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VAX–11
Software Installation Guide

Order No. AA-D021C-TE

VAX11

March 1980

This document contains detailed instructions for installing, upgrading, and updating the VAX/VMS operating system.

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Software Installation Guide

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PREFACE

MANUAL OBJECTIVES

The VAX-11 Software Installation Guide describes the procedures used to:

- Install a newly purchased VAX/VMS operating system on a VAX-11 processor
- Upgrade an existing VAX/VMS operating system
- Install maintenance updates and optional software products on an existing VAX/VMS operating system

INTENDED AUDIENCE

This manual is intended for VAX/VMS system managers or those users who are responsible for managing and controlling the operating system.

STRUCTURE OF THIS DOCUMENT

This manual is organized as follows:

- Chapter 1 presents three overviews of: (1) installing a system; (2) upgrading a system; and (3) installing maintenance updates and optional software products.
- Chapter 2 describes the procedures for copying the software distribution kit.
- Chapter 3 describes the steps to be taken when bootstrapping a system and lists the system parameters most likely to be modified during the bootstrap process.
- Chapter 4 describes the commands that can be issued to the system bootstrap program (SYSBOOT).
- Chapter 5 describes the steps to be taken to upgrade an existing VAX/VMS operating system.
- Chapter 6 describes the procedure for installing maintenance updates to the system software. It also describes the general procedure for installing optional software products.
- Appendix A describes the error messages issued during SYSBOOT and includes corrective actions.

- Appendix B lists the DIGITAL-supplied directories on the system disk and their contents.
- Appendix C provides samples of console bootstrap command procedures.
- Appendix D describes the steps performed to copy the VAX/VMS source kit.
- Appendix E details the steps performed to generate and initialize the system.

ASSOCIATED DOCUMENTS

This document has no prerequisites; however, an understanding of the information presented in the VAX/VMS Summary Description and Glossary may prove helpful.

The following documents, which are referred to in this manual, provide the information needed to manage the day-to-day operation of the VAX/VMS system once it is installed:

- VAX/VMS System Manager's Guide
- VAX/VMS Operator's Guide
- VAX-11 Utilities Reference Manual

For a complete list and descriptions of VAX-11 documents, including optional software products documents, see the VAX-11 Information Directory and Index.

SUMMARY OF TECHNICAL CHANGES

The following technical changes have been made to the VAX-11 Software Installation Guide for Version 2.0:

- A complete procedure for upgrading an existing VAX/VMS system has been incorporated in this manual.
- The information on the system generation utility program (SYSGEN) and the system parameters has been removed from this manual and incorporated in the VAX/VMS System Manager's Guide.
- The procedures for installing VAX-11 optional software products (for example, VAX-11 FORTRAN and VAX-11 COBOL-74) have been removed from this manual. Installation procedures for VAX-11 optional software products are described in the documentation shipped with those products.
- Appendix B has been updated to reflect the addition and deletion of files provided by DIGITAL on the VAX/VMS system binary distribution medium.

CHAPTER 1

OVERVIEW OF SOFTWARE INSTALLATION

VAX-11 software installation falls into three general categories: (1) bootstrapping and installing a newly purchased VAX/VMS system; (2) upgrading an existing VAX/VMS system; and (3) applying maintenance updates to a VAX/VMS system or installing optional VAX-11 software products.

You can determine which type of installation procedures you should use as follows:

- If you have purchased a new VAX/VMS Version 2.0 operating system, use the bootstrapping procedures described in Chapters 2 and 3.
- If you have a VAX/VMS Version 1.6 operating system, and you have not added user files to the system disk, use the bootstrapping procedures described in Chapters 2 and 3.
- If you have a VAX/VMS Version 1.6 operating system, and you have added user files to the system disk, use the upgrading procedures described in Chapter 5.

Table 1-1
How to Use this Manual

Type of Installation	Relevant Chapters
First system installation	1, 2, 3, 4
First system installation and maintenance update/ optional software installation	1, 2, 3, 4, 6
System upgrade	1, 5
System upgrade and optional software installation	1, 5, 6
Maintenance update/optional software installation	1, 6

All installation procedures are performed using the VAX-11 console subsystem. The remainder of this chapter describes this subsystem and provides an overview of all three types of software installation.

1.1 VAX-11/780 CONSOLE SUBSYSTEM

You use the VAX-11/780 console subsystem to:

- Bootstrap and install a VAX/VMS operating system
- Upgrade a VAX/VMS operating system
- Update a VAX/VMS operating system and install optional software products

The console subsystem consists of an LSI-11 microcomputer with 16K bytes of read/write memory and 8K bytes of read-only memory, or ROM (used to store the LSI diagnostics; the LSI bootstrap, and fundamental console routines); a system console block storage device (the floppy diskette drive); a console terminal, and an optional remote diagnostic port. Figure 1-1 shows a diagram of the basic console subsystem.

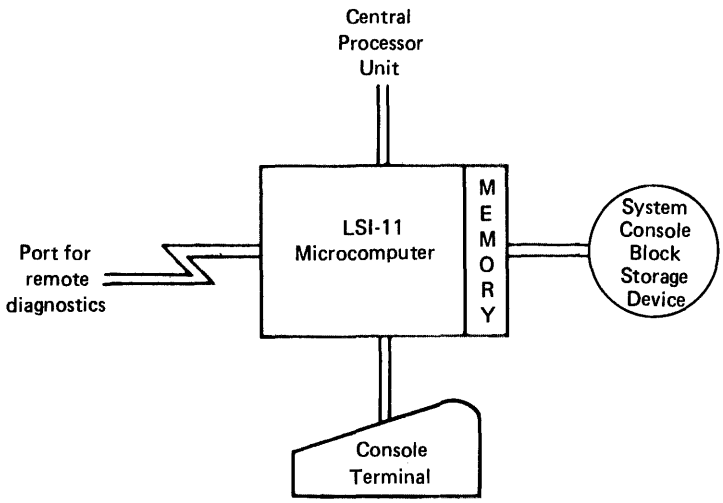

Figure 1-1 VAX-11/780 Console Subsystem

1.1.1 Using the Console Subsystem

During system generation and start-up, the system manager uses the console subsystem to bootstrap and initialize the operating system. Later, the system manager uses the console subsystem to upgrade the system software or to install maintenance updates or one or more optional software products.

The console subsystem also serves as a diagnostic console for operators and system specialists, and as a VAX/VMS system terminal for system users.

1.1.2 Using the System Console Block Storage Device

The system console block storage device, that is, the floppy diskette drive, is an integral part of the VAX/VMS operating system. During system installation, the hardware bootstrap reads a program from the console floppy diskette, which, in turn, loads the operating system from the system disk.

The system console block storage device is also used to read:

- Hardware diagnostic programs
- Maintenance updates and optional software products

1.2 OVERVIEW OF SYSTEM INSTALLATION

The procedure to bootstrap and install a VAX/VMS operating system is performed at the console terminal and includes the following steps:

1. Copying the software distribution kit to disk using the stand-alone version of the Disk Save and Compress Utility
2. Bootstrapping the system using the SYSBOOT program
3. Modifying (if desired) system parameters using either the SYSBOOT program or the SYSGEN utility

Figure 1-2 outlines the general installation procedure.

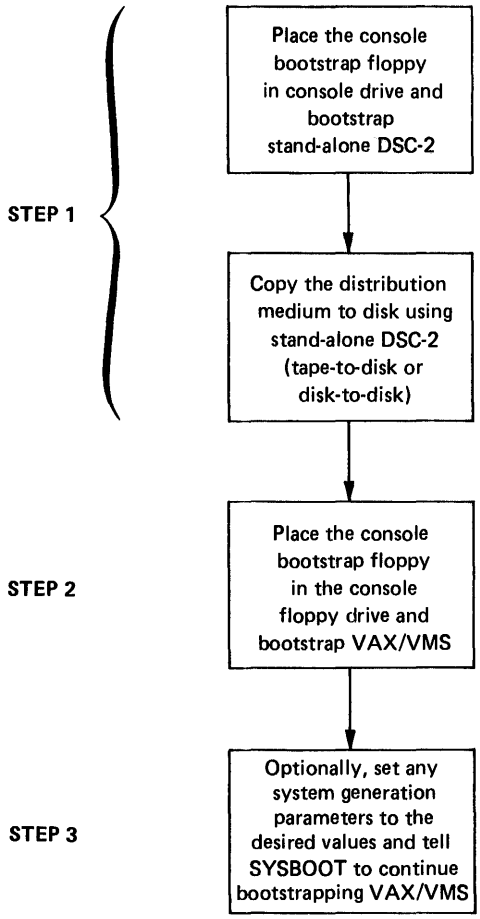

Figure 1-2 Transferring the Software Distribution Kit to Disk and Bootstrapping the System

1.2.1 Stand-Alone Disk Save and Compress Utility

The first step in installing a VAX/VMS system is to copy the software distribution kit to a bootable medium. This means copying the kit to a disk volume. To perform the copy operation, you use the stand-alone version of the Disk Save and Compress Utility (stand-alone DSC-2).

Stand-alone DSC-2 lets you create a bootable medium if you received your system on magnetic tape or lets you create a back-up volume if you received your system on an RK07 disk.

1.2.2 System Bootstrap Program

In a VAX/VMS system, system generation and start up occur automatically when the system is bootstrapped. You provide the information needed for system generation and start up by supplying to the system bootstrap program (SYSBOOT) the names of files that contain the system parameter values and start-up commands.

You can request that SYSBOOT prompt for commands during the bootstrap operation. This is referred to as a conversational bootstrap operation. If you do so, you can perform the following functions:

- Designate the name of a file that contains system parameter values
- Set and show individual parameter values
- Specify an alternate site-independent start-up command procedure

If you do not specify an alternate site-independent start-up command procedure, SYSBOOT uses the command procedure SYS$SYSTEM:STARTUP.COM by default. SYS$SYSTEM:STARTUP.COM requests execution of a site-specific start-up command procedure (SYSTARTUP.COM), which contains commands specified by the system manager to perform site-specific start-up functions. For example, SYSTARTUP.COM could contain the SET TERMINAL commands that set the characteristics of the installation's terminals. SYSTARTUP.COM resides in the directory [SYSMGR]. For detailed descriptions of the site-independent and site-specific start-up command procedures, see the VAX/VMS System Manager's Guide.

1.2.3 System Generation Utility

Once all the system initialization steps have occurred, the system creates a process to execute SYS$SYSTEM:STARTUP.COM. Among the commands contained in SYS$SYSTEM:STARTUP.COM are, by default, the following:

```
$ RUN SYS$SYSTEM:SYSGEN
AUTOCONFIGURE ALL
```

These commands request the running of the system generation utility (SYSGEN) and automatically configure the system to recognize all standard (DIGITAL-supplied) devices attached to it. I/O drivers for these devices also are loaded.

With SYSGEN you can perform the following functions:

- Modify parameter values and create a system parameter file that can be used in a subsequent bootstrap operation.
- Create contiguous files that can be used as the primary swapping and paging files, and the system dump file.
- Create and install noncontiguous files that can be used as secondary swapping and paging files. These files can exist on more than one volume in a multivolume set.
- Dynamically connect new devices to the system and load their I/O drivers.
- Dynamically alter some of the current system parameter values.
- Initialize multiport memory units.

Anyone can run SYSGEN; however, you must have certain privileges to execute device-related SYSGEN commands. See the VAX/VMS System Manager's Guide for complete information on using SYSGEN.

1.2.4 System Parameter Files

VAX/VMS provides several system parameter files that contain values suitable for the smallest through the largest VAX-11 hardware configurations. Each system parameter has four values associated with it:

- The current value
- The default or typical value
- The minimum allowable value
- The maximum allowable value

In SYSBOOT, the initial parameter values are the current values (that is, the values in effect the last time the system was bootstrapped). In SYSGEN, the initial parameter values are the default values.

You can specify the SET command to SYSBOOT or SYSGEN to set any parameter to a value in the allowable range.

1.2.5 System Installation Summary

The complete installation procedure encompasses the following steps (references to descriptions of each step are in parentheses):

1. Copy the software distribution kit to disk (Chapter 2)
2. Perform a conversational bootstrap operation (Section 3.2.1)
3. Select the appropriate system parameter file, noting any changes to be made (Section 3.4).
4. Compute the sizes of paging, swapping, and system dump files (Section 3.5)

5. Log in (Section 3.3)

6. Run SYSGEN to modify the system parameter file (optional; Section 3.4)

7. Alter the sizes of the primary paging and swapping files, and the size of the system dump file (optional; Section 3.5)

8. Copy the bootstrap command procedure to the console floppy diskette (Section 3.6)

9. Reboot the system, using a conversational bootstrap operation (Section 3.7)

10. Log in again, and customize the site-specific start-up command procedure (VAX/VMS System Manager's Guide)

11. Create the user authorization file and necessary user file directories (VAX/VMS System Manager's Guide)

12. Reboot, with default bootstrap command procedure (Section 3.8)

13. Install one or more optional software products (Chapter 6 and the documentation set for each product)

The system is now ready for use.

1.3 OVERVIEW OF SYSTEM UPGRADING

When a major revision of the operating system has been released (for example, Version 2.0), you can replace your current system software with the new system software. This process, referred to as system upgrading, replaces only system software; all user-written software remains intact. Thus, user files need not be copied from the system disk to a back-up volume and then restored later.

A system command procedure (VMSUPDATE.COM) controls the system upgrade operation. (This command procedure is also used to apply maintenance updates to the system software and to install optional software products.) You provide the information to upgrade a system by (1) setting up the proper conditions for the upgrade and (2) responding to the messages displayed at the console terminal as the upgrade procedure continues.

1.3.1 System Upgrade Summary

The complete system upgrading procedure encompasses the following steps (references to descriptions of each step are in parentheses):

1. Remove unimportant files from the system disk (Section 5.2.1)

2. Obtain a console printout of the current parameter values and the original parameter values (Section 5.2.2)

3. Back up the system disk (Section 5.2.2)

4. Reboot from the newly created system disk (Section 5.2.2)

5. Log in and initiate the system upgrade procedure (Section 5.3)

6. Restore the user authorization file (Section 5.4)

7. Tailor the system parameter file (Section 5.5)

8. Install one or more optional software products (Chapter 6 and the documentation set for each product)

9. Back up the system disk (Section 5.5)

The system is now ready for use.

1.4 OVERVIEW OF MAINTENANCE UPDATE AND OPTIONAL SOFTWARE INSTALLATION

Updating a VAX/VMS operating system consists of adding to or replacing one or more modules of system software between major releases of the operating system; for example, between Version 1.0 and Version 2.0. You update VAX/VMS by using the command procedure VMSUPDATE.COM.

You also use VMSUPDATE.COM to install optional VAX-11 software products that are purchased separately. VAX/VMS supports a diverse selection of optional software products, including compilers, communications facilities, and an interactive query facility.

This installation guide describes, in Chapter 6, the complete procedure for updating the system software, but only the preparatory and completion steps for installing optional software products. The complete procedure for installing an optional software product is described in that product's documentation set.

1.5 COMPUTER-ASSISTED INSTRUCTION COURSE FOR EDT

The VAX/VMS software distribution kit includes seven floppy diskettes that constitute the EDT Computer-Assisted Instruction (EDT CAI) course. This course presents introductory material and lessons on the DIGITAL Standard Editor, EDT. To install EDT CAI, follow the installation procedure described in the Introduction to the EDT Editor, Course Administrator Guide.

1.6 THE RSX-11S UPDATE CONSOLE FLOPPY DISKETTE

Accompanying the VAX/VMS software distribution kit is the RSX-11S update console floppy diskette (part description: RSX-11S UPDATE RX01). With this floppy diskette, you can modify RSX-11S Version 2.2 software to let you generate an RSX-11S system on a VAX/VMS system.

NOTE

The RSX-11S Version 2.2 software distribution kit is available under a separate license.

To use the RSX-11S update console floppy diskette and perform a subsequent RSX-11S system generation, see the RSX-11S System Generation and Installation Guide (order number: AA-2874D-TC) and Update #1 (AD-2874D-T1).

CHAPTER 2

PREPARING TO BOOTSTRAP THE SYSTEM

The first step in installing the VAX/VMS operating system is to copy the software distribution kit to your system disk (for example, an RK07, RM03, or RP06), by using the stand-alone version of the Disk Save and Compress Utility (stand-alone DSC-2) supplied as part of the distribution kit. You copy the distribution kit to your system disk for one of the following reasons:

- To create a bootable medium, if you received a magnetic tape kit
- To preserve the distribution medium, if you received an RK07 kit

2.1 VAX/VMS SOFTWARE DISTRIBUTION KITS

There are two media for VAX/VMS software distribution kits:

- Magnetic tape, in which the system binary distribution medium is a 1600 bpi, 9-track magnetic tape
- RK07 disk, in which the system binary distribution medium is an RK07 disk

The bill of materials that comes with the kit lists exactly what your VAX/VMS software distribution kit contains. After receiving a VAX/VMS software distribution kit, you should check that it contains everything listed in the bill of materials.

2.1.1 Magnetic Tape Kit

The following components are needed to copy the magnetic tape distribution medium to a bootable medium and bootstrap the system:

- The system binary distribution tape

  Part number: BB-D782C-BE

  Part description: VMS V2.0 BIN MT9

- The floppy diskettes that contain stand-alone DSC-2

  Part number: AS-E808I-BE

  Part description: STAND/ALONE 11780 DSC2 FLP 1

  Part number: AS-J831A-BE

  Part description: STAND-ALONE 11780 DSC2 FLP 2

- The console floppy diskette that contains the VAX/VMS version 2.0 bootstrap loading programs and bootstrap command procedures

  Part number: AS-E633I-YE

  Part description: RX 1/ 11780 LOCAL CNSL PKG

The following components, also contained in the magnetic tape kit, are needed to upgrade the system to Version 2.0:

- The system binary upgrade tape

  Part number: BB-J806A-BE

  Part description: VMS V2.0 UPGRADE MT9

- The floppy diskette that drives the Version 1.6 to Version 2.0 upgrade procedure

  Part number: AS-J803A-BE

  Part description: VMS V2.0 RX01 UPG

2.1.2 RK07 Kit

The following components are needed to back up the RK07 distribution medium and bootstrap the system:

- The RK07 system binary distribution disk[1]

  Part number: AY-H020C-BE

  Part description: VAX/VMS V2.0 BIN RK07

- The floppy diskettes that contain stand-alone DSC-2

  Part number: AS-E808I-BE

  Part description: STAND/ALONE 11780 DSC2 FLP 1

  Part number: AS-J831A-BE

  Part description: STAND/ALONE 11780 DSC2 FLP 2

---

1. The RK07 system binary distribution disk doubles as the system binary upgrade disk; see Chapter 5.

- The console floppy diskette that contains the VAX/VMS bootstrap loading programs and bootstrap command procedures

  Part number: AS-E633I-YE

  Part description: RX 1/ 11780 LOCAL CNSL PKG

The following component, also contained in the RK07 disk kit, is needed to upgrade the system to Version 2.0:

- The floppy diskette that drives the Version 1.6 to Version 2.0 upgrade procedure

  Part number: AS-J803A-BE

  Part description: VMS V2.0 RX01 UPG

2.2 COPYING THE DISTRIBUTION MEDIUM

The VAX/VMS system can be bootstrapped only from disk. Thus, if you receive a magnetic tape kit, you must copy the distribution tape to a disk before you can bootstrap the system. You should then retain the tape as a back-up copy of the distributed system.

