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VMS
System Managers Manual
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Typed in by: Guardian Of Time

This Manual provides the basic concepts and procedures for VMS system management; it is especially intended for managers of small clusters and systems.

Chapter 1 Introduction

The VMS operating system and the other software products that run on your computer provide you and the other users on your system w/ a wide range of computing capabilities. In order to create and maintain a proper and efficient computing environment, certain administrative tasks must be undertaken. These tasks are called SYSTEM MANAGEMENT, and they include the following:

- : Setting up the system
- : Giving individual users access to the system
- : Installing software (and software updates)
- : Managing acceptable performance levels
- : Preventing the loss of important information that you keep on line
- : Making sure that the system is secure
- : Handling media (such as disks/magnetic tapes)
- : setting up the software to allow for printers and for batch jobs
- : Setting up a cluster
- : Setting up a network

As system manager, you may need to do some of these tasks only once (for example, setting up software to allow for printers or batch jobs, or setting up a network); others are done on a continuing basis (for example, maintaining system security and preventing the loss of data). At some sites, one or more people are designated as SYSTEM MANAGERS, and other individuals are designated as OPERATORS. In these cases, operators are responsible for tasks such as physically mounting magnetic tapes and disks, monitoring printers, responding to emergencies or security alarms, and maintaining system log files.

Not all of the tasks described in this manual may be necessary for your site. This chapter provides an overview of the information that this manual contains. You should read this introductory chapter to determine which parts of the manual may be applicable to your site.

<NOTE: I overlooked section 1.1 because all it does is say that system >
< Managers should use this chapter / Operators should use this Chapter >
< there was NO usefull information on that part...Guardian of Time >

1.2 SYSTEM MANAGEMENT CONCEPTS AND TERMS

Some concepts and terms are used frequently in system management, and you should become familiar w/ them. The following terms and concepts are used both in the context of everyday general use in a VMS system and in the context of system management; they are described in the VMS GENERAL USER'S MANUAL:

- : Accounts and directories
- : Command Procedures
- : Digital Command Language (DCL)

The following concepts and terms apply primarily to system management:

- : SYSTEM account and [SYSMGR] directory

The SYSTEM account is reserved for use by the system manager. When you are logged into the SYSTEM ACCOUNT, your default directory (Which is also reserved for the system manager) is SYS\$SYSROOT:[SYSMGR].

Always be careful when you are logged into the SYSTEM account. When you are logged into the SYSTEM account, all privileges are enabled, by default. You need these privileges to perform many system management tasks; however, they can also produce unwanted or even destructive results if you use them carelessly.

- : CONSOLE (OPERATOR'S) TERMINAL

You can perform most system management tasks from any terminal that is connected to the processor (or the cluster). However, certain tasks such as bootstrapping the system and communicating w/ the VAX processor's console subsystem must be performed at a special terminal called the CONSOLE TERMINAL.

The console terminal, which always has the designation OPA0, is also usually designated as the OPERATOR'S TERMINAL. You use the operator's terminal to send messages to system users and respond to user requests, using the operator communication process (OPCOM).

CHAPTER 2 -- STARTING UP THE SYSTEM

The system startup procedure establishes the computing environment for your system

This chapter covers three major topics:

- : How to start your system for the first time
- : How to create the proper computing environment whenever you restart your

system
: How to shut down your system

Before you can use the procedures described in this chapter, you must first set up the hardware for each VAX processor. To set up the hardware and install the VMS operating system, refer to the instructions in your VAX processor installation and operations guide. After you have installed the operating system, you will be able to log into the SYSTEM account on your computer.

After the operating system has been successfully loaded, you can set up the proper computing environment for your system. The site-specific system startup file, SYSTARTUP_V5.COM, is an essential aspect of establishing an environment specific to the needs of your site. Section 2.4 describes how to modify SYSTARTUP_V5.COM to meet the needs of your site.

2.1 STARTING UP YOUR SYSTEM FOR THE FIRST TIME

Instructions for installing the VMS operating system are included in the installation and operations guide for your processor. You must choose whether you are installing the VMS operating system as a new installation or as an upgrade. If you are installing the VMS operating system for the first time, you must use the new installation procedure. If you already have a previous version of the VMS operating system on your processor, then you should use the upgrade procedure. Instructions for a new installation are found in your processor installation and operations guide; instructions for an upgrade procedure are found in the Release Notes for the VMS operating system.

When you install the VMS operating system using the new installation procedure, the disk on which you install the operating system is first erased, and then a directory structure and the operating system itself is put in place. When you use the upgrade procedure, the files for the VMS operating system are replaced (w/ files for the upgraded operating system), and all other files on your system disk (for example, data files, executable images that are NOT part of the operating system, and so on) remain as they are.

CAUTION: if you use the new installation procedure for a processor that already has a previous version of the VMS operating system, you will DESTROY the previous contents of the disk that you designate as the system disk.

2.2 BOOTING THE SYSTEM

Booting is the process of loading the operating system from the system disk into processor memory. You can perform either a nonstop boot or a conversational boot. A nonstop boot is the quickest and easiest method, and the operating system will automatically set system parameters that are appropriate for most computing activities for your system's hardware configuration. A conversational boot requires you to supply more information

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during the boot process, but it allows you to change system parameters during the boot procedure. See your VAX processor installation and operations guide for detailed booting instructions.

After a system shuts down, it must be rebooted before you can use it. Some processors provide the capability of an automatic reboot; when you enable this feature, the system automatically attempts to reboot itself after it has been shut down. For example, if your site experiences a power failure, a processor that has automatic reboot enabled restarts itself automatically after the power has been restored. See your VAX processor installation and operations guide for information about automatic rebooting.

In unusual cases, the normal startup procedures will NOT work properly and troubleshooting may be necessary. Section 2.9 describes procedures that you should follow if the normal startup procedure fails, or if you find yourself locked out of your system.

2.3 LOGGING INTO THE NEW SYSTEM

When the boot procedure is complete, a message is displayed on the terminal from which the system is booted (except on workstations, where the message is displayed on the operators window). The message is similar to the following:

```
VAX/VMS VERSION 5.0 08-JUN-1989 07:00:00.00
```

```
%%%%%%%%%%%% OPCOM, <08-JUN-1980 07:00:01.P> %%%%%%%%%%%%%%  
Logfile has been initialized by operator _OPA0:  
Logfile is SYS$SYSROOT: [SYSMGR]OPERATOR.LOG;1
```

```
%SET-I-INTSET, login interactive limit = 64, Current interactive value = 0  
SYSTEM      job terminated at <08-JUN-1980 07:00:00.00
```

After you see this display, you can then log into the system managers account, using the following procedure:

1. Press the RETURN/ENTER key on the console terminal.
2. In response to the system's request for your USERNAME, type SYSTEM.
3. In response to the system's request for your PASSWORD, type the password that you chose for the system account during installation. You should change your system password immediately after logging into the system for the first time. To change your password, enter the DCL command SET PASSWORD.

