Installing, Starting, and Stopping AOS/VS II

093-000539-02

For the latest enhancements, cautions, documentation changes, and other information on this product, please see the Release Notice (085-series) supplied with the software.

Ordering No. 093-000539

Printed in the United States of America
Revision 02, April 1990

Notice

Installing, Starting, and Stopping AOS/VS II
093-000539

Revision History:	Effective with:
Original Release — December 1988	
Addendum 086-000136 — April 1989	
First revision — August 1989	
Second revision — April 1990	AOS/VS II, Release 2.00

A vertical bar in the margin of a page indicates substantive change from 093-000539-01.

Instructions for Inserting Dividers

The tab dividers included with your manual will make the manual easier to use — but only if you insert them. Please insert the tab dividers as follows:

Divider	Insert Before
VSGEN	Page 4–27
VSGEN Summary	Page 4–189
Startup and Shutdown	Page 6–13
Startup/Shutdown Summary	Page 6–57
Emergency Procedures	Page 6–63
Disk Polisher	Page 6–75
Disk Jockey	Page 7–1
Updates	Page 8–1

About This Manual

AOS/VS II, the Advanced Operating System/Virtual Storage, is one of the Data General operating systems for ECLIPSE® MV/Family and DS-series computer systems.

This manual tells how to install AOS/VS II and create an AOS/VS II system tailored to your needs; it also tells how to start and stop AOS/VS II on your ECLIPSE MV/Family computer and how to install updates and new releases of AOS/VS II.

Installing includes installing and bringing up a starter system, generating a tailored system, and then creating the multiuser environment. (If your site has never run AOS/VS II before, you will need to format your system disk first.) The installation procedure is usually done only once for each release (for new customers, it is often done by a Data General engineer). You will need to repeat parts of the procedure for new devices and for new releases of AOS/VS II. Chapters 1 through 5 lead you through the installation procedure. If you have disk units in addition to your system disk, you will need to format them; you may want to read the material in Chapter 7.

Starting and *Stopping* includes day-to-day startup and shutdown, from using panel switches to bringing up the multiuser environment. Chapter 6 shows how to do this.

After installing a system, you'll want to keep it up to date by installing software updates and new releases as you receive them. Chapter 8 shows how to do this.

Audience and Objectives

This manual is for people acting as system managers or system operators. It assumes some experience with computer hardware and software — preferably, but not necessarily, with Data General hardware and AOS/VS II, AOS/VS II, or AOS software.

This book explains how to get AOS/VS II up and running, and how to keep it current. Other aspects of AOS/VS II, like details about the EXEC program, backup, and system security, are explained in a different manual, *Managing AOS/VS and AOS/VS II*. *Managing AOS/VS and AOS/VS II* contains the conceptual and hands-on information you need to make sound decisions about running the system.

Organization of the Manual

This manual is organized as follows:

Chapter 1 — is an overview of system software, ECLIPSE MV/Family hardware, and the steps involved in installing, starting, and stopping on an AOS/VS II system. It also describes keyboard control keys.

Chapter 2 — tells how to bring up your first AOS/VS II system on Data General computers licensed to run AOS/VS/II software.

On some ECLIPSE MV/Family computers — for example, ECLIPSE MV/1400™ DC systems — AOS/VS II is preinstalled. Using preinstalled AOS/VS II is described in *Starting and Updating Preinstalled AOS/VS II*.

Chapter 3	shows example computer systems that include the Message–Based Reliable Channel (MRC) I/O subsystem.
Chapter 4	tells how to run VSGEN to generate a tailored operating system. It also explains running the update tool to install the update shipped with AOS/VS II. Read it when you want to generate or modify an AOS/VS II operating system. There are two tab dividers, labeled "VSGEN" and "VSGEN Summary" for this chapter.
Chapter 5	tells how to bring up the multiuser environment, which supports many timesharing and batch users concurrently. It leads you through creating user profiles, initializing the EXEC program, editing the system UP and DOWN macros to make startup and shutdown easier, and creating a tailored error message file. Read this chapter after generating your first AOS/VS II system. Later, you may want to reread selected parts of it.
Chapter 6	details system startup, normal shutdown, and abnormal shutdown. You'll follow the steps described here quite often. There are several tab dividers for this chapter.
Chapter 7	explains how to run the Disk Jockey utility for disks other than your system disk. Use this when you want to format disks and create LDUs after AOS/VS II software has been installed on your system disk.
Chapter 8	explains how to install updates and new releases of AOS/VS II. You'll need to read this after receiving an update or a new release.
Appendix A	summarizes peripheral device names and codes.
Appendix B	lists and briefly describes files shipped with AOS/VS II.
Appendix C	summarizes the changes that have occurred for the last two releases of AOS/VS II.
Appendix D	explains first time power–up steps for ECLIPSE MV/4000®DC, ECLIPSE MV/4000 SC, and Data General DS/4000–series. These steps are described in other manuals, but we're retaining them here for your convenience. You'll need this information to power up your computer before anything has been installed on its disk(s).
Appendix E	explains first–time power–up steps for ECLIPSE MV/20000™, ECLIPSE MV/15000™, ECLIPSE MV/10000™, ECLIPSE MV/8000®–series, ECLIPSE MV/7800™, ECLIPSE MV/6000®, and MV/4000(meter–high) systems. These steps are described elsewhere, but we're retaining them here for your convenience. You'll need this information to power up your computer before anything has been installed on its disk(s). (For first–time powerup on an ECLIPSE MV/40000™ system, see *Starting ECLIPSE MV/40000™ Series Systems*.)

For fast reference, please insert and use the tab dividers.

What About Peripherals?

Peripherals include disk units, tape and/or diskette units, the system console, user terminals, and letter–quality, laser, and line printers.

Before you can begin, at least one disk unit, one tape or diskette unit, and a system console (DASHER® terminal) must be connected to your computer, and all must have adequate power.

A DG engineer usually installs the hardware, so you need no information on installling hardware. In fact, a DG engineer often installs the first system. But we include this material because you may want to do it.

Related Documentation

The manuals you will find most useful are listed next. The entire AOS/VS and AOS/VS documentation sets are listed after the Index of this manual.

Hardware Operation

To run an operating system, you must know how to use the switches and controls on your computer, tape and disk units, system console, and printer(s). See the appropriate documentation from the list that follows:

- System console — 014–series DASHER® display terminal reference manual that came with your terminal.
- Disk units — 014–series booklets for your disk unit(s); or, for older units, *DGC Disc Drives* (014–000099).
- Tape units — *Magnetic Tape Transports* (014–000095). Operator Reference book that describes how to operate a tape unit.
- Line printers — *DGC Line Printers* (014–000089). Describes how to operate line printers.

For device status errors and other information, you might want to refer to the manual of the appropriate device.

Hardware Error Diagnostics and System Control Program (SCP)

The Advanced Diagnostic EXecutive (ADEX) system is an optional diagnostics package for ECLIPSE MV/Family systems. ADEX provides a complete suite of diagnostics, including tests for peripherals and system exercisers for Data General hardware. ADEX is shipped on tape or diskettes, and it can be installed on the system disk along with AOS/VS II. It provides easy, fast access to hardware diagnostics from a system startup menu. For ADEX information, see the following manuals:

ADEX Operator's Manual (014–000744). Describes how to install and run ADEX.

User's Guide to Repair under Power for the Message–Based Reliable Channel (MRC) Model 31703, 014–001655 *(MOST User's Guide).* Describes installing and using the MOST diagnostic program with the MRC subsystem.

Many ECLIPSE MV/Family computers allow remote diagnostic testing. If your computer permits this, and you have a contract with DGC that supports it, see the following manual:

Communications Switch–II User Operation and Installation Guide (015–000207).

The System Control Program (SCP) features that you need for routine operation are covered in this manual. For more information, refer to the SCP manual that came with your computer.

First–Time Powerup

First–time and routine powerup involve turning on peripherals and using at least one switch on the computer front panel.

For most computers, these steps are described in an 014–series "Starting" manual shipped with the hardware. The manual you are reading duplicates these steps in Appendixes D and E (for first–time powerup) and Chapter 6 (for routine powerup). However, MV/40000 front panel information you need for first–time and routine powerup is explained only in "*Starting ECLIPSE MV/40000™ Systems* (014–001514).

Generally, the first–time and routine cold–start steps for a given computer are similar for all Data General operating systems (AOS/VS II, DG/UX, DG/RDOS, AOS/RT32) and for non–DG operating systems. Therefore, we try to describe these steps in a manual that's independent of the operating system — like a "Starting" manual — so that readers with any DG operating system, or a non–DG operating system, can use them.

AOS/VS II Manuals

This manual explains only a few tasks involved in maintaining and using the AOS/VS II operating system. Some other tasks, and the manuals that explain them, are as follows. The entire AOS/VS and AOS/VS II documentation sets are listed after the Index of this manual.

The following manuals are part of AOS/VS II operating system set.

AOS/VS and AOS/VS II Error and Status Messages (093–000540)

This book describes all the operating system error messages, including those you might encounter during system installation, startup, and shutdown.

Using the CLI (AOS and AOS/VS) (093–000646)

For all users, this manual explains the AOS/VS and AOS/VS II file and directory structure and how to use the CLI, a command line interpreter, as the interface to the operating system. This manual explains how to use the CLI macro facility, and includes a dictionary of CLI commands and pseudomacros.

Learning to Use Your AOS/VS System (069–000031)

A primer for all users, this manual introduces AOS/VS (but the material applies to AOS/VS II) through interactive sessions with the CLI, the SED and SPEED text editors, programming languages, assembler, and the Sort/Merge utility. *Using the CLI (AOS and AOS/VS)* is a good follow–up.

AOS/VS and AOS/VS II Glossary (069–000231)

For all users, this manual defines important terms used in AOS/VS and AOS/VS II manuals, both regular and preinstalled.

SED Text Editor User's Manual (AOS and AOS/VS) (093–000249)

For all users, this manual explains how to use SED, an easy–to–use screen–oriented text editor that lets you program function keys to make repetitive tasks easier. The *SED Text Editor* template (093–00036l) accompanies this manual.

Managing AOS/VS and AOS/VS II (093–000541)

For system managers and operators, this manual explains managing an AOS/VS or AOS/VS II system, but programmers will also find material of interest to them. Topics include editing user profiles, managing the multiuser environment, backing up and restoring files, improving system availability, using runtime tools, and maintaining system security. This manual complements the "Installing" manuals for regular or preinstalled systems.

Supplement to Managing Managing AOS/VS and AOS/VS II (093–000714)

For system managers and operators of regular (as opposed to preinstalled) systems, this supplement describes the new EXEC program that manages the multiuser environment. Insert this supplement as Chapter 3 in the manual *Managing AOS/VS and AOS/VS II.*

Supplement to Managing Managing AOS/VS and AOS/VS II (093–000715)

For system managers and operators of regular (as opposed to preinstalled) systems, this supplement describes the AOS/VS Revision 7.60 EXEC program that manages the multiuser environment. AOS/VS Revision 7.60 is certified as C2 compliant. If you are using AOS/VS (not AOS/VS II) and want to run this version of EXEC, insert this supplement as Chapter 3 in the manual *Managing AOS/VS and AOS/VS II.*

Other Software Manuals

With AOS/VS II, you may want to run any of the following applications.

- Running an automated office — *Managing the CEO® System* (093-000286) describes how to install and manage the CEO office automation software.

- Using a network. If your system is connected to other computers in a network, you might also need the pertinent networking manuals, as follows. For XODIAC/XTS, you may want *Managing and Operating the XODIAC™ Network Management System* (093-000260). For a Termserver network, you may want *Managing Your TermServer Network* (093-000527). To use personal computers on your AOS/VS II system, you may want *Installing and Using the Data General/PC*Integration Workstation Software* (093-000491).

- Monitoring performance and tuning your system. For these, you need the AOS/VS Performance Package — whose manual is the *AOS/VS and AOS/VS II Performance Package User's Manual* (093-000364). The Class Assignment and Scheduling Package (CLASP), included with the Performance Package and available as separate product, has its own manual, *Using CLASP (CLass Assignment and Scheduling Package* (093-000422).

- Using Preinstalled AOS/VS II. If your computer system has AOS/VS II preinstalled, you need the manual you're reading only under special circumstances. Your primary manual for running preinstalled AOS/VS II is *Starting and Updating Preinstalled AOS/VS II* (069-000294).

- Using the system management interface. For this, you'll need *Using the AOS/VS II System Management Interface (SMI)* (069-000311).

After you get your system and multiuser environment up and running, you will want to run other software, like compilers and data management products. These are described in books shipped with the software.

The Release Notice

The AOS/VS II Release Notice has the latest details on all system software: enhancements, new features, and improvements. The Release Notice is supplied both in printed form and as a disk file that you can print. The filename in directory :UTIL is 085_000930_05.

You may want to read the Release Notice, or selected parts of it. If you want to know the features of an AOS/VS II release, or have problems with a release, check the notice for solutions. The Release Notice assumes that you know the operating system well — so parts of it may be difficult to understand until you *do* know the system.

Document changes files, also in :UTIL, are part of each release, but you must print these yourself after installing the new software. The document changes filenames have the form 0ss_nnnnnn_rr, where ss is the series, nnnnnn is the part number, and rr is the revision (for example, 093_000539_01 is the document changes file for this manual). We suggest that, as you receive new software revisions from DG, you print the document changes file(s) and update the manual(s) as needed.

The Newsletter

Finally, you will find the *AOS/VS Monthly Newsletter* a useful source of information on the latest enhancements to the operating system.

Reader, Please Note:

We use these conventions for command formats in this manual:

COMMAND required *[optional]* ...