If you receive an RK07 kit, you should back up the system by copying the distribution disk to another disk before you bootstrap the system. You should then use the newly created system disk to bootstrap the system and retain the original disk as a back-up copy of the distributed system.

To copy either a magnetic tape or an RK07 disk, use stand-alone DSC-2. The VAX-11 Utilities Reference Manual contains a complete description of the Disk Save and Compress Utility (DSC). The following sections provide information specific to the use of stand-alone DSC-2 when preparing to install a VAX/VMS operating system.

2.2.1 Loading Stand-Alone DSC-2

The procedure for loading stand-alone DSC-2 is as follows:

1. Power up the system and halt the central processor. The following switches should be in the positions indicated:

   a. The ON-OFF rocker switch on the console terminal: ON.

   b. The AUTO RESTART rocker switch on the processor control panel: OFF.

   c. The rotary key switch on the processor control panel: LOCAL.

2. See that the following processor control panel indicators are lit: ATTN and POWER.

3. Turn on the needed disk drives and magnetic tape drives.

4. Place the console floppy diskette (part description: RX 1/ 11780 LOCAL CNSL PKG) into the console floppy diskette drive, as follows:

   a. Unlock and open the cabinet doors of the central processor.

   b. Swing out the drive assembly until it is at a right angle to the cabinet.

      The drive assembly is a rectangular, unpainted steel box in the lower right-hand corner of the central processor cabinet. There is a black handle on the right of the drive assembly. Pull the handle to swing out the drive assembly. The diskette cannot be inserted unless the drive is swung all the way out.

   c. Insert the diskette into the drive.

      Squeeze the black pushbutton to unlock the slot cover; the cover will spring open. As you insert the diskette, its label (on the smooth side of the diskette) should be at the top and should face the right-hand cabinet door. The oval slot on the diskette should be at the bottom.

   d. Close the diskette slot cover.

   e. Swing the drive assembly back into the central processor cabinet.

5. See that you have the attention of the console program: it will prompt with three angle brackets (>>>). If this prompt does not appear, perform the following steps:

   a. Check that the console floppy diskette (part description: RX 1/ 11780 LOCAL CNSL PKG) is in the console drive.

   b. Set the AUTO RESTART switch to the OFF position.

   c. Turn the rotary key to the LOCAL position, if it is not already set to LOCAL. Turning the power on boots the console floppy diskette and causes the console program to prompt.

   d. If the power is already on, press <CTRL/P> to cause the console program to prompt with three angle brackets (>>>). Type REBOOT to cause the console to be rebooted.

6. In response to the console program prompt (>>>) displayed at the console terminal, type the following command:

```
>>>BOOT DSC
```

7. Observe the following message on the console terminal:

```
CPU HALTED
INIT SEQ DONE
LOAD DONE, 00002000 BYTES LOADED

Please insert first system diskette or cartridge and type <ret>
```

8. Remove the console floppy diskette from the drive and place the first floppy diskette that contains stand-alone DSC-2 (part description: STAND/ALONE 11780 DSC2 FLP 1) in the console floppy diskette drive and press <RETURN>.

NOTE

Do not type on the console terminal while the system is being bootstrapped unless prompted for input. If you do so accidentally, the following messages will be printed:

```
SYSBOOT-W-FPLA,PCS or WCS version less than minimum required for VMS
SYSBOOT-W-Continue from halt to proceed with boot if desired
```

Either continue from the point where the system halted or reboot. To continue, type CONTINUE.

If you do not type on the console terminal while the system is being bootstrapped and the messages shown above are printed, your machine is not up to the correct ECO level. Please contact your local field service representative.

9. Observe, after about five minutes, the following message on the console terminal:

```
Please insert second system diskette or cartridge and type <ret>
```

10. Remove the first stand-alone DSC-2 floppy diskette from the drive and place the second stand-alone DSC-2 floppy diskette (part description: STAND/ALONE 11780 DSC2 FLP 2) in the console floppy diskette drive and press <RETURN>. After about one minute, the following prompt will be displayed:

```
DSC2>
```

Stand-alone DSC-2 is now running and ready to accept commands.

NOTE

Do not replace the stand-alone DSC-2 floppy with the console floppy until the copy operation is complete.

2.2.2 Copying Tape to Disk

To copy a magnetic distribution tape medium to a disk, proceed as follows:

1. Place the magnetic tape distribution medium on a magnetic tape drive (MTA0, for example), removing the write-enable ring to protect the contents of the tape and place the drive online.

2. Place a scratch disk on an appropriate disk drive (DBA0, for example) and place the drive online.

3. At the console terminal, enter the following DSC command:

```
DSC2> DBA0:/VE=MTA0:/RW
```

   This command copies the contents of the magnetic tape distribution medium on drive MTA0 to an RP06 disk on drive DBA0. The qualifier /RW causes the tape to be rewound before the copy operation. The qualifier /VE causes the contents of the disk and tape to be compared to make certain the copying operation was a success. Successful completion of the copying and verification is signaled by the reappearance of the prompt DSC2>.

   Any messages you receive while stand-alone DSC-2 is running are explained in the VAX-11 Utilities Reference Manual.

2.2.3 Copying Disk to Disk

To copy a RK07 distribution medium to a disk, proceed as follows:

1. Place the RK07 distribution medium on an RK07 disk drive (DMA1, for example). Press the WRITE PROT push button on this disk drive to protect the contents of the disk, then place the drive online.

2. Place a scratch disk on an appropriate disk drive (DMA0, for example) and place the drive on line.

3. At the console terminal, enter the following DSC command:

```
DSC2> DMA0:/VE=DMA1:
```

   This command copies the contents of the RK07 distribution medium on drive DMA1 to an RK07 disk on drive DMA0. The qualifier /VE causes the output and the input to be compared to make certain the copying operation was a success. Successful completion of the copying and verification is signaled by the reappearance of the prompt DSC2>.

   Any messages you receive while stand-alone DSC-2 is running are explained in the VAX-11 Utilities Reference Manual.

2.2.4 Terminating Stand-Alone DSC-2

To terminate stand-alone DSC-2, proceed as follows at the console terminal:

1. In response to the prompt DSC2>, press <CTRL/P>. The following prompt will be displayed: >>>.

2. In response to this prompt (>>>), type HALT and press <RETURN>.

   The following confirming message and prompt will then be displayed on the console terminal.

```
      HALTED AT ...
>>>
```

   This message displays the contents of the program counter at the time the processor was halted. The subsequent prompt is a request for the next console command.

3. Remove the distribution medium and the floppy diskette that contains stand-alone DSC-2 from their respective drives.

4. Place the bootstrap console floppy diskette (part description: RX 1/ 11780 LOCAL CNSL PKG) in the console floppy diskette drive.

For instructions on bootstrapping and installing the system, see Chapter 3.

CHAPTER 3

BOOTSTRAPPING AND INSTALLING THE SYSTEM

Once you have copied the distribution medium to disk, you are ready to bootstrap the VAX/VMS operating system. Proceed as follows to perform the initial bootstrap:

1. Bootstrap the system, stopping in SYSBOOT to specify that the parameter file MINIMUM.PAR is to be used, as described in Sections 3.1 and 3.2.1.

2. Select the appropriate DIGITAL-supplied parameter file and note any changes to be made, as described in Section 3.4.

3. Compute the sizes of the paging file, swapping file, and system dump file, as described in Section 3.5.

4. Log in to the system, as described in Section 3.3.

   a. Run the SYSGEN utility to customize the selected parameter file, if desired, as described in Section 3.4.

   b. Use the SWAPFILES.COM command procedure to alter the sizes of the primary paging and swapping files, and the size of the system dump file, if desired, as described in Section 3.5.

5. Copy the bootstrap command procedure to DEFBOO.CMD on the console floppy diskette, as described in Section 3.6.

6. Reboot the system, stopping in SYSBOOT to specify the name of the selected parameter file, as described in Section 3.7.

7. Log in to the system again and customize the site-specific start-up command procedure ([SYSMGR]SYSTARTUP.COM), as described in the VAX/VMS System Manager's Guide.

8. Run the AUTHORIZE program to create the user authorization file and the necessary user file directories, as described in the VAX/VMS System Manager's Guide.

9. Install one or more optional software products, if desired, as described in Chapter 6 and the documentation set for each product.

10. Reboot the system, as described in Section 3.8.

11. Optionally, copy the system disk using the command procedure VMSKITBLD.COM, as described in Section 3.10.

The system is now ready for use.

3.1 ENTERING COMMANDS TO THE CONSOLE PROGRAM

To bootstrap the system, you must first invoke the console program. To ensure that the console program is available for use, perform the following steps:

1. Check that the console floppy diskette (part description: RX 1/ 11780 LOCAL CNSL PKG) is in the floppy diskette drive.

2. Set the AUTO RESTART switch to the OFF position.

3. Turn the rotary key to the LOCAL position, if it is not already set to LOCAL. Turning the power on boots the console floppy diskette and causes the console program to prompt (>>>).

4. If the power is already on, press <CTRL/P> to cause the console program to prompt (>>>). Type REBOOT to reboot the console.

5. Before proceeding further, ensure that the disk to be booted is write enabled.

You are now ready to bootstrap your system.

3.2 BOOTSTRAPPING THE SYSTEM

You can bootstrap the system in either of the following ways:

- Conversational -- Request that SYSBOOT stop and allow you to modify the system parameters that configure the system. This is the option to use the first time you bootstrap the system.

- Nonstop -- Allow SYSBOOT to run to completion without your intervention.

Console commands are used to request the bootstrapping of the system. VAX/VMS provides a number of command procedures that contain the necessary console commands to request a bootstrap from an RM03 or RP06 disk device on the first MASSBUS controller, or from an RK07 disk device on the UNIBUS.

The console floppy diskette contains these command procedures in two sets:

- A conversational set that bootstraps the system from the specified device and then stops in the SYSBOOT program to accept changes to the parameters used to configure the system. See Section 3.2.1.

- A nonstop set that bootstraps the system from the specified device without stopping in SYSBOOT for changes to parameter values. See Section 3.2.2.

Table 3-1 lists the names of bootstrap command procedures on the console floppy diskette.

Table 3-1
VAX/VMS Bootstrap Command Procedures

Type of Command Procedure	Name of Command Procedure
Conversational bootstrap from RK07	DM0GEN DM1GEN DM2GEN DM3GEN
Conversational bootstrap from RM03 or RP06[1]	DB0GEN DB1GEN DB2GEN DB3GEN DB4GEN DB5GEN DB6GEN DB7GEN
Nonstop bootstrap from RK07	DM0BOO.CMD DM1BOO.CMD DM2BOO.CMD DM3BOO.CMD
Nonstop bootstrap from RM03 or RP06[1]	DB0BOO.CMD DB1BOO.CMD DB2BOO.CMD DB3BOO.CMD DB4BOO.CMD DB5BOO.CMD DB6BOO.CMD DB7BOO.CMD

1. The bootstrap command procedures for RM03 and RP06 disks bootstrap the disks from only the first MASSBUS adapter. To bootstrap an RM03 or RP06 from the second MASSBUS adapter, change the bootstrap command procedure to deposit the value 9 rather than the value 8 into register R1. For an example, see the DBBBOO.CMD bootstrap command procedure on the console floppy diskette.

NOTE

Do not type on the console terminal while the system is being bootstrapped unless prompted for input. If you do so accidentally, the following messages may be printed:

```
SYSBOOT-W-FPLA,PCS or WCS version less than minimum required for VMS.
SYSBOOT-W-Continue from halt to proceed with boot if desired.
```

Either continue from the point where the system halted or reboot. To continue, type CONTINUE.

If you do not type on the console terminal while the system is being bootstrapped and the messages shown above are printed, your machine is not up to the correct ECO level. Please contact your local field service representative.

3.2.1 Conversational Bootstrap

To bootstrap the system and request that SYSBOOT stop to allow you to change system parameters, type a command procedure name with the following command format:

```
>>> @DxyGEN
```

@

Indicates that the rest of the line contains the name of a command procedure located on the console floppy diskette.

x

Indicates the device type of the desired bootstrap device:

M = RK07
B = RM03 or RP06

y

Specifies the unit number of the drive containing the volume to be booted. This number is in the range of 0 through 3 if you are booting from an RK07, or 0 through 7 if you are booting from an RM03 or RP06.

When SYSBOOT is ready to accept commands, it prompts as follows:

```
SYSBOOT>
```

You can now issue any of the commands listed in Chapter 4.

The first time you bootstrap the system, type the following commands:

```
SYSBOOT> USE MINIMUM.PAR

SYSBOOT> CONTINUE
```

The second time you bootstrap the system, issue a USE command specifying the name of the parameter file that you want SYSBOOT to use to generate your system. This can be one of the file names listed in

Table 3-2 (in Section 3.4) or it can be the name of a file created by means of the SYSGEN utility.

The following example shows a console printout obtained by bootstrapping the system using the bootstrap command procedure DM0GEN and specifying the parameter file MYPARAM.PAR:

```
>>> @DM0GEN

!

!       DM0 CONVERSATIONAL BOOT COMMAND FILE - DM0GEN.

!       BOOT FROM DM0 AND STOP IN SYSBOOT TO ALTER PARAMETER VALUES.

!

HALT                    ! HALT PROCESSOR

        CPU HALTED

UNJAM                   ! UNJAM SBI

INIT                    ! INIT PROCESSOR

        INIT SEQ DONE
DEPOSIT/I 11 20003800   ! SET UP SCBB

DEPOSIT R0 1            ! CARTRIDGE DISK

DEPOSIT R1 3            ! UBA TR=3

DEPOSIT R2 3FF20        ! CSR ADDRESS OFFSET = 3FF20

DEPOSIT R3 0            ! CONTROLLER UNIT = 0

DEPOSIT R4 0            ! BOOT BLOCK LBN (UNUSED)

DEPOSIT R5 1            ! SOFTWARE BOOT FLAGS (CONVERSATIONAL BOOT)

DEPOSIT FP 0            ! SET NO MACHINE CHECK EXPECTED

START 20003000          ! START ROM PROGRAM

WAIT DONE               ! WAIT FOR COMPLETION

        HALT INST EXECUTED
        HALTED AT 200034F9

                        !

EXAMINE SP              ! SHOW ADDRESS OF WORKING MEMORY+^X200
        G  0000000E  00000200
LOAD VMB.EXE/START:@    ! LOAD PRIMARY BOOTSTRAP

                        LOAD DONE, 00002000 BYTES LOADED
START @                  ! AND START IT

<@EOF>
<@EXIT>
```

```
SYSBOOT>  HELP
Major SYSBOOT Commands are:

        CONTINUE - Continue with boot process
        EXIT     - Continue with boot process
        SET      - Set parameter value
             SET parameter-name value
             SET /STARTUP file-spec
        SHOW      - Show parameter  value (s)
             SHOW parameter_name
                  /ACP - Show ACP parameters
                  /ALL - Show ALL parameters
                  /GEN - Show  generative parameters
                  /MAJOR - Show MAJOR parameters
                  /NAMES - Show parameter names
                  /PQL - Show Process Quota List values
                  /RMS - Show RMS parameters
                  /STARTUP - Show Startup command file name
                  /SYS - Show SYSTEM parameters
        USE      - Set parameter file name
             USE file_spec.PAR
                  Reserved filespecs are:
        DEFAULT - Use permanent defaults
        CURRENT - Use current values

SYSBOOT>  USE MYPARAM.PAR
SYSBOOT>  SHOW /MAJOR

  Parameter Name    Current   Default   Minimum  Maximum  Unit
  --------------    -------   -------   -------  -------  ----
  PFCDEFAULT            127        16         0      127  PAGES
  GBLSECTIONS            80        40        20       -1  SECTIONS
  GBLPAGES             3072      2048       512       -1  PAGES
  MAXPROCESSCNT          64        64        12      256  PROCESSES
  SYSMWCNT              100        48        20    16384  PAGES
  BALSETCNT              40        24         4     1024  SLOTS
  IRPCOUNT              240        80         0    32768  PACKETS
  WSMAX                 700       256        60    16384  PAGES
  NPAGEDYN           109568     40448     16384       -1  BYTES
  PAGEDYN             32768      8192      8192       -1  BYTES
  VIRTUALPAGECNT       8192      8192       512    65536  PAGES
  QUANTUM                30        30         2    32767  10MS
  MPW_WRTCLUSTER         64        16         0      127  PAGES
  MPW_HILIM             128        24         0    16384  PAGES
  MPW_LOLIMIT            96        12         0    16384  PAGES

SYSBOOT>  SET BALSETCNT 8

SYSBOOT>  SET VIRTUALPAGECNT 999999

%SYSBOOT-W-Value set to maximum
SYSBOOT>  SHOW VIRTUALPAGECNT
  VIRTUALPAGECNT      65536      8192       512    65536  PAGES

SYSBOOT>  CONTINUE


  VAX/VMS  Version V2.0 30-MAR-1980 15:40


   Opcom, 30-MAR-1980 15:25:24.26 Logfile initialized, operator=_OPA0:

  Login quotas - Interactive limit=64, Current interactive value=0
  SYSTEM       job terminated at 30-MAR-1980 15:27:51.47
```

3.2.2 Nonstop Bootstrap

To perform a bootstrap operation without stopping in SYSBOOT, type a command procedure name with the following command format:

```
>>> @DxyBOO.CMD
```

@

Indicates that the rest of the line contains the name of a command procedure that is located on the console floppy diskette.

x

Indicates the device type of the desired bootstrap device:

M = RK07
B = RM03 or RP06

y

Specifies the unit number of the drive containing the volume to be booted. This number is in the range of 0 through 3 if you are booting from an RK07, or 0 through 7 if you are booting from an RM03 or RP06.

Note that you can type a command in the following format to perform a nonstop bootstrap operation:

```
>>> BOOT Dxy
```

For example, BOOT DM0 is equivalent to @DM0BOO.CMD. If you use the long form (@DxyBOO.CMD), the contents of the command procedure are displayed on the console. If you use the short form, they are not displayed.

The following console printout was obtained by bootstrapping the system using the bootstrap command procedure DM0BOO.CMD:

```
>>> BOOT DM0

        CPU HALTED
        INIT SEQ DONE
        HALT INST EXECUTED
        HALTED AT 200034F9

        G  0000000E  00000200
        LOAD DONE, 00002000 BYTES LOADED

  VAX/VMS Version V2.0 30-MAR-80 15:40

   Opcom, 30-MAR-1980 15:42:01.87, Logfile initialized, operator=_OPA0:

  Login quotas - Interactive limit=64, Current interactive value=0
  SYSTEM       job terminated at 30-MAR-1980 15:42:28.91
```

3.3 LOGGING IN TO THE SYSTEM

Once the system is loaded into memory and initialized, it announces itself as illustrated above. At this point, you can log in to the system as the system manager by performing the following steps at the console terminal:

1. Press <RETURN>.
2. In response to the system's request for your user name, type SYSTEM.
3. In response to the system's request for your password, type MANAGER.

The system prints the following message and the DIGITAL Command Language (DCL) command interpreter prompts:

```
     WELCOME TO VAX/VMS Version V2.0
$
```

When the DCL command interpreter prompt ($) appears on the console terminal, the system is now ready for use.

3.4 MODIFYING THE SYSTEM PARAMETER FILE

The VAX/VMS software distribution kit contains several system parameter files, each of which generates a system appropriate for a particular hardware configuration. These files are listed in Table 3-2. The parameter values defined in each file are generally suitable for the intended configuration. By selecting the system parameter file that best matches your hardware, you can produce a working system in a relatively short period.