CAUTION: DIGITAL recommends that you change the system manager's account password frequently to maintain system security. The system manager's account has full privileges by default; therefore, you should exercise caution when using it.

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After you enter your password, the system prints a welcome message on the console terminal. If it is not your first time login in, the system also prints the time of your last login, for example:

```
Welcome to VAX/VMS Version n.n
```

```
Last interactive login at 01-Jun-1989 15:13:21.07
```

The command procedure SYS\$EXAMPLES:MGRMENU.COM generates the system manager menu. This command procedure can serve as a sample for designing site-specific system manager menus.

2.4 STARTUP COMMAND PROCEDURE FOR YOUR SITE (SYSTARTUP_V5.COM)

A command procedure that sets up a computing environment for the specific needs of your site is executed each time that your system starts up. This file is located in the system manager's directory, [SYSMGR], and it is called SYSTARTUP_V5.COM. In order to customize SYSTARTUP_V5.COM for the needs of your site, you must make the appropriate edits to the file. This section describes how to customize the SYSTARTUP_V5 command procedure.

After you install the VMS operating system, the file SYSTARTUP_V5.COM is placed in the [SYSMGR] directory. SYSTARTUP_V5.COM is a template file, which means that it can be used as a basis or guide for creating a startup file that suits your own system. In particular, the SYSTARTUP_V5.COM template includes sections that can perform the following tasks at startup time:

- : Mounting public disks
- : Setting the characteristics of terminals and other devices
- : Initializing and starting queues
- : Installing known images
- : Starting up the DECnet network
- : Running the System Dump Analyzer
- : Purging the operator's log file
- : Submitting batch jobs that are run at system startup time
- : Limiting the number of interactive users
- : Starting up the LAT network
- : Site-specific LAT command procedure
- : Creating systemwide announcements
- : Defining a system login command procedure
- : Backing up the system

To modify SYSTARTUP_V5.COM, you can use any text editor. This file is a command procedure, so any changes that you make must conform to the rules for command procedures, as described in the VMS GENERAL USER'S MANUAL. In order to be used as a site-specific startup file, be sure to keep the file in the [SYSMGR] directory and use the file name SYSTARTUP_V5.COM.

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To allow SYSTARTUP_V5.COM to continue in the event of an error, include the DCL command SET NOON at the beginning of the file, as follows:

```
$ SET NOON
```

This command disables error checking after the execution of each command in the SYSTARTUP_V5.COM.

The following sections describe many of the elements of your user environment that you can establish w/ SYSTARTUP_V5.COM.

2.4.1 MOUNTING PUBLIC DISKS

A public disk is a disk that can be accessed by any system process. In order to make a public disk available for use, the disk must be physically mounted and you must then use the MOUNT command. You do not need to use the mount command for the system disk, because the system disk is already mounted when the system starts up.

This section describes how to mount disks in the SYSTARTUP_V5.COM file. If your system uses any disks that should be mounted whenever the system is running, you should read this section.

To include MOUNT commands in SYSTARTUP_V5.COM to mount your public disks for systemwide access, use the following MOUNT command syntax:

```
$ MOUNT/SYSTEM ddcu: volume_label logical_name
```

You use the /SYSTEM qualifier to mount the disk for systemwide access; this is called a public volume. If you are in a VAXcluster environment, then you should also use the /CLUSTER qualifier in order to make the volume accessible to any user in the cluster.

The expression ddcu represents the physical device name. You must always include a colon after the device name. The expression volume_label is a label that you choose for the disk. For example, if you mount a disk w/ the physical device name DRA1, and you choose USERFILES as the volume label for this disk, then you would include the following command in the SYSTARTUP_V5.COM file:

```
$ MOUNT DRA1: USERFILES
```

The expression logical_name, in the context of the MOUNT command, is a logical volume name that is associated w/ the volume that you mount. You can use the logical volume name (instead of the physical device name) in programs and procedures that are used on your system, and it is not necessary to know the physical drive on which the volume is mounted.

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If you do not specify a logical volume name in the MOUNT command, then the logical volume name is in the form DISK\$volume_label. In the previous example, where no logical name was specified and the volume label was USERFILES, the MOUNT command would automatically assign the logical name DISK\$USERFILES to the disk.

The following command produces the logical volume name USER and equates it to DRA1, the device name. Note that the logical volume name USER is equivalent to DRA1 only while the disk is actually mounted; if the volume is dismounted, then the logical volume name no longer has any systemwide meaning.

```
$ MOUNT/SYSTEM DRA1: USERFILES USER
```

2.4.2 SETTING DEVICE CHARACTERISTICS

On some systems, certain devices (such as terminals or printers) should have the same characteristics whenever the system is running. Characteristics include defining the device as a printer, setting the transmission speed for terminals, and so on. You can define these characteristics in the SYSTARTUP_V5.COM procedure. Read this section you want to define certain characteristics for specific devices on your system.

To establish the characteristics of the terminals and other devices on the system, use a series of SET commands in SYSTARTUP_V5.COM. Use the SET TERMINAL command for terminals; you may want to include comments to remind yourself of the user to whom specific terminals may be assigned.

Use the SET PRINTER command for printers. Printer characteristics must be set before you establish queues for the printers.

The following example shows how you could modify SYSTARTUP_V5.COM to set up characteristics for terminals and a printer:

```
$ SET TERMINAL TTC2: /SPEED=300 /DEVICE_TYPE=LA36 /PERMANENT !JONES
$ SET TERMINAL TTD1: /SPEED=9600 /PERMANENT !WRENS
$ SET TERMINAL TTD4: /SPEED=1200 /PERMANENT !JRSMTIH
$ SET TERMINAL TTG4: /SPEED=1200 /MODEM /PERMANENT !DIALUP1
$ SET PRINTER /LA11 /PAGE=60 /WIDTH=80 LPA0:
```

For more information about the qualifiers available w/ the SET TERMINAL and SET PRINTER commands, see the VMS General Users Manual (NOTE: I'm going to start to type that manual up at the same time as this one starting 19-Jun-89).

2.4.3 PRINTERS AND BATCH PROCESSING: INITIALIZING AND STARTING QUEUES

If your system has a printer that you want to make available for general use (that is, a printer that is not connected directly to an individual terminal), you must establish a print queue. Similarly, if you want to allow batch

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processing on your system, you must establish a batch queue. A queue allows users to submit requests for printing or batch processing, and the system prints or processes the user's jobs as resources allow.

