write random data, and then verify the data.

The MA780 device test creates and modifies mailboxes, common event flags, and global sections in shared memory; then it verifies that modifications can be made. You can run MA780 tests in parallel from separate systems so that the tests interact with each other through common MA780 memories.

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).

Table 9–1 lists the device test images and the devices to be tested.

Table 9–1   The 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
UETMA7800.EXE	MA780
UETUNAS00.EXE	Ethernet Adapters

9.6.3   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 generally the processes 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 Section 9.4.3) 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 Section 9.4.1).

9.6.4   DECnet Test Phase

If DECnet is included in your VMS 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 shuts down DECnet for the duration of the initialization and device test phases. It turns DECnet on again after those phases are completed. 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 phase individually by following the procedure described in Section 9.4.1.

9.6.4.1   Environment

The DECnet test will work successfully on VMS 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 UETP is running on

- All circuits in sequence

- 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.

9.6.4.2 **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 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 DECnet.

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  31-DEC-  38 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  31-DEC-1988 13:45:36.34
```

Because degradation is not necessarily an error, the test's success is determined by you, not 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
- Aged packet loss
- Node unreachable packet loss
- Node out of range packet loss
- Oversized packet loss
- Packet format error
- Partial routing update loss
- Verification reject

9.6.5 Cluster-Integration Test Phase

The cluster-integration test phase, which consists of a single program and a command file, depends heavily on DECnet. This phase uses DECnet to create SYSTEST_CLIG processes on each VMS 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 Section 9.3.13.

- 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 Section 9.5.4.1.

- The account can allow login only through DECnet.

- 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 some VMS node, it gives the reason for the failure and ignores that node for the lock tests and for sharing access during the file test. The test makes no attempt to report information relating to a failure at the node where creation was attempted; that is, any possible log file is not copied to the node running the test. If there is a problem communicating with a SYSTEST_CLIG process after it 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; that is, it checks the VMS and HSC nodes and the disks attached to each of them that can be seen from the node running the test. For selected VMS nodes, the primary thread attempts to start up a SYSTEST_CLIG process through DECnet. Those nodes on which the primary thread was able to start a SYSTEST_CLIG process run 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 VMS and HSC nodes in the cluster. The primary thread writes a block, reads it back, and verifies it. The primary thread selects one VMS node at random and asks that node to read the block and verify it. The primary extends the file by writing another block and has the secondary read and verify the second block. The file is deleted.

The secondary processes exit. They copy to the primary process the contents of their SYS$ERROR files, so that the UETP log file and console report show all problems in a central place. DECnet automatically creates a NETSERVER.LOG in SYS$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 cluster $BRKTHRU to announce the beginning and ending of the test to each VMS 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 system in the VAXcluster on which you want to trace events.

Part II

Part II describes frequently performed system operations such as system startup, shutdown, and backup.

10 Startup and Shutdown Procedures

This chapter contains information on the following:

- Overview of booting the system
- Ways to boot the system
- Shutting down the system

10.1 Overview of Booting

Booting is the process of loading system software into the processor's memory. The MicroVAX II uses an internal memory device to boot the VMS operating system from the system disk into memory.

The boot process consists of the following steps:

1 You enter the BOOT command. The boot procedure deposits information in the general purpose registers.

2 VMB, the primary boot program, is loaded from read-only memory (ROM) into memory. VMB is a program that allows access to the system disk. VMB locates SYS$SYSTEM:SYSBOOT.EXE on the system disk and loads it into memory.

3 SYSBOOT.EXE loads the SYSGEN parameters stored in SYS$SYSTEM:VAXVMSSYS.PAR and checks the conversational boot flag. If the flag is set, the procedure stops and displays the SYSBOOT> prompt. If the flag is not set, SYSBOOT.EXE loads the VMS executive into memory and transfers control to the VMS executive.

4 When the VMS executive finishes, it executes the SWAPPER process.

5 The SWAPPER creates the SYSINIT process.

6 SYSINIT creates the STARTUP process.

7 STARTUP executes SYS$SYSTEM:STARTUP.COM (unless you indicated another file at the SYSBOOT> prompt) and SYSTARTUP_V5.COM. The current values of SYSGEN parameters are written back to VAXVMSSYS.PAR.

8 The boot process finishes, and you can log into the VMS operating system.

Note: **If you want to boot a MicroVAX I from a system disk attached to a second Mass Storage Control Protocol (MSCP) controller, see Appendix A.**

10.2 Sniffer Boot

A sniffer boot allows you to boot the system without specifying a device name. When the system boots automatically, it always does a sniffer boot.

To perform a sniffer boot, do the following:

1 If the VMS operating system is not running, go to step 2.

If the VMS operating system is running, log into the SYSTEM account. Enter the following command and press RETURN:

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

Answer the questions. When the procedure asks if an automatic system reboot should be performed, press RETURN for NO. When the procedure is finished, it displays the following message:

```
SYSTEM SHUTDOWN COMPLETE - USE CONSOLE TO HALT SYSTEM
```

2 Stop the system. If your system has a HALT button, press it twice. If your system does not have a HALT button, press the F5 (BREAK) key.

3 Enter the following command and press RETURN:

```
>>> B
```

The system successively tries to boot devices until it finds one from which it can boot. The system searches in the following order for a device from which it can boot:

• Fixed disks

• TK50 tape cartridge drives (on MicroVAX II only)

• The network

If the system does not find any devices from which to boot, it continues to alternate between trying to boot from tape and from the network indefinitely.

10.3 Automatic Boot

The VMS operating system can boot automatically from the system disk. When the system boots automatically, it always does a sniffer boot. For more information on the sniffer boot, see Section 10.2.

You can cause the system to boot automatically whether the system is turned on or turned off.

• If the system is turned off, do the following:

1 On a MicroVAX II, set the Halt Enable/Disable switch to DISABLE by pushing the switch toward the circle with the dot outside it.

2 Turn on the system.

3 The procedure displays several console-mode and VMS messages and it might ask you for the date and time.

On a MicroVAX II, the automatic boot completes without asking you for the date and time.

On MicroVAX I processors, the automatic boot procedure asks you for the date and time. Enter the date and time using the 24-hour clock format and press RETURN. For example:

```
VAX/VMS Version BI50 Major version id = 01 Minor version id = 00
PLEASE ENTER DATE AND TIME (DD-MMM-YYYY HH:MM) 31-DEC-1988 13:00
```

4 The final message should look like the following:

```
SYSTEM    Job terminated at 31-DEC-1988 13:00:00.00
```

- If the system is turned on, on a MicroVAX II, set the Halt Enable/Disable switch to DISABLE by pushing the switch toward the circle with the dot outside it. The operating system boots automatically under the following conditions:

  — When the system turns on after a power failure

  — After you shut down the CPU using the SYS$SYSTEM:SHUTDOWN.COM command procedure (if you entered Y to specify automatic reboot)

  — After the CPU shuts down because of a bugcheck

10.4   Manual Boot

To boot the VMS operating system manually, use the following procedure:

1 Make sure that your computer is set up properly and turned on. Make sure the processor control panel (all models except the BA200 series) is set for normal operations. Only the READY button, the DC OK light, and the power switch should glow. On the BA200 series model, only the DC OK light and the power switch should glow.

2 Make sure that your console terminal is properly set up and turned on.

3 If the VMS operating system is not running, go to step 4.

If the VMS operating system is running, log into the SYSTEM account. Enter the following command and press RETURN:

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

Answer the questions. When the procedure asks if an automatic system reboot should be performed, press RETURN for NO. When the procedure is finished, it displays the following message:

```
SYSTEM SHUTDOWN COMPLETE - USE CONSOLE TO HALT SYSTEM
```

4 Stop the system. If your system has a HALT button, press it twice. If your system does not have a HALT button, press the F5 (BREAK) key.

5 Enter the BOOT command in the following format and press RETURN:

```
>>> B ddcu
```

Substitute the device name of the system disk for *ddcu*. Section 4.3 contains a list of device names for all MicroVAX II devices.

For example, to boot from a floppy diskette drive with a unit number of one, use the following command:

```
>>> B DUA1
```

6 The procedure might ask for the date and time. Enter the date and time using the 24-hour clock format and press RETURN. For example:

```
VAX/VMS Version BI50 Major version id = 01 Minor version id = 00
PLEASE ENTER DATE AND TIME (DD-MMM-YYYY HH:MM) 31-DEC-1988 13:00
```

7 After the system boots, it displays the following message:

```
VAX/VMS Version V5.0 31-DEC-1988 13:00

The VAX/VMS system is now executing the system startup procedure.

The VAX/VMS system is now executing the site-specific startup commands.

%SET-I-INTSET, login interactive limit=64, current interactive value = 0
   31-DEC-1988 13:00:00.00
   SYSTEM       job terminated at 31-DEC-1988 13:00:00.00
```

10.5 Conversational Boot

A conversational boot is most commonly used in research and development environments and during software upgrades. Perform a conversational boot when you want to stop the boot process before it completes. The boot process stops after it loads SYS$SYSTEM:SYSBOOT.EXE and displays the SYSBOOT> prompt. At the SYSBOOT> prompt, you can enter certain SYSGEN commands to do the following:

- Look at system parameter values

- Change system parameter values

- Specify another parameter file

- Specify another system startup command procedure

- Select the default system parameter file if you modified system parameters to values that render the system unbootable

- Specify a minimum startup

There are several ways to perform a conversational boot. The following is the most direct:

1 If the VMS operating system is not running, go to step 2.

If the VMS operating system is running, log into the SYSTEM account. Enter the following command and press RETURN:

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

Answer the questions. When the procedure asks if an automatic system reboot should be performed, press RETURN for NO. When the CPU is stopped, the procedure displays the following message:

```
SYSTEM SHUTDOWN COMPLETE - USE CONSOLE TO HALT SYSTEM
```

2 Stop the system. If your system has a HALT button, press it twice. If your system does not have a HALT button, press the F5 (BREAK) key.

3 To begin the conversational boot, enter the BOOT command in the following format and press RETURN:

```
>>> B/1 [ddcu]
```

If you do not specify a device name, the system performs a sniffer boot when you finish using the SYSGEN commands.

4 At the SYSBOOT> prompt, you can enter any of the SYSGEN commands listed in Table 10-1. For more information about these SYSGEN commands, see the *VMS System Generation Utility Manual*.

5 When you finish using the SYSGEN commands, enter the CONTINUE command to complete the boot process.

Table 10-1   SYSGEN Commands Used in SYSBOOT

Command	Description
CONTINUE	Resumes the boot process.
DISABLE CHECKS	Inhibits checking of parameter values specified with the SET command.
ENABLE CHECKS	Permits checking of parameter values specified with the SET command.
HELP	Displays a summary of the SYSBOOT commands on the terminal screen.
SET parameter-name	Establishes the name of a system parameter.
SET/STARTUP	Sets the name of the system startup command procedure.
SHOW [parameter-name]	Displays active, current, default, maximum, and minimum values for specific parameters. Use qualifiers to display characteristics of parameters grouped by categories.
USE [file-spec]	Specifies a parameter file to be used as a source of values (you must enter the entire file specification, including device and directory; you cannot specify a logical name).

The following examples illustrate some operations you can perform during a conversational boot.

You can enter the following commands to set a new value for the SYSGEN parameter WSMAX to 512 and to complete the boot process.

```
SYSBOOT> SET WSMAX 512
SYSBOOT> CONTINUE
```

When the VMS operating system displays the following message, the new SYSGEN parameter value becomes active.

```
SYSTEM  job terminated at 31-DEC-1988 15:00:00.00
```

If you modifed the system parameters to values that render the system unbootable, enter the following commands to boot using default values:

```
SYSBOOT> USE DEFAULT
SYSBOOT> CONTINUE
```

You also can use a conversational boot to specify a minimum startup. For example, if you want to boot the system and avoid autoconfiguring all your peripheral devices, enter the following command and press RETURN:

```
SYSBOOT> SET STARTUP_P1 "MIN"
```

This command initiates a minimum startup that performs the following sequence of operations:

1 Starts the processes that control error logging, the job controller, and the operator's log

2 Installs known images

3 Defines the number of interactive users as eight

4 Logs off

Because this procedure does not call SYSTARTUP_V5.COM, it does not autoconfigure the system's peripheral devices.

The value of STARTUP_P1 is saved and affects future boot operations. After the operating system boots, you can log into the SYSTEM account and run SYSGEN to reset STARTUP_P1. For example, enter the following commands to reset STARTUP_P1 to its default value (null):

```
$ RUN SYS$SYSTEM:SYSGEN
SYSGEN> USE CURRENT
SYSGEN> SET STARTUP_P1 ""
SYSGEN> EXIT
$
```

10.6 Booting with XDELTA

XDELTA is a debugging tool that system programmers use. To use XDELTA, you need to boot the system in a special way. For information on booting with XDELTA, see the *VMS Delta/XDelta Utility Manual*.

10.7 If the System Does Not Boot

If the system does not boot because a hardware problem occurs, a question mark (?) usually precedes the error message displayed on the console terminal. Examples of hardware problems are a read error on a disk drive or a machine check error. If you suspect a hardware problem, do the following:

1 Consult the hardware manual for your VAX computer

2 Contact DIGITAL Field Service

When the operating system is loaded into memory, the system displays the following message:

```
SYSTEM    job terminated at 31-DEC-1988 15:00:00.00
```

If the system does not display this message, a software problem has probably occurred. Do the following:

1 Turn off the system. Turn it on again and try to boot.

2 Do a conversational boot using the default SYSGEN parameters described in Section 10.5. If the system boots, run AUTOGEN. For more information on AUTOGEN, see the *Guide to Setting Up a VMS System*.

10.8 Shutting Down the System

Before you shut down the operating system, decide if you want it to reboot automatically or if you want to enter console-mode commands after the shutdown completes.

If you want the operating system to reboot automatically, set the Halt Enable/Disable switch on a MicroVAX II to DISABLE by pushing the switch toward the circle with the dot outside it. If you want to enter console-mode commands after the shutdown, set the Halt Enable/Disable switch on a MicroVAX II to ENABLE by pushing the switch toward the circle with the dot inside it.

10.8.1 Types of Shutdowns

You can perform the following three types of shutdown operations:

1 **An orderly shutdown with SYS$SYSTEM:SHUTDOWN.COM.** This procedure shuts down the system while performing maintenance functions such as disabling future logins, stopping the batch and printer queues, dismounting volumes, and stopping user processes. To use the SHUTDOWN command procedure, log into the SYSTEM account, enter the following command, and press RETURN:

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

To stop the system after the procedure completes, press the HALT button twice. If your system does not have a HALT button, press the F5 (BREAK) key.

For more information about the SHUTDOWN command procedure, see the *Guide to Setting Up a VMS System*.

2 **An emergency shutdown with OPCCRASH.EXE.** If you cannot perform an orderly shutdown with SHUTDOWN.COM, run the OPCCRASH emergency shutdown program. To run the OPCCRASH program, log into the SYSTEM account, enter the following command, and press RETURN:

```
$ RUN SYS$SYSTEM:OPCCRASH
```

To stop the system after the procedure completes, press the HALT button twice. If your system does not have a HALT button, press the F5 (BREAK) key.

For more information about the OPCCRASH program, see the *Guide to Setting Up a VMS System*.

3 **An emergency shutdown with CRASH commands.** Use these emergency shutdown commands if OPCCRASH fails. To force a MicroVAX I to fail, see Section 10.8.2.1. To force a MicroVAX II to fail, see Section 10.8.2.2.

10.8.2 Emergency Shutdown with CRASH commands

Note: Use CRASH commands only if the system is hung and you cannot log into the SYSTEM account to use SHUTDOWN or OPCCRASH.

CRASH commands cause the system to fail, resulting in immediate shutdown. CRASH commands display a fatal bugcheck message as well as additional messages and information. The procedure examines the program counter (PC), the processor status longword (PSL), and the stack pointers. It then deposits values in the PC and PSL to cause an exception condition that sends the contents of memory to the dump file on the system disk. Later you can read the dump file to determine why the system did not respond.

10.8.2.1   MicroVAX I

To force your MicroVAX I to fail, do the following:

1 Press the HALT button.

2 Enter the following commands and press RETURN after each one:

```
>>> E P
>>> E/I 0
>>> E +
>>> E +
>>> E +
>>> E +
>>> D/G F FFFFFFFF
>>> D P 1F0000
>>> C
```

3 CRASH commands stop the system, display the contents of the program counter, and display the console-mode prompt (> > >).

The system reboots. If the system does not reboot automatically, reboot it manually.

4 After the system reboots, you can examine the dump file. To examine the dump file, log into the SYSTEM account. Enter the following commands and press RETURN after each one:

```
$ ANALYZE/CRASH SYS$SYSTEM:SYSDUMP.DMP
SDA> SHOW CRASH
```

For more information about the System Dump Analyzer (SDA), see the *VMS System Dump Analyzer Utility Manual*.

10.8.2.2   MicroVAX II

To force your MicroVAX II to fail, do the following:

1 Set the Halt Enable/Disable switch to ENABLE.

2 Stop the system. If your system has a HALT button, press it twice. If your system does not have a HALT button, press the F5 (BREAK) key.

3 Enter the following commands and press RETURN after each one:

```
>>> E PSL
>>> E/I 0
>>> E +
>>> E +
>>> E +
>>> E +
>>> D PC FFFFFFFF
>>> D PSL 1F0000
>>> C
```

4 CRASH commands stop the system, display the contents of the program counter, and display the console-mode prompt (> > >).

The system reboots. If the system does not reboot automatically, reboot it manually.

5 After the system reboots, you can examine the dump file. To examine the dump file, log into the SYSTEM account. Enter the following commands and press RETURN after each one:

```
$ ANALYZE/CRASH SYS$SYSTEM:SYSDUMP.DMP
SDA> SHOW CRASH
```

For more information about the System Dump Analyzer (SDA), see the *VMS System Dump Analyzer Utility Manual*.

10.9   If the System Fails

Your system can fail in the following ways:

- Bugcheck—The system displays a bugcheck message on the console terminal and shuts itself down. This happens because the system encountered a problem that made further operation impossible. Boot the system manually as explained in Section 10.4 or let it reboot automatically as explained in Section 10.3.

- Hang—The system stops responding to your commands. The problem could be a failure in system software or a hardware component or a power failure.

- Erratic behavior—The system does not respond according to specifications. The problem could be a failure in system software or a hardware component.

To see if the failure is a system problem and not something you have done, try the following:

- Make sure that you did not press the F1 key (the NO SCROLL key on a VT100 series terminal) accidentally.

- Press CTRL/T to check the status of your process. A status line should appear, indicating the name of the program that is executing and other information. If the status line does not appear, the system is probably hung. If the status line does appear, the program you are executing may be hung. (If you have disabled CTRL/T by entering the commmand SET NOCONTROL=T or have set the terminal to nobroadcast mode by entering the command SET TERMINAL/NOBROADCAST, this procedure does not work.)

- Make sure that the cable connecting the terminal to the processor is secure.

Usually you can force an exit from a hung program by pressing CTRL/Y. When you press CTRL/Y, any work performed by the program and not saved on disk is lost.

If the system is hung, you must reboot without a normal shutdown. If your system has a HALT button, press it twice. If your system does not have a HALT button, press the F5 (BREAK) key. The system displays the console-mode prompt (> > >). Boot the system as described in Section 10.4.

If you have a problem with the system that DIGITAL has not warned you about, note in detail the sequence of events that caused the problem and notify DIGITAL Field Service.

11 Backup Procedures

This chapter describes the following procedures:

- Installing and booting standalone BACKUP on the system disk
- Installing and booting standalone BACKUP on an RX33 floppy diskette
- Installing and booting standalone BACKUP on a TK50 tape cartridge
- Backing up and restoring the system disk

11.1 Overview of Standalone BACKUP

The Backup Utility lets you create and restore backup copies of files, directories, and user disks. Because the Backup Utility copies only what is on the disk and ignores sections of any open files contained in memory, you should use it to back up user disks, not the system disk. If you use the Backup Utility to back up the system disk, the portions of the files that were in memory and data about files not yet written back to the disk (cache) will not be recorded on the resulting backup copy.

Use standalone BACKUP to make a complete backup of the system disk. Standalone BACKUP is a version of the Backup Utility that runs without the support of the entire VMS operating system. Before you use standalone BACKUP, you must shut down the VMS operating system. The shutdown procedure sends the contents of the caches back to the disk and closes any open files. By shutting down the system and using standalone BACKUP, you can make an exact copy of the system disk.

You can keep standalone BACKUP on the system disk, an RX33 floppy diskette, a TK50 tape cartridge, or any other media that the system supports. DIGITAL recommends that you keep standalone BACKUP on the system disk and on a floppy diskette or a tape cartridge. Usually you boot standalone BACKUP from the system disk because it saves time. However, you should keep a copy of standalone BACKUP on a floppy diskette or on a tape cartridge in case the system disk becomes damaged. If you have a floppy diskette or tape cartridge distribution kit, you received standalone BACKUP on a floppy diskette or a tape cartridge.

11.1.1 Installing Standalone BACKUP on the System Disk

You can install standalone BACKUP in any available root directory on the system disk from [SYS1] to [SYSE]. However, DIGITAL has established [SYSE] as the standard directory for standalone BACKUP.

To install standalone BACKUP in [SYSE] on the system disk, use the following procedure:

1 Log into the SYSTEM account.

Backup Procedures

11.1 Overview of Standalone BACKUP

2 Enter the following command and press RETURN:

```
$ @SYS$UPDATE:STABACKIT SYS$SYSDEVICE:
```

The procedure places the files in the directories [SYSE.SYSEXE] and [SYSE.SYS$LDR] on the system disk. It lists the files as they are copied. When the procedure finishes, it displays the following message:

```
The kit is complete.
```

3 To boot standalone BACKUP from the system disk, go to Section 11.1.2.

11.1.2 Booting Standalone BACKUP from the System Disk

To boot standalone BACKUP from the system disk, use the following procedure:

1 Set the Halt Enable/Disable switch on the MicroVAX II to ENABLE.

2 If the VMS operating system is not running, go to step 3.

If the VMS operating system is running, log into the SYSTEM account. Enter the following command and press RETURN:

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

Answer the questions. When the procedure asks if an automatic system reboot should be performed, press RETURN for NO. When the procedure is finished, it displays the following message:

```
SYSTEM SHUTDOWN COMPLETE - USE CONSOLE TO HALT SYSTEM
```

3 Stop the system. If your system has a HALT button, press it twice. If your system does not have a HALT button, press the F5 (BREAK) key.

4 Enter the BOOT command in the following format and press RETURN:

```
>>> B/E0000000 ddcu
```

Substitute the device name of the system disk for *ddcu*. Section 4.3 contains a list of device names for all MicroVAX devices.

5 A few minutes later the procedure might ask for the date and time. Enter the date and time using the 24-hour clock format and press RETURN. For example:

```
PLEASE ENTER DATE AND TIME (DD-MMM-YYYY HH:MM) 31-DEC-1988 13:00
```

6 The procedure displays a list of the local devices on your system and, if you have them, HSC- and MSCP-served devices. For example:

```
Available device MUA0:    device type TK50
                 .
                 .
                 .
```

Check the list of devices. If the list is incomplete, make sure that all the drives are connected properly to the system. See your hardware manuals for details.

7 When standalone BACKUP finishes booting, it displays an identification message followed by the dollar-sign prompt ($):

```
%BACKUP-I-IDENT, stand-alone BACKUP V5.0; the date is 31-DEC-1988 13:00:00.00
$
```

To back up the system disk to floppy diskettes, go to Section 11.2.1. To back up the system disk to tape cartridge, go to Section 11.2.3.

To restore the system disk from floppy diskettes, go to Section 11.2.2. To restore the system disk from tape cartridge, go to Section 11.2.4.

11.1.3 Installing Standalone BACKUP on a Diskette

DIGITAL recommends that you keep standalone BACKUP on a floppy diskette in case the system disk becomes damaged. To install standalone BACKUP on an RX33 floppy diskette, use the following procedure:

Note: If you have a floppy diskette distribution kit, you already have standalone BACKUP on a floppy diskette. If the original floppy diskette becomes damaged, or if you need to make extra copies, use the procedure in this section.

1 Obtain one blank RX33 floppy diskette. Write the name VAX/VMS V5.0 RX33 S/A BKUP on the paper label. Affix the paper label to the floppy diskette.

2 Log into the SYSTEM account.

3 Insert the diskette labeled VAX/VMS V5.0 RX33 S/A BKUP in the diskette drive.

4 Enter the following command and press RETURN:

```
$ @SYS$UPDATE:STABACKIT
```

Note: If you inserted the diskette into the drive upside down, or if it is improperly aligned, the system might display the following error message:

```
%MOUNT-F-MEDOFL, medium is offline
```

If the system displays this error message, remove the diskette from the drive and reinsert it.

5 The procedure asks for the name of the target device. Enter the device name of the drive holding the floppy diskette and press RETURN. For example:

```
%STABACKIT-I-SYMDEL, all global symbols deleted
Enter the name of the device on which to build the kit: DUA2
```

6 The procedure displays the following message. Enter Y (for YES) to initialize the floppy diskette. For example:

Note: If there are files on the floppy diskette and you do not initialize it, standalone BACKUP will not fit on the floppy diskette.

Backup Procedures

11.1 Overview of Standalone BACKUP

```
Do you want to initialize _DUA2:?

Note that this will erase all files currently on the volume.

It is not necessary to initialize the disk, and you would not want to
initialize if you want to add a kit to an existing Files-11 disk. The
disk must be a valid Files-11 disk if you wish to skip initializing, however.