Once you have selected the system parameter file most appropriate for your configuration, you can modify the values of individual parameters and write a new file. The most common changes are:

- Increasing the values of the WSMAX or VIRTUALPAGECNT parameters to accommodate a particular application
- Increasing the value of the NPAGEDYN parameter to support additional devices

Table 3-3 lists the major system parameter values and the system parameter values most likely to change in the parameter files provided by VAX/VMS.

To modify individual parameter values and write a new parameter file, proceed as follows:

1. Set your default device and directory to SYS$SYSTEM using the following DCL command:

   ```
   $ SET DEFAULT SYS$SYSTEM
   ```

2. Invoke the SYSGEN utility with the following command:

   ```
   $ RUN SYSGEN
   ```

3. Enter a USE command specifying the parameter file to be used as the source of parameter values. For example:

```
SYSGEN> USE 16USER.PAR
```

4. Change the values in the parameter file. For example:

```
SYSGEN> SET VIRTUALPAGECNT   8192
```

5. Create a file that contains the modified parameter values. For example:

```
SYSGEN> WRITE MYPARAM.PAR
```

6. Exit from SYSGEN, as follows:

```
SYSGEN> EXIT
$
```

The VAX/VMS System Manager's Guide contains a complete description of the SYSGEN utility and the system parameters.

Table 3-2
Parameter Files Provided by VAX/VMS

Parameter File Name	Description
MINIMUM.PAR	512KB memory Console terminal Console floppy Bootstrap disk
8USER.PAR	512KB memory 2 RK07 disks 8 DZ11 lines
16USER.PAR	768KB-1024KB memory 2 RM03 disks 16 DZ11 lines
32USER.PAR	1024KB-1536KB memory 2 RP06 disks 32 DZ11 lines
48USER.PAR	1536KB-2048KB memory 2 RP06 disks 48 DZ11 lines
64USER.PAR	2048KB-3072KB memory 2 RP06 disks 64 DZ11 lines
VIRT32MB.PAR	1024KB memory 2 RP06 disks 16 DZ11 lines Support of 32MB virtual address space

Table 3-3
Parameter Values in Parameter Files Provided by VAX/VMS

Parameter Name	Parameter File Name						
	MINIMUM	8USER	16USER	32USER	48USER	64USER	3VIRT32MB
PFCDEFAULT	16	16	32	64	127	127	127
GBLSECTIONS	20	30	32	48	80	80	32
GBLPAGES	1024	2048	2048	3072	3072	3072	2048
MAXPROCESSCNT	12	20	28	48	68	84	28
SYSMWCNT	80	100	120	140	160	180	120
BALSETCNT	5	12	20	34	52	68	8
IRPCOUNT	0	200	275	530	650	750	300
WSMAX	256	256	256	512	700	1024	1024
NPAGEDYN	32128	51200	74240	131072	159744	179712	92160
PAGEDYN	16384	24576	28672	40960	49152	65536	32768
VIRTUAL PAGECNT	4096	4096	4096	8192	8192	8192	65536
QUANTUM	60	60	60	60	60	60	60
MPW_WRTCLUSTER	8	16	32	64	127	127	127
MPW_HILIM	10	24	44	92	220	320	220
MPW_LOLIM	4	12	16	32	100	200	96
SPTREQ	700	650	700	700	700	700	700
WSINC	0	21	21	21	21	21	21
FREELIM	10	10	10	16	16	16	10
BUGCHECKFATAL	0	0	0	0	0	0	0
TTY_DEFCHAR	268440224	268440224	268440224	268440224	268440224	268440224	268440224
MAXPRINTSYMB	1	1	1	4	8	8	2
DEFPRI	4	4	4	4	4	4	4
IJOBLIM	4	9	17	33	49	65	17
BJOBLIM	1	1	1	4	8	8	4
NJOBLIM	16	16	16	16	16	16	16
ACP_SHARE	0	0	0	1	1	1	1
ACP_MAPCACHE	1	2	4	12	20	20	4
ACP_HDRCACHE	4	6	12	40	80	120	12
ACP_DIRCACHE	4	8	16	50	100	150	16
ACP_FIDCACH	8	8	8	12	16	16	8
ACP_EXTCACHE	8	8	16	16	32	32	16
ACP_EXTLIMIT	200	200	200	200	200	200	200

3.5 ALTERING PAGING, SWAPPING, AND SYSTEM DUMP FILE SIZES

VAX/VMS provides a command procedure in the directory [SYSUPD] to simplify the alteration of the of the sizes of the primary paging and swapping file, and the size of the system dump file. To execute the command procedure, log in as the system manager, as described in Section 3.3, and type the following command:

```
$ @[SYSUPD]SWAPFILES
```

The command procedure prints the current value of the paging, swapping, and system dump files, then prompts for new file sizes. In response to each request for a file's size, either press <RETURN> to leave the file size unchanged; or, type a new file size, then press <RETURN>. To avoid a system failure, do not delete the old files until the system is rebooted.

Table 3-4 lists the recommended paging file, swapping file, and system dump file sizes, in blocks, for the system parameter files that VAX/VMS provides. The VAX/VMS System Manager's Guide describes size guidelines for these files in greater detail.

Table 3-4
Recommended Paging, Swapping, and System Dump File Sizes

File Type	Parameter File Name						
	MINIMUM	8USER	16USER	32USER	48USER	64USER	VIRT32MB
PAGEFILE.SYS	8192	8192	16384	32768	61440	98304	98304
SWAPFILE.SYS	3072	5120	7168	24576	47600	86016	28672
SYSDUMP.DMP[1]	516	1028	2052	3076	4100	6148	2052

1. To calculate the exact size of the system dump file, use the following equation: SYSDUMP.DMP = number-of-pages-of-physical-memory + 4

3.6 DEFAULT BOOTSTRAP COMMAND PROCEDURE

Once you have selected the bootstrap command procedure to be used for your system, you should copy it to the console floppy diskette, giving it a file name of DEFBOO.CMD. This establishes it as the default bootstrap command procedure.

The default bootstrap command procedure is used in several situations:

- When the system automatically reboots itself; Section 3.6.3 describes the automatic bootstrap operation
- When you press the BOOT switch on the processor control panel
- When you issue the console command BOOT without specifying a device name

3.6.1 Copying the Default Bootstrap Command Procedure

VAX/VMS provides a command procedure named SETDEFBOO.COM that simplifies the copying of the default bootstrap command procedure to the console floppy diskette. To use SETDEFBOO, first log in to the system as the system manager and type the following:

```
$ @[SYSUPD]SETDEFBOO
```

SETDEFBOO asks you to confirm that the console floppy diskette is in the console drive and requests the name of the bootstrap command procedure that is to become the default:

```
Is the system console storage medium mounted? (Y/N):
Enter name of default boot command file:
```

Once you enter the name of the appropriate bootstrap command procedure, for example, DM0BOO.CMD, SETDEFBOO copies the specified bootstrap command procedure to DEFBOO.CMD on the console floppy diskette. When it finishes the copying operation, SETDEFBOO issues the following message:

```
Default boot command file replaced with <file-name>
```

3.6.2 Booting with Interleaved Memory

To bootstrap the system with interleaved memory, the system must conform to certain requirements, as described in the VAX-11/780 Hardware Handbook. If your system meets these requirements and you want the memory to be interleaved, edit the default bootstrap command procedure and the restart command procedure (RESTAR.CMD) to include commands that modify the memory controller registers. Appendix C contains examples of command procedures (DM0BOO.ILV,DB0BOOILV, and RESTAR.ILV) used to bootstrap systems with interleaved memory.

3.6.3 Automatic Restart

The VAX-11 processor is designed for unattended, continuous operation. It is able to restart or reboot itself in the event of power failure and recovery or any processor halt condition. To enable the automatic restart feature, set the AUTO RESTART rocker switch on the processor control panel to the ON position. Automatic restarting should be disabled during the installation procedure, but should be enabled once the installation procedure is completed.

When automatic restart is enabled and a power failure and recovery or halt occurs, the processor deposits the contents of the program counter (PC) and the processor status longword (PSL) at the time of the halt into registers R10 and R11 and deposits a code giving the reason for the restart into the Argument Pointer (AP). The processor then invokes the command procedure RESTAR.CMD, which is listed in Appendix C. After a power recovery, the restart ROM program checks to determine whether the contents of memory are still valid (battery back-up required) and whether the VAX/VMS restart routine can be located. If both conditions are satisfied, the restart ROM program passes control to the restart routine; otherwise, the system is rebooted using DEFBOO.CMD.

Any condition other than power recovery results in a VAX/VMS fatal bugcheck and an automatic rebooting of the system using DEFBOO.CMD.

3.7 REBOOTING THE SYSTEM STOPPING IN SYSBOOT

To halt the processor when VAX/VMS is running and to reboot the system, proceed as follows:

1. Shut down the system by executing the following command procedure:

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

   This command procedure prompts for the number of minutes until system shutdown, the reason for the shutdown, and whether to spin down the disks.

2. In response to the statement, "SYSTEM SHUTDOWN COMPLETE - USE CONSOLE TO HALT SYSTEM," halt the processor by pressing <CTRL/P> to obtain the console prompt (>>>), and type the HALT command.

3. Bootstrap the system, using one of the following command procedures:

   ```
   >>> @DMyGEN
   >>> @DByGEN
   ```

   The letter y denotes the unit number of the drive containing the volume to be booted. This number is in the range of 0 through 3 if you are booting from an RK07, or 0 through 7 if you are booting from an RM03 or RP06.

4. When SYSBOOT prompts, issue a USE command specifying the name of the parameter file that you wrote and continue. For example:

   ```
   SYSBOOT>  USE MYPARAM.PAR

   SYSBOOT>  CONTINUE
   ```

When VAX/VMS announces itself, the new parameter values and the new paging, swapping, and system dump files are in use.

3.8 REBOOTING USING THE DEFAULT BOOTSTRAP

Under normal system operation, you do not need to interrupt the bootstrapping of the system to type commands to SYSBOOT; that is, parameter values have been established. Rather, you can bootstrap the system using the default bootstap command procedure that you copied to the file DEFBOO.CMD. To do so, proceed as follows:

1. Shut down the system by executing the following command procedure:

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

   This command procedure prompts for the number of minutes until system shutdown, the reason for the shutdown, and whether to spin down the disks.

2. In response to the statement, "SYSTEM SHUTDOWN COMPLETE - USE CONSOLE TO HALT SYSTEM," halt the processor by pressing <CTRL/P> to obtain the console prompt (>>>), and type the HALT command.

3. Either type BOOT or press the BOOT push button on the processor control panel.

3.9 COPYING FILES TO OR FROM THE CONSOLE FLOPPY DISKETTE

Occasionally, you may want to copy files, other than DEFBOO.CMD, from the console floppy diskette, edit them, and place them back on the diskette. VAX/VMS provides a command procedure named DXCOPY.COM in the directory [SYSUPD] to simplify the copying of text files (that is, ASCII files such as bootstrap command procedures) to or from the console floppy diskette.

To request the execution of the command procedure and to copy the files, proceed as follows:

1. Invoke the command procedure by typing:

```
$ @[SYSUPD]DXCOPY
```

2. The command procedure asks whether the console floppy diskette is mounted, as follows:

```
Is the console floppy diskette mounted (Y/N)?:
```

   a. If it is not, type N and observe the following instructions:

      Please place the console floppy diskette in the console drive and type <ret> when ready.

   b. If it is, type Y to continue

3. The command procedure then asks whether the copy operation is from the console floppy diskette, as follows:

```
Copy from console medium (Y/N)?:
```

   You can type Y to indicate a copy from the console floppy diskette to the current default directory, or you can type N to indicate a copy from the current default directory to console floppy diskette.

4. Finally, the command procedure requests the name of the file to be copied to or from the console floppy. Type the name of the file, and press <RETURN>.

3.10 BUILDING AND COPYING A VAX/VMS SYSTEM DISK

Occasionally, you may want to build or make a copy of your system software. VAX/VMS provides a command procedure named VMSKITBLD.COM as part of the system software for the purposes of building and copying a VAX/VMS operating system. Sections 3.10.1 and 3.10.2, below, describe how to use VMSKITBLD.COM.

NOTE

Do not press <CTRL/C> or <CTRL/Y> while running VMSKITBLD.COM. Doing so causes the command procedure to unconditionally terminate.

3.10.1 Building a VAX/VMS System Disk

You can use VMSKITBLD.COM to build a VAX/VMS system binary disk. For example, if you have a mixed-disk system (with RK07 and either RP06 or RM03 disks but no magnetic tape drives), you can use VMSKITBLD.COM to transfer your VAX/VMS system from an RK07 disk cartridge to a larger, faster RP06 or RM03 disk.

NOTE

The building procedure destroys all previous information on the target disk before it builds the system.

Before you can use VMSKITBLD.COM to build a VAX/VMS system (on an RP06, for example) you must boot your system, as described at the beginning of this chapter. With this RK07 system running, proceed as follows:

1. Log in under the system manager's account (initially, an account with the user name SYSTEM and the password MANAGER).
2. Establish the following default directory:

```
$ SET DEFAULT [SYSUPD]
```

3. Place either an RP06 or RM03 disk on an appropriate drive and place it online. This will be the target disk in the system building procedure.
4. Type the following command to initiate the building of the system:

```
$ @VMSKITBLD
```

5. Supply the needed information about the source and target disks as prompted.

You then receive the following query:

```
Is this a BUILD or COPY operation?
```

Answer by typing BUILD.

Continuation of the system disk building procedure is indicated by the display of messages at your terminal. These messages either (1) prompt you for information needed to complete the copy operation, or (2) inform you of the current status of the building procedure.

In the process of building a bootable VAX/VMS system on an RP06 or RM03 disk, this command procedure automatically creates a larger swap file, a larger page file, and a larger system dump file than were in the original RK07 binary distribution kit. Thus, the resulting VAX/VMS system is suitable for running off an RP06 or RM03 system disk.

VMSKITBLD.COM informs you when the system disk is built by sending the following message to your terminal:

```
Kit is complete.
```

At this point, the disk is ready to be bootstrapped.

3.10.2 Copying a VAX/VMS System Disk

You can also use VMSKITBLD.COM to copy the files of the VAX/VMS system binary disk onto a target disk that already contains a valid VAX/VMS system. The copy operation modifies only system files; it leaves all user files intact.

Before you can use VMSKITBLD.COM to copy one system disk to another, your VAX/VMS system must be running and the source disk that you intend to copy must be mounted. Often, this source disk is the system disk from which the system was booted. Proceed as follows to copy the source disk to a target disk:

1. Log in under the system manager's account (initially, an account with the user name SYSTEM and the password MANAGER).
2. Establish the following default directory:

   ```
   $ SET DEFAULT [SYSUPD]
   ```

3. Place a target disk on an appropriate drive.
4. Type the following command to initiate the copy operation:

   ```
   $ @VMSKITBLD
   ```

5. Supply the needed information about the source and target disks as prompted.

You then receive the following query:

```
Is this a BUILD or COPY operation?
```

Answer by typing COPY.

Continuation of the copy operation is indicated by the display of messages at your terminal. These messages either (1) prompt you for information needed to complete the copy operation, or (2) inform you of the current status of the copy operation.

VMSKITBLD.COM informs you when the copy operation is complete by sending the following message to your terminal:

```
Kit is complete.
```

At this point, the disk is ready to be bootstrapped.

CHAPTER 4

THE SYSBOOT PROGRAM

You can use a subset of the commands of the SYSGEN utility with the SYSBOOT program, which actually allocates the necessary system structures based on the system parameter values. The commands that can be used with SYSBOOT are listed in Table 4-1 along with a brief description of each command. Detailed descriptions of these commands are in Sections 4.2 through 4.9. The SYSGEN utility is described in the VAX/VMS System Manager's Guide.

Table 4-1
Summary of the SYSBOOT Commands

Command	Description
CONTINUE	Resumes the bootstrapping operation
DISABLE CHECKS	Inhibits checking of system parameter values specified with the SET command
ENABLE CHECKS	Permits checking of system parameter values specified with the SET command
HELP	Displays a summary of the SYSBOOT commands at your terminal
SET (parameter-value)	Establishes the value of a system parameter
SET (start-up file)	Specifies the start-up command procedure to be executed after SYSBOOT
SHOW	Displays specific system parameters
USE	Specifies the system parameter file to be used as a source of values

4.1 INVOKING AND TERMINATING SYSBOOT

You invoke SYSBOOT by typing the name of a bootstrap command procedure in response to the console program prompt (>>>). The name of the command procedure represents the following information:

- The device and unit containing the disk volume to be bootstrapped
- Whether you want SYSBOOT to prompt for commands during the bootstrap operation

To resume bootstrapping of the system, if you stopped in SYSBOOT, type CONTINUE.

The following example demonstrates a typical system bootstrap operation, stopping in SYSBOOT:

```
>>>@DB0GEN
    .
    .
    .
SYSBOOT> CONTINUE
```

This console command invokes the DB0GEN command procedure, which will bootstrap VAX/VMS from the RP06 or RM03 (unit 0) device and stop in SYSBOOT. After the necessary modifications are made, the CONTINUE command resumes the bootstrap operation.

4.2 CONTINUE

The CONTINUE command allows the system bootstrapping operation to continue without further intervention.

Format

CONTINUE

Examples

```
.
.
.
SYSBOOT> CONTINUE
```

This command causes SYSBOOT to resume bootstrapping of the system.

DISABLE CHECKS

4.3 DISABLE CHECKS

The DISABLE CHECKS command inhibits the range checking SYSBOOT performs on parameter values. By default, range checking is enabled for SYSBOOT. When range checking is enabled, if you attempt to set a parameter to a value that is above the maximum, SYSBOOT will set it to the maximum and issue a warning message to inform you. If you attempt to set a parameter to a value that is below the minimum, SYSBOOT will set it to the minimum and issue a warning message.

Format

```
DISABLE CHECKS
```

Examples

```
SYSBOOT> SET WSMAX 20
%SYSBOOT-W-Value set to minimum
SYSBOOT> DISABLE CHECKS
SYSBOOT> SET WSMAX 20
SYSBOOT> SHOW WSMAX
WSMAX           20        256       60        16384     PAGES
```

In this sequence of commands, the user first attempts to set WSMAX to 20 while range checking was enabled; SYSBOOT issues a warning message. The user then issued the second command to disable range checking. Subsequent commands set the current value of WSMAX to 20 and displayed WSMAX values, respectively.

Note

If you create a parameter file containing values that are outside the normal range, and want to use the parameter file with SYSBOOT, you must issue a DISABLE CHECKS command to SYSBOOT. Otherwise, SYSBOOT does not allow you to use parameter values that are not in the standard range.

ENABLE CHECKS

4.4 ENABLE CHECKS

The ENABLE CHECKS command requests that SYSBOOT ensure that parameter values changed using the SET command remain in the allowable range. By default, range checking is enabled. If you attempt to set a parameter to a value that is above the maximum, SYSBOOT will set it to the maximum and issue a warning message to inform you. If you attempt to set a parameter to a value that is below the minimum, SYSBOOT will set it to the minimum and issue a warning message.

Format

ENABLE CHECKS

Examples

```
SYSBOOT>  ENABLE CHECKS
SYSBOOT>  SET GBLSECTIONS 18
%SYSBOOT-W-Value set to minimum
SYSBOOT>
```

In the sequence above, the first command enables range checking. The second command attempts to limit the number of global sections in the system to 18; the minimum value for that parameter is 20. SYSBOOT sets the parameter value to 20 and issues the warning message.

HELP

4.5 HELP

The HELP command displays a summary of commands that are available during SYSBOOT.