If you want to include printing or batch processing capabilities on your system, you should include commands in SYSTARTUP_V5.COM that do the following:

- 1: Start the system job queue manager
- 2: Initialize and start each queue w/ a separate INITIALIZE/QUEUE/START command line

The following example shows how to start the system job queue manager and initialize and start queues in SYSTARTUP_V5.COM:

```
$ !
$ ! Start the system job queue manager
$ !
$ START/QUEUE/MANAGER
$ !
$ ! Set printers spooled and establish printer queues
$ !
$ SET PRINTER/LOWER LAO:
$ SET DEVICE/SPOOLED=SYS$PRINT LPA0:
$ INITIALIZE/QUEUE/START/DEFAULT=FLAG/NOENABLE_GENERIC LPA0:
$ !
$ SET PRINTER/LOWER LPB0:
$ SET DEVICE/SPOOLED=SYS$PRINT LPB0:
$ INITIALIZE/QUEUE/START/DEFAULT=FLAG/NOENABLE_GENERIC LPB0:
$ !
$ INITIALIZE/QUEUE/START/GENERIC=(LPA0,LPB0) SYS$PRINT
$ !
$ ! Establish batch queues
$ !
$ INITIALIZE/QUEUE/START/BATCH/JOB_LIMIT=2/BASE_PRIORITY=3 SYS$BATCH
```

NOTE: DIGITAL recommends using the /RESTART qualifier w/ the START/QUEUE/MANAGER command. This qualifier causes the queue manager to restart automatically if the job controller should abort.

A spooled device directs the output of an application to an intermediate file until the application program finishes. When the application completes, the file is submitted for printing. A spooled device can help balance the workload demand on line printers if you are running applications on a time-shared system. Use the SET DEVICE/SPOOLED command to establish spooled devices.

2.4.4 INSTALLING KNOW IMAGES

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You can install commonly used programs as known images to reduce the I/O overhead in activating those images and to assign attributes or privileges to the images. If you have programs on your system that meet any of the following conditions, you should read this section and install such programs as known images in the SYSTARTUP_V5.COM startup file:

- : Programs that are frequently run
- : Programs that are usually run concurrently by several processes
- : Programs that require special privileges

All known images must be reinstalled each time the system is rebooted, because known file lists are not saved if the system is shut down or fails. You include INSTALL commands in SYSTARTUP_V5.COM to install programs as known images. Chapter 9 includes a discussion about performance characteristics and known images.

The following example shows a command sequence that might appear in SYSTARTUP_V5.COM for installing additional known images:

```
$ INSTALL
```

```
ADD/OPEN/SHARED/HEADER_RESIDENT BLISS32
ADD/OPEN/SHARED MACRO32
ADD/OPEN DIRECTORY
```

2.4.5 STARTING UP THE DECNET NETWORK

The DECnet software lets your system communicate w/ other computers. If you install DECnet software on your system, you must include commands in SYSTARTUP_V5.COM that start up the DECnet network. Read this section if you have the DECnet software on your system.

If you have started a batch queue on your system (as described in an earlier section), then you should start the network using the following commands in SYSTARTUP_V5.COM:

```
$ IF F$SEARCH("SYS$SYSTEM:NETACP.EXE") .NES. "" - ! This is faster, if you
$ THEN SUBMIT SYS$MANAGER:STARTNET.COM           ! have batch queues setup.
```

These commands submit the network startup procedure (SYS\$MANAGER:STARTNET.COM) as a batch job, which reduces the amount of time it takes to boot your system. Alternatively, if you have not started a batch queue, use the following command in SYSTARTUP_V5.COM to start up the network:

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

2.4.6 RUNNING THE SYSTEM DUMP ANALYZER

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In the event of a system failure, the System Dump Analyzer (SDA) can help you determine why the system failed. In order to use SDA for this purpose, you should make sure that the system dump file is available for analysis and not overwritten by a new crash. REad the rest of this section if you want to learn about using SDA w/ SYSTARTUP_V5.COM.

You can start SDA in your site-specific startup file by using the following lines in SYSTARTUP_V5.COM:

```
$ ANALYZE/CRASH_DUMP SYS$SYSTEM: SYSDUMP.DMP
COPY SYS$ERRORLOG: SYSDUMP.DMP SYSDUMP.BACK
```

For further information, invoke the SDA for an interactive session upon completion of startup, or refer to the SDA documentation in the extended VMS documentation set.

CAUTION: If you use the page file for the crash dump file, when the system reboots, you **MUST** enter the SDA command COPY to copy the dump[from the page file to another file suitable for analysis. If you fail to perform the copy operation, pages used to save the crash dump information are not released for paging, and your system hangs while executing STARTUP.COM in the rebooting process.

2.4.7 PURGING OPERATORS LOG FILE

Each time the system is rebooted, a new version of OPERATOR.LOG is created in the SYS\$MANAGER directory. You should devise a plan for regular maintenance of these files. Adding the following command to SYSTARTUP_V5.COM purges all but the last two (2) versions of the operator's log file:

```
$ PURGE/KEEP=2 SYS$MANAGER: OPERATOR.LOG
```

See Chapter 10 for additional suggestions for maintaining the operators log files.

2.4.8 SUBMITTING BATCH JOBS THAT ARE RUN AT STARTUP TIME

Some sites may have batch jobs that are submitted at system startup time. To submit such batch jobs, add SUBMIT commands to your SYSTARTUP_V5 file, in the following format:

```
$ SUBMIT [/qualifier,...] file-spec
```

In the following example, a batch job is submitted to run a command procedure that rebuilds the disks each time the system is initialized.

```
$ SUBMIT SYS$MANAGER: SYSDISK_REBUILD
```

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If you submit batch processing jobs in SYSTARTUP_V5.COM, make sure that the batch processing jobs are submitted after the batch queues have been initialized. See Chapter 5 for more information on submitting batch jobs.

2.4.9 DEFINING THE NUMBER OF INTERACTIVE USERS

You can set a limit for the number of interactive users that are allowed to be logged into your system at one time. To do this, include the following command in SYSTARTUP_V5.COM:

```
$ STARTUP$INTERACTIVE_LOGINS ==n <- where n is is where you would put a #
```

Where n is the maximum number of interactive users that are permitted to log in at one time.

NOTE: the number of interactive users must be set to a value no greater than that which is authorized by your VAX processor license.

2.4.10 STARTING UP THE LAT NETWORK

A LAT network is any local area network where terminal servers and operating systems use the Local Area Transport (LAT) protocol. A LAT network can coexist on the same Ethernet w/ other protocols. If your system uses a LAT network, you should read this section.

To configure your system as a service node w/in a LAT network, execute the command procedure SYS\$MANAGER:LTLOAD.COM from w/in SYSTARTUP_V5.COM. LTLOAD.COM starts up the LAT protocol. In the LAT protocol, a VMS operating system advertises its services over the Ethernet and responds to connection requests from terminal servers supporting user terminals and other asynchronous devices.

to start up the LAT network, add the following command line to SYSTARTUP_V5.COM:

```
$ @SYS$MANAGER: LTLOAD
```

To configure a node as a service node that connects only to interactive terminals on a terminal server, include the command line shown in the last example in SYSTARTUP_V5.COM.

However, if you want to use remote printers on a terminal server or to create dedicated application services on the VMS service node, you must modify LTLOAD.COM

SUPPORTING USER TERMINALS ON A TERMINAL SERVER

To create a VMS service node on a LAT network that supports only interactive

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terminals is a one-step procedure. You insert the command @SYS\$MANAGER:LTLOAD into SYSTEARTUP_V5.COM and append any of the following arguments:

```
$ @SYS$MANAGER:LTLOAD "P1" "P2" "P3" "P4"
```

The arguments P1/P4 have the following meanings:

P1..Service name..Name of the VMS service. For clustered VMS service nodes, use the cluster name as the service name. For independent VMS service nodes, use the physical node name.