[Do you want to initialize [Yes/No, default No]: Y
```

The procedure displays verification messages informing you that files are being copied. When the procedure finishes, it displays a message similar to the following:

```
Ending time   31-DEC-1988 13:45:29.90
Starting time 31-DEC-1988 13:22:39.05

The kit is complete.
```

7 Remove the floppy diskette labeled VAX/VMS V5.0 RX33 S/A BKUP from the drive.

8 Write-protect the diskette and store it in a safe place.

11.1.4 Booting Standalone BACKUP from a Diskette

If the system disk containing standalone BACKUP should become unusable, you can boot standalone BACKUP from an RX33 diskette. You need an RX33 floppy diskette that contains standalone BACKUP (either the distribution floppy diskette or one you created). To boot standalone BACKUP from an RX33 diskette, use the following procedure:

1 Set the Halt Enable/Disable switch on the MicroVAX II to ENABLE.

2 If the VMS operating system is not running, go to step 3.

If the VMS operating system is running, log into the SYSTEM account. Enter the following command and press RETURN:

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

Answer the questions. When the procedure asks if an automatic system reboot should be performed, press RETURN for NO. When the procedure is finished, it displays the following message:

```
SYSTEM SHUTDOWN COMPLETE -- USE CONSOLE TO HALT SYSTEM
```

3 Stop the system. If your system has a HALT button, press it twice. If your system does not have a HALT button, press the F5 (BREAK) key.

4 Insert the standalone BACKUP diskette in the diskette drive.

5 Enter the BOOT command in the following format and press RETURN:

```
>>> B ddcu
```

Substitute the device name of the drive holding the floppy diskette for *ddcu*. Section 4.3 contains a list of device names for all MicroVAX II devices.

6 The procedure might ask you for the date and time. Enter the date and time using the 24-hour clock format and press RETURN. For example:

```
VAX/VMS Version BI50 Major version id = 01 Minor version id = 00
PLEASE ENTER DATE AND TIME (DD-MMM-YYY HH:MM) 31-DEC-1988 13:00
```

7 The procedure displays a list of the local devices on your system and, if you have them, HSC- and MSCP-served devices. For example:

```
Available device MUA0:    device type TK50
     .
     .
     .
```

Check the list of devices. If the list is incomplete, make sure that all the drives are connected properly to the system. See your hardware manuals for details.

8 When standalone BACKUP finishes booting, it displays an identification message and the dollar-sign prompt ($):

```
%BACKUP-I-IDENT, stand-alone BACKUP V5.0; the date is 31-DEC-1988 13:00:00.00
$
```

9 Remove the standalone BACKUP diskette from the diskette drive.

To back up the system disk, go to Section 11.2.1.

To restore the system disk, go to Section 11.2.2.

11.1.5 Installing Standalone BACKUP on a Tape Cartridge

DIGITAL recommends that you keep standalone BACKUP on a tape cartridge in case the system disk becomes damaged. To install standalone BACKUP on a tape cartridge, use the following procedure:

Note: **If you have a tape cartridge distribution kit, you already have standalone BACKUP on a tape cartridge. If the original tape cartridge becomes damaged, or if you need to make extra copies, use the procedure in this section.**

1 Obtain a blank tape cartridge. Write the name VAX/VMS V5.0 TK50 S/A BKUP on the paper label. Insert the label into the label slot.

2 Write-enable the tape cartridge.

3 Insert the tape cartridge labeled VAX/VMS V5.0 TK50 S/A BKUP in the tape cartridge drive.

4 Log into the SYSTEM account.

5 Enter the following command and press RETURN:

```
$ @SYS$UPDATE:STABACKIT
```

6 The procedure asks for the name of the target device. Type MUA0 and press RETURN. For example:

```
%STABACKIT-I-SYMDEL, all global symbols deleted
Enter the name of the device on which to build the kit: MUA0
```

7 The procedure displays the following message:

```
     .
     .
     .
Please place the scratch tape cartridge in drive _MUA0:.
This volume will receive the volume label SYSTEM.

Enter "YES" when ready:
```

8 When you are ready to continue, type Y (for YES) and press RETURN.

9 The procedure displays verification messages informing you that files are being copied.

10 When standalone BACKUP is installed, the procedure displays a message similar to the following:

```
Ending time   31-DEC-1988 13:45:29.90
Starting time 31-DEC-1988 13:22:39.05

The kit is complete.
```

11 Remove the tape cartridge labeled VAX/VMS V5.0 TK50 S/A BKUP from the tape cartridge drive.

12 Write-protect the tape cartridge and store it in a safe place.

11.1.6 Booting Standalone BACKUP from a Tape Cartridge

If the system disk containing standalone BACKUP should become unusable, you can boot standalone BACKUP from a tape cartridge. Booting standalone BACKUP from a tape cartridge takes approximately 20 minutes. You need a tape cartridge that contains standalone BACKUP (either the distribution tape cartridge or one that you created). To boot standalone BACKUP from a tape cartridge, use the following procedure:

1 Set the Break Enable/Disable switch to ENABLE.

2 If the VMS operating system is not running, go to step 3.

If the VMS operating system is running, log into the SYSTEM account. Enter the following command and press RETURN:

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

Answer the questions. When the procedure asks if an automatic system reboot should be performed, press RETURN for NO. When the procedure is finished, it displays the following message:

```
SYSTEM SHUTDOWN COMPLETE - USE CONSOLE TO HALT SYSTEM
```

3 Stop the system. If your system has a HALT button, press it twice. If your system does not have a HALT button, press the F5 (BREAK) key.

4 Insert the tape cartridge containing standalone BACKUP in the tape cartridge drive.

5 Enter the following command and press RETURN:

```
>>> B MUA0
```

6 The procedure might ask for the date and time. Enter the date and time using the 24-hour clock format and press RETURN. For example:

```
VAX/VMS Version BI50 Major version id = 01 Minor version id = 00
PLEASE ENTER DATE AND TIME (DD-MMM-YYY HH:MM) 31-DEC-1988 13:00
```

7 The procedure displays a list of the local devices on your system and, if you have them, HSC- and MSCP-served devices. For example:

```
Available device MUAO:    device type TK50
          .
          .
          .
```

Check the list of devices. If the list is incomplete, make sure that all the drives are connected properly to the system. See your hardware manuals for details.

8   When standalone BACKUP finishes booting, it displays an identification message followed by the dollar-sign prompt ($) :