Where	Means
COMMAND	You must enter the command (or its accepted abbreviation) as shown. (You can, but generally need not, type commands in uppercase.)
required	You must enter some argument (such as a filename). Sometimes, we use: $\left\{\begin{array}{l} \text{required}_1 \\ \text{required}_2 \end{array}\right\}$ which means you must specify *one* of the arguments. Don't type the braces; they only set off the choice.
[optional]	You have the option of specifying this argument. Don't type the brackets; they only set off what's optional.
...	You may repeat the preceding entry or entries. The explanation will tell you exactly what you may repeat.

Additionally, we use certain symbols in special ways:

Symbol	**Means**
↵	Press the NEW LINE key on your terminal's keyboard. If there is no NEW LINE key, press the Carriage Return (CR) key.
□	Be sure to put a space here. (We use this only where we must; normally, you can see where to put spaces.)
)	The AOS/VS and AOS/VS II operating system CLI prompt.

All numbers are decimal, except for device codes and numbers marked octal. For example,

27 buffers	means 27 decimal
device code 27	means 27 octal
say 27 octal	means 27 octal

We show CLI commands in UPPERCASE; but you can type them in lowercase, uppercase, or any combination. (SCP CLI commands, typed at the *SCP–CLI>* prompt, must be uppercase.) Finally, we use

THIS TYPEFACE TO SHOW YOUR ENTRY↵
This typeface for system queries and responses.
`This typeface to show listings.`

Contacting Data General

- If you have comments on this manual, please use the prepaid Comment Form that appears at the back. We want to know what you like and dislike about this manual.
- If you require additional manuals, please use the enclosed TIPS order form (USA only) or contact your local Data General sales representative.

Telephone Assistance

If you are unable to solve a problem using any manual you received with your system, and you are within the United States or Canada, contact the Data General Service Center by calling 1-800-DG-HELPS for toll-free telephone support. The center will put you in touch with a member of Data General's telephone assistance staff who can answer your questions.

Free telephone assistance is available with your warranty and with most Data General service options. Lines are open from 8:30 a.m. to 8:30 p.m., Eastern Time, Monday through Friday.

For telephone assistance outside the United States or Canada, ask your Data General sales representative for the appropriate telephone number.

Joining Our Users Group

Please consider joining the largest independent organization of Data General users, the North American Data General Users Group (NADGUG). In addition to making valuable contacts, members receive FOCUS monthly magazine, a conference discount, access to the Software Library and Electronic Bulletin Board, an annual Member Directory, Regional and Special Interest Groups, and much more. For more information about membership in the North American Data General Users Group, call 1-800-877-4787 or 1-512-345-5316.

End of Preface

Contents

Chapter 1 About Installing, Starting, and Stopping AOS/VS II

Chapter 2 Bringing Up the Starter System and Installing AOS/VS II

Chapter 3 Configurations with MRC I/O Subsystems — Some Sample Installations

Chapter 4 Generating a Tailored AOS/VS II System

Chapter 5 Creating the Multiuser Environment

Chapter 6 Startup and Shutdown

Chapter 7 Formatting Disks and Creating LDUs Using Disk Jockey

Chapter 8 Handling Updates and New Releases from DG

Appendix A Peripheral Device Names and Types

Appendix B Files Shipped with AOS/VS II

Appendix C Major Differences Between AOS/VS II Releases 2.00, 1.20, and 1.10

Appendix D Powering Up for the First Time and Loading Microcode — ECLIPSE MV/4000 DC, MV/4000 SC, and Data General DS/4000-Series Computers

Appendix E Powering Up for the First Time and Loading Microcode — ECLIPSE MV/20000, MV/15000, MV/10000, MV/8000, MV/7800, MV/6000, and MV/4000 Computers

Index

Document Set

Tables

Table

Figures

Figure

Figure

Chapter 1
About Installing, Starting, and Stopping AOS/VS II

Read this chapter when you want to learn how to install, start, and stop an AOS/VS II system.

Installing your first system (Chapters 1–5 and Chapter 7) is one part of this manual. Routinely *starting and stopping* AOS/VS II is another part. (*Managing* is yet another part, covered in another manual: *Managing AOS/VS II*). This chapter outlines both the installing and starting/stopping parts. It assumes that AOS/VS II is new to you. The major sections are

- What Is AOS/VS II?
- The ECLIPSE MV/Family Computers
- AOS/VS II File Structure
- What's Involved in System Installation?
- What's Involved in Startup and Shutdown?
- Finding Information on Other AOS/VS II Management Tasks
- Machine Operation
- Cautions and Control Characters
- If You Make a Mistake

What Is AOS/VS II?

AOS/VS II — and its predecessor, AOS/VS — is a multitasking, multiprogramming, demand–paged, virtual storage operating system. You can use it to support users on a time–sharing basis, to run batch jobs, or to perform control applications on a real–time basis. You communicate with AOS/VS by typing Command Line Interpreter (CLI) commands on a terminal.

AOS/VS II runs on all Data General 32–bit, ECLIPSE® MV/Family and DS–series computers.

Figures 1–1 and 1–2 show the hardware in typical minimum ECLIPSE MV/Family installations. There can be, and often are, additional tape units, disk units, printers, and terminals.

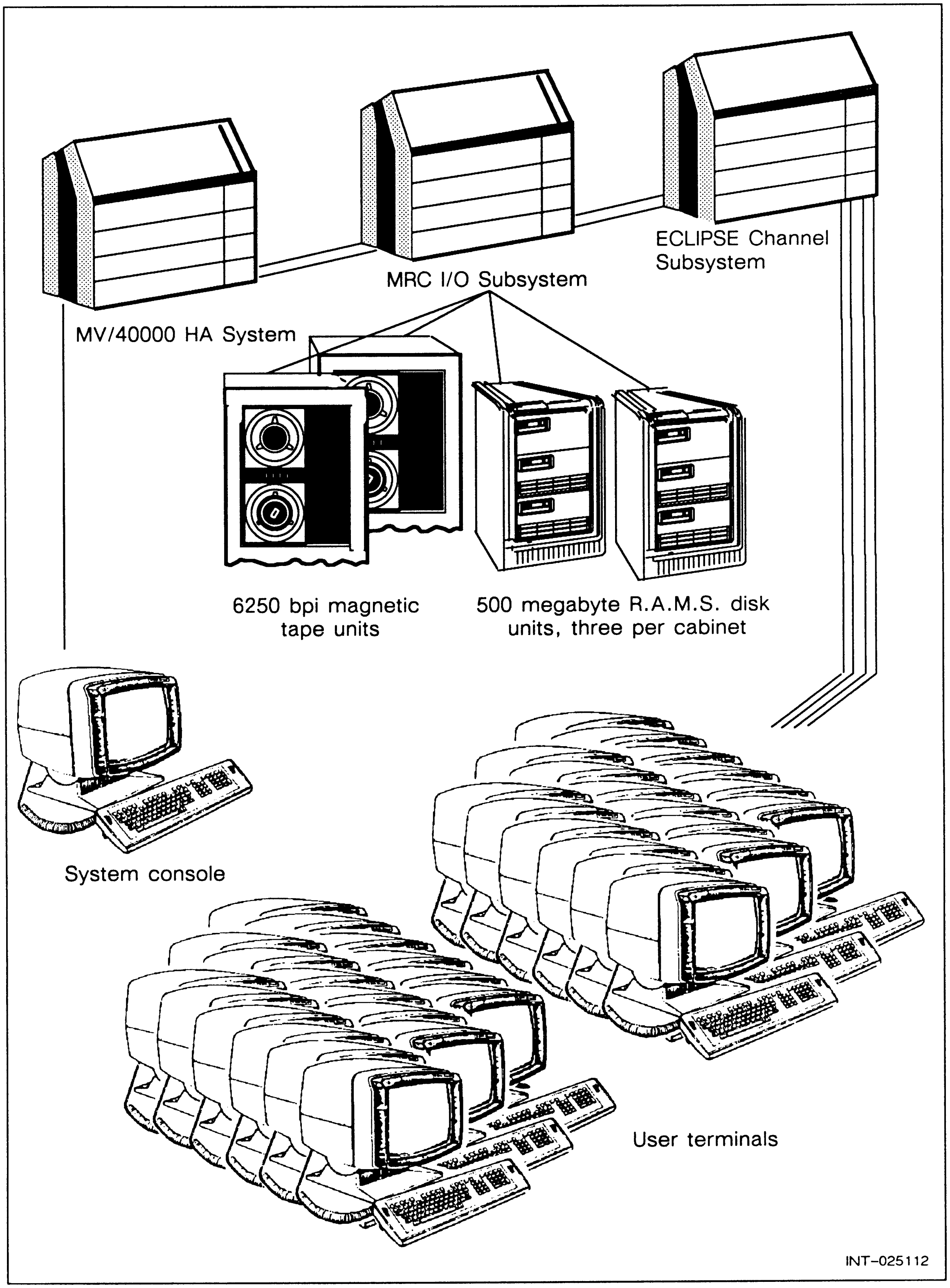


Figure 1-1 Sample ECLIPSE MV/40000™ HA Configuration with AOS/VS II

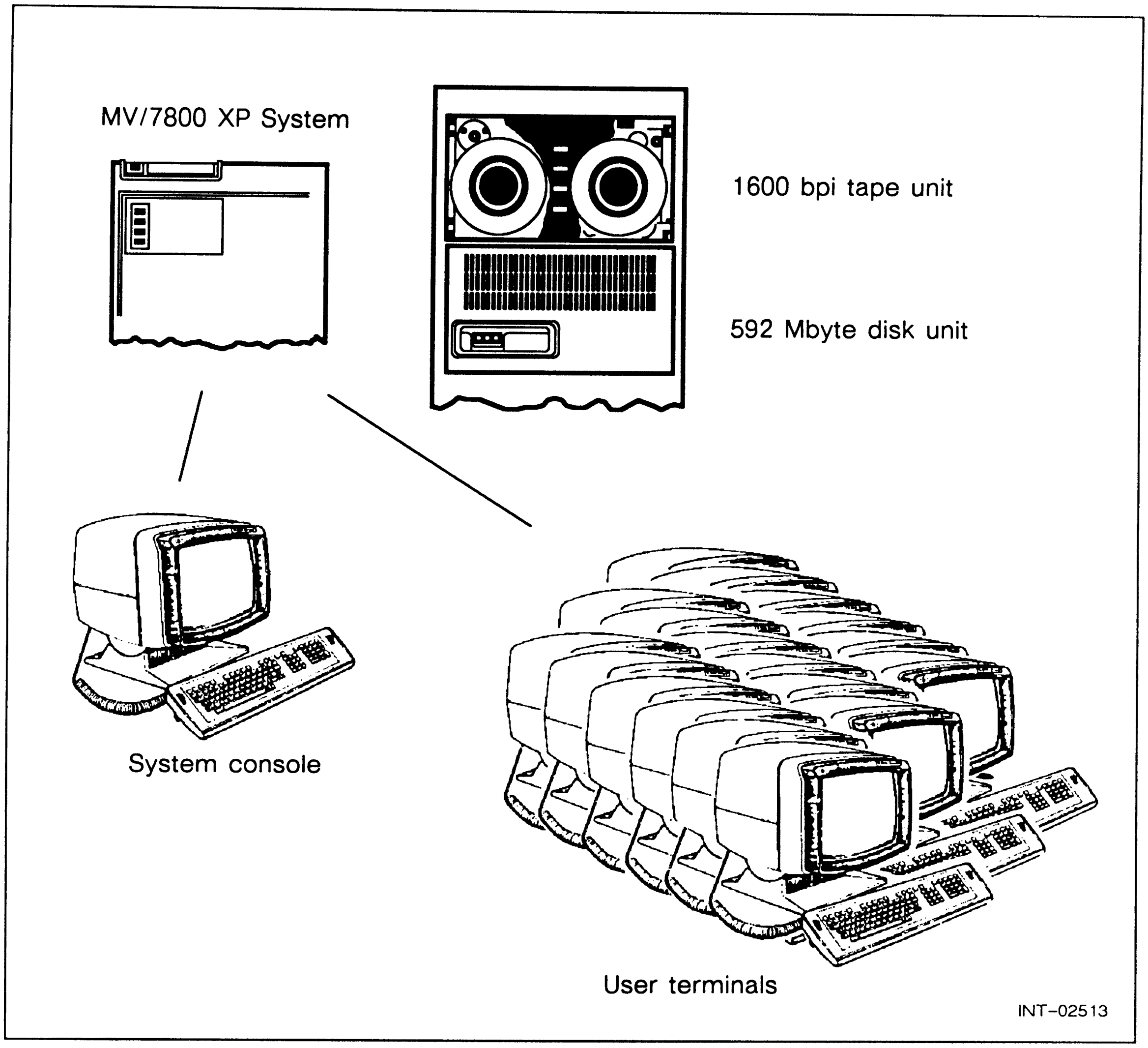


Figure 1–2   Sample AOS/VS II ECLIPSE MV/7800™ XP System Hardware Configuration

The ECLIPSE MV/Family Computers

The Data General ECLIPSE MV/Family has a broad range of 32–bit systems, from the ECLIPSE MV/40000 HA and ECLIPSE MV/40000 to the ECLIPSE MV/1000™ DC computer. The ECLIPSE MV/2500™ DC, ECLIPSE MV/2000™ DC, ECLIPSE MV/1400™ DC and ECLIPSE MV/1000™ DC ship with AOS/VS II preinstalled, so you do not need to read this book to use these machines. Instead, read *Starting and Updating Preinstalled AOS/VS II.*

In all ECLIPSE MV/Family computers, AOS/VS II runs in the main processor. Another operating system, called the System Control Program (SCP or SCP OS) serves to load vital microcode into the main processor(s), and boot (load) AOS/VS into main processor memory. The SCP also manages powerup and monitors system error conditions.

Physically, ECLIPSE MV/Family computers range from the MV/40000 HA with MRC subsystem and separate peripherals to the compact, self–contained MV/1000 DC.