P2 - P4..any of the following: /IDENTIFICATION="string"..Description of the node and its services that are advertised over the Ehternet. The default is the string defined by the logical name SYS\$ANNOUNCE.

/ENABLE=group-list..Terminal server groups qualified to establish connections w/ the VMS servic node. By default, Group 0 is enabled.

/DISABLE=group-list..Removes previously enabled terminal server groups.

The argument P1 assigns a service name to the node, using the LATCP command CREATE SERVICE. Arguments P2 through P4 can be any valid qualifier to the SET NODE command.

For example, the following command creates the service OFFICE on the VMS node, MOE, which is part of the OFFICE cluster.

```
$ @SYS$MANAGER:LTLOAD OFFICE "/ENABLE=1" "/DIABLE=0"
```

2.4.11 CREATING SYSTEMWIDE ANNOUCEMENTS

This section describes how to define the following types of systemwide announcements in your SYSTARTUP_V5.COM file:

- : A message to users informing them that the system is available for use (after a system boot)
- : A message to users when first accessing the system for login
- : A welcoming message when a user logs in

When your system has completed the startup procedure and is up and running, you can send a message to all connected terminals announcing the system's availability. To do this, include a line, w/ an appropriate message w/in the quotation marks, before the \$EXIT command in your SYSTARTUP_V5.COM file:

```
$ REPLY/ALL/BELL "VMS Operating System at NIGHTMARE 589-7840..READ FOR USE."
```

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if you want to display at the beginning of each user's login procedure, include a line, w/ an appropriate message w/in the quotation marks, in SYSTARTUP_V5.COM:

```
$ DEFINE/SYSTEM SYS$ANNOUNCE "NIGHTMARE, 589-7840 -- AUHTORIZED USE ONLY"
```

You can also display a messge to all interactive users immediately after they log in by including a line similar to the folling in SYSTARTUP_V5.COM:

```
$ DEFINE/SYSTEM SYS$WELCOME "Welcome to the VMS Operating System at Nightmare,  
589-7840."
```

If you do not define SYS\$WELCOME, the following standard messaged is displayed:

Welcome to VMS version n.n

The SYSTARTUP_V5 command file supplied as a template w/ DIGITAL'S distribution kit includes additional command examples for SYS\$ANNOUNCE and SYS\$WELCOME.

You may also want to display various system announcements to users at the time they log in. You do this w/ a command in the systemwide login command procedure, SYLOGIN.COM, as explained later in this chapter.

2.5 DEFINING A SYSTEM LOGIN COMMAND PROCEDURE

A system login command procedure is executed for each interactive usree when the user logs in. W/ a system login command procedure, you can establish elements of a computing environment that are the same for all interactive users. To use a system login procedure, you should do as follows:

1. Define the logical name SYS\$SYLOGIN, usually in your site-specific startup file (SYSTARTUP_V5.COM).
2. Create a system login command procedure.

To define the logical name SYS\$SYLOGIN and point to a system login command file name SYS\$MANAGER:SYLOGIN.COM, include the following line in SYSTARTUP_V5.COM:

```
$ DEFINE/SYSTEM/EXEC/NOLOG SYS$SYLOGIN SYS$MANAGER:SYLOGIN.COM
```

A template for a system login command procedure is found in SYS\$MANAGER:SYLOGIN.COM. This file includes commands that you can modify and add to according to the needs of your site.

You can use the system login command procedure to display announcements for your site. Todo this, you would do the following:

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1. Create a text file that has current announcements, for example w/ the filename SYS\$MANAGER:ANNOUNCEMENTS.TXT. You could then update this file (adding/deleting announcements) as needed.
2. Include a line at the end of your system login command procedure that displays the announcements file, such as the following:

```
$ TYPE SYS$MANAGER: ANNOUNCEMENTS.TXT
```

In addition to a system login command procedure, users can also have their own login command procedures. User login command procedures are executed immediately after the system login command procedure.

2.6 BACKING UP THE SYSTEM

To limit the risk of losing your operating system environment, you should perform the following sequential operations after installing and customizing your system:

1. Back up the console volume
2. Build a standalone backup kit
3. Back up the system disk

If your processor has a console storage device, DIGITAL recommends that you make a backup copy of your console volume, it is useful to have a backup copy in case your original becomes corrupted. The VMS operating system provides a command procedure called CONSCOPY.COM in the SYS\$UPDATE directory that copies your console volume to a blank one.

To back up your system disk, DIGITAL recommends that you use standalone BACKUP, which uses a subset of Backup Utility qualifiers. If your system was not distributed on magnetic tape, you must build a standalone BACKUP kit either on console media or on disk. You can then boot standalone directory root SYSE on a Files-11 disk.

Installing and using standalone BACKUP in an alternate root on your system disk saves time when you are backing up your system disk, because you do not have to boot standalone BACKUP from your console volume.

NOTE: The procedures for backing up the console volume and backing up the system disk vary for different VAX processors. See your VAX processor installation and operations guide for the setp-by-step procedures that apply to your processor.

2.7 BUILDING AND COPYING A VMS SYSTEM DISK

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The command procedure SYS\$UPDATE:VMSSKITBLD is used for building and copying a VMS system disk. The procedure provides you w/ the following options:

- : BUILD -- Destroys all previous information on the target disk and then builds the new system disk.
- : ADD -- Adds another copy of the operating system to an alternate system root directory on the same system disk.
- : COPY -- Copies the operating system files to a target disk w/out destroying the files that are currently on the target disk.
- : COMMON - Initializes the target disk and builds it as a cluster-common system disk.

CAUTION: The VMSKITBLD BUILD and COMMON options initialize the target disk, deleting, all of its previous contents.

In some cases, you may want the operating system to exist on another disk. The following paragraphs describe two such cases and the procedures that you would use.

You may want to move your operating system files to another disk. for example, assume that your operating system is initially stored on a disk together w/ some of your user files. Suppose that you want to move only the operating system files from original disk to a smaller disk. You can build the operating system on the smaller disk (called the target/destination disk) w/out affecting the user files on the original disk (the source disk) by using the BUILD option of the VMSKITBLD command procedure.

You may want to create a separate test environment where you can modify the operating system w/out affecting current operations. You could use the ADD option to copy the operating system to an alternate system root directory and create a boot command procedure to select that version for testing sessions. In addition, you may want to preserve the current version of the operating system before upgrading your system to the next major version. To do so, use the ADD option to make a copy of the current operating system in an alternate system root directory (SYSA) and then upgrade and run the new version of the operating system in SYS0.

CAUTION: When you copy the system disk using VMSKITBLD.COM, SYSUAF.DAT and all user-modified command files are NOT copied onto the target disk. VMSKITBLD.COM uses the site-specific template files w/ the TEMPLATE file type in building the new system disk.