Format

```
HELP
```

Examples

```
SYSBOOT> HELP
Major SYSBOOT Commands are:

   CONTINUE    - Continue with boot process
   EXIT        - Continue with boot process
   SET         - Set parameter value
        SET parameter_name value
        SET /STARTUP file_spec
   SHOW        - Show parameter value(s)
        SHOW parameter_name
               /ACP - Show ACP parameters
               /ALL - Show ALL parameters
               /GEN - Show generative parameters
               /MAJOR - Show MAJOR parameters
               /NAMES - Show parameter names
               /PQL - Show Process Quota List values
               /RMS - Show RMS parameters
               /STARTUP - Show Startup command file name
               /SYS - Show SYSTEM parameters
   USE - Set parameter file name
        USE file_spec.PAR
             Reserved filespecs are:
                       DEFAULT - Use permanent defaults
                       CURRENT - Use current values
```

The HELP command displays the HELP information available during SYSBOOT.

SET (PARAMETER VALUE)

4.6 SET (PARAMETER VALUE)

The SET (Parameter Value) command allows you to establish the value of a system parameter. If SYSGEN is not used to make further modifications, the parameter values currently established are carried over to the next bootstrapping of the system.

Format

SET parameter-name value

parameter-name

Specifies the name of the parameter for which the new value is to be established. The VAX/VMS System Manager's Guide provides the names of and describes all the parameters.

value

Specifies the value of the parameter. The value can be either a decimal number in the allowable range for that parameter or the keyword DEFAULT.

If you specify DEFAULT, SYSBOOT uses the default or typical value assumed by SYSBOOT.

Examples

1.
```
SYSBOOT> SHOW PFCDEFAULT
  PFCDEFAULT    16        16        0        127     PAGES

SYSBOOT> SET PFCDEFAULT  20
```

   The first command above displays the current, default, minimum, and maximum values for the page fault cluster default size. The SET command raises the cluster size to 20.

2.
```
SYSBOOT> SET GBLSECTIONS DEFAULT
```

   This command sets the number of global section descriptors to be allocated by SYSBOOT to the default value of 40.

SET (START-UP FILE)

4.7 SET (START-UP FILE)

The SET (Start-up File) command specifies the name of an alternate site-independent start-up command procedure to be executed as the system is bootstrapped. By default, the start-up process executes the SYS$SYSTEM:STARTUP.COM command procedure.

Format

SET /STARTUP file-spec

/STARTUP

Indicates that the SET command is to designate a start-up command procedure.

file-spec

Specifies the name of the start-up command procedure to be used. The file must be located on the system disk.

Examples

```
SYSBOOT>  SET /STARTUP SYS$SYSTEM:NEWSTART.COM
```

This command establishes the start-up command procedure as SYS$SYSTEM:NEWSTART.COM.

Note

If you use the parameter file MINIMUM.PAR, the site-independent start-up command procedure is SYS$SYSTEM:STARTUP.MIN

4.8 SHOW

The SHOW command displays the names of system parameters, or the values associated with system parameters. The SHOW command displays four values for each parameter and indicates the unit of measure associated with the values:

- Current value
- Default value
- Minimum allowable value
- Maximum allowable value

A -1 in the minimum or maximum value column indicates that no minimum or maximum value exists for the parameter.

Format

SHOW parameter-name

Command Qualifiers

/ACP
/ALL
/DYNAMIC
/GEN
/JOB
/MAJOR
/NAMES
/PQL
/RMS
/STARTUP
/SYS

parameter-name

Specifies the name of a single parameter for which the value is to be displayed. If you specify a parameter name, you cannot include a qualifier in the command.

You can issue the following command to display the names of all parameters:

```
SHOW /NAMES
```

The most frequently used parameter names (that is, the names of parameters in the major category) follow:

BALSETCNT -- balance set count
GBLPAGES -- global pages
GBLSECTIONS -- global sections
IRPCOUNT -- I/O request packet count
MAXPROCESSCNT -- maximum process count
MPW_HILIM -- modified page list high limit
MPW_LOLIMIT -- modified page list low limit
MPW_WRTCLUSTER -- modified page write cluster size
NPAGEDYN -- nonpaged dynamic memory

PAGEDYN -- paged dynamic memory
PFCDEFAULT -- page fault cluster default size
QUANTUM -- time quantum
SYSMWCNT -- system maximum working set count
VIRTUALPAGECNT -- virtual page count
WSMAX -- working set maximum

These and all other system system parameters are described in detail in the VAX/VMS System Manager's Guide.

Command Qualifiers

/ALL

Displays the values for all parameters.

/ACP

Displays all the system parameters associated with Files-11 ancillary control processes (ACPs).

/DYNAMIC

Displays the system parameters that can be changed by the SYSGEN utility after the system has been bootstrapped.

/GEN

Displays the structure-generating system parameters and other parameters that have effect only when the system is bootstrapped.

/JOB

Displays all job controller system parameters.

/MAJOR

Displays the major system parameters. These are the parameters that are most likely to require adjustment for individual installations.

/NAMES

Displays the names of all the system parameters.

/PQL

Displays the values associated with process creation limits and quotas.

/RMS

Displays the values associated with VAX-11 RMS.

/STARTUP

Displays the name of the start-up command procedure.

/SYS

Displays the system parameters associated with overall system operation.

Examples

1. SYSBOOT> SHOW /JOB

Parameter Name	Current	Default	Minimum	Maximum	Unit
MAXPRINTSYMB	8	8	1	255	PROCESSES
DEFPRI	4	4	1	31	
IJOBLIM	64	64	1	1024	JOBS
BJOBLIM	16	16	0	1024	JOBS
NJOBLIM	16	16	0	1024	JOBS

The SHOW/JOB command causes the parameters associated with the job controller to be displayed.

2. SYSBOOT> SHOW WSMAX

WSMAX	256	256	60	16384	PAGES

The SHOW WSMAX command shows the values associated with the parameter that controls the maximum working set size of all processes in the system.

USE

4.9 USE

The USE command specifies the source of system parameter values. You can specify a file that you created or that DIGITAL supplied as part of the operating system, or you can indicate that either the current parameter values or the default parameter values are to be used. Having established the source, you can modify individual parameters by means of the SET command.

Formats

```
USE file-spec

USE CURRENT

USE DEFAULT
```

file-spec

Indicates the name of the parameter file whose values are to be used to bootstrap the system. You can specify a file that you created by use of the SYSGEN WRITE command or that DIGITAL distributed with the system.

The parameter file must be located in the [SYSEXE] directory on the system; and the file type, usually PAR, is required syntax.

CURRENT

Indicates that the values in effect the last time the system was bootstrapped are to be used. When the system is first copied from the distribution medium, the CURRENT and DEFAULT values are the same.

DEFAULT

Indicates that the default values established by VAX/VMS are to be used to bootstrap the system.

Examples

```
SYSBOOT>  USE DEFAULT
SYSBOOT>  SET IJOBLIM 80
SYSBOOT>  SET BJOBLIM 10
```

The first command sets the values of the system parameters to the defaults supplied by VAX/VMS. The two SET commands establish new values for the limits on the number of interactive and batch jobs, respectively.

CHAPTER 5

UPGRADING THE SYSTEM

As described in Chapter 1, if you have a VAX/VMS Version 1.6 system, and you have added user files to the system disk, you should use the system upgrading procedure described in this chapter to install Version 2.0.

To upgrade a system, proceed as follows:

1. Confirm that your VAX/VMS software distribution kit contains the components needed to upgrade your system, as described in Section 5.1.

2. Remove unimportant files from the system disk, as described in Section 5.2.1.

3. Obtain a record of the original and current system parameter values, as described in Section 5.2.2.

4. Make a copy of the system disk and boot this newly copied system disk, as described in Section 5.2.2.

5. Log in to the system and set the login quota to zero, as described in Section 5.3.

6. Turn off the network, if it is currently in use, as described in Section 5.3.

7. Flush all batch and printer queues, as described in Section 5.3.

8. Prepare the system disk and the upgrade kit volume for the upgrade operation, as described in Section 5.3.

9. Invoke the command procedure VMSUPDATE.COM to initiate the system upgrade operation, as described in Section 5.3.

10. Reboot the system from the upgraded system disk and log in under the temporary account provided by the system, as described in Section 5.4.

11. Use the command procedure UPGRADFIN.COM to complete the upgrading of the system and to restore the user authorization file, as described in Section 5.4.

12. Tailor the system parameter file to suit your needs, as described in Section 5.5.

13. Back up the upgraded system disk, as described in Section 5.5.

14. Reboot the system from the back up copy of the upgraded system disk, as described in Section 3.2.2.

After you complete the final step, the system is ready for use.

5.1 VAX/VMS UPGRADE MEDIA

The VAX/VMS software distribution kit, as described in Chapter 2, also contains the components needed to upgrade an existing Version 1.6 system. This kit is distributed as either:

- A magnetic tape kit
- An RK07 kit

Sections 5.1.1 and 5.1.2, below, describe the required system upgrade components in the magnetic tape and RK07 kits. However, before proceeding any further, you should check that your kit contains all the components listed in the bill of materials that comes with the kit.

5.1.1 Upgrade Components in Magnetic Tape Kit

The following components are needed to upgrade your system from magnetic tape:

- The system binary upgrade tape

  Part number: BB-J830A-BE

  Part description: VMS 2.0 UPGRADE MT9

- The floppy diskette that drives the Version 1.6 to Version 2.0 upgrade procedure

  Part number: AS-J803A-BE

  Part description: VMS V2.0 RX01 UPG

- The console floppy diskette that contains the VAX/VMS Version 2.0 bootstrap loading programs and bootstrap command procedures

  Part number: AS-E633I-YE

  Part description: RX 1/ 11780 LOCAL CNSL PKG

The following component, also contained in the magnetic tape kit, may be used to back up the system during various stages of the upgrade operation:

- The floppy diskettes that contain the stand-alone version of the Disk Save and Compress Utility (stand-alone DSC-2)

  Part number: AS-E808I-BE

  Part description: STAND/ALONE 11780 DSC2 FLP 1

  Part number: AS-J831A-BE

  Part description: STAND/ALONE 11780 DSC2 FLP 2

5.1.2 Upgrade Components in RK07 Disk Kit

The following components are needed to upgrade your system from RK07 disk:

- The RK07 system binary upgrade disk[1]

  Part number: AY-H020C-BE

  Part description: VAX/VMS V2.0 BIN RK07

- The floppy diskette that drives the Version 1.6 to Version 2.0 upgrade procedure

  Part number: AS-J803A-BE

  Part description: VMS V2.0 RX01 UPG

- The console floppy diskette that contains the VAX/VMS Version 2.0 bootstrap loading programs and boostrap command procedures

  Part number: AS-E633I-YE

  Part description: RX 1/ 11780 LOCAL CNSL PKG

The following component, also contained in the RK07 disk kit, may be used to back up the system during various stages of the upgrade operation:

- The floppy diskettes that contain the stand-alone version of the Disk Save and Compress Utility (stand-alone DSC-2)

  Part number: AS-E808I-BE

  Part description: STAND/ALONE 11780 DSC2 FLP 1

  Part number: AS-J831A-BE

  Part description: STAND/ALONE 11780 DSC2 FLP 2

---

1. The RK07 system binary upgrade disk doubles as the system binary distribution disk; see Chapter 2.

5.2 PREPARING TO UPGRADE THE SYSTEM

Before upgrading a VAX/VMS system, be sure that you have:

- A minimum of 12,000 free blocks on the system disk
- A console printout of the current system parameter values and the original system parameter values (that is, the values established by DIGITAL)

The sections below explain why these precautions must be taken and contain suggested procedures for accomplishing them.

5.2.1 Freeing Up Space on the System Disk

Because available disk space is always at a premium, you should remove all unwanted or redundant files from the current system disk before upgrading your system. To do so, use any one of the following DCL file manipulation commands: COPY, DELETE, or PURGE. Use the command appropriate for the type of operation desired.

Note that to upgrade the system, there must be a minimum of 12,000 free blocks on the system disk. You can confirm the free block count with the following command:

```
$ SHOW DEVICES  device-name
```

5.2.2 Recording System Parameter Values

After a VAX/VMS system has been bootstrapped and installed, the values of the system parameters can be modified to fit the needs of the particular installation. If you have changed any parameter values at your installation, it will be necessary for you to obtain a record of:

- The parameter file you used to generate your system
- The DIGITAL-supplied parameter file that most closely resembles your hardware configuration

With this record, you can calculate the difference in individual parameter values. After upgrading the system, you use these calculations to again modify the parameter values.

To obtain a record of the two parameter files, proceed as follows at the console terminal:

1. Log in under the privileged system manager's account
2. Establish the following default:

   ```
   $  SET DEFAULT SYS$SYSTEM
   ```

3. Invoke the SYSGEN utility with the following command:

   ```
   $  RUN SYSGEN
   ```

4. Obtain a console printout of the current parameter values and the original parameter values (that is, the values established by DIGITAL), as demonstrated in the example below:

```
SYSGEN> USE CURRENT
SYSGEN> SHOW/ALL
SYSGEN> USE 16USER.PAR
SYSGEN> SHOW/ALL
```

NOTE

Save this listing. You may need to refer to it if you tailor your system parameter file (see Section 5.5).

5. Terminate the SYSGEN utility with the command:

```
SYSGEN> EXIT
```

At this point, you are ready to upgrade your system. However, before proceeding any further, you should back up your system disk and use the newly created copy to reboot the system. By doing so, you:

- Preserve the original disk for future reference
- Confirm that the newly created disk is a usable copy of the original disk
- Simplify the task of upgrading the disk by consolidating all free space into one contiguous area

You can back up the system disk using the back-up procedure described in Chapter 2. (Chapter 2 uses stand-alone DSC-2 to back up the system.)

5.3 UPGRADING VAX/VMS

Before actually upgrading the system, you must proceed as follows at the console terminal:

1. Bootstrap your system using the back-up copy of the system disk that you created in Section 5.2.2. The Version 1.6 console floppy diskette should be in the console drive.
2. Log in under the privileged system manager's account.
3. Prevent users from logging in to the system by typing:

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

4. If you are running DECnet-VAX, shut down the network.
5. Flush all batch and printer queues, if there are any jobs in the queues.
6. Be sure that the logical name SYS$DISK is assigned to the system disk that is to be upgraded. The disk to be upgraded is assumed to be the disk you used to bootstrap the system.

7. Place the upgrade kit volume (that is, the RK07 disk or magnetic tape contained in the upgrade kit) on the appropriate drive and place it online.

8. Write-lock the upgrade kit volume to protect the contents of the volume

9. Establish the following defaults:

```
$ SET UIC [1,4]

$ SET DEFAULT [SYSUPD]
```

   These commands are to be executed in the order shown.

10. Delete all user-defined DCL symbols with the following commands:

```
$  DELETE/SYMBOLS/GLOBAL/ALL
$  DELETE/SYMBOLS/LOCAL/ALL
```

To initiate the upgrade operation, execute the command procedure VMSUPDATE.COM, as shown below:

```
$ @VMSUPDATE
```

An introductory message, explaining the upgrade operation, will then be sent to the console terminal. Read the text carefully and follow the instructions accordingly.

Note that you will receive a device-not-mounted message, if the console floppy diskette is not mounted. Ignore the message, and place the upgrade floppy diskette (part description: VMS V2.0 RX01 UPG) in the console drive.

NOTE

If at any time during the upgrade operation a system failure occurs, you must restart the upgrade operation using another copy of your Version 1.6 system disk.

You will receive the following query:

```
Are you ready to continue?:
```

If you type Y, the upgrade proceeds.

If you type N, the request to put the upgrade floppy diskette in the console drive and the query "Are you ready to continue?:" will be repeated.

Continuation of the upgrade operation is signaled by the display of the following question:

```
What is the source media name?  (DDCU:):
```

Respond by entering the name of the device that contains the upgrade kit volume. This is either an RK07 disk drive (for example, DMA2) or a magnetic tape drive (for example, MTA0).

You then receive the following messages:

```
        Allocate and mount the source media.
    Is the source media, DDCU:, ready to be mounted?  (Y/N):
```

When you type Y, the upgrade kit volume is allocated and mounted and the upgrade operation proceeds.

At the console terminal, various messages are displayed that report the status of the upgrade operation. These messages include (1) those that inform you of the set of files being copied, and (2) those that indicate that certain files cannot be deleted. The latter of these messages can be ignored if the message indicates that the file does not exist. Messages of this type appear for new files that are included in this version of the system software and were not part of the system software in any past version.

When the installation of the upgraded system is complete (approximately one hour), the following message is displayed at the console terminal:

```
Kit is complete.

Place console floppy back in drive for reboot.
```

You should immediately insert the Version 2.0 console floppy diskette (part description: RX 1/ 11780 LOCAL CNSL PKG) into the console drive.

At this point, the system is shut down. Use the console to halt the system.

To transfer control of the system to the upgraded version of VAX/VMS, perform the steps listed in Section 5.4.

5.4 COMPLETING THE UPGRADE

To complete the system upgrade operation, you must execute the command procedure UPGRADFIN.COM. This command procedure automatically:

- Renames and deletes files left over from the Version 1.6 system
- Converts your user authorization file to the new Version 2.0 format
- Sets protection on strategic files to ensure system security

Failure to execute this command procedure may result in unpredictable system consequences.

A temporary user authorization file in Release 2.0 format is supplied to allow you to log in to the system and complete the upgrade operation. To complete the upgrade operation, proceed as follows:

1. Check that the Version 2.0 console floppy diskette (part description: RX 1/ 11780 LOCAL CNSL PKG) is in the console drive.
2. Boot the upgraded system stopping in SYSBOOT and specify the system parameter file MINIMUM.PAR.
3. Log in under the temporary account provided by the system (the user name is SYSTEM and the password is MANAGER).

4. Establish the following defaults:

```
$ SET UIC [1,4]

$ SET DEFAULT SYS$SYSDISK:[SYSUPD]
```

   These commands are to be executed in the order shown.

5. Type the following command to initiate the conversion:

```
$ @UPGRADFIN
```

At the completion of the conversion (approximately 10 minutes), the following message is sent to the console terminal:

```
SYSTEM SHUTDOWN COMPLETE - USE CONSOLE TO HALT SYSTEM
```

Halt the system as directed.

5.5 TAILORING THE SYSTEM PARAMETER FILE

Before permitting users to gain access to the system, you must reboot the system stopping in SYSBOOT and specify the DIGITAL-supplied system parameter file that most closely resembles your hardware configuration. Using the SYSGEN utility, you can then tailor this parameter file to meet the needs of your installation.

The VAX/VMS System Manager's Guide contains chapters on tailoring the system parameter file to improve system performance. However, before reading that manual, you can make the following simple change: use the adjustments you made to your Version 1.0 parameter file as a guide for making adjustments to your Version 2.0 parameter file. Making these types of adjustments generally produces favorable results, provided you have not altered your system's hardware resources and/or workload.

Finally, after editing is complete, reboot the system stopping in SYSBOOT and specify the new parameter file. Then, to establish the default bootstrap command procedure, execute the command procedure SETDEFBOO.COM, as described in Section 3.6.1. As a precautionary measure, you should back up the system disk and save the original for future reference.

CHAPTER 6

INSTALLING MAINTENANCE UPDATES AND OPTIONAL SOFTWARE

This chapter describes the procedures for installing maintenance updates to a VAX/VMS system and installing optional VAX-11 software products available for VAX/VMS, such as, VAX-11 FORTRAN and VAX-11 COBOL-74.