Operationally — after your first AOS/VS II system is generated — update and startup procedures are similar for all ECLIPSE MV/Family computers.

NOTE: Although their names and central processors are similar, the MV/7800, MV/7800 C, and MV/7800 XP differ significantly from the MV/7800 DC and MV/7800 DCX. The MV/7800, MV/7800 C, and MV/7800 XP are meter–high computers with one or more peripheral bays. The ECLIPSE MV/7800 DC and MV/7800 DCX are compact systems with built–in tape and disk units; they are designed to fit under a desk if needed. In this book (and generally) the name "MV/7800" represents the first type of machine; the phrase "MV/7800 DC and DCX" represents the second type of machine.

AOS/VS II File Structure

AOS/VS II manages many parts of its file structure, but you need to understand the options that are under your control. A typical AOS/VS II file system looks like Figure 1–3.

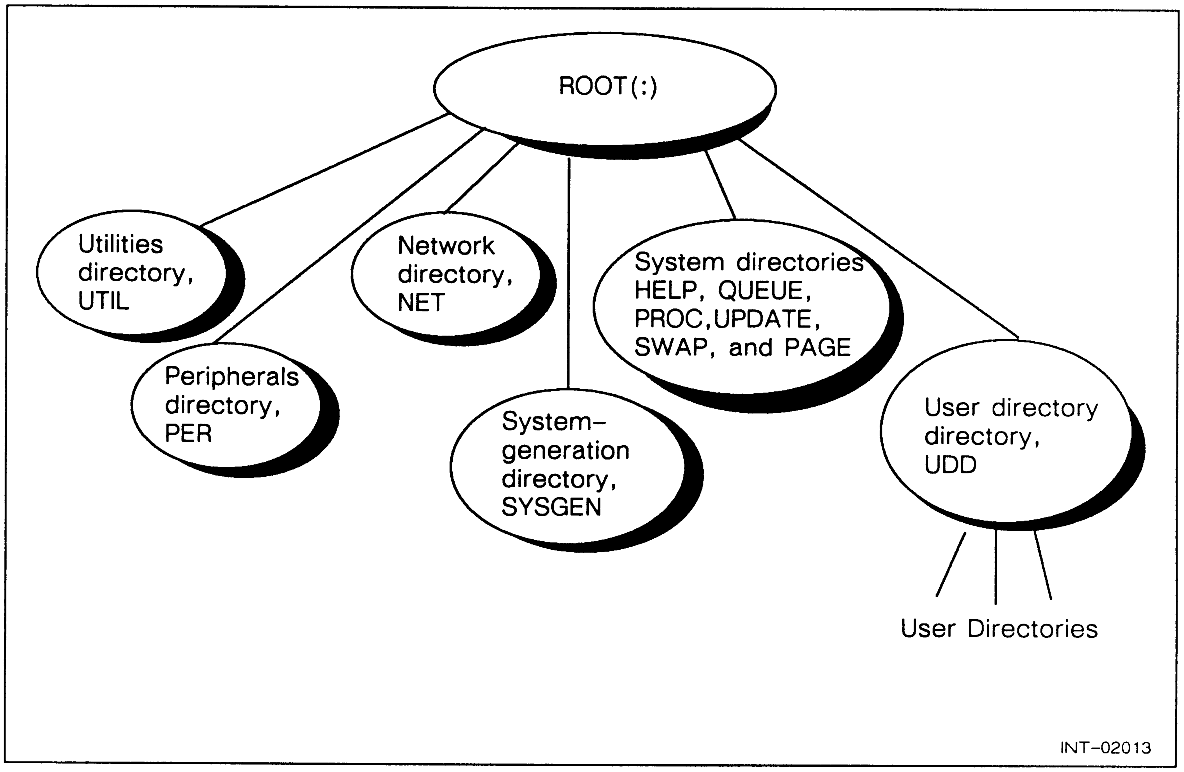


Figure 1–3 Operating System File Structure

The root directory (:) and other system directories are created and managed by AOS/VS II or its utility programs. The AOS/VS II operating system program file is usually in directory :SYSGEN.

Directory :UDD has an entry for each time–sharing *user* directory. A user is an authorized person who can execute other programs — often application programs. So :UDD often has many subordinate directories and uses a lot of storage space.

All these directories, and their subordinate directories, can reside on one *logical disk unit (LDU)*. Or any of these directories can reside on *its own* LDU. An LDU is a piece of one or more physical disks, created by the Disk Jockey utility.

Generally, for the most versatile, simple system, you will make each LDU an entire physical disk. The system disk (from which you run AOS/VS II) is nearly always a single–disk LDU. (If you set up an LDU with pieces on more than one disk, all disks must be on line before anyone can access the LDU.)

A major advantage of single–disk LDUs is that they are conceptually simple to mirror — providing two identical LDU images for higher availability if one image fails.

With Disk Jockey, you can set up a structure in which everything will be on one LDU. Or you can set up a system LDU with separate LDUs for database management and user directories (for example, UDD1, UDD2, UDD3), depending on your needs and number of disk units.

You might set up a multiple-disk LDU to handle a very large file — perhaps a database file — that won't fit on a single disk. The system will then access the multiple-disk LDU as one directory file, providing enough space for the large database.

For an example of a single-disk LDU system, imagine the structure in Figure 1-3 on a single disk. An example of a multiple-LDU system follows in Figure 1-4.

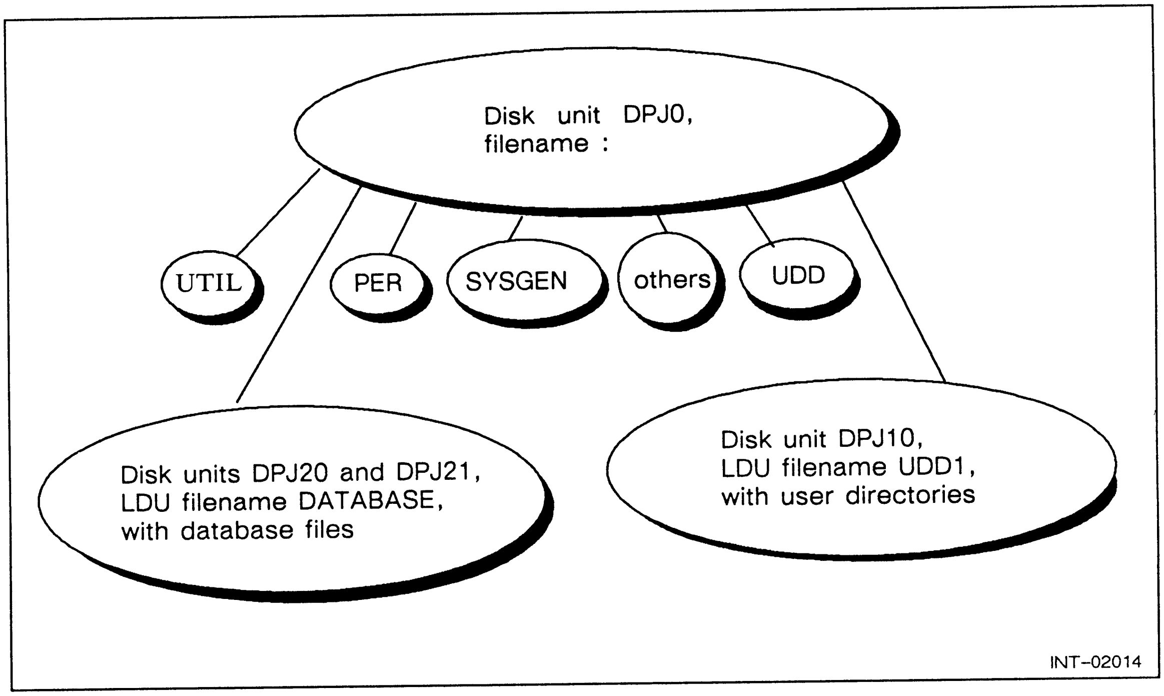


Figure 1-4 System with Several Logical Disk Units

Generally, your system disk is a single-disk, one-piece LDU. If this disk is on an ECLIPSE I/O bus (as opposed to an MRC I/O bus), it must be unit 0 on its controller; if the disk is on an MRC I/O bus, it can be any unit. If your system will use more than one disk, you may need to format these disks and make decisions about their names. We will give more detail on the specifics later, but mention them here so that you'll know about your options.

What's Involved in System Installation?

The system installation procedure includes running Disk Jockey to format the system disk (if needed) and install system software, generating a tailored AOS/VS II system, and creating the multiuser environment.

If you have never installed AOS/VS II on your system, you will need to format disks and create LDUs on them. This is also true if your system is running AOS/VS, since AOS/VS II uses a different disk format from AOS/VS. If you *have* AOS/VS II installed, you needn't format disks.

Then you must use Disk Jockey to load the new AOS/VS II software, install microcode, and determine what hardware you have; and you must run VSGEN to generate tailored system configuration and names files and, perhaps, create user profiles and edit system UP and DOWN macros.

Figure 1–5 shows each step in the system installation procedure — beginning to end.

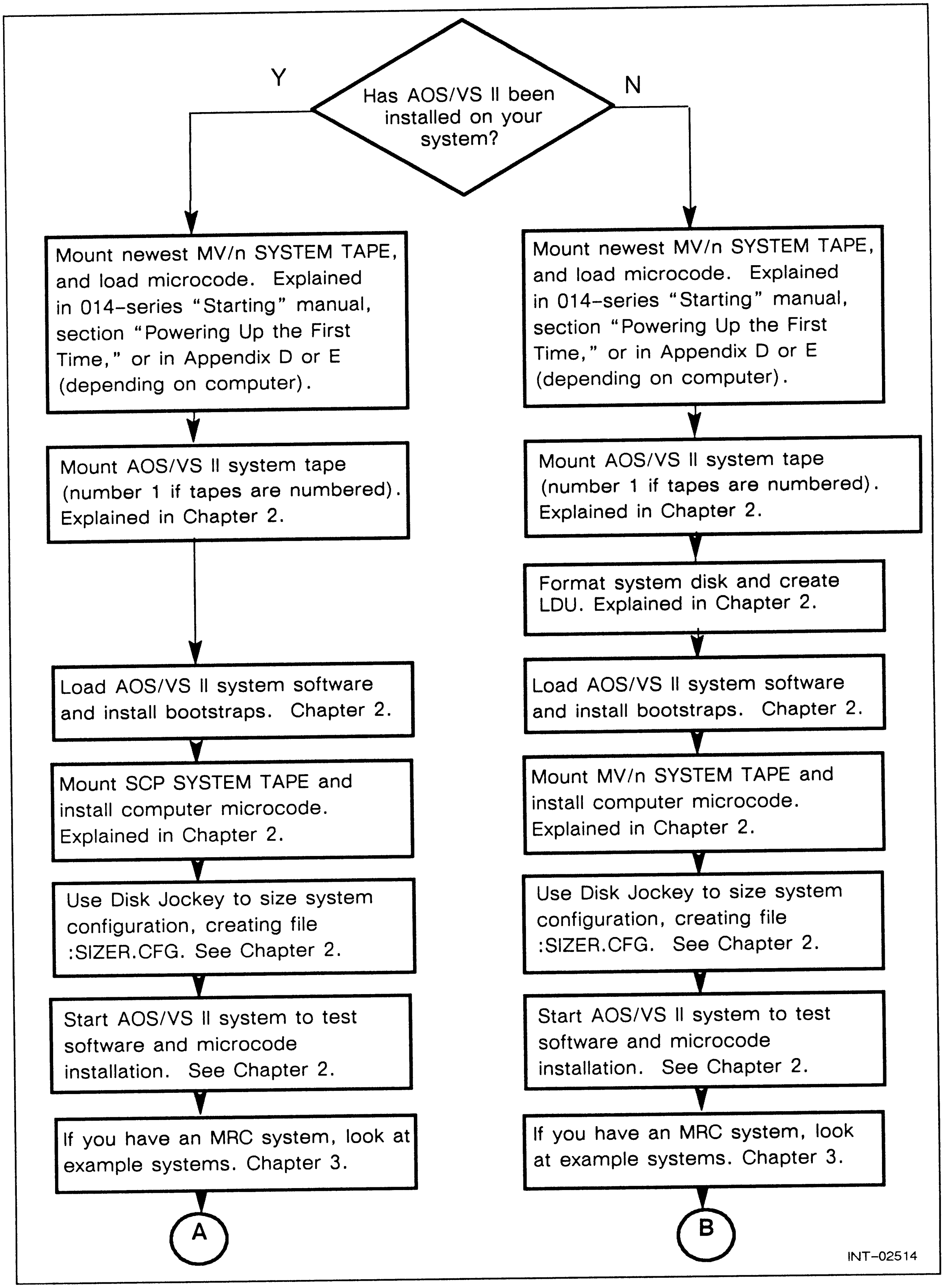
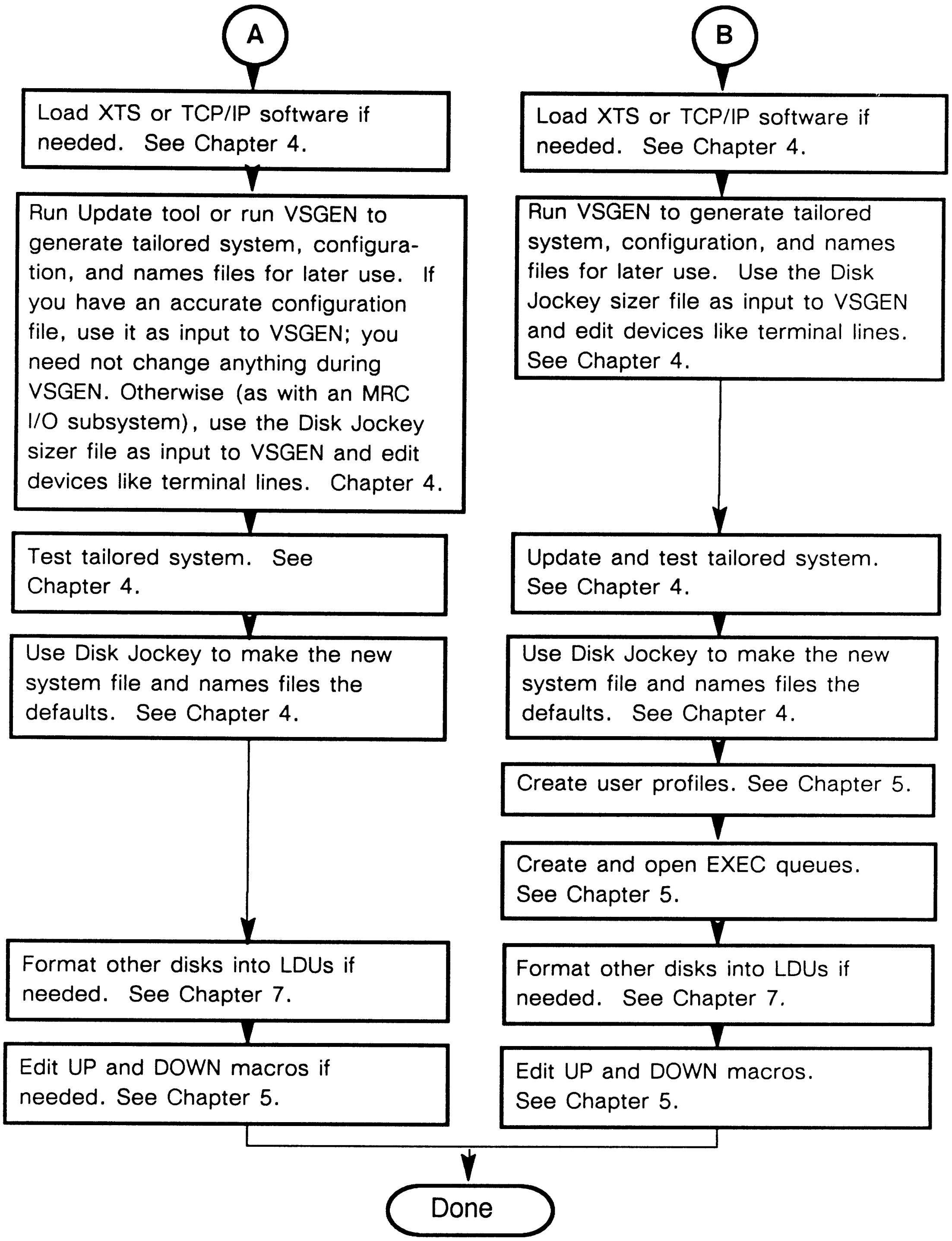