2.8 SYSTEM STARTUP PROCEDURES

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This section describes the process that the VMS operating system follows when you boot your system. This section is mostly informational -- that is, you usually do NOT have to do anything during the booting process, but you may want to know how the operating system is set up.

Each time that your system is booted, the VMS operating system initiates a startup procedure. The startup procedure includes the execution of the following series of command procedures:

- : SYS\$SYSTEM:STARTUP.COM -- A file containing a series of procedures that must execute at system startup time in order for the system to run properly. STARTUP.COM is the site-independent startup command procedure supplied by DIGITAL. Do not modify this command procedure. The STARTUP.COM procedure invokes the site-specific procedures that are described in this section.
- : SYS\$MANAGER:SYCONFIG.COM -- A template file supplied by DIGITAL to which you can add site-specific configuration commands.
- : SYS\$MANAGER:SYLOGICALS.COM -- A template file supplied by DIGITAL for defining logical names. This file contains a command procedure for adding system logical names for a MicroVAX that is not in a cluster. If your processor is not a standalone Micro Vax, you can ignore that section of the procedure that pertains only to MicroVax systems and add any systemwide logical name assignments for your own system to the end of this file.
- : SYS\$MANAGER:SYLOGIN.COM -- A template file supplied by DIGITAL to which you can add commands that are executed whenever a user logs in.
- : SYS\$MANAGER:SYSTARTUP_V5.COM -- A template file supplied by DIGITAL to which you can add various commands for setting up site-specific operations that are executed at startup time. The template contains commands that you can modify to meet the needs of your processing environment.
- : SYS\$MANAGER:SYPAGEFILES.COM -- A file supplied by DIGITAL to which you can add commands to install page and swap files on any disk.

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Two versions of the template files are included in your VMS distribution kit: an executable version w/ the file name extension COM, and a nonexecutable version w/ the file extension TEMPLATE (for example, SYS\$MANAGER:SYCONFIG.COM and SYS\$MANAGER:SYCONFIG.TEMPLATE). The files w/ the COM filetype are executed at startup time, and those are the files that you should modify to meet the needs of your site. The files w/ the TEMPLATE filetype should NOT be modified.

CAUTION: Do NOT delete the DIGITAL-supplied template command files w/ the TEMPLATE file type. The VMSKITBLD.COM procedure uses the TEMPLATE versions to create a new system disk.

More information on STARTUP.COM and the site-specific command procedures is provided in the sections that follow.

2.8.1 STARTUP COMMAND PROCEDURE FOR THE SYSTEM (STARTUP.COM)

This section describes the system startup file (STARTUP.COM). STARTUP.COM is executed whenever the system is booted, and it creates the basic environment for the operating system and some software products. It is not a startup file that is customized for your site. You should not modify the STARTUP.COM file. Read this section if you are interested in learning about the startup process.

The file SYSTARTUP_V5.COM, which is also executed each time the system is booted, is the startup file where you include features specific to your site. To learn how to customize the startup process for your site by modifying STARTUP_V5.COM, see section 2.4.

The file SYS\$SYSTEM:STARTUP.COM executes immediately after the operating system is booted. It is a driver that uses a series of component files to perform the following startup tasks:

- : Defines systemwide logical names required for the symbolic debugger, language processors, linker, image activator, and help processor.
- : Start processes that control error logging, SMISERVER (the system management server), the job controller, and the operator's log. (on a standalone workstation the operator's log is not automatically started.)
- : Connects and configures devices that are physically attached to the system and loads their I/O drivers by invoking the SYCONFIG.COM procedure.
- : Installs known images to reduce I/O overhead in activating the most commonly used images or to identify images that must have special privileges.

CAUTION: Do not modify SYS\$SYSTEM:STARTUP.COM. This file is deleted and replaced each time you upgrade your system w/ the next version of the VMS operating system. Leaving STARTUP.COM intact prevents you from inadvertently

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altering any commands in the file, which in turn could cause the startup procedure to fail.

All of the component files used by STARTUP.COM are in the directories w/ the logical name SYS\$STARTUP. SYS\$STARTUP is actually a searchlist that includes both SYS\$SYSROOT:[SYSMGR] (the SYS\$MANAGER directory) and SYS\$SYSROOT:[SYS\$STARTUP].

In VMS Version 5.0, the following three data files are involved in startup process and located in SYS\$STARTUP:

1. VMS\$PHASES.DAT--This file determines the order of the phases of the startup procedure. It is a sequential list of phases that will be started by STARTUP.COM. It includes a series of four (4) basic phases (INITIAL, CONFIGURE, SYSFILES, & BASEENVIRON) needed to bring the VMS operating system up to a basic working environment, followed by a series of phases for optional software products. This file must not be modified.
2. VMS\$VMS.DAT--This is a component data file for starting the VMS operating system environment. You should NOT modify this file.
3. VMS\$LAYERED.DAT--This is a component file for optional software products that are installed using the callback procedure of VMSINSTAL. It is an indexedsequential file, containing the following fields for each file:
 1. Name of the component file(either .EXE or .COM) to be run.
 2. Phase in which the component file is to be run. The valid phases are LPBEGIN, LPMAIN (default), LPBETA, & END.
 3. Method (or mode) by which the component file is to run. The valid choices are DIRECT(the default, where the command procedure or image is executed immediately), BATCH(valid only for command procedures, or SPAWN.
 4. Node restrictions for the component. This is either the node or nodes on which the component file should ONLY be run, or the node or nodes on which the component file should NOT be run.
 5. Node restriction byte field. This field determines whether the nodes listed in the previous field are allowed or disallowed (for running the component).
 6. Parameters passed to the component file for execution. You can pass up to eight parameters, using the following format:
(P1:args, P2: args,...)

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(The parentheses can be omitted if you pass only a single parameter.)

An important function of each phase is to meet the prerequisites of the following phase; therefore, the ordering of the phases is extremely important. Components that occur in a phase cannot have dependencies on components that are in the same phase or in subsequent phases. When installing optional software products as known images using the STARTUP.COM procedure, be sure that all requisite components occur in a previous phase.

If an optional software product can use the callback procedure included in VMSINSTALL, then you can install it as a known image at system startup using the method described earlier in this section, and you do not have to include the product in the site-specific startup file(SYSTARTUP_V5.COM). In these cases, the component files must be in the SYS\$STARTUP directory. Software products that do not use the callback procedure should be installed as known images at system startup using SYSTARTUP_V5.COM.

You can also use the System Management Utility (SYMAN) to manage the new startup process. W/ the STARTUP command of SYSMAN, you can add, modify, display, or remove elements of existing component files, create a new startup file and perform other startup functions. A description of SYSMAN commands is found in the Reference section.

Several site-specific command procedures are executed from w/in STARTUP.COM. You can add commands to these files or modify the template files supplied in your VMS distribution kit. Remember, however, to modify only the executable version of the file(w/ the file extension .COM)and not the template version (w/ the file extension TEMPLATE). If you have an existing .COM file and you want to modify a version of the original TEMPLATE file, then you should first make a copy of the TEMPLATE file(giving the copy a filetype of .COM).