```
%BACKUP-I-IDENT, stand-alone BACKUP V5.0; the date is 31-DEC-1988 13:00:00.00
$
```

9   Remove the tape cartridge containing standalone BACKUP from the tape cartridge drive.

To back up the system disk, go to Section 11.2.3.

To restore the system disk, go to Section 11.2.4.

11.2   Backing Up the System Disk

You should back up the system disk for the following reasons:

- In case a problem occurs during a VMS upgrade or update, or during the installation of other software products. *Before* you attempt any of these procedures, you should back up the system disk. If a problem occurs, you can restore the backup copy of the system disk.

- To prevent loss of system files if they are deleted accidentally. *After* you install or upgrade the VMS operating system, or any other software products, you should back up the system disk. If a system file is deleted and renders the system disk inoperable, you can restore the backup copy and continue to use the system.

- In case the drive that holds the system disk malfunctions. If you have a backup copy of the VMS operating system, you can restore it to a functioning disk and continue to use the system.

- To eliminate disk fragmentation. Fragmentation happens when files are stored noncontiguously on the disk. The BACKUP command creates a copy on which files are stored contiguously.

  — If the system disk is removable, eliminating disk fragmentation is a one-step process. Use the backup copy as the new system disk. Store the old system disk in a safe place.

  — If the system disk is fixed, back it up to a tape cartridge or to floppy diskettes. Then restore the files to the original system disk.

DIGITAL recommends that you use standalone BACKUP, which uses a subset of Backup Utility qualifiers, to back up and restore the system disk. It is especially important that you understand the functions of the /IMAGE and

/PHYSICAL qualifiers to the BACKUP command before using standalone BACKUP.

Qualifier	Function
/IMAGE	Lets you create a functionally equivalent copy of the entire system disk
/PHYSICAL	Copies, saves, restores, or compares the entire system disk in terms of logical blocks, ignoring any file structure

For a complete description of the Backup Utility and its qualifiers, see the *VMS Backup Utility Manual*.

11.2.1 Backing Up the System Disk to Diskettes

To back up the system disk to floppy diskettes, use the following procedure:

1 Boot standalone BACKUP as described in either Section 11.1.2 or Section 11.1.4.

2 Determine the device names of the drive holding the system disk and the drive that will hold the backup floppy diskettes. Section 4.3 contains a list of device names for all MicroVAX devices.

Note: You use at least 25 floppy diskettes to back up the system disk. Label the floppy diskettes in sequence. The procedure asks you for each diskette until the operation is complete.

3 Write-enable a scratch diskette.

4 Insert the floppy diskette in the diskette drive.

5 Enter the BACKUP command in the following format and press RETURN:

```
$ BACKUP/IMAGE/VERIFY source-drive: target-drive:saveset.BCK/SAVE_SET
```

where:

- *source-drive* is the location of the files you want to back up. Use the device name of the drive holding the system disk.

- *target-drive* is the destination. Use the device name of the drive holding the backup floppy diskette.

- *saveset.BCK* is the name of the saveset (the name should reflect the contents of the backup diskette and cannot exceed 17 characters in length.)

For example:

```
$ BACKUP/IMAGE/VERIFY DUAO: DUA2:DEC_31_1988.BCK/SAVE_SET
```

Disregard any error messages similar to the following:

```
%BACKUP-W-INCFILATR, incomplete file attribute data for . . .

%BACKUP-I-NO BACKUP, DUA1:[SYSO.SYSEXE]PAGEFILE.SYS:1 data not copied, file
marked NOBACKUP
```

These messages are normal when you back up the VMS operating system to floppy diskettes.

6 The procedure displays the following message:

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

7 The procedure displays the following messages:

```
%BACKUP-I-RESUME, Resuming operation on volume 2
%BACKUP-I-READYREAD, Mount volume 2 on DUA2: for writing
Enter "YES" when ready.
```

   a. Remove the backup diskette from the drive.

   b. Label the diskette COMPLETE SYSTEM BACKUP, number it, and include the date.

   c. Write-protect the backup diskette.

   d. Write-enable another scratch diskette and insert it in the drive.

   e. When you are ready to continue, type Y (for YES) and press RETURN.

   f. The procedure displays the following message:

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

     Each time the procedure displays a mount request, follow steps a through e.

8 When the procedure is finished, it displays the following message:

```
%BACKUP-I-PROCDONE, operation completed. Processing finished at 31-DEC-1988 13:00:00.00
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:
```

9 Remove the last backup diskette from the drive. Label the diskette COMPLETE SYSTEM BACKUP and number it, and include the date.

10 Write-protect the diskette.

11 Stop the system. If your system has a HALT button, press it twice. If your system does not have a HALT button, press the F5 (BREAK) key.

12 Reboot the system.

Store the backup diskettes in a safe place.

Note: The BACKUP command creates a system disk that includes a DIGITAL-provided set of volume parameters, including a CLUSTER_SIZE (disk access scheme) of one. (The CLUSTER_SIZE refers to the way files are stored on the disk, NOT to VAXcluster environments.) You can change most volume parameters later with the SET VOLUME command. However, to change the CLUSTER_SIZE you must back up the system disk to a disk that has been initialized previously with the CLUSTER_SIZE that you want. To prevent the BACKUP command from reinitializing the target disk, use the /NOINITIALIZE qualifier with the BACKUP command. For more information about initializing a disk, see the *Guide to Maintaining a VMS System.* For more information on the BACKUP command, see the *VMS Backup Utility Manual.*

11.2.2 Restoring the System Disk from Diskettes

To restore the system disk from diskettes, use the following procedure:

1 Boot standalone BACKUP as described in Section 11.1.2 or Section 11.1.4.

2 Determine the device name of the drive holding the system disk and the drive that will hold the backup floppy diskettes. For a list of device names for all MicroVAX devices, see Section 4.3.

3 Insert the first backup diskette in the diskette drive.

4 Enter the BACKUP command in the following format and press RETURN:

```
$ BACKUP/IMAGE/VERIFY source-drive: saveset.BCK/SAVE_SET target-drive:
```

where:

- *source-drive* is the location of the files you want to restore. Use the device name of the drive holding the backup floppy diskette.

- *saveset.BCK* is the name of the saveset

- *target-drive* is the destination. Use the device name of the drive holding the system disk.

For example:

```
$ BACKUP/IMAGE/VERIFY DUA2:DEC_31_1988.BCK/SAVE_SET DUA1:
```

5 The procedure displays the following message:

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

6 The procedure displays the following message:

```
%BACKUP-I-RESUME, Resuming operation on volume 2
%BACKUP-I-READYREAD, Mount volume 2 on DUA2: for reading
Enter "YES" when ready.
```

  a. Remove the backup diskette from the drive.

  b. Make sure the next backup diskette is write-protected and insert it in the drive.

  c. When you are ready to continue, type Y (for YES), and press RETURN.

  d. The procedure displays the following message:

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

    Each time the procedure displays a mount request, follow steps a through c.

7 When the procedure is complete, it displays the following message:

```
%BACKUP-I-PROCDONE, operation completed. Processing finished at 31-DEC-1988 13:00:00.00
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:
```

8 Remove the last backup diskette from the diskette drive.

9 Stop the system. If your system has a HALT button, press it twice. If your system does not have a HALT button, press the F5 (BREAK) key.

10 Reboot the system.

Store the backup diskettes in a safe place.

11.2.3 Backing Up the System Disk to a Tape Cartridge

To back up the system disk to a tape cartridge, use the following procedure:

1 Obtain a scratch tape that you can use for the backup copy.

2 Write-enable the scratch tape cartridge.

3 Insert the tape cartridge in the tape cartridge drive.

4 Boot standalone BACKUP as described in Section 11.1.6.

5 Determine the device name of the drive holding the system disk and the drive holding the backup tape. Section 4.3 contains a list of device names for all MicroVAX devices.

6 Enter the BACKUP command in the following format:

```
$ BACKUP/IMAGE/BUFFER_COUNT=5/VERIFY source-drive: target-drive:saveset.BCK/LABEL=volume-label/REWIND
```

where:

- *source-drive* is the location of the files you want to back up. Use the device name of the drive holding the system disk.

- *target-drive* is the destination. Use the device name of the drive holding the backup tape.

- *saveset.BCK* is the name of the saveset (the name should reflect the contents of the backup tape and cannot exceed 17 characters in length)

- *volume-label* is the volume label of the tape in the target-drive. If the tape has been initialized already, use the same volume label that was assigned by the INITIALIZE command. If the tape has not been initialized, you can assign a volume label at this time. The volume label cannot have more than six characters.

For example:

```
$ BACKUP/IMAGE/BUFFER_COUNT=5/VERIFY DUAO: MUAO:DEC_31_1988.BCK/LABEL=31DECF/REWIND
```

7 The procedure displays the following message:

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

8 If your system disk contains more data than one tape cartridge can store, the procedure displays the following messages:

```
%BACKUP-I-RESUME, Resuming operation on volume 2
%BACKUP-I-READYWRITE, Mount volume 2 on _MUAO: for writing
Enter "YES" when ready:
```

If the procedure does not display these messages, go to step 9.

a. Remove the backup tape cartridge from the drive.

b. Label the tape COMPLETE SYSTEM BACKUP, number it, and include the date.

c. Write-protect the tape cartridge.

d. Write-enable another scratch tape cartridge and insert it in the drive.

e. When you are ready to continue, type Y (for YES) and press RETURN.

f. The procedure displays the following message:

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

Each time the procedure displays a mount request, follow steps a through c.

9 When the procedure is finished, it displays the following message:

```
%BACKUP-I-PROCDONE, operation completed. Processing finished at 31-DEC-1988 15:00:00.00
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:
```

10 Remove the backup tape cartridge from the drive. Label the tape cartridge COMPLETE SYSTEM BACKUP and indicate the date.

11 Write-protect the tape cartridge.

12 Stop the system. If your system has a HALT button, press it twice. If your system does not have a HALT button, press the F5 (BREAK) key.

13 Reboot the system.

Store the backup tape cartridge in a safe place.

Note: The BACKUP command creates a system disk that includes a DIGITAL-provided set of volume parameters, including a CLUSTER_SIZE (disk access scheme) of one. (The CLUSTER_SIZE refers to the way files are stored on the disk, NOT to VAXcluster environments.) You can change most volume parameters later with the SET VOLUME command. However, to change the CLUSTER_SIZE you must back up the system disk to a disk that has been initialized previously with the CLUSTER_SIZE that you want. To prevent the BACKUP command from reinitializing the target disk, use the /NOINITIALIZE qualifier. For more information about initializing a disk, see the *Guide to Maintaining a VMS System*. For more information on the BACKUP command, see the *VMS Backup Utility Manual*.

11.2.4 Restoring the System Disk from a Tape Cartridge

To restore the system disk from a tape cartridge, use the following procedure:

1 Write-protect the backup tape cartridge.

2 Insert the first backup tape cartridge in the tape cartridge drive.

3 Boot standalone BACKUP as described in Section 11.1.2 or Section 11.1.6.

4 Determine the device name of the drive holding the system disk and the drive holding the backup tape. Section 4.3 contains a list of device names for all MicroVAX devices.

5 Enter the BACKUP command in the following format:

```
$ BACKUP/IMAGE/BUFFER_COUNT=5/VERIFY source-drive:saveset.BCK/REWIND target-drive
```

where:

- *source-drive* is the location of the files you want to restore. Use the device name of the drive holding the backup tape.

- *saveset.BCK* is the name of the saveset.

- *target-drive* is the destination. Use the device name of the drive holding the system disk.

For example:

```
$ BACKUP/IMAGE/BUFFER=5/VERIFY MUAO:DEC_31_1988.BCK/REWIND DUA1:
```

6 The procedure displays the following message:

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

If the backup copy of the system disk is *one* tape, go to step 8.

7 If the backup copy of the system disk consists of several tape cartridges, the procedure displays the following message:

```
%BACKUP-I-RESUME, Resuming operation on volume 2
%BACKUP-I-READYREAD, Mount volume 2 on MUAO: for reading
Enter "YES" when ready.
```

a. Remove the backup tape cartridge from the drive.

b. Insert the next backup tape cartridge in the drive.

c. When you are ready to continue, type Y (for YES), and press RETURN.

d. The procedure displays the following message:

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

Each time the procedure displays a mount request, follow steps a through c.

8 When the procedure is finished, it displays the following message:

```
%BACKUP-I-PROCDONE, operation completed. Processing finished at 31-DEC-1988 15:00:00.00
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:
```

9 Remove the last backup tape cartridge from the drive.

10 Stop the system. If your system has a HALT button, press it twice. If your system does not have a HALT button, press the F5 (BREAK) key.

11 Reboot the system.

Store the backup tape cartridge in a safe place.

A Booting a MicroVAX I on the Second MSCP Controller

The MicroVAX I Read Only Memory (ROM) can only boot a system disk attached to the first Mass Storage Control Protocol (MSCP) controller. To boot from a disk attached to a second MCSP controller, follow the procedures in this appendix.

Note: **If your MicroVAX I has an RC25 disk drive with one fixed and one removable disk, DIGITAL recommends that you use the removable disk as the system disk. The device name of this removable disk is DAB0. If you use the removable disk as the system disk, you can remove the system disk and back up the fixed disk (containing user files) to a spare removable disk. If there are user files on the system disk, you can back them up to floppy diskettes.**

A.1 Creating a Console Diskette

The console diskette will contain files that let you boot from a system disk attached to the second MSCP controller. This procedure assumes that the first RC25 disk attached to the second MSCP controller (DAB0) will be the new system disk. To create a console diskette, do the following:

1 Log into the SYSTEM account.

2 Make sure that the first diskette drive is empty and inactive; the red activity light should be off. If there is a diskette in the drive, remove it following the instructions in Section 3.2.5.

3 Label a scratch diskette CONSOLE DISKETTE.

4 Enter the following command and press RETURN:

   `$ @SYS$UPDATE:VMBUVAX1`

5 The procedure displays the following message:

   `What system disk do you want to be able to boot from?`

   Type DAB0 and press RETURN.

   The procedure displays a series of informational messages.

6 The procedure displays the following message:

   `Where will the intermediate RX50 media be mounted?`

   Type DUA1 and press RETURN.

7 The procedure displays the following message:

   `Are you ready?`

8 Insert the diskette labeled CONSOLE DISKETTE in diskette drive 1, DUA1.

   When you are ready to continue, type Y (for YES) and press RETURN.

Booting a MicroVAX I on the Second MSCP Controller
A.1 Creating a Console Diskette

9 When the system has created the console diskette, it displays the following message:

```
The media on DUA1 may now be used to boot device DAB0
```

10 Write-protect the console diskette.

If you want to mount the console diskette automatically every time you boot the system, add the following command to the end of SYS$MANAGER:SYSTARTUP_V5.COM. This informs other users that the drive is being used.