Figure 1–5 Installing AOS/VS II and Bringing Up a Tailored System (continued)



Your LDU(s), tailored AOS/VS II system, and multiuser environment are complete. To bring the system up, you can boot it from disk; then type UP. To bring it down, you can type DOWN, and then BYE. Operation becomes routine. Congratulations.

For future system generations, the VSGEN configuration file will make the procedure easy. The VSGEN device names file will provide device address information as needed.

Figure 1–5 Installing AOS/VS II and Bringing Up a Tailored System (concluded)

What's Involved in Startup and Shutdown?

After creating your tailored, multiuser system, you'll need routinely to start it up and shut it down. This may involve coping with abnormal shutdown (along with normal shutdown).

Generally, startup is quite a simple procedure, involving only a panel switch or two (on a cold start) and a few typed commands.

Shutdown, also, is straightforward, but it involves some human dynamics since you must ensure that users are ready for the act of shutdown.

Finding Information on System Management Tasks

Running and managing an AOS/VS II system involves many tasks other than installation, startup, and shutdown. Table 1–1 shows some typical system installation and management tasks and the primary place (manual and chapter) you can find information on them. The topics proceed alphabetically. Any chapter shown without a manual title appears in this manual.

Table 1-1 Finding Information on Starting and Running AOS/VS II

Topic	Where to Find Details
Abnormal shutdown	Chapter 6
Backup procedures	*Managing AOS/VS and AOS/VS II*, Chapters 4 – 7
Batch operations	*Managing AOS/VS and AOS/VS II*, Chapters 3, 4
Bootstrapping programs	Chapter 6, Startup/Shutdown sections
CLI commands (operator)	*Managing AOS/VS and AOS/VS II*, Chapter 9
Dumping files for backup	*Managing AOS/VS and AOS/VS II*, Chapter 4
Errors	*AOS/VS and AOS/VS II Error and Status Messages*
EXEC commands	*Managing AOS/VS and AOS/VS II*, Chapter 3
EXEC multiuser environment	Chapter 5
Executing user applications	*Managing AOS/VS and AOS/VS II*, Chapter 9
First AOS/VS II system	
Installing	Chapter 2
Generating	Chapter 4 (VSGEN)
Fixing (polishing) LDUs	Chapter 6
Formatting disks, first system	Chapter 2
Formatting disks, later on	Chapter 7
Generating tailored system	Chapter 4 (VSGEN)
Installing software, first system	Chapter 2
Installing software, later on	Chapter 8
Labeled tapes	*Managing AOS/VS and AOS/VS II*, Chapters 3, 4
Log file, system	*Managing AOS/VS and AOS/VS II*, Chapters 9, 12
Management decisions	*Managing AOS/VS and AOS/VS II*, Chapters 9, 12
Memory Dump (and ESD)	Chapter 6
Microcode, loading, routine	Chapter 6
MRC subsystem configurations	Chapter 3
Microcode, loading, first time	Chapter 2
Multiuser environment, creating	Chapter 5
Multiuser environment, running	*Managing AOS/VS and AOS/VS II*, Chapters 2, 3
Operator tools, runtime	*Managing AOS/VS and AOS/VS II*, Chapter 9
Power failures	Chapter 6
Queues, creating	Chapter 5
Queues, running	*Managing AOS/VS and AOS/VS II*, Chapter 3
SCP operating system	Chapter 6
Shutdown, normal/abnormal	Chapter 6, Startup/Shutdown sections
Software Trouble Report (STR)	*Managing AOS/VS and AOS/VS II*, Chapter 10
Startup	Chapter 6
System Management Interface (SMI)	*Using the AOS/VS II System Management Interface (SMI)*
Tapes, mounting for users	*Managing AOS/VS and AOS/VS II*, Chapter 3
User logon	*Managing AOS/VS and AOS/VS II*, Chapter 3
User profiles, creating (first time)	Chapter 5
User profiles, creating (general)	*Managing AOS/VS and AOS/VS II*, Chapter 2

Machine Operation

For the system installation procedure, you'll need to mount magnetic tape (if you have a tape unit). If your primary disk unit uses a removable pack, you'll also need to insert a pack in the unit. If you don't know how to do these things, check the Preface for pertinent manuals.

Cautions and Control Characters

This section gives some hints and cautions that will help you during the system generation process. Simply read it; don't do anything yet.

CPU and Disk Switches

During the system generation procedure, power will be on to the CPU and the CPU Power lamp will be lit. The primary disk will be ready and write enabled. While you're working with the system (and whenever a system is running), *don't press the CPU or disk switches.*

If power stops to the CPU, the SCP operating system and microcode will be lost, and they must be reloaded. If power stops to the disk(s) when an AOS/VS program is running, the program will usually abort. In either case, you will need to start the program that was running all over again — a time-consuming nuisance that you can avoid by leaving the switches alone after the CPU and disks are ready.

When AOS/VS II is shut down and the SCP is idle, you *can* shut off power to the disk(s) if you wish — but you may want to keep CPU power on. Cutting power to the CPUsaves energy, but adds a few steps and a few minutes when you bring the system up again.

System Console

During the system generation procedure (and afterwards) you'll use the system console (DASHER® display or printing terminal) extensively. Normally, when AOS/VS II is not running, the SCP operating system CLI controls the console. Its prompt is

SCP–CLI>	(On some systems, this prompt includes *Jpn,* where *Jp* means job processor and *n* is the job processor number.

To the SCP CLI, you type commands that load and run other programs, including AOS/VS II operating systems. These AOS/VS II programs take control of the system console when they run. When AOS/VS II stops, it types an appropriate message on the console; the SCP CLI regains control of the console and displays *SCP–CLI>*.

Generally, while AOS/VS II is running, you will not need and should not use the SCP CLI. If an *SCP–CLI>* prompt appears on the system console while AOS/VS II is running, you may have accidentally typed the break sequence (explained in Table 1–2). You can return control to AOS/VS II as described in Table 1–2. Accidental breaks can be annoying. You can prevent them via the SCP command FLAGS, described in Table 6–1.

Keyboard Control (CTRL) Characters

There are several keyboard control sequences and keys that govern terminal display, interrupt program execution, and the like. You *may* need one or more of these for system installation; and it will help to know about them afterward — or if you accidentally type one on the keyboard.

To type a control sequence, first press the CTRL key; while you hold the CTRL key down, press the other character. Table 1–2 lists the control characters and special keys and their functions.

Table 1-2 Control Characters and Special Keys

Key(s)	What It Does
CTRL–O	Discards display for the portion of the command that remains to be executed, or until you type CTRL–O again, whichever happens first. CTRL–O turns off display, and then turns it on again. It does not halt the program. During system installation, you will not use CTRL–O. Later, especially on a hardcopy terminal, it can help speed up programs that do a lot of writing to the terminal.
CTRL–S	Suspends display. Display resumes where it stopped when you press CTRL–Q. CTRL–S and CTRL–Q are useful when you want to read long files on a CRT, when display is too fast to read.
CTRL–Q	Resumes display. If you stopped display with CTRL–S, use CTRL–Q. If you stopped display with CTRL–O, CTRL–Q has no effect.
CTRL–U	Erases the current input line. This is handy when you have typed a long, erroneous command line and don't want to press the DEL key many times to erase it. CTRL–U is most useful on hardcopy terminals.
CTRL–C CTRL–A	Interrupts execution of an AOS/VS II CLI command. You'll find this sequence useful.
CTRL–C CTRL–B	In AOS/VS II, aborts the process that issues it (like the CLI or a text editor). You will probably want to avoid using this sequence.
CTRL–D CTRL–D	In AOS/VS II, signals an end of file — which usually aborts the issuing process. Generally, avoid this sequence.
CTRL–C CTRL–E	In AOS/VS II, creates a memory–image break file (useful for debugging), and aborts the issuing process. Generally, avoid this.
DEL key	Erases the last character typed. On a hardcopy terminal, DEL echoes as _ (underscore) or /*x* (slash, then the character) for each character erased.
BREAK key	Enters the break sequence. On newer CRTs, press the CMD key and, while holding it down, press the BREAK/ESC key; on DASHER® D2 CRTs, press the BREAK key; on hardcopy terminals, press the BRK key. Unless it has been disabled, a break sequence typed on the system console gives control to the SCP CLI. To return control to AOS/VS II, type TTY and press NEW LINE. Or, on MV/7800–series MV/4000–series, MV/2500 DC, MV/2000 DC, MV/1400 DC, and MV/1000 DC computers, type CONTINUE and press NEW LINE. You can disable the break sequence using the LOCK switch, if any, or the SCP command FLAGS).

If You Make a Mistake

The programs in the AOS/VS II package have good error messages and error recovery. But if you make what appears to be a fatal mistake, you can usually restart the program from the beginning without problems.

If, at the system console, everything seems to have stopped, press CTRL–Q. If CTRL–Q has no effect, press CTRL–O. If CTRL–O has no effect, press CTRL–O to undo the first CTRL–O. Finally, if the SCP-CLI> prompt has appeared unexpectedly, recover as shown under the BREAK key in Table 1–2.

The manual *AOS/VS and AOS/VS II Error and Status Messages* describes important error messages and error recovery.

What Next?

To install AOS/VS II, continue to Chapter 2.

End of Chapter

Chapter 2
Bringing Up the Starter System and Installing AOS/VS II

Read this chapter

- When your computer system hardware has just been installed and you want to bring up AOS/VS II on it.
- When you want to format a new disk, install an AOS/VS II system on it, load system files onto it, and bring up the AOS/VS II system.
- When you want to install a new revision of AOS/VS II on your system.

This chapter tells you how to execute all steps needed before you run the VSGEN program to generate your first tailored system. It applies to the following ECLIPSE computers:

MV/40000 Models HA, 2, and 1
MV/20000 Models 2, 1, and C
MV/18000, all models
MV/15000 and MV/15000 S, all models
MV/10000 SX and MV/10000
MV/9500
MV/8000 II and MV/8000 C
MV/8000
MV/7800, MV/7800 C, and MV/7800 XP
MV/6000
MV/4000
MV/4000 DC and SC

The major sections are

- Note to DS/7500-Series, ECLIPSE MV/2500 DC, MV/2000 DC, MV/1400 DC, and MV/1000 DC System Users
- Checking Your System Media
- First-Time Powerup
- Starting Disk Jockey from the AOS/VS II Tape
- Formatting the System Disk into an LDU
- Installing AOS/VS II Software on the System LDU
- Installing Microcode on the System LDU
- Sizing Your System Hardware
- Bringing Up the AOS/VS II Starter System
- Step Summary

Note to DS/7500–Series, ECLIPSE MV/2500 DC, MV/2000 DC, MV/1400 DC, and MV/1000 DC System Users

If you have a Data General DS/7500–series or ECLIPSE MV/2500 DC, MV/2000 DC, MV/1400 DC, or MV/1000 DC computer with AOS/VS II, do not continue with this chapter! Your system arrived with an easy–to–use model of AOS/VS II already installed on the disk. Using preinstalled AOS/VS II is explained in the manual *Starting and Updating Preinstalled AOS/VS II.*

Examining Your System Media

There are several tapes involved in bringing up your first system. (For MV/4000 DC and SC systems, there are three diskettes as well as tapes.) They are

- Your computer's SCP SYSTEM MEDIA tape (for example, the MV/40000 SCP SYSTEM MEDIA tape) shipped with the hardware. This tape contains firmware that is independent of the operating system: a diagnostic program, diagnostic operating system (SCP–ADEX), CPU diagnostics, CPU microcode, and the SCP operating system. This tape is required for first–time powerup (described in Appendix E). You will need it later to install the microcode file on your system disk.