STARTUP.COM executes the site-specific command procedures in the following sequence:

1. SYS\$MANAGER:SYPAAGSWPFILES.COM
2. SYS\$MANAGER:SYCONFIG.COM
3. SYS\$MANAGER:SYLOGICALS.COM
4. SYS\$MANAGER:SYSTARTUP_V5.COM

2.8.2 SETTING UP LOGICAL NAMES FOR YOUR SITE (SYLOGICALS.COM)

A logical name is a name that is equivalent to a file specification, a directory, a device name, another logical name, or some other equivalence string. For example, when you have a logical name associated w/ a device name, you can use the logical name instead of the formal device name.

You can assign logical names that apply for the entire system; these are called systemwide logical names, and they can be used by any process on the

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system. For example, if a systemwide logical name equated the logical name `FINANCE_DISK` to the device `DRA2`, any user on the system (and any program running on the system) could use the name `FINANCE_DISK` in place of `DRA2`.

The file `SYS$MANAGER:SYLOGICALS.COM` can be used for assigning systemwide logical names. `SYLOGICALS.COM` is executed as part of the `STARTUP.COM` procedure whenever your system is booted. The logical names defined in `SYLOGICALS.COM` (as well as the logical names assigned automatically in `STARTUP.COM`) are always included in the system logical name table.

If your system is a MicroVAX that is NOT in a cluster, you should use the file `SYLOGICALS.COM` as a template for assigning systemwide logical names. If you have a MicroVAX that is not in a VAXcluster environment and you want to have systemwide logical names, you should read this section.

Unless your processor is a MicroVAX that is NOT in a VAXcluster environment, the template procedure that is found in `SYLOGICALS.COM` has NO effect. However, if your processor is on where the template procedure does not apply, you can still use `SYLOGICALS.COM` to assign systemwide logical names by adding them to `SYLOGICALS.COM` before the `EXIT` command, as indicated in the `SYLOGICALS.COM` template.

During VMS system operations when the integrity of the system could be compromised by incorrect logical names, such as the activation of privileged images (`LOGINOUT`, `MAIL`, etc...) only executive-mode and kernel-mode logical names are used; supervisor-mode and user-mode names are ignored. DIGITAL therefore recommends that logical names for system components (for example, public disks/directories) be defined in executive mode, for example:

```
$ DEFINE/SYSTEM/EXECUTIVE/NOLOG SYDSK SYS$SYSDEVICE:
```

See the VMS General Users Manual for information about logical name assignments and the privilege modes.

2.9 EMERGENCY STARTUP PROCEDURES

The startup and login procedures provided by DIGITAL should always work; however, certain user interventions may cause them to fail. For example, if you modify the startup of login procedures, or modify the login accounts, you may accidentally lock yourself out of the system. A very simple way to lock yourself out of the system is to set passwords and forget them. Another way to lock yourself out of the system is to introduce an error condition or an infinite loop into a startup or login procedure. Under such circumstances, use the emergency startup procedure described in this section.

2.9.1 BYPASSING THE USER AUTHORIZATION FILE

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The preferred method of breaking into a locked system is to set the alternate user authorization file. This method requires setting the system parameter UAFALTERNATE, which defines the logical name SYSUAF to refer to the file SYS\$SYSTEM:SYSUAFALT.DAT. If this file is found during a normal login, the system uses it to validate the account and prompts you for the user name/password.

If this file is not located, the system assumes that the UAF is corrupt and accepts any user name/password to log you into the system from the system console. Logins are prohibited from all other locations.

NOTE: You can use this method only to log into the system from the console terminal; you cannot use other terminal lines.

To set the alternate user authorization file, use the following procedure:

1. Perform a conversational boot by following the instructions in your VAX processor installation/operations guide.
2. When the SYSBOOT> prompt appears, enter the following command:

```
SYSBOOT> SET UAFALTERNATE 1
```

3. Type CONTINUE and press RETURN/ENTER KEY.
4. When the startup procedure completes, log in on the console terminal by entering any user name/password in response to the USERNAME: and then the PASSWORD: prompts.

The system assigns the following values to your user account:

```
: NAME -User Name
: UIC  -[001,004]
: command Interpreter -DCL (Digital Command Language)
: Login Flags -None
: Priority -Value of the system parameter DEFPRI
: Resources -Values of the PQL system parameters
: Privileges -All
```

The process name is usually the name of the device on which you logged in (for example, _OPA0:).

5. Fix the problem that caused you to be locked out of the system. That is, make the necessary repairs to the UAF or to the startup or login procedures. (If you modify a login or startup procedure and the problem is still not solved, you should restore the procedure to its previous state.) If the problem is a forgotten password, reset the UAFALTERNATE system parameter to 0, as explained in the next step. Then invoke the Authorize Utility and type HELP MODIFY for information on modifying passwords.

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6. Clear the UAFALTERNATE parameter by running SYSGEN and giving appropriate SYSGEN commands. To run SYSGEN, enter the following command at the DCL prompt:

```
$ RUN SYS$SYSTEM:SYSGEN
```

The SYSGEN> prompt is displayed, and you should enter the following commands:

```
SYSGEN> SET UAFALTERNATE 0  
SYSGEN> WRITE CURRENT  
SYSGEN> EXIT
```

7. Shut down and reboot the system.

2.9.2 EMERGENCY STARTUP AFTER MODIFYING SYSTEM PARAMETERS

In some cases, modifying system parameters may cause the system to become unbootable. If this occurs, use the following emergency startup procedure to restore to normal operation:

1. Perform a conversational boot by following the instructions in your VAX processor installation/operations guide.
2. When the SYSBOOT> prompt appears, enter the following commands:
SYSBOOT> USE DEFAULT.PAR
SYSBOOT> CONTINUE
3. When the system finishes booting, review any changes you made to SYSGEN parameters, modify MODPARAMS.DAT as necessary, and reexecute AUTOGEN.

2.9.3 BYPASSING STARTUP/LOGIN

If the system does not complete the startup procedures or does not allow you to log in, bypass the startup/login procedures by following these steps:

1. Perform a conversational boot by following the instructions in your VAX processor installation/operations guide.
2. Define the console to be the startup procedure by entering the following command at the SYSBOOT> prompt:

SYSBOOT> SET/STARTUP OPA0:

type CONTINUE and press Return/Enter in response to the next SYSBOOT> prompt. Wait for the DCL prompt to return.
3. Correct the error condition that caused the login failure. That is, make the necessary repairs to the startup/login procedures, or to the UAF. You may want to enter the following DCL commands because bypassing the startup

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procedures leaves the system in a partially initialized state:

```
$ SET NOON
$ SET DEFAULT SYS$SYSROOT: [SYSEXE]
```

Invoke a text editor to correct the startup/login procedure file. Note that some system consoles may NOT supply a screen/mode editor. You can also copy a corrected file and delete the incorrect version by using the RENAME/DELETE commands.