The procedures for installing a maintenance update or optional software product are automated, and thus require little involvement on your part beyond (1) setting up the proper conditions for the installation and (2) responding to queries and prompting messages displayed as the installation proceeds. Most queries are simple "Yes" or "No" questions. You respond with Y or N, as appropriate.

6.1 DISTRIBUTION KITS

Maintenance updates and optional VAX-11 software products are distributed on floppy diskettes, two or more depending on the component.

Each diskette is labeled with both a name corresponding to the software product and a serial number that differentiates that floppy diskette from others in the distribution kit. You should check that your kit contains all the floppy diskettes listed in the bill of materials.

The floppy diskette contains files, including command procedures that copy the components to the system disk. These command procedures direct the installation procedure by means of queries and instructions sent to the terminal.

6.2 GENERAL INSTALLATION PROCEDURES

This section describes the steps you take to prepare for the installation of a maintenance update or optional software product.

For a complete description of the installation procedure for a particular software product, refer to the documentation set for that product.

6.2.1 Preparing for Installation

To prepare for the installation of a maintenance update or optional software product, proceed as follows at the console terminal:

1. Log in under the privileged system manager's account.

2. Be sure that you have set the default to the disk that is to receive the update or optional software product. This is typically the system disk (with the logical name SYS$SYSDISK).

3. Establish the following defaults:

```
$ SET UIC [1,4]

$ SET DEFAULT [SYSUPD]
```

   These commands are to be executed in the order shown.

4. Type the following command to initiate the installation of a maintenance update or optional software product:

```
$ @VMSUPDATE
```

You will then see the following message text at the terminal:

```
                    VMS Update Procedure

    This command procedure performs VAX/VMS software updates and
    optional software installations for VAX/VMS Release 2. During
    this sequence, the standard console medium will not be present in
    the console drive. Therefore, the system may be vulnerable to a
    power failure or other fatal crash. If a system crash should
    occur during this period the update sequence can be restarted at
    the beginning of the first incomplete update.

    Dismount the current console medium.

    Please place the first volume in the console drive
```

Note that you will receive a device-not-mounted message if no console floppy diskette is mounted. Ignore the message, and place your first update or optional software floppy diskette in the console drive.

You will receive the following query:

```
    Are you ready to continue?:
```

If you type Y, the installation proceeds.

If you type N, the request to put the first update or optional software floppy diskette in the console drive and the query "Are you ready to continue?:" will be repeated.

At this point, you are ready to install a maintenance update or an optional software product. The procedure for installing a maintenance update is described in Section 6.3; the procedure for installing an optional software product is described in that product's documentation set.

6.2.2 Installation Completion

When the installation of the maintenance update or optional software product is completed, control is returned to the command procedure VMSUPDATE.COM, which sends the following messages to the terminal:

```
Are there more kits to process?:
```

If you type Y, you will receive the following request, and the installation procedure begins again.

```
Please place the first volume in the console drive.
```

If you have no further installations or updates, type N. You then receive the message:

```
Please place the system console medium in the console drive.
```

You should immediately restore the console floppy diskette to the console drive.

Next, you will receive the following query:

```
Are you ready to continue?:
```

If you type Y, the console floppy diskette is automatically mounted and you receive the following message:

```
Requested update sequence is complete.
```

Finally, after installing the maintenance update or optional software product, you should back up the system disk and save the original for future reference. Backing up the system disk is described in Chapter 2.

6.3 INSTALLING MAINTENANCE UPDATES

A distribution kit to update the VAX/VMS system consists of one or more floppy diskettes.

To install a maintenance update to your system, follow the procedure described in Section 6.2.1 and perform the following modifications before you invoke the VMSUPDATE.COM command procedure:

1. Prevent users from gaining access to the system by executing the SHUTDOWN.COM command procedure. Then reboot the system. Executing SHUTDOWN.COM and rebooting the system are described in the VAX/VMS Operator's Guide.

2. Set the login quota to 0 by typing:

```
$ SET LOGIN/INTERACTIVE = 0
```

3. As a precautionary measure, copy the contents of the system disk to another disk.

When directed to place the update floppy diskette in the console drive, replace the console floppy diskette with the first update floppy diskette. Then enter Y to the query:

```
Are you ready to continue?:
```

Continuation of the update is indicated by the display of the announcement:

```
VAX/VMS Version 2.xx Update
```

This message is followed by three questions.

The first question is:

```
Do you want all the updates applied? (Y/N, YES RECOMMENDED):
```

A "yes" (Y) to this question is recommended, because it is the option supported by DIGITAL. Answering "no" (N) lets you accept or reject each patch. Rejecting a patch, however, may make it difficult for DIGITAL to answer problem reports and difficult for you to apply future patches supplied by DIGITAL.

The second question is:

```
Do you want an explanation of each update displayed during the
update? (Y/N):
```

If you type Y, brief descriptions of the patches will be displayed on the console terminal.

The third question is:

```
Do you want previous versions of updated file purged? (Y/N):
```

Type N if there is enough disk space to preserve previous versions of the updated files.

When updating has been completed, the completion messages described in Section 6.2.2 are displayed.

To transfer control of the system to the updated version of VAX/VMS, halt the processor and reboot the system as described in Chapter 3.

APPENDIX A

SYSBOOT MESSAGES

This appendix lists the messages issued by SYSBOOT. Each message consists of a prefix followed by message text, in the form:

%component-x-text

component

The component issuing the message, that is, BOOT or SYSBOOT.

x

The severity level of the error:

E (error)
F (fatal error)
W (warning)

text

The message text. Within the two sections that follow, messages are described in alphabetic order by message text.

A warning message (W) indicates that BOOT or SYSBOOT has altered a user-specified parameter value because that value was not within the allowable range. An error message (E) indicates that a command contains an error or that an I/O error occurred during execution of a command. Commands in which an error occurs have no effect. A fatal error message (F) indicates that the current attempt to boot the system has been terminated.

A.1 BOOT MESSAGES

%BOOT-F-Bootfile not contiguous

Explanation: The file [SYSEXE]SYSBOOT.EXE was located but is not contiguous.

User Action: The disk you are attempting to boot cannot be booted. Obtain another copy of the system disk.

%BOOT-F-I/O error reading boot file

Explanation: An uncorrectable read error occurred while the file [SYSEXE]SYSBOOT.EXE was being read.

User Action: Try booting the disk again. If subsequent attempts fail, obtain another copy of the system disk.

%BOOT-F-Nonexistent drive

Explanation: The specified drive number does not exist.

User Action: Specify an appropriate device unit to the console program, or use a different console bootstrap command procedure.

%BOOT-F-Unable to locate boot file

Explanation: The file [SYSEXE]SYSBOOT.EXE could not be found.

User Action: You are attempting to boot a volume that does not contain a VAX/VMS binary system. Attempt to boot again using an appropriate disk volume.

%BOOT-F-Unexpected exception

Explanation: An unexpected exception occurred while the primary bootstrap (VMB.EXE) was being executed. This condition probably indicates a corrupted SYSBOOT.EXE file or a hardware failure.

User Action: Determine the source of the error, and either obtain a new copy of the system disk or call your local field service representative.

%BOOT-F-Unexpected machine check

Explanation: An unexpected machine check occurred while the primary bootstrap (VMB.EXE) was being executed. This condition probably indicates a corrupted SYSBOOT.EXE file or a hardware failure.

User Action: Determine the source of the error, and either obtain a new copy of the system disk or call your local field service representative.

A.2 SYSBOOT MESSAGES

%SYSBOOT-W-Continue from halt to proceed with boot if desired

Explanation: A potentially serious condition (for example, a missing hardware ECO) has been detected, causing the processor to halt.

User Action: Call your local field service representative.

%SYSBOOT-E-File not contiguous

Explanation: The file specified by a USE command is not contiguous.

User Action: Create a contiguous parameter file.

%SYSBOOT-W-FPLA, PCS, or WCS version less than minimum required for VMS.

Explanation: The hardware ECO level is below that which is required for correct software operation.

User Action: Call your local field service representative.

%SYSBOOT-E-I/O error reading file

Explanation: An unrecoverable I/O error occurred while SYSBOOT was reading a parameter file or the system image. If the error occurred while a parameter file was being read, SYSBOOT does not perform the requested action. If the error occurred while the system image was being read, SYSBOOT terminates the boot operation.

User Action: Attempt to reboot the system or try a different drive.

%SYSBOOT-W-Maximum WS raised to PHD+MINWSCNT

Explanation: SYSBOOT has raised the maximum working set size you specified, to accommodate the minimum working set size allowed by VAX/VMS. To execute, every process requires a minimum fluid working set (MINWSCNT) plus space for its process header (PHD).

User Action: None.

%SYSBOOT-E-No such parameter

Explanation: A parameter name specified in a SET or SHOW command is not a recognized parameter name.

User Action: Reissue the command specifying correct parameter names.

%SYSBOOT-E-Syntax error

Explanation: You issued a command that was syntactically incorrect.

User Action: Reissue the command using proper syntax.

%SYSBOOT-F-Unable to allocate physical memory

Explanation: The sum of pages required for the system page table, nonpaged dynamic pool, interrupt stack, and resident executive exceeds available physical memory.

User Action: Reconfigure the system to require less physical memory and reboot the system. Reduce one or more parameters controlling the allocation of physical memory: NPAGEDYN, BALSETCNT, and VIRTUALPAGECNT.

%SYSBOOT-F-Unable to allocate SPT

Explanation: SYSBOOT cannot find enough contiguous pages of physical memory to contain the required system page table (SPT).

User Action: Reduce parameters controlling SPT size: VIRTUALPAGECNT, BALSETCNT, REALTIME_SPTS, and SPTREQ.

%SYSBOOT-F-Unable to locate driver for boot device

Explanation: SYSBOOT cannot locate the driver image file for the boot device in directory [SYSEXE] on the volume to be booted.

User Action: Put the correct driver image file in the directory [SYSEXE].

Device Type	Driver Name
RK06/RK07	DMDRIVER.EXE
RM03	DRDRIVER.EXE
RP05/RP06	DBDRIVER.EXE

%SYSBOOT-E-Unable to locate file

Explanation: SYSBOOT cannot locate a file specified in a USE command on the volume to be booted.

User Action: Reissue the command specifying the correct file name.

%SYSBOOT-F-Unable to locate SYS.EXE

Explanation: SYSBOOT cannot locate the system image file in directory [SYSEXE] on the boot volume.

User Action: The system disk is either defective or corrupted; or the disk you are accessing is not the system disk. Obtain a new copy of the VAX/VMS system disk.

%SYSBOOT-F-Unexpected exception

Explanation: An unexpected exception has occurred indicating a probable hardware error or SYSBOOT logic error.

User Action: Call your local field service representative.

%SYSBOOT-F-Unexpected machine check

Explanation: An unexpected machine check occurred indicating a probable hardware error or SYSBOOT logic error.

User Action: Call your local field service representative.

%SYSBOOT-F-Unknown processor

Explanation: The processor type code in the system identification register does not correspond to any supported model of a VAX-11 processor.

User Action: Call your local field service representative.

%SYSBOOT-W-Value set to maximum

Explanation: You attempted to set a parameter to a value greater than the maximum allowable value. SYSBOOT has set the parameter to the maximum permissible value.

User Action: None.

%SYSBOOT-W-Value set to minimum

Explanation: You attempted to set a parameter to a value that is less than the allowable minimum value. SYSBOOT has set the parameter to the minimum permissible value.

User Action: None.

%SYSBOOT-W-WS default and quota raised to PDH+MINWSCNT

Explanation: SYSBOOT has raised the default working set size you specified to accommodate the sizes of the process header plus the minimum fluid working set size.

User Action: None.

APPENDIX B

FILES OF THE VAX/VMS SYSTEM

This appendix contains the names and brief descriptions of the files provided by DIGITAL on the VAX/VMS system binary distribution medium. The files on this medium are cataloged in eight directories; two other directories on the medium are provided for later use by the system. The names of all ten directories and descriptions of their contents follow.

1. [SYSERR]

   This directory is reserved for the error log file (ERRLOG.SYS).

2. [SYSEXE]

   As shown in Table B-1, this directory contains commonly used executable images of the VAX/VMS operating system and installation.

3. [SYSHLP]

   As shown in Table B-2, this directory contains text libraries for the HELP utility and other components. (Source examples are listed in the subdirectory [SYSHLP.EXAMPLES] -- Table B-8.)

4. [SYSLIB]

   As shown in Table B-3, this directory contains various macro and object libraries as well as other files used for general reference.

5. [SYSMAINT]

   This directory is reserved for system hardware diagnostic programs.

6. [SYSMGR]

   As shown in Table B-4, this directory contains files used in managing the operating system. This directory is the default directory for the system manager's account.

7. [SYSMSG]

   As shown in Table B-5, this directory contains system message text files.

8. [SYSTEST]

   As shown in Table B-6, this directory contains files used to run the User Environment Test Package (UETP).

9. [SYSUPD]

   As shown in Table B-7, this directory contains files used in applying system updates.

10. [SYSHLP.EXAMPLES]

    As shown in Table B-8, this directory contains sample driver programs, user-written system service programs, and other source code examples of interest.

Table B-1
Files Contained in Directory [SYSEXE]

File Name	Description
4USER.PAR	Reserved for future use
16USER.PAR	VAX/VMS system parameter file
32USER.PAR	VAX/VMS system parameter file
48USER.PAR	VAX/VMS system parameter file
64USER.PAR	VAX/VMS system parameter file
8USER.PAR	VAX/VMS system parameter file
ANALYZ.EXE	VAX/VMS object module analyzer
AUTHORIZE.EXE	User authorization program
BACKTRANS.EXE	Back translator of DCL into MCR commands
BAD.EXE	Bad block locator utility
BADBLOCK.EXE	Dynamic bad block Files-11 ACP subprocess
BCK.EXE	RMS-11 back-up utility
BOOT58.EXE	Reserved for future use
BOOTBLOCK.EXE	Reserved for future use
CANCEL.EXE	CANCEL command
CLEDITOR.EXE[1]	Command language editor
CNV.EXE	RMS-11 file conversion utility
CONINTERR.EXE	Connect-to-Interrupt driver
COPY.EXE	File copying utility
CRDRIVER.EXE	Card reader driver
CREATE.EXE	File and directory creation utility
CRF.EXE	Compatibility mode cross reference utility
CVTHELP.EXE	Version 1.0 to Version 2.0 help file upgrade
CVTUAF.EXE	Version 1.0 to Version 2.0 user authorization file upgrade
DBDRIVER.EXE	RP05 and RP06 disk driver
DCL.EXE	Command interpreter
DCLDEF.STB	Global definitions for DCL structures
DDDRIVER.EXE	Reserved for future use
DEF.EXE	RMS-11 interactive file definition utility
DELETE.EXE	File deletion/purge utility
DFN.EXE	RMS-11 noninteractive file definition utility
DIF.EXE	File compare utility

1. Not supported by DIGITAL.

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Table B-1 (Cont.)
Files Contained in Directory [SYSEXE]

File Name	Description
DIRECTORY.EXE	Directory utility
DISKQUOTA.EXE	Disk quota utility
DISMOUNT.EXE	Volume dismount utility
DISPLAY.EXE	Utility that displays system performance statistics
DLDRIVER.EXE	RL02 disk driver
DMDRIVER.EXE	RK07 disk driver
DMP.EXE	File dump utility
DRDRIVER.EXE	RM03 disk pack driver
DSC1.EXE	Files-11 Structure Level 1 disk save and compress utility
DSC2.EXE	Files-11 Structure Level 2 disk save and compress utility
DSP.EXE	RMS-11 file attribute display utility
DXDRIVER.EXE	RX01 console floppy diskette driver
DYDRIVER.EXE	RX02 floppy diskette driver
EDI.EXE	RSX-11M text editor
EDT.EXE	EDT text editor
ERRFMT.EXE	Error logging facility
F11AACP.EXE	Files-11 Structure Level 1 ancillary control process image
F11BACP.EXE	Files-11 Structure Level 2 ancillary control process image
FLX.EXE	RT-11 file transfer utility
HELP.EXE	Help utility
HEXZAP.EXE[1]	Hexadecimal image patching utility
IFL.EXE	RMS-11 utility index load program
IMGDEF.STB	Global definitions for image activator structures
INFO.EXE[1]	Process information utility
INIT.EXE	Disk device initialization utility
INPSMB.EXE	Card reader input symbiont
INSTALL.EXE	Utility that installs known images
JBCSYSQUE.DAT	Data file for queuing facility
JBCSYSQUE.EXE	Queuing facility
JOBCTL.EXE	Job controller/symbiont manager
LADRIVER.EXE	LPA-11 driver
LALOAD.EXE	Accepts commands from or sends requests to LALOADER to load LPA-11 microcode
LALOADER.EXE	Loads LPA-11 microcode upon power recovery or upon request from LALOAD
LBR.EXE	RSX-11M librarian
LIBRARIAN.EXE	Librarian utility
LINK.EXE	Linker
LOGINOUT.EXE	Login/logout utility
LPDRIVER.EXE	Line printer driver
MAC.EXE	MACRO-11 assembler
MACRO32.EXE	VAX-11 MACRO assembler
MAIL.EXE	Mail utility
MAILEDIT.COM	Default MAIL editing command procedure
MBXDRIVER.EXE	Shared memory mailbox driver

1. Not supported by DIGITAL.

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Table B-1 (Cont.)
Files Contained in Directory [SYSEXE]

File Name	Description
MCR.EXE	MCR command interpreter
MDL.EXE[1]	Structure definition translator
MESSAGE.EXE	Message compiler
MINIMUM.PAR	VAX/VMS system parameter file for minimum hardware configuration
MTAAACP.EXE	Magnetic tape ancillary control process image
NDXDMP.EXE[1]	Runoff indexing utility
NETDRIVER.EXE[2]	DECnet logical link driver
NOTICE.TXT	Text file that can contain announcements to system users
OPCCRASH.EXE	System shutdown utility
OPCOM.EXE	Operator communications utility
PAGEFILE.SYS	System paging file
PAT.EXE	RSX-11M object module patch utility
PATCH.EXE	VAX-11 image file patch utility
PAX.EXE[1]	VAX-11 object module patch utility
PFMANALYZ.EXE[1]	Page fault monitor analyzer utility
PFMFILWRT.EXE[1]	Page fault monitor file writer
PIP.EXE	RSX-11M peripheral interchange utility
PRTSMB.EXE	Print symbiont
QUEMAN.EXE	Queue managing utility command image
REMACP.EXE[2]	Remote device ACP
REMDEVICE.DAT[2]	Remote device data base
RENAME.EXE	File rename utility
REPLY.EXE	Message broadcasting facility
REQUEST.EXE	Operator request facility
RMS.EXE	Record management services image
RMSANLZ.EXE[1]	Utility to display file attributes
RMSDEF.STB[1]	Global definitions for VAX-11 RMS structures
RMSSHARE.EXE	File sharing utility program
RST.EXE	RMS-11 file restoration utility
RSX.EXE	RSX-11M application migration executive main program
RTB.EXE	Utility that writes an RT-11 bootstrap on disk
RTPAD.EXE[2]	Remote terminal command interface
RTTDRIVER.EXE[2]	Remote terminal driver
RUNDET.EXE	Facility that runs detached images
RUNOFF.EXE[1]	Text formatting utility
SDA.EXE	System dump analyzer utility
SEARCH.EXE[1]	File search utility
SET.EXE	SET command processor
SETNAME.EXE[1]	Utility to set process name
SETP0.EXE	SET command processor
SFA.EXE[1]	System file analyzer utility
SHOW.EXE	SHOW command processor
SHUTDOWN.COM	System shutdown command procedure
SLP.EXE	RSX-11M source file editing utility
SORT32.EXE	SORT command processor
SOS.EXE	SOS text editor
SRT.EXE	SORT-11 utility