  For MV/4000 DC and SC systems only, the SYSTEM MEDIA are shipped on two diskettes, not a tape. A third diskette is the I/O CB emulator, shipped on a 737,000 byte diskette with your computer. The I/O CB emulator diskette holds the operating system that runs in the device controllers. The I/O CB and your SYSTEM MEDIA diskettes are required for first time powerup (described in Appendix D).

- AOS/VS II *release tapes*. These tapes contains all AOS/VS II system software.

- AOS/VS II *update* tape. This tape (or tapes) contains updated versions of programs and files on the AOS/VS II release tape. Depending on the release, you may not receive an update tape.

There will also be tapes with other DG software, but these must wait until you get AOS/VS II up and running.

Identify the (two or three) tapes. You'll need them soon.

First–Time Powerup

To power up your system for the first time, follow the procedures explained in the 014–series "Starting" manual supplied with your computer, section "First–Time Powerup." If there is no such manual or section, use Appendix E of this manual; then return here. The steps explained here assume that the SCP CLI prompt (*SCP–CLI>*) is showing on the system console. If this prompt is showing, this means that first–time powerup steps have already been executed.

Starting Disk Jockey from the AOS/VS II Tape

Disk Jockey is the utility program you use to format disks, create logical disk units (LDUs), and load AOS/VS II software. Disk Jockey is a friendly, menu-driven program — complete with a Help facility you can access at any time by pressing the HELP function key (F1) on a CRT or pressing the ESC key and H on a hardcopy terminal.

Disk Jockey Menu Screens and Keywords

Normally, you select Disk Jockey operations, like formatting physical disks and loading software, via a sequence of menus. But instead of using menu sequences, you can go directly to a specific menu or screen (bypassing intervening menus) via the proper keyword. At the *Enter choice:* prompt, you need type only the keyword of a screen and press NEW LINE.

For each screen, this chapter shows the keyword, next to the menu name, in square brackets; for example

Physical Disk Format Menu [PDISK]

From any *Enter choice:* prompt in Disk Jockey, you can get to this menu by typing PDISK and pressing NEW LINE.

Keywords are most useful after you know Disk Jockey well. This chapter doesn't expect you to use them. Later, though, knowing them can save time. There is a complete list of Disk Jockey keywords in Chapter 7.

Mistakes and Errors

If you type an incorrect answer to a Disk Jockey question, and have not yet pressed NEW LINE to enter the answer, press the DEL key or CTRL–U to erase the wrong characters.

If you already have pressed NEW LINE, but haven't confirmed by answering the *Execute?* question, you can back up and change the answer. To do this on a CRT, use the cursor control uparrow key to back up to the wrong answer; then correct it. With a hardcopy terminal, you can move backward one field by pressing CTRL–W (press the CTRL key, and, while holding it down, press W).

If you decide to abort and restart a Disk Jockey session, type the break sequence (explained in Table 1–2) and return to step 1 in the following section. If you abort Disk Jockey while it's testing for bad blocks, restart the bad block test.

If Disk Jockey reports a disk error or other error, make sure the disk unit is write enabled (if this applies). If the disk is write enabled, check the error message in *AOS/VS II Error and Status Messages*, in the alphabetical table.

CRT Versus Hardcopy Terminals

The way Disk Jockey displays screen information and defaults depends on whether you are using a CRT or a hardcopy terminal.

On a CRT terminal, Disk Jockey displays a screen, complete with default answers (if any), and then moves the cursor from question to question. You can take the default answer to a question by pressing NEW LINE.

On a hardcopy terminal, Disk Jockey displays a screen, complete with default answers, but then posts the questions on the menu one by one, *without* displaying defaults. To redisplay the default, type CTRL–A (press the CTRL key, hold it down, and type A). The program will redisplay the default answer. You can then tell the program to accept the default by pressing NEW LINE.

Running Disk Jockey is easier on a CRT; use a CRT if you can. If your system console is a hardcopy terminal, you must use the hardcopy terminal to format your system LDU; but later, to format other disks, you can run stand–among Disk Jockey from a user terminal that is a CRT.

Disk Jockey Startup

1. Get one of the AOS/VS II system tapes. If the tape labels show numbers, use tape number 1 (but generally, the order in which you load the tapes does not matter). If the tape has a plastic write–enable ring or tab, remove this ring or place the tab in the SAFE position before mounting the tape.

   Mount the tape on unit 0 if possible. This is the unit connected as the first tape device on the first tape controller. If the tape unit has a density switch, make sure the switch is set to high density (1600 or 6250 b/pi). Put the unit on line.

   Starting with AOS/VS II Release 2.00, Disk Jockey and the AOS/VS II starter system can access any tape or disk unit you have, on any device code. As before, if a tape or disk unit is on an ECLIPSE bus, you can *boot* from it only if it is unit 0 on the controller. With an MRC bus, you can boot from any tape or disk unit on a controller.

2. The SCP CLI prompt is showing on the system console. Reset the system by typing

   RESET↵

3. Load from tape by typing BOOT and the controller device code. The standard device codes are as follows.

Unit Type	**Default Device Code Information**
ECLIPSE–bus MTB or MTC	Device code (octal) is 22.
ECLIPSE–bus MTD	Device code (octal) is 62.
ECLIPSE–bus MTJ	On combined storage subsystem (CSS), the device code (octal) is 23.
MRC–bus MRCTAPE	Device code is 116 (octal) or 10E (hex).

   For example,

BOOT 22↓ (Or 116 or 62)

If you type an invalid device code or the tape unit isn't ready, nothing happens. If nothing happens after 30 seconds or so, type the break sequence: on a CRT, press the CMD key, hold it down, and press the BREAK/ESC key. On a hardcopy terminal, press BRK. This returns the SCP CLI prompt. Correct any obvious problems and return to step 2 in this section.

NOTE: All ECLIPSE and MRC device codes that you boot from, including 22, 23, 62, and 116, appear in octal in this book. The default radix on some MV/40000s is hex. If, with an MV/40000, you use the BOOT command with an octal radix and receive no response, type the break sequence and check the radix with the command RADIX. If the radix is H (hex), type RADIX O, press NEW LINE, and try the BOOT command again.

With the tape on a standard ECLIPSE controller, skip to step 5. With the tape on an MRC subsystem (you typed BOOT 116), the hardware needs to know what MRC slot the tape controller is in and what the tape unit number is.

4. With the tape on an MRC, you see the question

   Enter NODE,UNIT of MRC boot device in hex [x,y]

   The value of the default unit (*x,y*) depends on the last default set. If a default has never been set, *x,y* shows *No default given.* Generally, with a 23-slot MTC, the primary MRC tape controller is in node A (slot number 0A, in hex) and the unit is number 0, so with a 23-slot MRC, type 0A,0 and press NEW LINE.

   For a 10-slot MRC, the tape controller slot varies depending on the number of other boards in the chassis. The tape unit number is usually 0. For a 10-slot MRC, type the node (slot number) of the tape controller and the unit number. For example, with a 10-slot MRC, type 5,0 and press NEW LINE.

   After you answer, the hardware will ask if you want the new value to be the default. Respond No by pressing NEW LINE. You want the default to be the device you boot AOS/VS II from, which will be disk, not tape.

   The hardware tries to read from the specified device. If you see a *Timeout* message, this means that the system tape isn't mounted on the unit you specified. Type the break sequence. Then make sure the tape unit is on and on line, with the AOS/VS II system tape mounted. Type BOOT 116 and press NEW LINE again, and specify the correct slot and unit number.

5. The hardware reads the AOS/VS II bootstrap program from the system tape and the bootstrap displays

   Loading tape file 1; please wait.

   There is a pause while the tape bootstrap loads tape file 1, Disk Jockey, into memory.

   If your system console is a CRT with a printer port, Disk Jockey will display the message *A slave printer has been detected... Do you want to run in hardcopy mode?.* Answer N and press NEW LINE.

If your computer has a boot clock — time-of-day clock — and the boot clock is working, Disk Jockey gets the date and time from the clock. If so, it displays its Main Menu; skip to step 8.

If Disk Jockey needs to know the date and time, it will display its Set System Date and Time menu as follows.

Disk Jockey Rev x.xx

Set System Date and Time

Date (MM/DD/YY): *1/01/69*

Time [HH:MM:SS]: *00:00:00*

Offset to GMT [+HH:MM:SS]: *+0:00*

It's critically important to set the date and time accurately here to provide accurate timestamps for files that will be loaded later. We will take the questions one by one.

Date [MM/DD/YY]: *1/01/69*

6. Type the date as numbers for month, day, and year. You can use spaces or slashes to separate numbers. For example, for March 3, 1990, type

   3 23 90↲

   Time [HH:MM:SS] *00:00:00*

7. Type the time, based on a 24-hour clock, in hours, minutes, and seconds. (Minutes and seconds are optional. If you omit them, the system sets each to 0.) Use spaces or colons to separate items. For example, for 2:30 p.m., type

   14 30↲

   Offset to GMT [+HH:MM:SS]: *+0:00*

   Take the default: with a CRT terminal, press NEW LINE; with a hardcopy terminal, press CTRL-A and then NEW LINE.

8. Disk Jockey displays its Main Menu:

   Disk Jockey Main Menu [keyword: MAIN]

   1. Format a physical disk
   2. Create, view, or modify a logical disk unit
   3. Install system software
   4. View or change startup parameters
   5. Run Disk Polisher

   Enter choice:

At this point, you have a choice:

- If a previous release of AOS/VS II has been installed on this disk, you can install this release now. Skip all the way to the section "Installing AOS/VS II System Software on the System LDU."
- If AOS/VS II has never been installed on this disk, you must format your system disk into an LDU, then install this release. Continue with the next section.

Formatting the System Disk into an LDU

An LDU is a physical disk (or parts of one or more physical disks) that has been given an identifier, a filename, and system tables.

You'll now use Disk Jockey to format your system disk and create an LDU on it. Disk Jockey is displaying its Main Menu.

Disk Jockey Main Menu [keyword: MAIN]

1. Format a physical disk
...
...
Enter choice:

9. You want to format a physical disk, choice 1, so type

1↵

Disk Jockey displays another menu:

Physical Disk Format Menu [PDISK]

1. Software format a physical disk
2. View or modify the bad block table
3. View system areas
4. Create, change, or delete user-defined system areas

Enter choice:

10. You want to software format the disk, choice 1, so type

1↵

Disk Jockey displays the Format a Physical Disk screen:

Format a Physical Disk [FORMAT]

WARNING: FORMATTING A PHYSICAL DISK DESTROYS ALL DATA ON THE PHYSICAL DISK

Disk unit name:

Test for bad blocks (surface analysis):	*Y*
Number of test patterns (1 - 5):	*n*
Format as a bootable disk:	*Y*
Reserve a diagnostic area on this disk:	*Y*
Size of diagnostic area in blocks (decimal):	*n*
Maximum number of user-defined system areas:	*10*
Maximum number of LDU pieces:	*8*
Maximum number of entries in the bad block table:	*n*

Execute? (Y or N):

NOTE: As the warning indicates, formatting a physical disk, as you're about to do, destroys all information on the disk (if there is any information). However, if you have never formatted your disks under AOS/VS II, you *must* format them. If your system disk is already formatted for AOS/VS II, return to the Disk Jockey Main Menu and skip to the section in this chapter "Installing AOS/VS II System Software on the System LDU." If your system disk was formatted under AOS/VS (the Disk Formatter), and you think it may contain valuable data, you should exit from Disk Jockey and copy disk material with the DUMP_II utility before proceeding. Then return to step 1 earlier and format the disk. Later, you can load the dumped material you want back onto the disk with the LOAD_II utility. If you're ready to format the LDU, proceed.

On the Disk Jockey Format screen, you'll specify the answers one by one. We'll explain the answers as you go.

The first prompt is

Disk unit name:

Model numbers, device types, default device codes, and default unit names of disks on an ECLIPSE bus follow in Table 2-1. Disks on an MRC bus are explained in Table 2-2.

With a disk controller on an ECLIPSE bus, the hardware can boot only from the first disk unit on a controller, so your system disk will generally be the first unit on a controller. A disk controller on an MRC bus can boot from any unit on the controller. Thus with disks on an MRC you can choose any disk as the system disk. You may also want to configure a second or third disk as a system disk to serve as a backup system disk (if you're willing to devote the extra disk space and effort to install AOS/VS II software).