4. Reset the startup procedure by invoking SYSGEN and entering the following commands:

```
$ RUN SYS$SYSTEM:SYSGEN
SYSGEN> SET/STARTUP SYS$SYSTEM:STARTUP.COM
SYSGEN> WRITE CURRENT
SYSGEN> EXIT
```

5. Perform a normal startup by entering the following command:

```
$ @SYS$SYSTEM:STARTUP
```

2.9.4 STARTUP PROBLEMS

Sometimes the operating system does not boot after you enter the BOOT command. This can be caused by either a hardware/software malfunction.

A read error on a disk drive or console medium, or a machine check error, may indicate a hardware malfunction. When a hardware problem occurs, a question mark (?) usually precedes the error message that is displayed on the system console terminal. You should then do the following:

1. Consult the hardware manual for your VAX processor.
2. If you still cannot correct the problem, contact your DIGITAL FIELD REPRESENTATIVE.

When the operating system is loaded into memory but the STARTUP.COM command procedure does not execute, a software malfunction has probably occurred. You should suspect this condition if the usual message specifying the number of interactive users does not appear.

Perform one or both of the following actions to correct the situation:

1. Try again, by repeating the boot procedure to restart the system.
2. Leave the system disk in the original drive. Restore a backup copy of the system disk using Standalone Backup.

2.10 SHUTDOWN PROCEDURES

The VMS operating system provides the following types of shutdown procedures:

- : An orderly shutdown w/ SYS\$SYSTEM:SHUTDOWN.COM. This procedure shuts down the system while performing housekeeping functions such as disabling future logins, stopping the batch and output queues, dismounting mounted volumes, and stopping user processes.

SHUTDOWN.COM optionally invokes a site-specific command procedure named SYS\$MANAGER:SYSHUTDOWN.COM, which you can modify to meet the needs of your basic installation. An empty SYSHUTDOWN.COM file is included in your VMS distribution kit.

- : An emergency shutdown w/ OPCCRASH. If you are unable to perform an orderly shutdown w/ SHUTDOWN.COM, run the OPCCRASH emergency shutdown program.
- : An emergency shutdown w/ CRASH. Use this emergency shutdown procedure if OPCCRASH fails. Note that not all VAX processors have the CRASH program. If your VAX processor has the CRASH procedure, it is located on the console media, and it can only be executed from the console terminal. See your VAX processor installation/operations guide for a description of the CRASH procedure or for the equivalent commands to use to force an abrupt emergency shutdown.

2.10.1 ORDERLY SHUTDOWN W/ SHUTDOWN.COM

Use SHUTDOWN.COM to shut down the system in an orderly fashion. Do not modify SHUTDOWN.COM. Add commands to the SYS\$MANAGER:SYSHUTDOWN.COM command procedure to perform site-specific functions.

To execute SHUTDOWN.COM, you must have either the SETPRV privilege or all the following privileges: CMKRNL, EXQUOTA, LOG_IO, OPER, SYSNAM, SYSPRV, TMPMBX, and WORLD. Usually, you shut down the system from the SYSTEM account, which includes these privileges by default.

2.10.1.1 SHUTDOWN.COM SEQUENCE OF PROMPTS AND MESSAGES

To perform an orderly shutdown of the system, invoke SHUTDOWN.COM from any terminal and any privileged account w/ the following DCL command:

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

The procedure then prompts you w/ a series of questions and messages. The default response appears in brackets at the end of each question. Press the RETURN key to select the default response. A summary of the questions follows:

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: Minutes until shutdown:

How many minutes until final shutdown [0]?

Enter an integer. If the system logical name SHUTDOWN\$MINIMUM_MINUTES is defined, its integer value is the minimum value that you can enter. Therefore, if the logical name is defined as 10, you must specify at least 10 minutes to final shutdown or an error message is returned. If you do not enter a value, the logical name value is used. If the logical name is not defined, and you do not enter a value, 0 minutes is the default.

: Reason for shutdown:

Reason for shutdown [standalone]:

Enter a one-line reason for shutting down the system.

: Decide if you want to spin down the disk volumes:

Do you want to spin down the disk volumes [No]?

Enter Yes or No (Y or N). Note, however, that the system disk cannot be spun down.

: Decide if you want to invoke a site-specific shutdown procedure:

Do you want to invoke the site-specific shutdown procedure [Yes]?

Enter Yes or No. This refers to SYS\$MANAGER:SYSHUTDOWN.COM.

: Decide if you want an automatic system reboot:

Should an automatic system reboot be performed [No]?

By default, the system does not automatically reboot. However, if you respond w/ YES, the system attempts to reboot automatically when the shutdown is complete.

: Message broadcast to users about rebooting the system:

When will the system be rebooted [later]?

Enter the expected reboot time in the format you want printed in the message that will be broadcast to users. For example, you could specify IMMEDIATELY, or IN 10 MINUTES, or a time such as 2 PM, or 14:00. If you do not know when the system will be available again, press RETURN to specify 'later' as the time when the system will reboot.

: Shutdown options:

Shutdown options (enter as a comma-separated list):

SAVE_FEEDBACK : Saves feedback data for AUTOGEN calculations

REMOVE_NODE : Remaining nodes in the cluster should be adjust quorum

CLUSTER_SHUTDOWN : Entire cluster is shutting down

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REBOOT_CHECK : Check existence of basic system files
Shutdown options [NONE]

The procedure prompts you to specify one or more shutdown options.

Entering the SAVE_FEEDBACK option records feedback data collected from the system since it was last booted. This option creates a new version of the AUTOGEN feedback data file, which can be used when you next run AUTOGEN.

If your system is a cluster member, all options are listed. When the REMOVE_NODE option is specified on one cluster member system, users on all member systems are notified. Clusterwide notification is required, because users logged in to any member system may be affected by the shutdown of another system, for example:

- : Users may have batch jobs running on other systems.
- : If terminal servers are in operation, users may have alternate terminal sessions in progress on the system being shut down.

Otherwise, only the REBOOT_CHECK and SAVE_FEEDBACK options are listed. Enter REBOOT_CHECK to verify the presence of a subset of files necessary to reboot the system after shutdown completes. (if you are certain that the files exist, press RETURN.)

If you select the REBOOT_CHECK option, the procedure checks for the necessary files and notifies you if any are missing. Replace missing files before proceeding. If all files are present, the following success message appears:

%SHUTDOWN-I-CHECKOK, Basic reboot consistency check completed.

The following events occur as the shutdown procedure continues, and the corresponding messages are printed on the terminal:

1. A message requesting users to log out is broadcast at decreasing time intervals to all users on the system.
2. The system logical name SHUTDOWN\$TIME is defined as the absolute time of shutdown. For example, if the value 10 is specified at 12:00 in response to the first question, the logical name is assigned the absolute time value 12:10 along w/ the date. By requesting the logical name definition SHUTDOWN\$TIME (w/ the SHOW LOGICAL command), you can see if a shutdown is in progress or determine the actual time of shutdown. This feature is useful if a user missed the shutdown broadcast message.
3. At six minutes or less until system shutdown, the terminal from which shutdown was invoked is made an operator's console and all future nonoperator logins are disabled. If the DECnet network is running, it is shut down.