```
$ MOUNT/SYSTEM/FOREIGN DUA1: INTERMEDIATE
```

Note: **To boot the system, the console diskette must be in the first diskette drive, DUA1.**

A.2 Copying the VMS Operating System to the New System Disk

To copy the VMS operating system to a disk on the second MSCP controller, do the following:

CAUTION: **This procedure destroys the contents of the new system disk.**

1 Place the new system disk in the disk drive and spin it up.

2 Log into the SYSTEM account.

3 Insert the console diskette into the first diskette drive, DUA1. To mount the console diskette, enter the following command and press RETURN:

```
$ MOUNT/SYSTEM/FOREIGN DUA1:
```

4 Notify current users to log out. Make sure that no new user can log in. To prevent users from logging in, enter the following command and press RETURN:

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

5 Shut down the network if it is running. Perform this step only if your system is running DECnet–VAX. If you are not sure whether your system is running DECnet–VAX, enter the following command and press RETURN:

```
$ SHOW NETWORK
```

If the system displays the following message, the system is not running DECnet–VAX.

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

If your system is running DECnet–VAX, enter the following commands to shut down the network. Press RETURN after each one.

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

6 Stop all batch and print queues. To stop all batch and print queues, do the following:

  a. Enter the following command and press RETURN:

```
$ SHOW QUEUE/DEVICE/BATCH/ALL
```

b. Enter a command in the following format and press RETURN:

```
$ STOP/QUEUE/NEXT queue-name
```

where *queue-name* is the name of an active queue.

For example:

```
$ STOP/QUEUE/NEXT LAB$LNO3A
```

7 Copy the VMS operating system and all other files on the old system disk to the new system disk. To copy these files, enter commands in the following format and press RETURN after each one:

```
$ INITIALIZE source-drive: VMS
$ MOUNT/FOREIGN target-drive:
$ BACKUP/IMAGE/VERIFY/IGNORE=INTERLOCK source-drive: target-drive:
```

where:

- *source-drive* is the device name of the drive holding the current system disk.

- *target-drive* is the device name of the drive holding the new system disk.

For example, if your system has the following configuration:

- The current system disk is DUA0 (a fixed RD52 or RD53 disk)

- The new system disk is DAB0 (a removable RC25 disk)

Enter the following command and press RETURN:

```
$ BACKUP/IMAGE/VERIFY/IGNORE=INTERLOCK DUAO: DABO:
```

Ignore any error messages that report specific files not copied by BACKUP.

8 Enter a command in the following format and press RETURN:

```
$ DISMOUNT/NOUNLOAD target-drive:
```

where *target-drive* is the device name of the new system disk. For example:

```
$ DISMOUNT/NOUNLOAD DABO:
```

A.3 Booting from the New System Disk

To boot from the new system disk, do the following:

1 Make sure that the console diskette is inserted in the first diskette drive, DUA1.

2 Stop the system. Press the HALT button.

3 Enter the BOOT command in the following format and press RETURN:

```
>>> B source-drive
```

where *source-drive* is the name of the diskette drive that contains the console diskette. For example, if the console diskette is in the first diskette drive, DUA1, enter the following command and press RETURN:

```
>>> B DUA1
```

4 The procedure asks for the date and time. Enter the date and time using the 24-hour clock format and press RETURN. For example:

```
VAX/VMS Version BI50 Major version id = 01 Minor version id = 00
PLEASE ENTER DATE AND TIME (DD-MMM-YYYY HH:MM) 31-DEC-1988 13:00
```

5 After the system boots, it displays the following message:

```
    VAX/VMS Version V5.0 31-DEC-1988 13:00

The VAX/VMS system is now executing the system startup procedure.

The VAX/VMS system is now executing the site-specific startup commands.

%SET-I-INTSET, login interactive limit=64, current interactive value = 0
  31-DEC-1988 13:00:00.00
    SYSTEM        job terminated at 31-DEC-1988 13:00:00.00
```

When you are satisfied that the new system disk is working properly, delete all the VMS files from the old system disk. If you do not delete the VMS files from the old system disk, the system might use the old system disk accidentally if the console diskette is not inserted in the drive.

Glossary

boot or 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 server: A computer that is part of a local area VAXcluster. The boot server in a local area VAXcluster has a system disk that contains cluster common files; other nodes in the cluster (satellite nodes) can access these files. See also *satellite node*.

console mode: In console mode, you control the system by entering console-mode commands. In console mode, the VMS operating system is not running.

device name: The name you use to identify a device on the system. A device name indicates the device code, controller designation, and unit number.

local area VAXcluster: Consists of a VAX computer that acts as a boot server and a number of low-end VAX computers that act as satellite nodes. Ethernet connects all of the computers. These computers share a single file system.

local drive: Any drive that is connected directly to a computer is referred to as a local drive.

Mass Storage Control Protocol (MSCP): The protocol used to communicate between a VAX computer and a controller. An MSCP server makes local MASSBUS, UNIBUS, and UDA disks accessible to all the nodes in a VAXcluster environment.

MASSBUS: A high-speed I/O subsystem. Some of the devices that can be connected to the MASSBUS are RM05 disk drives, RP07 disk drives, and TA78 magnetic tape drives.

media: A generic term that refers to any packaging agent capable of storing computer software. Examples of media are magnetic tapes, floppy diskettes, disk packs, tape cartridges, etc.

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.

program mode: In program mode, you control the system through the VMS operating system.

satellite node: A computer that is part of a local area VAXcluster. A satellite node is booted remotely from the system disk of the boot server in the local area VAXcluster. See also *boot server*.

save set: The format that the Backup Utility stores files in. The VMS operating system is shipped in this format.

scratch disk: A blank disk or a disk with files that you no longer need.

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 version of the Backup Utility that runs from memory without the control of the VMS operating system.

standalone system: A computer system with only one VAX computer.

system disk: The disk that contains (or will contain) the VMS operating system. A VMS system disk is set up so that most of the VMS files can be shared by several computers. In addition, each computer has its own directory on the system disk that contains its page, swap, and dump files.

UDA50: An intelligent disk drive controller that supports up to four disk drives on the UNIBUS.

UNIBUS: A medium-speed I/O subsystem. Some of the devices that can be connected to the UNIBUS are UDA50's, RL02 disk drives, and TU81 magnetic tape drives.

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.

VMS User Environment Test Package (UETP): A software package that tests all the standard peripheral devices on your system, various commands and operating system functions, the system's multi-user capability, DECnet–VAX, and the VAXcluster environment.

VMSTAILOR: A software program that lets you customize your system disk.

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