Table 2-1 ECLIPSE-Bus Disks, Default Device Codes, and Unit Names

Disk Model Number and Description	Device Type Device	Controller / Default Code	Unit Number Name	Default Disk Unit
6236, 6237, 6239, 6240, 6290, 6297, 6298, 6299, 6310, 6328, 6329, 6363, 6446, 6491, 6492, 6578, 6579, 6581, 6582, 6584, and 6621 Models with numbers 6236 though 6299 are 14-inch disks. They have a power switch at the upper right and an LED display that shows the current cylinder or fault code. A controller can run four units. Three units fit in a cabinet. A Model 6236 holds 354 Mbytes; a Model 6239 holds 592 Mbytes; a Model 6290/6240 is two or three 6239 units in one cabinet on one controller. A Model 6297 holds 862 Mbytes; a Model 6298/6299 is two or three 6297 units in one cabinet on one controller. Models 6309, 6310, 6328, 6329, and 6363 are 5.25-inch diskettes and disks built into a MV/4000 DC system cabinet. Models 6491 and 6446 are 5.25-inch disks that hold 322 or 234 Mbytes, respectively, in a Combined Storage Subsystem (CSS). Up to four units fit in a CSS chassis. Models 6492, 6578, and 6579 are sealed 8-inch disks; one disk holds 727 Mbytes. A 6492 has one disk; 6578 two disks; and 6579, four disks. Models 6581, 6582, 6584, and 6621 are Rapid Access Mass Storage (R.A.M.S.) disks. A 6581 holds one 500-Mbyte disk; a 6582 holds two 500-Mbyte disks; and a 6584 holds four 500-Mbyte disks. A 6621 is one 1.2-Gbyte disk.	DPJ	First / 24	First Second Third Fourth	DPJ0 DPJ1 DPJ2 DPJ3
		Second / 64	First Second Third Fourth	DPJ10 DPJ11 DPJ12 DPJ13
		Third / none	First Second Third Fourth	DPJ20 DPJ21 DPJ22 DPJ23
		Fourth / none	First Second Third Fourth	DPJ30 DPJ31 DPJ32 DPJ33
		nth / none (n proceeds 0, 1, 2,..., 8, 9, A, B, C, D, E, F, G, H, I, J, ...)	First Second Third Fourth	DPJ(n-1)0 DPJ(n-1)1 DPJ(n-1)2 DPJ(n-1)3
6060 and 6061; 6067; 6122; 6160 and 6161; 6214 The 6060, 6061, 6067, and 6122 units use removable packs; a controller can run four units. The 6160 and 6161 units use non-removable disks; a controller can run two units. A Model 6060 holds 96 Mbytes; a 6061 holds 190 Mbytes; a 6067 holds 50 Mbytes; a 6122 holds 277 Mbytes. A 6160 holds 73 Mbytes and a 6161 holds 147 Mbytes. A 6214 is a freestanding unit with a nonremovable disk; one controller can run two units. A unit holds 602 Mbytes.	DPF	First / 27	First Second Third Fourth	DPF0 DPF1 DPF2 DPF3
		Second / 67	First Second Third Fourth	DPF10 DPF11 DPF12 DPF13
		nth / none	First Second Third Fourth	DPF(n-1)0 DPF(n-1)1 DPF(n-1)2 DPF(n-1)3
6234. A sealed moving-head disk, bay mounted. It holds 50 Mbytes.	DPI	First / 33 Second / 73	Only Only	DPI0 DPI10

Table 2-2 MRC-Bus Disks, Default Slot Numbers, and Unit Names

Disk Model Number and Description	Device Type	Controller / Default Slot Number	Unit Number	Default Disk Unit Name
6236, 6237, 6239, 6240, 6290, 6297, 6298, 6299, 6492, 6578, 6579, 6581, 6582, 6584, and 6621 Models with numbers between 6200 and 6300 are sealed 14-inch disks. The power switch is at the upper right; an LED display shows the current cylinder or fault code. A controller can run four units. Three units fit in a cabinet. A Model 6236 holds 354 Mbytes; a Model 6239 holds 592 Mbytes; a Model 6290/6240 is two or three 6239 units in one cabinet on one controller. A Model 6297 holds 862 Mbytes; a Model 6298/6299 is two or three 6297 units in one cabinet on one controller.	MRCDISK	First / 0E (hex)	First Second Third Fourth Fifth Sixth Seventh Eighth	MRCDISK000E00 MRCDISK000E01 MRCDISK000E02 MRCDISK000E03 MRCDISK000E04 MRCDISK000E05 MRCDISK000E06 MRCDISK000E07
		Second / 0F (hex)	First Second Third Fourth Fifth Sixth Seventh Eighth	MRCDISK000F00 MRCDISK000F01 MRCDISK000F02 MRCDISK000F03 MRCDISK000F04 MRCDISK000F05 MRCDISK000F06 MRCDISK000F07
Models 6581, 6582, 6584, and 6621 are Rapid Access Mass Storage (R.A.M.S.) disks. A Model 6581 holds one 500-Mbyte disk. A 6582 holds two 500-Mbyte disks. A 6584 holds four 500-Mbyte disks. A controller can run as many as 8 units. A Model 6621 is one 1.2-Gbyte disk; a controller can run up to four units.		nth / none	First Second Third Fourth Fifth Sixth Seventh Eighth	MRCDISKccnn00 MRCDISKccnn01 MRCDISKccnn02 MRCDISKccnn03 MRCDISKccnn04 MRCDISKccnn05 MRCDISKccnn06 MRCDISKccnn07 cc = MRC chassis number at site, hex. nn = node (slot) number in MRC chassis (hex).

11. Type the disk unit name; for example,

DPJ0↵   (or MRCDISK000E00↵ or other disk unit name)

Next, Disk Jockey asks other questions to identify the disk. For now, until you run VSGEN, you will need to tell Disk Jockey where the device is. Running VSGEN creates both a tailored operating system file and a device names file which lets Disk Jockey locate a device using its name alone.)

Device Specification

Device name:	*xxx*	
Bus type (ECL or MRC):	*xxx*	
Device type:	*xxx*	*ddd,ddd,ddd,ddd* *ddd,ddd,ddd,ddd*
Unit number:		
Device code (octal):		
MRC slot number (hex):		
Execute (Y/N):		

As before, we will explain these one by one.

Device name: *xxx*

Here, the device name *xxx* is copied from the previous question; you can't change it.

Bus type (ECL or MRC):

12. If the disk is on an ECLIPSE bus, type ECL and press NEW LINE. If the disk is on an MRC bus (you booted from device code 116), type MRC and press NEW LINE. For example,

MRC↵

Device Type:

13. Specify the type of disk from Table 2–1 or 2–2. Valid types you can specify here include DPJ, DPF, DPI, and MRCDISK. A complete list of valid devices follows the prompt. For example,

DPJ↵   (or MRCDISK↵)

Unit number:

14. A system disk on an ECLIPSE bus must be unit 0; the hardware can boot only from unit 0. So if this disk is on an ECLIPSE bus (DPJ, DPF, DPI), type 0 and press NEW LINE. A system disk on an MRC bus need not be unit 0, but generally it is unit 0. With a disk on an MRC, if you know the disk is a different unit, specify that unit number; otherwise specify 0:

0↵

Device code:

15. If the disk is on an ECLIPSE bus, type the device code from Table 2-1 or 2-2. Or if you know the disk is on a nonstandard device code, specify that device code. For example, a common ECLIPSE standard device code is 24. For a disk on an ECLIPSE bus, Disk Jockey skips the next question.

If the disk is on an MRC bus, type the device code of the *MRC channel*; by default this is 116 octal. Type the device code and press NEW LINE.

MRC slot number (hex):

16. Specify the slot number, in the MRC chassis, that holds the disk controller. You must use hexadecimal. Generally, for a 23-slot MRC, the first disk controller is in slot E (hex); so for a 23-slot MRC generally answer E and press NEW LINE. For a 10-slot MRC, the controller slot depends on the number of other controllers in the chassis; type the controller slot number and press NEW LINE.

Execute (Y/N):

17. Check your answers. For a typical ECLIPSE disk, the screen looks like this:

Device Specification

Device name:	*DPJ0*
Bus type (ECL or EMRC):	*ECL*
Device type:	*DPJ*
Unit number:	*0*
Device code:	*24*
MRC slot number (hex):	
Execute (Y/N):	

If you are satisfied with the answers, confirm by typing Y and pressing NEW LINE.

Disk Jockey checks the syntax of each answer immediately after you press NEW LINE; if you receive an error message, specify the answer again. Disk Jockey does *not* check for the existence of the disk until you fill the entire screen and confirm via the *Execute* question. At that point, if the disk doesn't exist on the given device code, Disk Jockey may hang, requiring you to abort and restart it. So take care to specify the correct disk unit, device code, and, if needed, slot.

18. Disk Jockey returns to the previous screen, next question:

Test for bad blocks (surface analysis): *N*

Disk Jockey can test for bad blocks (flawed areas on the disk surface that will not hold information). It is important to identify bad blocks so AOS/VS II will bypass them. However, the controllers of many disk models can detect and bypass bad blocks without notifying the operating system; for such disks, you need not have Disk Jockey test for bad blocks.

Disks whose controllers can detect and bypass bad blocks (and which you need not test for bad blocks) include

Model 6236 (354 Mbytes) and multiple-unit Model 6237.

Model 6239 (592 Mbytes) and multiple-unit Models 6290 and 6240.

Model 6357 (862 Mbytes) and multiple-unit Models 6398 and 6399.

Model 6446 (234 Mbytes).

Model 6491 (322 Mbytes).

Model 6492 (727 Mbytes).

Model 6581 (500 Mbytes) and multiple-unit Models 6582 and 6584.

Model 6621 (1.2 Gbytes).

Other disk controllers cannot detect bad blocks. If your system disk (and other disk) controller can't detect bad blocks, and the disk(s) have never been tested, we *strongly suggest* that you have Disk Jockey test the disk(s) for bad blocks. You'll rarely, if ever, need to do this again.

NOTE: You need not test for bad blocks on any disk that's been formatted under an earlier release of AOS/VS or AOS/VS II. This is so because Disk Jockey can use the bad block table created during the previous format; it need not create a new table. The only disks that *require* bad block testing are previously unformatted disks of model numbers other than those shown above.

To test for bad blocks, Disk Jockey writes a pattern to each 16-bit word on the disk and reads it back. The more patterns you run, the more thorough the test. You can choose the number of patterns to run. Each pattern takes time (approximate times for certain models are shown in Table 2-3).

Table 2-3 Bad Block Test (Surface Analysis) Times for Disks

Disk Model	Capacity (Megabytes)	Time per Test Pattern (Approximate)
6060 or 6061	96 or 190	13 or 17 minutes
6122	277	26 minutes
6160 or 6161	73 or 147	11 or 22 minutes
6214	602	52 minutes
6234	50	8 minutes
6236*, 6237*	354 per unit	35 minutes per unit
6239*, 6290*, 6240*	592 per unit	50–60 minutes per unit
6297*, 6298*, 6299*	862 per unit	70–85 minutes per unit
6446* or 6491*	234 or 322 per unit	20–40 minutes per unit
6492*	737 per unit	80–100 minutes per unit
6581*, 6582*, 6584*	500 per unit	30–60 minutes per unit

* Surface analysis is not required with this disk model

Depending on your disk model, and whether it's ever been formatted, answer No (type N↲) or Yes, which is the default. For the default with a CRT, press NEW LINE; for the default with a hardcopy terminal, type Y and press NEW LINE. If you answer No, the program inserts a blank answer to the next question; skip to step 20.

If you answer Yes, Disk Jockey prompts

Number of test patterns (1–5)? n

19. Each pattern takes the amount of time shown for the disk in Table 2–3. A good general–purpose answer is 3. For the most thorough test, answer 5. For example,

3↲

20. Disk Jockey moves the cursor to the next question:

Format as a bootable disk: Y

(On any menu/screen, you can change an answer given earlier or back up to get help on an earlier question. To back up on a CRT, press the uparrow cursor control key in the key group to the right of the main keypad; on a hardcopy terminal, press CTRL–W. Doing this moves the cursor (or current line) back to the previous question, where you can change the answer or ask for help as explained on the screen. You can back up for any question on the current menu/screen until you confirm the menu by answering the *Execute?* question with Y↲. Try it now, if you'd like.)

A bootable disk is a logical disk unit (LDU) that has software bootstrap programs installed on it; you can start software from it. (The disk usually has an operating system as well as the bootstrap programs.) A Yes answer to this question reserves space on the disk for bootstrap programs and microcode, which you later install using Disk Jockey.

On an ECLIPSE I/O bus (as opposed to a MRC I/O bus), the hardware can boot from only the first disk on a controller. For example, you could boot from DPJ0 or DPJ10, but not from DPJ1 or DPJ11. Therefore, for an ECLIPSE disk it may waste space to answer Yes for a disk that is not (or cannot be inserted as) the first disk on a controller. Always answer No for a disk you know you won't boot from (like a diskette). On an MRC I/O bus, the hardware can boot from any disk.

Your system LDU *must* be a bootable disk. So for your system LDU, answer Yes. On a CRT, press NEW LINE. On a hardcopy terminal, press CTRL–A and then NEW LINE. For example,

↲

Disk Jockey moves the cursor to the next question:

Reserve a diagnostic area on this disk: Y

This question lets you reserve an area on disk for later installation of the DG Advanced Diagnostic EXecutive (ADEX) system. ADEX is available to all DG customers who have a valid Data General On Call service contract and remote support. If your service contract includes remote support, ADEX *needs* to be installed on disk.

If you don't reserve an area for ADEX now, and later decide to install ADEX, you will need to reformat your system disk to do so.

ADEX for ECLIPSE MV/Family machines requires from 3,000 disk blocks (about 1.5 Mbytes) up to 15,000 blocks or so. This space is lost for AOS/VS II file storage.

ADEX can run only from a bootable (system) disk. Thus, you should *always* say No for an LDU that won't be the system disk. Generally, ADEX is installed on only one disk per system.

21. To reserve a diagnostic area, type Y and press NEW LINE:

    Y↵

    If you don't want to install ADEX and run it from disk, answer No by typing N↵. Disk Jockey supplies a blank space for the next question; skip to step 23.

22. Disk Jockey needs to know how large a diagnostic area to reserve:

    Size of diagnostic area in blocks (decimal): 10000

    The default is a point between the maximum (15000) and minimum (3000). For specific information, consult the *CORESIDENT Diagnostics System Operator's Reference Guide*. When you know the number of blocks required, type it; for example,

    12000 ↵

23. Disk Jockey moves the cursor to the next question:

    Maximum number of user-defined system areas: n

    System areas are areas on the disk, outside the file system, reserved for things like system bootstraps and microcode. *User-defined* system areas are those that you can use for your own purposes — perhaps for disk identifiers or similar purposes. User programs can open user-defined system areas via the ?GOPEN system call (using the form disk-unitname:system-area-ID — for example, @DPJ0:1005). The programs can then read from and write to these areas as if they were files. The PER entries for the disk unit must allow the kind of access needed (for example, Read to open, Write to modify).