1. Not supported by DIGITAL.

2. Requires DECnet-VAX optional product for use.

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Table B-1 (Cont.)
Files Contained in Directory [SYSEXE]

File Name	Description
STARTUP.COM	System start-up command procedure
STARTUP.MIN	Alternate system start-up command procedure for system with minimum hardware configuration
STOPREM.EXE[2]	Stop REMACP utility
SUBMIT.EXE	Batch job submission facility
SUMSLP.EXE	Source file editor
SWAPFILE.SYS	System swap file
SYE.EXE	Utility that formats the error log file
SYS.EXE	Operating system image file
SYS.MAP	Map of the operating system image
SYS.STB	Global symbol table of operating system
SYSBOOT.EXE	System bootstrap utility
SYSDEF.STB[1]	Global definitions for executive structures
SYSDUMP.DMP	Crash dump of system image
SYSGEN.EXE	System generation and configuration utility
SYSINIT.EXE	Operating system initialization image
SYSLOAYYY.EXE	Reserved for future use
SYSLOAZZZ.EXE	Reserved for future use
SYSLOA780.EXE	VAX-11/780 system image file
SYSUAF.DAT	User authorization data file
SYSUAF.RL2	Version-2.0- supplied SYSUAF file
TALK.EXE[1]	Interterminal communications utility
TCX.EXE[1]	Runoff indexing utility
TECO.EXE[1]	TECO text editor
TKB.EXE	RSX-11M task builder
TMDRIVER.EXE	Magnetic tape driver
TOC.EXE[1]	Runoff table of contents utility
TSDRIVER.EXE	TS11 Magnetic tape driver
TTDRIVER.EXE	Terminal driver
TYPE.EXE	TYPE command processor
UFD.EXE	User file directory creation utility
UNLOCK.EXE	File unlock utility
USERS.EXE[1]	Interactive users display utility
VFY1.EXE	Files-11 Structure Level 1 file structure verification utility
VFY2.EXE	Files-11 Structure Level 2 file structure verification utility
VIRT32MB.PAR	VAX/VMS system parameter file that supports system with large virtual address space
VMB.EXE	VAX/VMS primary bootstrap
VMOUNT.EXE	Volume mount utility
WHO.EXE[1]	Performs UIC <---> user name translation
WRITEBOOT.EXE	System volume bootblock writing utility
XADRIVER.EXE	Reserved for future use
XFDRIVER.EXE	DR32 system interconnect interface driver
XFLOADER.EXE	DR32 microcode loader utility
XMDRIVER.EXE	DMC-11 Synchronous Communications Line Interface driver
XWDRIVER.EXE[1]	DUP-11 device driver
ZAP.EXE	RSX-11M task/file octal patch utility

1. Not supported by DIGITAL.

2. Requires DECnet-VAX optional product for use.

Table B-2
Files Contained in Directory [SYSHLP]

File Name	Description
DEBUG.HLB	Debugger help library
DISKQUOTA.HLB	Help library for disk quota utility
EDTHELP.HLB	EDT help library
EDTVT100.DOC	EDT keypad layout for VT100
EDTVT52.DOC	EDT keypad layout for VT52
HELPLIB.HLB	Default (DCL) help library
MAIL.HLB	Mail utility help library
PFMON.HLP	Help text for page fault monitor
SDA.HLP	System dump analyzer help file
SFA.HLP[1]	Help file for SFA
SYSGEN.HLB	Help file for SYSGEN
WHO.HLB[1]	Help file for UIC <---> user name translation

1. Not supported by DIGITAL.

Table B-3
Files Contained in Directory [SYSLIB]

File Name	Description
CLIMAC.REQ	Structure definitions for BLISS programs interfacing with the command language interpreter
CRFSHR.EXE	Cross-reference shareable image
DCLINTPRT.EXE	Shareable image for DCL (interpreter part)
DCLTABLES.EXE	Shareable image for DCL (table part)
DEBUG.EXE	VAX/VMS debugging facility
DELTA.EXE	DELTA multimode debugging tool image
DELTA.OBJ	Alternate VAX/VMS debugging tool object
FORDEF.FOR	FORTRAN INCLUDE file: FOR$ symbols
FORIOSDEF.FOR	FORTRAN INCLUDE file: IOSTAT error codes
LBRSHR.EXE	Librarian shareable image
LIB.MLB	Operating system macro library
LIB.REQ	Structure definitions of executive internals for use by BLISS programs
LIBDEF.FOR	FORTRAN program utility INCLUDE files
LOCAL.TEC[1]	TECO macro to reorder local labels
MTHDEF.FOR	FORTRAN INCLUDE files: MATH$ symbols
ODT.OBJ	RSX-11M debugging tool
PGFALTMON.OBJ[1]	Module that initiates page fault monitoring
RMS11.ODL	RMS-11 sample overlay description
RMSLIB.OLB	RMS-11 object library
RMSMAC.MLB	RMS-11 macro library
RMSRES.ODL	RMS-11 shared resident library sample build file
RMSVECTOR.OBJ	Reserved for future use
RSXMAC.SML	RSX-11M compatibility mode macro library
RSXSHR.EXE	Shareable image of RSX-11M application migration executive

1. Not supported by DIGITAL.

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Table B-3 (Cont.)
Files Contained in Directory [SYSLIB]

File Name	Description
RSXUSR.EXE	Shareable image of RSX-11M application migration executive
SEARCH.TEC[1]	TECO macro to search files for strings
SIGDEF.FOR	FORTRAN program utility INCLUDE files
SQU.TEC[1]	Condense TECO macros
STARLET.MLB	System macro library
STARLET.OLB	System object library and Run-Time Library
STARLET.REQ	User interface structures for use by BLISS programs
SUMSHR.EXE	Source update merge shareable image
SYSLIB.OLB	RSX-11M object library
TPAMAC.REQ	Structure definitions for BLISS programs using TPARSE
TRACE.EXE	VAX/VMS error traceback facility
TYPE.TEC[1]	TYPE command utility
VMLIB.OLB	RSX-11M work file support routines
VMSRTL.EXE	Shareable image for Run-Time Library
VT52.TEC[1]	TECO macro that provides a keypad-scope TECO editor
VTEDIT.TEC[1]	VT52/VT100 keypad editor
XFDEF.FOR	Definitions available for programs using DR780 support routines

1. Not supported by DIGITAL.

Table B-4
Files Contained in Directory [SYSMGR]

File Name	Description
CHARTYPE.DAT	Line printer characteristics for print symboint
FORMSTYPE.DAT	Line printer forms description for print symbiont
LPA11STRT.COM	LPA11 site-specific start-up command procedure
RTTLOAD.COM[1]	Remote terminal loader
SYSHUTDWN.COM	Site-specific system shut-down command procedure
SYSTARTUP.COM	Site-specific system start-up command procedure

1. Requires DECnet-VAX optional product for use.

Table B-5
Files Contained in Directory [SYSMSG]

File Name	Description
QIOSYM.MSG	RSX-11M compatibility mode QIO message file
SOS.HLP	Help file for SOS text editor
SYSMSG.EXE	System message file

Table B-6
Files Contained in Directory [SYSTEST]

File Name	Description
APPEND.PIP	Tests PIP append function
DMPASRC.DMP	Master file to test ASCII mode in DMP
DMPBYOC.DMP	Master file to test byte octal format in DMP
DMPDATA.DMP	Good input file for DMP test
DMPDCWD.DMP	Master file to test decimal word format in DMP
GLOBALS1.COM	Command procedure that contains global symbols
GLOBALS2.COM	Command procedure that contains global symbols
MCLBR1.MAC	Macro to test LBR utility
MCLBR2.MAC	Macro to test LBR utility
MCLBR3.MAC	Macro to test LBR utility
OBJLBR1.OBJ	Object module to test LBR utility
OBJLBR2.OBJ	Object module to test LBR utility
OBJLBR3.OBJ	Object module to test LBR utility
PATCHED.PAT	Tests PAT utility
PATCHPAT.OBJ	Patch file to test PAT utility
PIPDATA.PIP	Good input file for PIP test
RANDOM.FLX	Tests FLX utility
SATSSF01.EXE	Tests for event flag services and $SETEXV service
SATSSF02.EXE	Tests for event flag services
SATSSF03.EXE	Tests for logical name services
SATSSF04.EXE	Tests for time services
SATSSF05.EXE	Tests for process control services
SATSSF06.EXE	Tests for process control services
SATSSF07.EXE	Tests for process control services
SATSSF08.EXE	Tests for $CMEXEC and $GETMSG services
SATSSF09.EXE	Tests for I/O services
SATSSF10.EXE	Tests for send system services
SATSSF11.EXE	Tests for I/O services
SATSSF12.EXE	Tests for memory management services
SATSSF13.EXE	Tests for memory management services
SATSSF14.EXE	Tests for memory management services
SATSSF15.EXE	Tests for handler services and $ADJ
SATSSF16.EXE	Tests for $FAO services and $SNDERR
SATSSF17.EXE	Tests for $INPUT, $OUTPUT, $QIO, and $QIOW services
SATSSF18.EXE	Tests for $CREPRC, $SETPRV, and $UNWIND services
SATSSS01.EXE	Tests for I/O services
SATSSS05.EXE	Tests for send message services
SATSSS07.EXE	Tests for $CREMBX, $DELMBX services
SATSSS08.EXE	Tests for $BRDCST service
SATSSS09.EXE	Tests for $FAO, $FAOL SERVICES
SATSSS10.EXE	Tests for $GETMSG and $PUTMSG services
SATSSS22.EXE	Tests for condition handling services
SATSSS26.EXE	Tests for timer and AST services
SATSSS30.EXE	Tests for logical name services
SATSSS35.EXE	Tests for $CREPRC service
SATSSS36.EXE	Tests for $DELPRC service
SATSSS37.EXE	Tests for $SUSPND service
SATSSS38.EXE	Tests for $RESUME service
SATSSS39.EXE	Tests for $HIBER service
SATSSS40.EXE	Tests for $WAKE service
SATSSS41.EXE	Tests for $EXIT service

(continued on next page)

Table B-6 (Cont.)
Files Contained in Directory [SYSTEST]

File Name	Description
SATSSS42.EXE	Tests for $FORCEX service
SATSSS43.EXE	Tests for exit and change mode handling services
SATSSS44.EXE	Tests for $SETPRN service
SATSSS45.EXE	Tests for $SETPRI service
SATSSS46.EXE	Tests for $SETRWM service
SATSSS47.EXE	Tests for $SETPRV service
SATSSS50.EXE	Tests for $ASCEFC, $DACEFC services
SATSSS52.EXE	Tests for $DLCEFC service
SATSSS53.EXE	Tests for $SETEF service
SATSSS54.EXE	Tests for $CLREF service
SATSSS55.EXE	Tests for $READEF service
SATSSS56.EXE	Tests for wait services
SATSSS60.EXE	Tests for time conversion services
SATSSS61.EXE	Tests for $SCHDWK, $CANWAK services
SATSSS70.EXE	Tests for $EXPREG service
SATSSS71.EXE	Tests for $CNTREG service
SATSSS72.EXE	Tests for $CRETVA service
SATSSS73.EXE	Tests for $DELTVA service
SATSSS74.EXE	Tests for global section services (currently disabled)
SATSSS78.EXE	Tests for $LKWSET, $ULWSET services
SATSSS79.EXE	Tests for $LCKPAG, $ULKPAG services
SATSSS80.EXE	Tests for $PURGWS service
SATSSS81.EXE	Tests for $ADJWSL service
SATSSS82.EXE	Tests for $SETPRT service
SATSSS83.EXE	Tests for $SETSWM service
SATSSS90.EXE	Tests for change mode services
SATSSS91.EXE	Tests for $ADJSTK service
SATSUT01.EXE	Utility module for SATSSF05, SATSSF18, and SATSSS35
SATSUT04.EXE	Utility module for SATSSS50
SATSUT05.EXE	Utility module for SATSSS38
SATSUT06.EXE	Utility module for SATSSS40
SATSUT07.EXE	Utility module for SATSSS61
SATSUT08.EXE	Utility module for SATSSS37, SATSSS45
SATSUT09.EXE	Utility module for SATSSS41
SATSUT10.EXE	Utility module for SATSSS52
SATSUT11.EXE	Utility module for SATSSS56
SATSUT12.EXE	Utility module for abort feature
SATSUT13.EXE	Utility module for SATSSS42
SATSUT14.EXE	Utility module for SATSSS36
SCAN.COM	Command procedure that scans service list
SETEXEC.COM	Command procedure that executes test modules
SLPDATA.SLP	Input data to test SLP utility
SLPLIST.SLP	Good output file for SLP test
SLPOUT.SLP	Good output file for SLP test
SMFILE1.DAT	Master data file for VAX-11 SORT test
SMFILE2.DAT	Master data file for VAX-11 SORT test
SMFILE3.DAT	Master data file for VAX-11 SORT test
SMFILE4.DAT	Master data file for VAX-11 SORT test
SORT.DAT	Input data file for VAX-11 SORT tests
SORTED.FLX	Tests FLX utility
SORTUETP.COM	Master script for VAX-11 SORT test

(continued on next page)

Table B-6 (Cont.)
Files Contained in Directory [SYSTEST]

File Name	Description
SSHELP.COM	Command procedure that contains help information for system service tests
SSTEST.COM	Master command procedure for system service tests
TST01A.EXE	Test for QIO, QIOW (RSX-11M directive)
TST01B.EXE	Test for QIO, QIOW (RSX-11M directive)
TST02A.EXE	Test for event flags (RSX-11M directive)
TST03A.EXE	Test for GET TIME, MARK TIME, RUN (RSX-11M directive)
TST03B.EXE	Test for GET TIME, MARK TIME, RUN (RSX-11M directive)
TST06A.EXE	Test for MCR command line, specify SST vector table (RSX-11M directive)
TST07A.EXE	Test for AST services (RSX-11M directive)
TST10A.EXE	Test for SEND DATA, RECEIVE DATA (RSX-11M directive) currently disabled
TST10B.EXE	Test for SEND DATA, RECEIVE DATA (RSX-11M directive) currently disabled
TST11A.EXE	Test for SUSPEND, RESUME (RSX-11M directive)
TST11B.EXE	Test for SUSPEND, RESUME (RSX-11M directive)
TST12A.EXE	Test for ABORT, EXIT-IF (RSX-11M directive)
TST12B.EXE	Test for ABORT, EXIT-IF (RSX-11M directive)
TST15A.EXE	Test for ASSIGN LUN, GET LUN (RSX-11M directive)
TST16A.EXE	Test for CANCEL SCHEDULED requests (RSX-11M directive)
TST16B.EXE	Test for CANCEL SCHEDULED requests (RSX-11M directive)
TST16C.EXE	Test for CANCEL SCHEDULED requests (RSX-11M directive)
TST17A.EXE	Test for CANCEL MARK TIME request (RSX-11M directive)
TST17B.EXE	Test for CANCEL MARK TIME request (RSX-11M directive)
TST20A.EXE	Test for GET TASK PARAMS, REQUEST, RUN (RSX-11M directive)
TST20B.EXE	Test for GET TASK PARAMS, REQUEST, RUN (RSX-11M directive)
UETCOMP00.COM	Main script for compatibility mode utility tests
UETCOMP01.COM	Command procedure for verifying the compatibility mode utility tests
UETCOMP03.COM	Main script for RSX-11M executive directive test
UETCSOS01.DAT	Data file for SOS test
UETCSOS02.CMD	Commands for SOS test
UETCSOS03.DAT	Known good data after SOS editing
UETDISK00.COM	Logs in and runs the disk test
UETDISK00.EXE	Disk device test
UETFORT01.DAT	FORTRAN data file used by UETFORT01
UETFORT97.EXE	Compiled version of UETFORT01 for load test
UETFORT98.EXE	Compiled version of UETFORT02 for load test
UETFORT99.EXE	Compiled program for load test
UETINIT00.EXE	Gets VAX/VMS configuration and builds UETINIDEV.DAT

(continued on next page)

Table B-6 (Cont.)
Files Contained in Directory [SYSTEST]

File Name	Description
UETINIT01.EXE	Quick checks all devices for testability
UETLOAD01.EXE	Controls load test with various numbers of users
UETLOAD02.COM	User script for load test
UETLOAD03.COM	User script for load test
UETLOAD04.COM	User script for load test
UETLOAD05.COM	User script for load test
UETLOAD06.COM	User script for load test
UETLOAD07.COM	User script for load test
UETLOAD08.COM	User script for load test
UETLOAD09.COM	User script for load test
UETLOAD10.COM	User script for load test
UETLOAD11.COM	User script for load test
UETMEMY01.EXE	Tests high page faulting rates in load test
UETNATV00.COM	Script that runs VAX/VMS system service tests
UETNATV01.EXE	Creates a process to run VAX/VMS system service tests
UETNRMS00.COM	Main script for VAX-11 RMS tests
UETNRMS01.EXE	Test program to exercise VAX-11 RMS functions
UETP.COM	Main command procedure for entire UETP
UETPDEV01.EXE	Creates detached process to run I/O device tests
UETPRIN00.COM	Logs in and runs the printer test
UETPRIN00.EXE	Tests printer
UETTAPE00.COM	Logs in and runs the magnetic tape test, including MOUNT and DISMOUNT commands
UETTAPE00.EXE	Tests magnetic tapes on one controller
UETTAPE01.EXE	Creates logical names used for mounting magnetic tapes
UETTAPE02.COM	Delivers exit status from tape test to UETPDEV01
UETTTYS00.COM	Logs in and runs terminal test
UETTTYS00.EXE	Tests terminals for one controller

Table B-7
Files Contained in Directory [SYSUPD]

File Name	Description
BOOTUPD.COM	Command procedure that updates VMS bootstrap file on console floppy diskette
CONSCOPY.COM	Command procedure that copies console floppy diskette
CVTUAF.COM	Command procedure that converts Version 1.0 SYSUAF files to Version 2.0 format
DIRCLENUP.COM	Command procedure that removes dangling directory entries
DXCOPY.COM	Command procedure that copies files from console floppy diskette and restores files to floppy diskette

(continued on next page)

Table B-7 (Cont.)
Files Contained in Directory [SYSUPD]

File Name	Description
SETDEFBOO.COM	Command procedure that sets default boot command file
SWAPFILES.COM	Command procedure that creates swapping, paging, and system dump files of appropriate size for system being installed
UPGRADBLD.COM	Command procedure that builds and applies upgrade kits
UPGRADFIN.COM	Command procedure that completes upgrade operation
VMSKITBLD.COM	Command procedure that builds and copies VAX/VMS distribution disk
VMSKITBLD.DAT	Files in VAX/VMS system disk that drive FLDKITBLD, FLDKITFIN, and VMSKITBLD
VMSUPDATE.COM	System update command procedure

Table B-8
Files Contained in Directory [SYSHLP.EXAMPLES]