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4. When there is one minute left until system shutdown, batch and device queues and the system job queue manager are stopped.
5. At zero minutes before system shutdown the site-specific command procedure SYS\$MANAGER:SYSHUTDOWN.COM is invoked.
6. All user processes are stopped; however, system processes continue. Ancillary Control Processes (ACP's) may delete themselves when their mounted volumes are finally dismounted.
7. For dual-processor systems, the secondary processor is stopped.
8. All installed images are removed.
9. All mounted volumes are dismounted and, if you request it, the disks are spun down. Note, however, that the system disk cannot be spun down. Also, the quorum disk (if present on your system) is not dismounted or spun down.
10. The operator's log file is closed.
11. The program SYS\$SYSTEM:OPCCRASH is invoked to shut down the system.
12. If you did not request an automatic reboot, the following message appears on the system console:

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if you requested an automatic reboot, the system reboots, provided the necessary controls are set.
13. If you are not automatically rebooting, halt the system after the previous message is printed at the console terminal.

Example 2-1 demonstrates an orderly system shutdown on standalone node AVALON.

EXAMPLE 2-1: ORDERLY SYSTEM SHUTDOWN W/ SHUTDOWN.COM

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

```
SHUTDOWN -- Perform an Orderly System Shutdown
```

```
How many minutes until final shutdown [0]: 10
```

```
Reason for shutdown: [Standalone] MONTHLY PREVENTIVE MAINTENANCE.
```

```
Do you want to spin down the disk volumes [NO]? RETURN
```

```
Do you want to invoke the site-specific shutdown procedure [Yes]? RETURN
```

```
Should an automatic system reboot be performed [NO]? RETURN
```

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When will the system be rebooted [Later]? 12:30

Shutdown options:

REBOOT_CHECK : Check existence of basic system files

shutdown options [NONE]: RETURN

SHUTDOWN message on AVALON, from user SYSTEM at _AVALON\$OPA0: 12:00:00.20
AVALON will shut down in 10 minutes; back up 12:30. Please log off node AVALON.
MONTHLY PREVENTIVE MAINTENANCE

%SHUTDOWN-I-OPERATOR, This terminal is now an operator's console.
%%%%%%%%%% OPCOM, 16JUL1988 12:01:00.15 (NOTE THE TIME WILL BE ACUTAL TIME)
Operator status for operator _AVALON\$OPA0:
CENTRAL, PRINTER, TAPES, DISKS, DEVICES, CARDS, NETWORK, OPER1, OPER2, OPER3,
OPER4, OPER5, OPER6, OPER7, OPER8, OPER9, OPER10, OPER11, OPER12

%SHUTDOWN-I-DISLOGINS, Interactive logins will now be disabled.
%SET-I-INTSET, login interactive limit = 0 current interactive value = 17
%SHUTDOWN-I-SHUTNET, the DECnet network will now be shut down.
%SHUTDOWN-I-STOPQUEMAN, The queue manager will now be stopped.

SHUTDOWN message on AVALON, from user SYSTEM at _AVALON\$OPA0: 12:05:00.20
AVALON will shut down in 5 minutes; back up 12:30. Please log off node AVALON.
MONTHLY PREVENTIVE MAINTENANCE

17 terminals have been notified on AVALON.

SHUTDOWN message on AVALON from user SYSTEM at _AVALON\$OPA0: 12:06:55.28.
AVALON will shut down in 4 minutes; back up 12:30. Please log off node AVALON.
MONTHLY PREVENTIVE MAINTENANCE

%%%%%%%%%% OPCOM, 16-Jul-1988 12:07:12:30 %%%%%%%%%%

Message from user DECnet on AVALON
DECnetv2 even 2.0, local node state change
From node 2.161 (AVALON), 16-Jul-1988 12:07:22.26
Operator command, old state = on, New state = Shut

SHUTDOWN message on AVALON from user SYSTEM at _AVALON\$OPA0: 12:07:12:56
AVALON will shut down in 3 minutes; back up 12:30. Please log off node AVALON.
MONTHLY PREVENTIVE MAINTENANCE

%SHUTDOWN-I-STOPQUEMAN, The queue manager will now be stopped.
SHUTDOWN message on AVALON user SYSTEM at _AVALON\$OPA0: 12:08:12.56
AVALON will shut down in 2 minutes; back up 12:30. Please log off node AVALON.
MONTHLY PREVENTIVE MAINTENANCE

%%%%%%%%%% OPCOM, 16-JUL-1988 12:08:12:30 %%%%%%%%%%

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Message from user JOB_CONTROL on AVALON
-SYSTEM-S-NORMAL, normal successful completion

%%%%%%%%% OPCOM, 16-JUL-1988 12:08:42:30
Message from user DECNET on AVALON
DECnet shutting down

SHUTDOWN message on AVALON from user SYSTEM at _AVALON\$OPA0: 12:09:12.56
AVALON will shut down in 1 minute; back up 12:30. Please log off node AVALON.
MONTHLY PREVENTIVE MAINTENANCE.

17 terminals have been notified on AVALON
%SHUTDOWN-I-SITESHUT, The site-specific shutdown procedure will now be
invoked.
%SHUTDOWN-I-STOPUSER, All user processes will now be stopped.
%SHUTDOWN-I-REMOVE, All installed images will now be removed.
%SHUTDOWN-I-DISMOUNT, All volumes will now be dismounted.
%%%%%%%%% OPCOM, 16-JUL-1988 12:09:42.30
Message from user System on AVALON
_AVALON\$OPA0:, AVALON shutdown requested by the operator.

%%%%%%%%% OPCOM, 16-JUL-1988 12:10:02.44 %%%%%%%%%%%
Logfile was closed by operator _AVALON\$OPA0:
Logfile was SYS\$SYSROOT: [SYSMGR] OPERATOR.LOG;8

%%%%%%%%% OPCOM, 16-JUL-1988 12:10:32.20
Operator _AVALON\$OPA0: has been disabled, username SYSTEM

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2.10.1.2 DEFINING SHUTDOWN\$INFORM_NODES

Before you execute SYS\$SYSTEM:SHUTDOWN.COM, you can define the logical name
SHUTDOWN\$INFORM_NODES to be a list of cluster member nodes. The nodes listed
in SHUTDOWN\$INFORM_NODES will be notified when the system is shutdown, as shown
in the following example:

```
$ DEFINE SHUTDOWN$INFORM_NODES "NODE1,NODE2,NODE3"  
$ @SYS$SYSTEM:SHUTDOWN
```

If you define SHUTDOWN\$INFORM_NODES and then execute SYS\$SYSTEM:SHUTDOWN.COM,
all cluster member nodes included in the list are notified of the shutdown.
Users on the node that is being shut down are always notified regardless of
whether you define SHUTDOWN\$INFORM_NODES. If you omit the name of the node
that is being shut down from the list specified in the DEFINE command, the name
is automatically added to the list by the SHUTDOWN.COM procedure.

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2.10.2 EMERGENCY SHUTDOWN W/ OPCCRASH