    We recommend the default. With a CRT, press NEW LINE; with a hardcopy terminal, press CTRL-A and then NEW LINE.

Disk Jockey moves the cursor to the next question:

Maximum number of LDU pieces: 8

24. A physical disk can include more than one piece, up to the number you specify here. For example, if you want to create two LDUs on a physical disk, this number must be at least 2.

Your system disk can include only one piece. But since this question simply sets an upper limit, you might as well take the default. (You can learn more about using pieces in Chapter 7. Take the default.

Disk Jockey moves the cursor to the next question:

Maximum number of entries in the bad block table: n

This limits the number of bad blocks allowed on the disk. Usually if the number of bad blocks exceeds the default, there's a hardware problem with the disk. Therefore, specifying a large maximum probably won't extend the bad-block tolerance of the disk. On the other hand, specifying a number smaller than the default may force you to reformat a disk before its time. If Disk Jockey finds more bad blocks than the number you specify here, it will give you a chance to enlarge the bad block table.

25. We suggest you take the default.

After you answer, Disk Jockey moves the cursor to the *Execute?* question. This gives you a chance to check your answers and confirm. Generally, for the system LDU, the completed screen should look like this:

Test for bad blocks (surface analysis):	*N* (or *Y*)
Number of test patterns (1–5):	*0* (or *n*)
Format as a bootable disk:	*Y*
Reserve a diagnostics area on the LDU:	*Y* (or *N*)
Size of diagnostic area in blocks (decimal):	*0* (or *n*)
Maximum number of user-defined system areas:	*10*
Maximum number of LDU pieces:	*8*
Maximum number of entries in the bad block table:	*128*

Execute? (Y or N)

26. After checking your answers, confirm by typing

Y↲

Disk Jockey now tries to access the disk you identified back in steps 11–17. If you see no new messages for a period of, say, 60 seconds or more, perhaps you specified a nonexistent disk unit or device code. You may want to abort Disk Jockey (press the break sequence) and return to step 2. Normally, Disk Jockey will be able to access the disk and it will display a message to explain what's happening.

27. If you said No to bad block testing, skip to step 28. If you specified bad block testing, Disk Jockey tests the disk surface for bad blocks, describing its progress across the disk. (If Disk Jockey finds too many bad blocks, it notifies you and asks if you want to continue. If you answer Yes, it will let you enlarge the bad block table. You might choose to enlarge the table, say by 50 percent. But generally, too many bad blocks means a hardware problem like head misalignment; perhaps someone should run disk diagnostics.)

In most cases, it's simply a matter of waiting for testing to finish. Approximate testing times are given in Table 2-3.

When Disk Jockey has tested for bad blocks, it notes any bad blocks in the disk's bad block table. (You can examine this table, if you ever need to, via the Bad Block Table screen, keyword BBT.)

28. Disk Jockey now creates the tables AOS/VS II needs. You'll see messages about disk tables being created. This takes just a few moments.

When done, Disk Jockey returns to the Physical Disk Format Menu, allowing you to software format other disks. (If you want to do this now, go ahead; but first you may want to read Chapter 7 for background.)

Your next step is to create a logical disk unit. (If you formatted disks other than the system disk, the next steps are to create logical disk units from them.) To create a logical disk unit, you must return to Disk Jockey's Main Menu, as follows.

29. On a CRT terminal, press CANCEL/EXIT, F11 (in the topmost row of keys, this is the eleventh key from the left); on a hardcopy terminal, press ESC and C.

Disk Jockey Main Menu [MAIN]

1. Format a physical disk
2. Create, view, or modify a logical disk unit
3. Install system software
4. View or change startup parameters
5. Run Disk Polisher

Enter choice:

Creating an LDU

From this point on, you'll use choices 2 and 3; later, you may want to use choices 4 and 5. *All these choices* (all but choice 1) let you change settings without destroying user information on the LDU. Choice 1 is the only choice that destroys all information on an LDU. For example, after you've used an LDU for a while, you might want to change the ACL (available under choice 2), mirror the LDU (also available under choice 2), or load a new revision of system software (choice 3). You can do any of these without changing unrelated values or destroying user data.

30. You want to create a logical disk unit, so take choice 2:

2↵

Disk Jockey displays the Logical Disk Unit menu:

Logical Disk Unit Menu [LDMENU]

1. *Create a one-piece LDU*
2. *Create a multiple-piece LDU*
3. *Delete an LDU*
4. *Change LDU parameters*
5. *View LDU information*
6. *Rename an LDU*
7. *Copy an LDU*

Enter choice: 1

31. You want to create a one-piece LDU. (This is true because the system LDU must be just one piece. If in future you want an LDU to span two physical disks, or have two different parts on one physical disk, you will need to select choice 2 for that LDU. The concept of LDU pieces is described in Chapter 7. Take the default. With a CRT terminal, press NEW LINE; on a hardcopy terminal, press CTRL-A and then NEW LINE.

Disk Jockey asks for the filename and number of images:

LDU filename:
Number of images:

We will explain these one by one.

LDU filename:

32. Your answer determines the filename for the LDU. This is the system LDU; it will be the system root directory (:) So the name you type is not critical in terms of file access.

But for any LDU that is not the system LDU, the filename becomes the name by which people access the LDU. People will use this name just as any other directory filename. For example, if you have a lot of users and want to put some of them on a nonsystem LDU, you might name the LDU something like UDD1. Or, for a big multiple-disk LDU, you might choose the filename DATABASE. You can change the LDU filename later, if you want, with Disk Jockey.

NOTE: Later on, for optimum performance, if you have many large disks and can afford the disk space, you might want to dedicate an LDU to the AOS/VS II SWAP and PAGE directories. To do this, name the LDU BOTH. And give it an access control list of +,E via the CLI or the Disk Jockey "Change LDU parameters" option. This disk will *not* be a system disk. Later on, at VSGEN, you'll give this disk's unit name as the Swap and Page directory parameter. Then, when you bring up your tailored system, AOS/VS II will use this LDU for swapping and paging. An LDU you dedicate for swapping/paging should be a DPJ– or DPF–type disk to be large enough; and it should — ideally — be on its own controller.

For your system LDU, come up with a meaningful filename and type it. AOS/VS II filenames can have from 1 through 31 characters, including numbers, upper– and lowercase characters (lowercase are converted to uppercase), and the characters ?, $, . (period), and _ (underscore). For example, type

ROOT↵

Number of images:

33. AOS/VS II can maintain 2 or 3 images of an LDU, using a process called mirroring. After you tell the system to mirror (using the MIRROR command), mirroring occurs dynamically. If a serious error occurs on any mirror image, AOS/VS II notifies the system operator, releases the offending image, and continues using the other mirror image(s). By providing an accessible substitute LDU, mirroring offers higher availability of data.

However, mirroring is not free. It requires a second LDU (a third LDU is optional). Ideally, mirrored LDUs should be on different disk controllers to eliminate the disk controller as a single point of failure. (However, hardware mirroring, which provides faster synchronization than software mirroring, requires that the mirrored images be on the same controller.)

On an ECLIPSE bus, for the system LDU to be mirrored effectively, the secondary image should be the first disk on its controller — so that you can boot an AOS/VS II system from it. (On an MRC bus, you can boot from any disk.) Generally, a system LDU includes an entire physical disk, which means that to mirror a system disk you must dedicate another entire disk as the mirror.

The decision about mirroring an LDU is not final: even if you say No to mirroring now, you can decide to mirror this LDU later without destroying data on it. To do this, you would format a disk of the same size and specify the same filename, but different unique IDs, and take the default for LDU parameters (asked later). Then you could start mirroring on startup with the MIRROR command. Mirroring is further described in Chapter 4, and Chapter 7, and *Managing AOS/VS and AOS/VS II.*

To answer this question, decide whether or not to mirror this LDU. In most cases, you won't want to mirror the system LDU.

If you *do* want to mirror the LDU, you can choose either 2 or 3 images. For 2 images, you need to define one extra LDU of identical size to the original; for 3 images, you need 2 extra LDUs of identical size. Normally, 2 images is enough — but for really critical applications, 3 images provides two backups. With 3 images, you can continue using the LDU even if 2 images fail.

Decide on the number of images you want, and type the answer. For example,

1↵

Disk Jockey now displays the Create One-Piece LDU screen:

Create One-Piece LDU
LDU filename: xxx (*xxx* is the filename you specified above)

Disk unit name:
LDU unique ID:
Size: *Starting address (octal): n*

Change default LDU parameters? (Y or N) *N*

Execute? (Y or N)

As before, we'll explain these choices one by one.

Disk unit name:

34. For image 1, specify the same disk unit you indicated earlier. Generally, you can take the Disk Jockey default, if displayed (unless you are specifying the second or third image of a mirror, in which case you must specify the disk unit name of the second or third image).

For example, the displayed default is DPJ0. On a CRT terminal, you would press NEW LINE; on a hardcopy terminal, you would press CTRL-A and then NEW LINE.

Next, as before, Disk Jockey asks other questions about the disk in the Device Specification screen.

Device Specification

Device name: *xxx*

Bus type (ECL or MRC): *xxx*

Device type: *xxx*

Unit number: *n*

Device code: *n*

MRC slot number (hex):

Execute (Y/N):

35. Disk Jockey retains the values you specified earlier for the disk. So if the LDU is not mirrored, you can take the defaults for all values. To take the defaults on a CRT, press Execute (F1). On a hardcopy terminal, press CTRL–A to redisplay each default, and then press NEW LINE; when you reach the *Execute?* question, type Y and press NEW LINE. Then skip to the next question.

If the LDU is the second or third mirror image, you can't take all defaults, since an LDU can't be mirrored to itself. To specify the address of the second (or third) image, you must change at least one displayed default answer: unit number (for a mirror image on a different unit), device code (for a mirror image on a different controller), and/or MRC slot number (for a mirror image on a different MRC controller). Correct the answers you need to, take the default for each correct answer, and when you reach the Execute prompt, type Y and press NEW LINE.

Disk Jockey returns to the previous screen, second question.

LDU unique ID:

36. The system uses the unique ID to keep track of the disk(s) in LDUs. Users don't see or use the ID. ID names follow the rules for AOS/VS II filenames: 1 through 31 characters, and so on, as described for LDU filenames earlier.

For a nonremovable disk, you can use the disk unit name of the disk; for example, DPJ0. Or, for any disk, you can use a technique like the one described next.

If you plan to mirror this LDU, the ID will distinguish this image from others. (In a mirrored group, each LDU has the same filename, so the system needs a different ID for each one.) Disk Jockey cannot check the ID for uniqueness, so you must make sure it is unique. One way to create a unique ID is to add the characters .IMAGEn to the LDU filename. For example, for the first image of an LDU named UDD, you'd specify a unique ID of UDD.IMAGE1; for the second image, you'd specify UDD.IMAGE2, and (if you wanted a third image) you'd use UDD.IMAGE3 for the third image.

For an LDU named PAGE, SWAP, or BOTH, respectively, you must use the unique ID PAGE, SWAP, or BOTH (use the filename as the unique ID).

Decide on a unique ID and type it; for example,

ROOT.IMAGE1 ↲

Size: n (*n* is the decimal number of blocks in the largest contiguous area available on the physical disk.)

37. The LDU size *n* displayed should be the size of the disk, less a few blocks for system tables. Take the default. On a CRT terminal, press NEW LINE; on a hardcopy terminal, press CTRL–A and then NEW LINE.

Starting address (octal): n (*n* is the starting location of the contiguous area.)

38. For the system LDU, the starting address *n* begins as close as possible to the beginning of the disk. Take the default. On a CRT terminal, press NEW LINE; on a hardcopy terminal, press CTRL–A and then NEW LINE.

39. If you specified one image in step 33, skip to the next step.

If you specified more than one image in step 33, Disk Jockey repeats the *Disk unit name, Bus type, Device type, Unit number, Device code, MRC slot number, LDU unique ID, Size,* and *Starting address* prompts for the next image. The LDU(s) you specify must provide *at least* as much storage as the original image. Disk capacities are given in Tables 2–1 and 2–2. (The disk itself need not be the same model as the one that holds the original image, but it must hold at least as much.) As a mirror for the system LDU, on an ECLIPSE bus, it's simplest (and most effective) to specify a disk that's in the first unit on a different controller; for example, DPJ10. When you describe a mirror image, don't take the default value for disk unit name (since this value is the last disk unit name specified to Disk Jockey — not what you want for a mirror).

Change default LDU parameters? (Y/N) N

40. Here, LDU parameters means the placement of the disk bitmap, placement and size of the bad block table, the LDU access control list (ACL), default data directory element sizes, index element sizes, maximum index level, and file information table (FIT) element size. The default bitmap position is 33 percent of the distance across the disk — an efficient default. The default ACL is +,E — a good general purpose ACL. The default data element and index element size is 4, and the default maximum index level is 3. Again, these are good general–purpose values that will serve well for practically all applications.

For your system LDU, and, generally, for all LDUs, we recommend the original default parameters. If you want to check or change these, you can answer Yes and step through the questions, described in more detail in Chapter 7. To retain the default parameters, take the default.

Execute? (Y or N)

41. Review the answers on the screen for the image(s) of this LDU, particularly the unit name and unique ID answers. Correct any that you don't like. Then at the *Execute?* prompt, confirm with Y:

Y↵

Disk Jockey returns to the Logical Disk Menu.