File Name	Description
ADDRIVER.MAR	Example device driver for AD11-K
CONNECT.COM	Command procedure that connects device for LABIO system
DRCOPY.PRM	Parameter file for DRCOPY routines
DRCOPYBLD.COM	Command procedure to build DRCOPY.EXE
DRMAST.MAR	VAX-11 RMS interface for DRMASTER.FOR
DRMASTER.FOR	Master subroutines for DRCOPY (the DR32 file transfer program)
DRSLAVE.FOR	Slave subroutines for DRCOPY (the DR32 file transfer program)
DRSLV.MAR	VAX-11 RMS interface for DRSLAVE.FOR
GBLSECUFO.MAR	Opens file that is to be used as a global section for LABIO system
LABCHNDEF.FOR	Defines information associated wth each A/D for LABIO system
LABIO.OPT	Linker options file for linking modules to be used in LABIO system
LABIOACQ.FOR	Acquires data for LABIO system
LABIOCIN.MAR	Contains connect-to-interrupt call for LABIO system
LABIOCIN.OPT	Linker options file for linking LABIO_DATA_ACQ
LABIOCOM.FOR	Attaches a LABIO user program to the LABIO system modules of the LABIO system
LABIOCOMP.COM	Command procedure to compile and assemble the modules of the LABIO system
LABIOCON.FOR	Handles user requests and modifies the data base for LABIO system
LABIOLINK.COM	Command procedure to link LABIO system
LABIOPEAK.FOR	Samples channel for peak data in LABIO system
LABIOSAMP.FOR	Samples channel in intervals, reporting date, time, and average value on logical device for LABIO system

(continued on next page)

Table B-8 (Cont.)
Files Contained in Directory [SYSHLP.EXAMPLES]

File Name	Description
LABIOSEC.FOR	Places LABIO_SECTION on page boundary
LABIOSTAT.FOR	Displays status of the A/D channels for LABIO system
LABIOSTRT.COM	Command procedure to start LABIO system
LABMBXDEF.FOR	Defines mailbox block for LABIO system
LBRDEMO.COM	Command procedure to create Librarian DEMO.EXE
LBRDEMO.FOR	Librarian demo (first part)
LBRMAC.MAR	Librarian demo (second part)
LPATEST.FOR	LPA11-K test program
PEAK.FOR	Peak selection routine in LABIO system
SCRFT.MAR	Optional screen package (SCR$...in RTL) extension to handle foreign terminals
TESTLABIO.FOR	Tests LABIO sytem
TDRIVER.MAR	Template for user-written driver
USSDISP.MAR	Sample user system service dispatch and service examples
USSLINK.COM	Link command procedure for USSDISP
USSTEST.MAR	Sample program to invoke one of the example user services implemented in USSDISP
USSTSTLNK.COM	Link command procedure for USSTEST
XADRIVER.MAR	DR-11 driver
XAMESSAGE.MAR	DR-11 test program
XATEST.FOR	Companion program for XAMESSAGE

APPENDIX C

BOOTSTRAP COMMAND PROCEDURES

This appendix contains samples of the command procedures used to bootstrap the system.

```
DB3GEN.;1                       18-AUG-1978 15:58:31.05         Page 1

   50   !
   55   !       DB3 CONVERSATIONAL BOOT COMMAND FILE - DB3GEN.
   57   !       BOOT FROM DB3 AND STOP IN SYSBOOT TO ALTER PARAMETERS
   60   !
  100   HALT                        ! HALT PROCESSOR
  200   UNJAM                       ! UNJAM SBI
  300   INIT                        ! INIT PROCESSOR
  400   DEPOSIT/I 11 20003800       ! SET UP SCBB
  500   DEPOSIT R0 0                ! DISK PACK DEVICE TYPE
  600   DEPOSIT R1 8                ! MBA TR=8
  700   DEPOSIT R2 3                ! ADAPTER UNIT = 3
  800   DEPOSIT R3 3                ! CONTROLLER UNIT = 3
  900   DEPOSIT R4 0                ! BOOT BLOCK LBN (UNUSED)
 1000   DEPOSIT R5 1                ! SOFTWARE BOOT FLAGS (CONVERSATIONAL BOOT)
 1100   DEPOSIT PP 0                ! SET NO MACHINE CHECK EXPECTED
 1200   START 20003000              ! START ROM PROGRAM
 1300   WAIT DONE                   ! WAIT FOR COMPLETION
 1400                               !
 1500   EXAMINE SP                  ! SHOW ADDRESS OF WORKING MEMORY+^X200
 1600   LOAD VMB.EXE/START:0        ! LOAD PRIMARY BOOTSTRAP
 1700   START 0                     ! AND START IT
```

```
DB6GEN.;1                          18-AUG-1978 15:58:35.36          Page 1

   50   !
   55   !       DB6 CONVERSATIONAL BOOT COMMAND FILE - DB6GEN.
   57   !       BOOT FROM DB6 AND STOP IN SYSBOOT TO ALTER PARAMETERS
   60   !
  100   HALT                        ! HALT PROCESSOR
  200   UNJAM                       ! UNJAM SBI
  300   INIT                        ! INIT PROCESSOR
  400   DEPOSIT/I 11 20003800       ! SET UP SCBB
  500   DEPOSIT R0 0                ! DISK PACK DEVICE TYPE
  600   DEPOSIT R1 8                ! MBA TR=8
  700   DEPOSIT R2 6                ! ADAPTER UNIT = 6
  800   DEPOSIT R3 6                ! CONTROLLER UNIT = 6
  900   DEPOSIT R4 0                ! BOOT BLOCK LBN (UNUSED)
 1000   DEPOSIT R5 1                ! SOFTWARE BOOT FLAGS (CONVERSATIONAL BOOT)
 1100   DEPOSIT FP 0                ! SET NO MACHINE CHECK EXPECTED
 1200   START 20003000              ! START ROM PROGRAM
 1300   WAIT DONE                   ! WAIT FOR COMPLETION
 1400                               !
 1500   EXAMINE SP                  ! SHOW ADDRESS OF WORKING MEMORY+^X200
 1600   LOAD VMB.EXE/START:0        ! LOAD PRIMARY BOOTSTRAP
 1700   START 0                     ! AND START IT
```

DB1800.CMD;2 18-AUG-1978 15:57:56.51 Page 1

```
   50   !
   55   !       DB1 BOOT COMMAND FILE - DB1800.CMD
   60   !
  100   HALT                        ! HALT PROCESSOR
  200   UNJAM                       ! UNJAM SBI
  300   INIT                        ! INIT PROCESSOR
  400   DEPOSIT/I 11 20003800       ! SET UP SCBB
  500   DEPOSIT R0 0                ! DISK PACK DEVICE TYPE
  600   DEPOSIT R1 8                ! MBA TR=8
  700   DEPOSIT R2 1                ! ADAPTER UNIT = 1
  800   DEPOSIT R3 1                ! CONTROLLER UNIT = 1
  900   DEPOSIT R4 0                ! BOOT BLOCK LBN (UNUSED)
 1000   DEPOSIT R5 0                ! SOFTWARE BOOT FLAGS
 1100   DEPOSIT FP 0                ! SET NO MACHINE CHECK EXPECTED
 1200   START 20003000              ! START ROM PROGRAM
 1300   WAIT DONE                   ! WAIT FOR COMPLETION
 1400                               !
 1500   EXAMINE SP                  ! SHOW ADDRESS OF WORKING MEMORY+^X200
 1600   LOAD VMB.EXE/START:.        ! LOAD PRIMARY BOOTSTRAP
 1700   START .                     ! AND START IT
```

DB0BOO.CMD;2 18-AUG-1978 15:57:54.24 Page 1

```
   50   !
   55   !        DB0 BOOT COMMAND FILE - DB0BOO.CMD
   60   !
  100   HALT                        ! HALT PROCESSOR
  200   UNJAM                       ! UNJAM SBI
  300   INIT                        ! INIT PROCESSOR
  400   DEPOSIT/I 11 20003800       ! SET UP SCBB
  500   DEPOSIT R0 0                ! DISK PACK DEVICE TYPE
  600   DEPOSIT R1 8                ! MBA TR=8
  700   DEPOSIT R2 0                ! ADAPTER UNIT = 0
  800   DEPOSIT R3 0                ! CONTROLLER UNIT = 0
  900   DEPOSIT R4 0                ! BOOT BLOCK LBN (UNUSED)
 1000   DEPOSIT R5 0                ! SOFTWARE BOOT FLAGS
 1100   DEPOSIT FP 0                ! SET NO MACHINE CHECK EXPECTED
 1200   START 20003000              ! START ROM PROGRAM
 1300   WAIT DONE                   ! WAIT FOR COMPLETION
 1400                               !
 1500   EXAMINE SP                  ! SHOW ADDRESS OF WORKING MEMORY+^X200
 1600   LOAD VMB.EXE/START:*        ! LOAD PRIMARY BOOTSTRAP
 1700   START *                     ! AND START IT
```

DEFBOO.CMD;3 18-AUG-1978 15:58:13.10 Page 1

```
   50   !
   55   !       DB82 BOOT COMMAND FILE - DEFBOO.CMD
   60   !
  100   HALT                        ! HALT PROCESSOR
  200   UNJAM                       ! UNJAM SBI
  300   INIT                        ! INIT PROCESSOR
  400   DEPOSIT/I 11 20003800       ! SET UP SCBB
  500   DEPOSIT R0 0                ! DISK PACK DEVICE TYPE
  600   DEPOSIT R1 9                ! MBA TR=9 ; SECOND MBA
  700   DEPOSIT R2 2                ! ADAPTER UNIT = 2
  800   DEPOSIT R3 2                ! CONTROLLER UNIT = 2
  900   DEPOSIT R4 0                ! BOOT BLOCK LBN (UNUSED)
 1000   DEPOSIT R5 2                ! SOFTWARE BOOT FLAGS (KEEP DEBUG CODE)
 1100   DEPOSIT FP 0                ! SET NO MACHINE CHECK EXPECTED
 1200   START 20003000              ! START ROM PROGRAM
 1300   WAIT DONE                   ! WAIT FOR COMPLETION
 1400                               !
 1500   EXAMINE SP                  ! SHOW ADDRESS OF WORKING MEMORY+^X200
 1600   LOAD VMB.EXE/START:*        ! LOAD PRIMARY BOOTSTRAP
 1700   START *                     ! AND START IT
```

```
RESTAR.CMD;2                    3-APR-1980 15:24:59.03          Page 1

!
!       RESTART COMMMAND FILE - RESTAR.CMD
!
!       THIS COMMAND FILE IS INVOKED IN THE EVENT OF POWER RECOVERY AND
!       OTHER CONSOLE DETECTED RESTART CONDITIONS IF THE AUTO RESTART SWITCH
!       IS SET.  IT CAN ALSO BE INVOKED MANUALLY WITH THE COMMAND:
!                               @RESTAR.CMD
!
HALT                        ! HALT PROCESSOR
INIT                        ! INITIALIZE PROCESSOR
DEPOSIT/I 11 20003800       ! SET ADDRESS OF SCB BASE
DEPOSIT R0 0                ! CLEAR UNUSED REGISTERS
DEPOSIT R1 3                ! UBA TR=3
DEPOSIT R2 0                ! CLEAR UNUSED REGISTER
DEPOSIT R3 0                ! CLEAR UNUSED REGISTER
DEPOSIT R4 0                ! CLEAR UNUSED REGISTER
DEPOSIT R5 0                ! CLEAR UNUSED REGISTER
DEPOSIT FP 0                ! NO MACHINE CHECK EXPECTED
START 20003004              ! START RESTART REFEREE
```

DM0BOO,ILV;1 18-AUG-1978 15:57:50.81 Page 1

```
  100   !
  200   !       DM0 BOOT COMMAND FILE FOR INTERLEAVED MEMORIES - DM0BOO,ILV
  300   !       THIS IS A TEMPLATE COMMAND FILE FOR BOOTING FROM RK06/RK07 DISKS
  400   !       IN SYSTEMS WITH TWO INTERLEAVED MEMORY CONTROLLERS.  THE MEMORY
  500   !       CONTROLLERS ARE ASSUMED TO BE AT TR NUMBERS 0 AND 1.
  550   !
  555   !       THIS COMMAND FILE SHOULD BE EDITED TO CHANGE THE UNIT NUMBER IF
  560   !       NECCESSARY AND USED TO REPLACE THE DEFAULT BOOT COMMAND FILE.
  600   !
  700   HALT                    ! HALT PROCESSOR
  800   UNJAM                   ! UNJAM SBI
  900   INIT                    ! INIT PROCESSOR
 1000   DEPOSIT/I 11 20003800   ! SET UP SCBB
 1100   DEPOSIT R0 1            ! CARTRIDGE DISK
 1200   DEPOSIT R1 3            ! UBA TR=3
 1300   DEPOSIT R2 3FF20        ! CSR ADDRESS OFFSET = 3FF20
 1400   DEPOSIT R3 0            ! CONTROLLER UNIT = 0
 1500   DEPOSIT R4 0            ! BOOT BLOCK LBN (UNUSED)
 1600   DEPOSIT R5 0            ! SOFTWARE BOOT FLAGS
 1700   DEPOSIT FP 0            ! SET NO MACHINE CHECK EXPECTED
 1705   DEPOSIT 20002000 101    ! ENABLE INTERLEAVE FOR TR #1 MEMORY CONTROLLER
 1710   DEPOSIT 20002004 4000   ! FORCE 0 STARTING ADDRESS
 1715   DEPOSIT 20004000 101    ! ENABLE INTERLEAVE FOR TR #2 MEMORY CONTROLLER
 1720   DEPOSIT 20004004 4000   ! FORCE 0 STARTING ADDRESS
 1800   START 20003000          ! START ROM PROGRAM
 1900   WAIT DONE               ! WAIT FOR COMPLETION
 2000                           !
 2100   EXAMINE SP              ! SHOW ADDRESS OF WORKING MEMORY+^X200
 2200   LOAD VMB.EXE/START:*    ! LOAD PRIMARY BOOTSTRAP
 2300   START *                 ! AND START IT
```

DB0BOO.ILV;1 18-AUG-1978 15:57:46.42 Page 1

```
  100   !
  200   !       DB0 BOOT COMMAND FILE FOR INTERLEAVED MEMORIES - DB0BOO.ILV
  212   !       THIS IS A TEMPLATE COMMAND FILE FOR BOOTING FROM RM03/RP06 DISKS
  224   !       IN SYSTEMS WITH TWO INTERLEAVED MEMORY CONTROLLERS.  THE MEMORY
  236   !       CONTROLLERS ARE ASSUMED TO BE AT TR NUMBERS 0 AND 1.
  248   !
  260   !       THIS COMMAND FILE SHOULD BE EDITED TO CHANGE THE UNIT NUMBER IF
  272   !       NECCESSARY AND USED TO REPLACE THE DEFAULT BOOT COMMAND FILE.
  284   !
  300   !
  400   HALT                    ! HALT PROCESSOR
  500   UNJAM                   ! UNJAM SBI
  600   INIT                    ! INIT PROCESSOR
  700   DEPOSIT/I 11 20003800   ! SET UP SCBB
  800   DEPOSIT R0 0            ! DISK PACK DEVICE TYPE
  900   DEPOSIT R1 8            ! MBA TR=8
 1000   DEPOSIT R2 0            ! ADAPTER UNIT = 0
 1100   DEPOSIT R3 0            ! CONTROLLER UNIT = 0
 1200   DEPOSIT R4 0            ! BOOT BLOCK LBN (UNUSED)
 1300   DEPOSIT R5 0            ! SOFTWARE BOOT FLAGS
 1400   DEPOSIT FP 0            ! SET NO MACHINE CHECK EXPECTED
 1420   DEPOSIT 20002000 101    ! ENABLE INTERLEAVE FOR TR #1 MEMORY CONTROLLER
 1440   DEPOSIT 20002004 4000   ! FORCE 0 STARTING ADDRESS
 1460   DEPOSIT 20004000 101    ! ENABLE INTERLEAVE FOR TR #2 MEMORY CONTROLLER
 1480   DEPOSIT 20004004 4000   ! FORCE 0 STARTING ADDRESS
 1500   START 20003000          ! START ROM PROGRAM
 1600   WAIT DONE               ! WAIT FOR COMPLETION
 1700                           !
 1800   EXAMINE SP              ! SHOW ADDRESS OF WORKING MEMORY+^X200
 1900   LOAD VMB.EXE/START:0    ! LOAD PRIMARY BOOTSTRAP
 2000   START 0                 ! AND START IT
```

D80800.ILV;1 18-AUG-1978 15:57:46.42 Page 1

```
  100   !
  200   !       DB0 BOOT COMMAND FILE FOR INTERLEAVED MEMORIES - D80800.ILV
  212   !       THIS IS A TEMPLATE COMMAND FILE FOR BOOTING FROM RM03/RP06 DISKS
  224   !       IN SYSTEMS WITH TWO INTERLEAVED MEMORY CONTROLLERS.  THE MEMORY
  236   !       CONTROLLERS ARE ASSUMED TO BE AT TR NUMBERS 0 AND 1.
  248   !
  260   !       THIS COMMAND FILE SHOULD BE EDITED TO CHANGE THE UNIT NUMBER IF
  272   !       NECCESSARY AND USED TO REPLACE THE DEFAULT BOOT COMMAND FILE.
  284   !
  300   !
  400   HALT                      ! HALT PROCESSOR
  500   UNJAM                     ! UNJAM SBI
  600   INIT                      ! INIT PROCESSOR
  700   DEPOSIT/I 11 20003800     ! SET UP SCBB
  800   DEPOSIT R0 0              ! DISK PACK DEVICE TYPE
  900   DEPOSIT R1 8              ! MBA TR=8
 1000   DEPOSIT R2 0              ! ADAPTER UNIT = 0
 1100   DEPOSIT R3 0              ! CONTROLLER UNIT = 0
 1200   DEPOSIT R4 0              ! BOOT BLOCK LBN (UNUSED)
 1300   DEPOSIT R5 0              ! SOFTWARE BOOT FLAGS
 1400   DEPOSIT FP 0              ! SET NO MACHINE CHECK EXPECTED
 1420   DEPOSIT 20002000 101      ! ENABLE INTERLEAVE FOR TR #1 MEMORY CONTROLLER
 1440   DEPOSIT 20002004 4000     ! FORCE 0 STARTING ADDRESS
 1460   DEPOSIT 20004000 101      ! ENABLE INTERLEAVE FOR TR #2 MEMORY CONTROLLER
 1480   DEPOSIT 20004004 4000     ! FORCE 0 STARTING ADDRESS
 1500   START 20003000            ! START ROM PROGRAM
 1600   WAIT DONE                 ! WAIT FOR COMPLETION
 1700                             !
 1800   EXAMINE SP                ! SHOW ADDRESS OF WORKING MEMORY+^X200
 1900   LOAD VMB.EXE/START:0      ! LOAD PRIMARY BOOTSTRAP
 2000   START 0                   ! AND START IT
```

DB0B00.ILV;1 18-AUG-1978 15:57:46.42 Page 1

```
  100   !
  200   !       DB0 BOOT COMMAND FILE FOR INTERLEAVED MEMORIES - DB0B00.ILV
  212   !       THIS IS A TEMPLATE COMMAND FILE FOR BOOTING FROM RM03/RP06 DISKS
  224   !       IN SYSTEMS WITH TWO INTERLEAVED MEMORY CONTROLLERS.  THE MEMORY
  236   !       CONTROLLERS ARE ASSUMED TO BE AT TR NUMBERS 0 AND 1.
  248   !
  260   !       THIS COMMAND FILE SHOULD BE EDITED TO CHANGE THE UNIT NUMBER IF
  272   !       NECCESSARY AND USED TO REPLACE THE DEFAULT BOOT COMMAND FILE.
  284   !
  300   !
  400   HALT                    ! HALT PROCESSOR
  500   UNJAM                   ! UNJAM SBI
  600   INIT                    ! INIT PROCESSOR
  700   DEPOSIT/I 11 20003800   ! SET UP SCBB
  800   DEPOSIT R0 0            ! DISK PACK DEVICE TYPE
  900   DEPOSIT R1 8            ! MBA TR=8
 1000   DEPOSIT R2 0            ! ADAPTER UNIT = 0
 1100   DEPOSIT R3 0            ! CONTROLLER UNIT = 0
 1200   DEPOSIT R4 0            ! BOOT BLOCK LBN (UNUSED)
 1300   DEPOSIT R5 0            ! SOFTWARE BOOT FLAGS
 1400   DEPOSIT FP 0            ! SET NO MACHINE CHECK EXPECTED
 1420   DEPOSIT 20002000 101    ! ENABLE INTERLEAVE FOR TR #1 MEMORY CONTROLLER
 1440   DEPOSIT 20002004 4000   ! FORCE 0 STARTING ADDRESS
 1460   DEPOSIT 20004000 101    ! ENABLE INTERLEAVE FOR TR #2 MEMORY CONTROLLER
 1480   DEPOSIT 20004004 4000   ! FORCE 0 STARTING ADDRESS
 1500   START 20003000          ! START ROM PROGRAM
 1600   WAIT DONE               ! WAIT FOR COMPLETION
 1700                           !
 1800   EXAMINE SP              ! SHOW ADDRESS OF WORKING MEMORY+^X200
 1900   LOAD VMB.EXE/START:0    ! LOAD PRIMARY BOOTSTRAP
 2000   START 0                 ! AND START IT
```

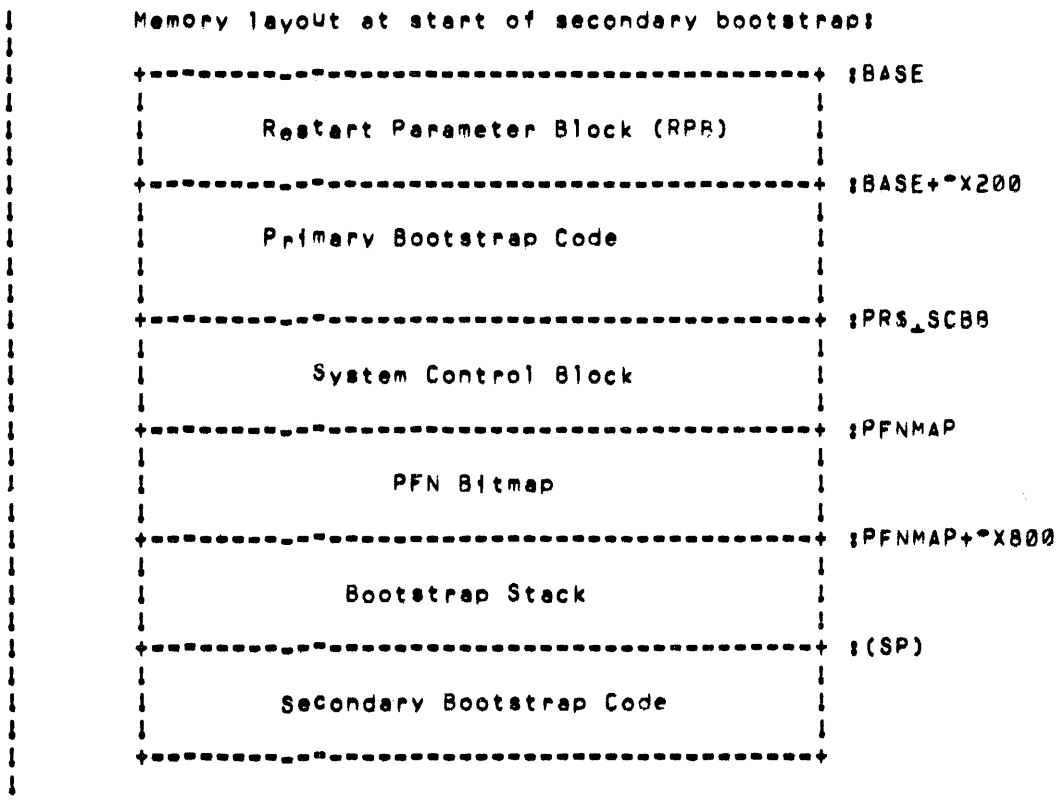
D80800.ILV;1 18-AUG-1978 15:57:46.42 Page 1

```
  100   !
  200   !       DB0 BOOT COMMAND FILE FOR INTERLEAVED MEMORIES - D80800.ILV
  212   !       THIS IS A TEMPLATE COMMAND FILE FOR BOOTING FROM RM03/RP06 DISKS
  224   !       IN SYSTEMS WITH TWO INTERLEAVED MEMORY CONTROLLERS.  THE MEMORY
  236   !       CONTROLLERS ARE ASSUMED TO BE AT TR NUMBERS 0 AND 1.
  248   !
  260   !       THIS COMMAND FILE SHOULD BE EDITED TO CHANGE THE UNIT NUMBER IF
  272   !       NECCESSARY AND USED TO REPLACE THE DEFAULT BOOT COMMAND FILE.
  284   !
  300   !
  400   HALT                      ! HALT PROCESSOR
  500   UNJAM                     ! UNJAM SBI
  600   INIT                      ! INIT PROCESSOR
  700   DEPOSIT/I 11 20003800     ! SET UP SCBB
  800   DEPOSIT R0 0              ! DISK PACK DEVICE TYPE
  900   DEPOSIT R1 8              ! MBA TR=8
 1000   DEPOSIT R2 0              ! ADAPTER UNIT = 0
 1100   DEPOSIT R3 0              ! CONTROLLER UNIT = 0
 1200   DEPOSIT R4 0              ! BOOT BLOCK LBN (UNUSED)
 1300   DEPOSIT R5 0              ! SOFTWARE BOOT FLAGS
 1400   DEPOSIT FP 0              ! SET NO MACHINE CHECK EXPECTED
 1420   DEPOSIT 20002000 101      ! ENABLE INTERLEAVE FOR TR #1 MEMORY CONTROLLER
 1440   DEPOSIT 20002004 4000     ! FORCE 0 STARTING ADDRESS
 1460   DEPOSIT 20004000 101      ! ENABLE INTERLEAVE FOR TR #2 MEMORY CONTROLLER
 1480   DEPOSIT 20004004 4000     ! FORCE 0 STARTING ADDRESS
 1500   START 20003000            ! START ROM PROGRAM
 1600   WAIT DONE                 ! WAIT FOR COMPLETION
 1700                             !
 1800   EXAMINE SP                ! SHOW ADDRESS OF WORKING MEMORY+^X200
 1900   LOAD VMB.EXE/START:0      ! LOAD PRIMARY BOOTSTRAP
 2000   START 0                   ! AND START IT
```

```
RESTAR.ILV;2                    3-APR-1980 15:25:05.70          Page 1

!
!       RESTART COMMMAND FILE FOR INTERLEAVED MEMORIES - RESTAR.ILV
!       THIS COMMAND FILE SHOULD REPLACE RESTAR.CMD FOR SYSTEMS WITH TWO
!       INTERLEAVED MEMORY CONTROLLERS.  MEMORY CONTROLLERS ARE ASSUMED
!       TO BE AT TR NUMBERS 1 AND 2.
!
!       THIS COMMAND FILE IS INVOKED IN THE EVENT OF POWER RECOVERY AND
!       OTHER CONSOLE DETECTED RESTART CONDITIONS IF THE AUTO RESTART SWITCH
!       IS SET.  IT CAN ALSO BE INVOKED MANUALLY WITH THE COMMAND:
!                           @RESTAR.CMD
!
HALT                    ! HALT PROCESSOR
INIT                    ! INITIALIZE PROCESSOR
DEPOSIT/I 11 20003800   ! SET ADDRESS OF SCB BASE
DEPOSIT R0 0            ! CLEAR UNUSED REGISTERS
DEPOSIT R1 3            ! UBA TR=3
DEPOSIT R2 0            ! CLEAR UNUSED REGISTER
DEPOSIT R3 0            ! CLEAR UNUSED REGISTER
DEPOSIT R4 0            ! CLEAR UNUSED REGISTER
DEPOSIT R5 0            ! CLEAR UNUSED REGISTER
DEPOSIT FP 0            ! NO MACHINE CHECK EXPECTED
DEPOSIT 20002000 101    ! ENABLE INTERLEAVE FOR TR #1 MEMORY CONTROLLER
DEPOSIT 20002004 4000   ! FORCE 0 STARTING ADDRESS
DEPOSIT 20004000 101    ! ENABLE INTERLEAVE FOR TR #2 MEMORY CONTROLLER
DEPOSIT 20004004 4000   ! FORCE 0 STARTING ADDRESS
START 20003004          ! START RESTART REFEREE
```

```
!               Bootstrap Help File - BOOT.HLP
!
!
!       This file describes the input parameters to the bootstrap program
!       VMB.EXE .  Normally the bootstrap will lookup the file [SYSEXE]SYSBOOT.EXE
!       on the specified device, load it into memory and transfer control
!       to it.
!
!       Two sets of command files are provided on the VAX/VMS console floppy
!       to perform the necessary bootstrap operations.  One set of these command
!       files will boot selecting an option to stop in SYSBOOT to alter system
!       parameters.  They are invoked as console indirect command files.
!
!               @DM0GEN                 ! Boot from RK07 unit 0
!               @DM1GEN                 !                unit 1
!               @DM2GEN                 !                unit 2
!               @DM3GEN                 !                unit 3
!               @DB0GEN                 ! Boot from RM03/RP06 unit 0
!               @DB1GEN                 !                     unit 1
!               @DB2GEN                 !                     unit 2
!               @DB3GEN                 !                     unit 3
!               @DB4GEN                 !                     unit 4
!               @DB5GEN                 !                     unit 5
!               @DB6GEN                 !                     unit 6
!               @DB7GEN                 !                     unit 7
!
!       The other set of these command files is normally invoked only via
!       the BOOT command but may be invoked explicitly as indirect command files.
!       These command files perform a normal, non-interactive boot without any
!       stop in SYSBOOT to change parameters.
!
!       BOOT DM0    or    @DM0BOO.CMD   ! Boot RK07 unit 0
!       BOOT DM1                        !           unit 1
!       BOOT DM2                        !           unit 2
!       BOOT DM3                        !           unit 3
!       BOOT DB0                        ! Boot RM03 or RP06 unit 0
!       BOOT DB1                        !                   unit 1
!       BOOT DB2                        !                   unit 2
!       BOOT DB3                        !                   unit 3
!       BOOT DB4                        !                   unit 4
!       BOOT DB5                        !                   unit 5
!       BOOT DB6                        !                   unit 6
!       BOOT DB7                        !                   unit 7
!
!       The bootstrap is loaded into memory at least one page above the first
!       available working memory to allow space for the Restart Parameter
!       Block.  The address of the base of the bootstrap is passed through
!       SP, the stack pointer, where it also serves as a temporary stack pointer.
!
! Input Parameters:
!       R0  -  <31:4>=MBZ; <3:0>=Device Type Code
!                       0 => Disk Pack          (RM03/RP04/RP05/RP06/RP07)
!                       1 => Cartridge Disk     (RK06/RK07)
!
!       R1  -  <31:4>=MBZ; <3:0>=System Bus Address("TR" Number)
!                For most configurations the following convention has been
!                used:
!                       TR Number       Adapter / Controller
!                       ---------       --------------------
!                           3           UNIBUS adapter
!                           8           MASSBUS adapter number 1
```

```
                        9          MASSBUS adapter number 2

      R2  -  For UBA:
                     <31:18>=MBZ; <17:3>=UNIBUS Address of Control Register
                     <2:0>=MBZ
                     RK06/RK07 CSR = 3FF20
             FOR MBA:
                     <31:4>=MBZ; <3:0>=Controller/Formatter Number
      R3  -  <31:4>=MBZ; <3:0>=Unit Number
      R4  -  <31:0>=Logical Block Number to read as boot block
      R5  -  <31:0>=Software Boot Control flags
              Bit     Meaning
              ---     -------
               0      Conversational boot. At various points in the system
                      boot procedure, parameter and other input will be
                      solicited from the console.

               1      Debug.  This flag is passed through to VMS and causes
                      the code for the exec debugger to be included in
                      the running system.

               2      Initial breakpoint. If this flag is set, and the exec
                      debugger code is included (flag bit 1) then a breakpoint
                      will occur immediately after the exec enables mapping.

               3      Boot block.  If this flag is set then the boot block
                      will be read and control transfered to it.

               4      Diagnostic boot.  This flag causes a boot by file
                      name for the diagnostic supervisor.

               5      Bootstrap breakpoint. This flag causes the bootstrap
                      to stop a breakpoint after performing necessary init-
                      ialization if it has been built with debug code.

               6      Image header. If this flag is set the transfer address
                      from the image header of the boot file will be used.
                      Otherwise control will transfer to the first byt of the
                      boot file.

               7      Memory test inhibit. This flag inhibits the testing
                      of memory during bootstrapping.

               8      File name. Causes the bootstrap to solicit the name
                      of the boot file.

               9      Halt before transfer.  Causes a HALT instruction
                      to be executed prior to the transfer to the bootfile.
                      This option is useful for debugging purposes.


      SP  -  ADDRESS+(^X200) of first working 64Kb memory region
             usable as both stack pointer and pointer to good memory.


Output Parameters:
      R10     -      Base address of region containing secondary bootstrap
      R11     -      Pointer to Restart Parameter Block (RPB)
      SP      -      Stack pointer
      PR$_SCBB -     System Control Block base register
```


Memory layout at start of secondary bootstrap:
Restart Parameter Block (RPB)
Primary Bootstrap Code
System Control Block
PFN Bitmap
Bootstrap Stack
Secondary Bootstrap Code
;BASE
;BASE+^X200
;PRS_SCBB
;PFNMAP
;PFNMAP+^X800
;(SP)

APPENDIX D

VAX/VMS SOURCE KIT

The VAX/VMS source kit is a multivolume tape set that contains source files and object files for all standard components of the VAX/VMS system, and command procedures, languages, and utilities needed to build a source kit on disk. (The languages and utilities used in this building operation are not supported by DIGITAL.)

Before you can begin building a source kit, you must have two free RP06 disks: one is used to store the source kit, the other is used to store the output of the system build.

To use the VAX/VMS source kit, you must mount the first volume of the kit (the tape labeled VAX/VMS V2.0 VMSRC1 SCR MT9) and the RP06 disk and copy the files from tape to disk. This copying operation continues until all the files are copied to disk. To do this, use the following sequence of DCL commands:

```
$ ALLOCATE MTcn:
$ ALLOCATE DBcn:
$ MOUNT/FOREIGN MTcn:
$ MOUNT/FOREIGN DBcn:
$ MCR DSC2 DBcn:  = MTcn:
```

When the last tape has been copied to disk, dismount both the tape and disk, and remount the disk using the /SYSTEM command qualifier (the label on the disk is VMSMASTER). Then execute the following command procedure to install the source kit:

```
$ @DBcn:[SYSBLDCOM]SRCINSTAL
```

This command procedure creates a system build account on the system that contains the logical name definitions and private commands needed to set up the proper environment to run a system build. To log in to this account, specify the user name SYSTEMBUILD and the password CAVEAT_EMPTOR.

Finally, to obtain a general description of the source kit, either display (by means of the TYPE command) or list (by means of the PRINT command) the file [SYSBLDCOM]SOURCEKIT.DOC.

APPENDIX E

BOOT PROCESS

This appendix details the steps required to produce a running VAX/VMS system.

1. Power up occurs.

2. Code in LSI-11 read-only memory (ROM) reads block 0 from the floppy diskette into LSI-11 memory.

3. This code reads CONSOL.SYS (the console program) from the floppy diskette into LSI-11 memory.

4. CONSOL.SYS now has control of the LSI-11. This program performs the following steps:

   a. Loads WCS from the floppy diskette file WCSxxx.PAT.

   b. Accepts commands interactively or from a command procedure on the floppy to:

      (1) Set up SCBB for memory controller ROM code.

      (2) Set up registers that indicate boot device type, TR, unit, CSR, and boot flags.

      (3) Initiate execution of memory controller ROM code; find the first good contiguous 64K bytes of VAX/VMS memory. (Use adapter mapping register space for scratch space.) Return base address + ^X200 in stack pointer (SP).

      (4) Load VMB.EXE (the primary bootstrap) from the floppy diskette into base +^X200 and start it. At the base address is a restart parameter block (RPB) which is filled in at different stages of the boot process.

5. VMB is the primary bootstrap. It contains I/O drivers capable of reading and writing all bootstrap devices. The drivers will be available to the secondary bootstrap. VMB performs the following steps:

   a. Saves the register values and some values calculated from the register values in the RPB.

   b. Determines the amount and pattern of memory. A page frame number (PFN) bitmap is constructed. Unless inhibited by a boot flag, memory is tested for gross, uncorrectable parity errors. VMB constructs, in the RPB, a table indexed by TR number of all memory controller and I/O adapter types.

c. Based on register values, one of the following occurs:

(1) A boot block at the designated LBN will be read into VAX/VMS memory and given control.

(2) A file named [SYSEXE]SYSBOOT.EXE will be read and given control.

(3) A file named [SYSMAINT]DIAG.EXE will be read and given control.

(4) A file specified by the user in response to a prompt will be read and given control.

6. SYSBOOT is the standard secondary bootstrap. It performs initialization suitable for the unmapped environment. SYSBOOT performs the following steps:

a. Reads the current parameter settings from SYS.EXE.

b. Looks up the boot device driver file and stores information about it.

c. If register values so indicate, prompts the user to modify current system parameter settings. The user may change the start-up command procedure name and modify system parameters using SET or a previously created parameter file. New parameters become the current parameters on the next boot.

d. Sets up the SPT, SYSPHD, and PFN data structures.

e. Reads the resident executive into high physical memory. The PFN data structure can be smaller because it need not contain data about the resident executive.

f. Locates and transfers to INIT code.

7. INIT is part of SYS.EXE. It performs the following:

a. Enables mapping and sets the PC to system space.

b. Announces the system.

c. Initializes the map for I/O adapters. For MASSBUS, allocates and initializes ADP, CRB, IDB. For UNIBUS, allocates and initializes ADP. Initializes hardware registers.

d. Loads the boot disk driver into nonpaged pool and, based on driver prologue data, finishes allocating and initializing the data structures for the boot device.

e. Creates SYS$SYSTEM, SYS$SYSDISK, and SYS$SHARE logical names.

f. Moves a piece of INIT code to the pool and REIs to it. This segment of code releases INIT pages to the free list and jumps to the scheduler.

8. SYSINIT process:

   a. If necessary or requested, prompts for time of day

   b. Writes back system parameters to SYS.EXE

   c. Creates some logical names

   d. Sets up swap and page files

   e. Installs VAX-11 RMS image and system message file as a pageable system section

   f. Mounts the disk (ACP process created)

   g. Creates job controller, OPCOM, and ERRFMT

   h. Creates STARTUP process

9. STARTUP reads start-up command procedure, which causes it to:

   a. Create logical names

   b. Run SYS$SYSTEM:SYSGEN to configure the I/O system

   c. Install images

   d. Invoke [SYSMGR]SYSTARTUP.COM

   e. Logout

10. SYSGEN is run by STARTUP or at any other time. SYSGEN:

   a. Provides for dynamic loading of and connecting to drivers (the operator, null, and mailbox drivers are permanently part of the executive image)

   b. Provides for creation of new parameter files (which have an encoded format)

   c. Creates paging, swapping, and system dump files

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