Logical Disk Menu

1. Create a one–piece LDU
2. Create a multiple–piece LDU
...
...
Execute? (Y or N):

42. You've formatted the physical disk and created an LDU. You're ready to install AOS/VS II software. You need to return to the Disk Jockey Main Menu. For a CRT terminal, press CANCEL/EXIT (F11); for a hardcopy terminal, press ESC and C. Disk Jockey displays the Main Menu:

Disk Jockey Main Menu

1. Format a physical disk
2 ...
...
Enter choice:

Installing AOS/VS II Software on the System LDU

Next you'll install AOS/VS II software and microcode on your system LDU.

NOTE: You must use Disk Jockey, not the LOAD command or LOAD_II program, to install AOS/VS II software. If you don't use Disk Jockey to install, you won't be able to boot from disk later on.

The task of installing software is independent of creating an LDU; therefore, in this section, step numbers start again from 1. Disk Jockey is displaying its Main Menu:

Disk Jockey Main Menu

1. Format a physical disk
2. Create, view, or modify a logical disk unit
3. Install system software
4. View or change startup parameters
5. Run Disk Polisher

Enter choice:

1. You want to install system software, so take choice 3:

3↵

Disk Jockey displays the Install System Software Menu:

Install System Software Menu [SOFTWARE]

1. Install an AOS/VS II release or update
2. Install bootstrap programs
3. Install microcode

Enter choice:

2. To install an AOS/VS II release, choose item 1:

1↵

Disk Jockey asks some questions about the LDU:

Disk unit name: xxx
LDU filename: xxx
LDU unique ID: xxx
Execute (Y/N):

We'll explain the questions one by one.

Disk unit name: xxx

3. If you identified your system disk earlier and specified only one image (no mirroring), the default should be correct; if so, take the default.

If you didn't identify your disk earlier, no default appears. Type the unit name of your system disk. Model numbers, device types, default device codes, and default unit names of disks on an ECLIPSE bus appear earlier in Table 2–1. Disks on an MRC bus are explained in Table 2–2.

If you specified multiple images (mirroring) earlier, you must identify all the units involved. Separate the unit names with an exclamation point (!). For example, if you specified the image DPJ0 and mirror image DPJ10, type DPJ0!DPJ10↲.

Type the disk unit name; for example

DPJ0↲ (or, for a disk on an MRC bus, MRCDISK000E00↲)

Disk Jockey displays the Device Specification screen to ask more about the disk:

Device Specification

Device name: *xxx*

Bus type (ECL or MRC): *xxx*

Device type: *xxx*

Unit number: *n*

Device code (octal): *n*

MRC slot number (hex):

Execute (Y/N):

You may have seen these questions before. If you answered them before in this session, Disk Jockey retains the answers you gave then as defaults. These defaults should be correct; take them all. With a CRT, press the EXECUTE key (F1); with a hardcopy terminal, press CTRL–A and NEW LINE for all the questions and answer Y and NEW LINE to the last. Then skip to step 5 below.

4. If you have not answered these questions for your system disk, the default answers are probably not right; you must type answers to at least some questions. Here is a brief summary of standard values for a system disks.

	ECLIPSE–Bus Disk	**MRC–Bus Disk**
Device name:	DPJ0 or DPF0	MRCDISK000E00
Bus type (ECL/MRC):	ECL	MRC
Device type:	DPJ or DPF	MRCDISK
Unit number:	0	0 or other unit
Device code (octal):	24 (DPJ) or 27 (DPF)	116
MRC slot number (hex):	Does not apply	0E

If your system disk is mirrored, Disk Jockey will repeat device specification questions for the units(s) that hold the second and third images. For example, if your system disk DPJ0 will be mirrored on an image in DPJ10, Disk Jockey will repeat device information questions for DPJ10. To specify the address of the second (or third) image, you must change at least one displayed default answer: unit number (for a mirror image on a different unit), device code (for a mirror image on a different controller), and/or MRC slot number (for a mirror image on a different MRC controller). Correct the answers you need to, take the default for each correct answer, and when you reach the *Execute?* prompt, type Y and press NEW LINE.

5. Disk Jockey returns to the previous screen, second question:

LDU filename: xxx

6. Specify the same filename you specified earlier for the LDU. Generally, you can take the default, *xxx*. Even if you specified mirroring, all images must have the same LDU filename. For example, the displayed filename is ROOT. With a CRT terminal, press NEW LINE; with a hardcopy terminal, press CTRL–A and then NEW LINE.

LDU unique ID: xxx

7. Specify the same ID you specified earlier for this image. Generally, if there's only one image, you can take the default.

   But if you specified multiple images earlier, indicate the unique IDs of all images involved. As with unit names, separate the IDs with an exclamation point. For example, if you assigned the unique IDs ROOT.IMAGE1 and ROOT.IMAGE2, type ROOT.IMAGE1!ROOT.IMAGE2↵.

8. Disk Jockey asks for load information:

Install an AOS/VS II Release or Update [LOADOS]

Load from tape or diskettes (T = Tape, D = Diskettes): T
Pathname to load from: MTB0:2

Pathname template: #

Delete existing files with same names as files you are loading,
or ask for confirmation? (D = Delete, C = Confirm): D

List files loaded? (P = Printer, F = File, T = Terminal only): T

Execute? (Y or N)

As before, we'll explain these as you need them.

9. Make sure the AOS/VS II tape is ready and on line. (It should still be.)

The first question is

Load from tape or diskettes (T = Tape, D = Diskettes): T

10. Take the default. With a CRT, press NEW LINE; with a hardcopy terminal, press CTRL–A and then NEW LINE.

Pathname to load from: MTC0:2

11. Type the tape unit name, according to the device code you originally booted from at the beginning of this chapter. Follow the name with :2, to indicate tape file 2, as follows.

Device Code	Pathname to Type
22	MTC0:2
62	MTD0:2
23	MTJ0:2
116	MRCTAPE000A00:2

For example,

MTC0:2↵ (or MRCTAPE000A00:2↵)

Disk Jockey displays the Device Specification screen to ask more about the tape.

Device Specification

Device name:	*xxx*
Bus type (ECL or MRC):	*xxx*
Device type:	*xxx*
Unit number:	*n*
Device code (octal):	*n*
MRC slot number (hex):	
Execute (Y/N):	

As before, we will explain these one by one.

Device name: *xxx*

Here, the *xxx* is copied from the previous question; you can't change it.

Bus type:

12. If the tape is on an ECLIPSE bus, type ECL and press NEW LINE. If the tape is on an MRC bus (you booted device code 116), type MRC and press NEW LINE.

Device type:

13. If you booted the tape unit from device code 22, 62, 23, or 116, you can determine the device code from the previous table. Use only the leading letters of the pathname (no numbers); for example, MTC or MRCTAPE. Type the tape type and press NEW LINE. For example,

MRCTAPE↵

If you did not boot from one of the standard tape unit device codes, you can determine the tape unit type as follows.

Tape Unit Model Number	Unit Type
6026 (1600/800 b/pi dual mode)	MTB
6125, 6231, 6311	MTC
4307, 6299, 6300 (6250/1600 b/pi dual mode on ECLIPSE bus)	MTD
6340, 6341, 6351, 6352, QICSHOT (cartridge units)	MTJ

After you answer the unit type question, the program asks

Unit number:

14. On an ECLIPSE bus, the tape is generally mounted on unit 0 since the hardware can boot only from unit 0. So, if this tape is on an ECLIPSE bus (MTC, MTD, and so on), type 0 and press NEW LINE. On an MRC bus, the tape need not be on unit 0, but generally it is unit 0. With a tape on an MRC, if you know the tape is a different unit, specify that unit number; otherwise, specify 0. For example,

0↵

Device code (octal):

15. If the tape is on an ECLIPSE bus, type the device code from which you originally booted the tape (22, 62, or 23). Or if you know the tape is on a nonstandard device code, specify that device code.

If the tape is on an MRC bus, type the device code of the *MRC channel*; by default this is 116 (which indicates channel 1, device code 16). For example,

22↵ (or 116↵)

For a tape on an ECLIPSE bus, Disk Jockey skips the next question.

MRC slot number (hex):

16. Specify the slot number, in the MRC chassis, that holds the tape controller. You must use hexadecimal. Generally, for a 23-slot MRC, the first tape controller is in slot A (hex); so for a 23-slot MRC generally answer A and press NEW LINE. For a 10-slot MRC, the controller slot depends on the number of other controllers in the chassis; type the controller slot number and press NEW LINE. For example,

0A⤶

Execute? (Y/N)

17. Check your answers. For a typical ECLIPSE tape, the screen might look like this:

Device Specification

Device name:	*MTC0*
Bus type (ECL or MRC):	*ECL*
Device type:	*MTD*
Unit number:	*0*
Device code (octal):	*62*
MRC slot number (hex):	
Execute (Y/N):	

After you're satisfied with your answers, confirm by typing

Y⤶

As we mentioned before, Disk Jockey doesn't check for the existence of the device at the specified device code until you confirm all answers with the *Execute?* question.

Pathname template: #

18. You want to load all files (as indicated by the # template). So take the default. With a CRT, press NEW LINE; with a hardcopy terminal, press CTRL–A and then NEW LINE.

Delete existing files with same names as files you are loading, or ask for confirmation? (D = Delete, C = Confirm): D

19. You want to delete existing files, so take the default:

⤶

List files loaded? (P = Printer, F = File, T = Terminal only): T

20. For your first system, you don't need a list. (There's a list of files in Appendix B.) Take the default, *Terminal only.*

⤶

Execute? (Y or N)

21. After checking your answers, change any you want. Then confirm with Y:

Y⤶

22. Disk Jockey reads tape file 2, loading AOS/VS II files onto your system LDU (and mirror images, if any). Depending on your tape unit, this may take from 10 to 50 minutes. It displays the names of files as it loads them.

After loading files and rewinding the tape, Disk Jockey prompts for another tape:

Load completed.
Do you have another release or update tape to load (Y or N):

23. It's time to load the second AOS/VS II release tape. Get the second release tape (*not the Update tape!*) and mount it on the same unit you used for the first release tape. Put the unit on line.

24. Type Y and press NEW LINE:

Y↵

Please mount the tape on unit Mxxx (*Mxxx* is the unit you specified earlier.)
Press NEW LINE when unit is on line and ready:

25. Press NEW LINE.

As before, Disk Jockey loads files. After loading them, it rewinds the tape and displays this message:

Load completed.
Do you have another release or update tape to load (Y or N):

26. After loading the two AOS/VS II release tapes, you must now load the update (if you received one). The update contains programs that have been updated since they were released; if you received one, it's critically important to install it.

If you're sure you didn't receive an update tape, type N↵ and skip to step 30. If you received an update tape, type Y↵.

Please mount the tape on unit Mxxx
Press NEW LINE when unit is on line and ready:

27. Remove the AOS/VS II system tape from the unit and mount the update tape on the unit. Put the unit on line.

28. Confirm that you're ready by pressing NEW LINE.

Disk Jockey now loads the update, displaying files as it loads them. Generally, this takes much less time than loading the release. After loading the update, Disk Jockey rewinds the tape. Then it asks

Load completed.
Do you have another release or update tape to load (Y or N):

29. Generally, there will be only one update tape. Check your tapes. If there is only one update tape, answer No by typing N↵. Skip to the next step.

If there happens to be a second update tape, type Y↵. Then mount the tape. Disk Jockey will prompt you to press NEW LINE when ready. Do so and the program will load the files and rewind the tape.

30. Next Disk Jockey offers to install the AOS/VS II bootstrap programs. (You could also do this from the Install System Software Menu, but doing it here saves steps.)

Do you want to install bootstrap programs (Y or N):

The bootstrap programs let you start AOS/VS from disk. There are several of them and you want to install them all. Installing the bootstraps copies them into reserved areas called system areas, from which the hardware can execute them. (The bootstrap programs were *loaded onto the LDU* — but not installed — in previous steps.)

31. To install the bootstraps, answer Y↲.

Disk Jockey reads bootstrap files from the LDU and copies them into system areas. This takes a few minutes. You'll see some *Copying* and *Installing* messages. Then Disk Jockey prompts

Press NEW-LINE to continue.

32. To continue, press NEW LINE.

Disk Jockey returns to the Install System Software Menu:

Install System Software Menu

1. Install an AOS/VS release or update
2. Install bootstrap programs
3. Install microcode

Enter choice:

Next you want to install microcode so it can be loaded automatically on future startups.

Installing Microcode on the System LDU

The next step is to install computer microcode on the system LDU. Installing microcode lets it be loaded automatically, on powerup, from disk, instead of requiring someone to mount the SCP SYSTEM MEDIA tape for your computer.

Disk Jockey is displaying the Install System Software Menu:

Install System Software Menu [SOFTWARE]

1. Install an AOS/VS II release or update
2. Install bootstrap programs
3. Install microcode

Enter choice:

33. Dismount the AOS/VS II tape.

34. Mount the SCP SYSTEM MEDIA tape.

35. To install microcode, select choice 3:

3⤶

Disk Jockey displays the Install Microcode menu:

Install Microcode [LOADMCODE]

Disk unit name: xxx

System area ID:

The microcode file will be loaded into the system area as well as into the following root logical disk.

LDU filename:

LDU unique ID: xxx

Install from tape or disk (T = Tape, D = Disk): T

Pathname: MTC0:1

Execute? (Y or N):

As before, we'll take these questions one by one.

Disk unit name: xxx

36. As earlier in this section, specify the disk unit name. If you specified one image earlier, take the default. With a CRT, press NEW LINE; with a hardcopy terminal, press CTRL–A and then NEW LINE.

If you specified multiple images (mirroring) earlier, identify all units involved. (If you don't specify all the units, you'll receive an *Incomplete mirrored LDU* error message.) Separate unit names with an exclamation point. For example, if you specified units DPJ0 and DPJ10 earlier, type DPJ0!DPJ10⤶.

As before, Disk Jockey displays the Device Specification screen:

Device Specification

Device name: *xxx*

Bus type (ECL or MRC): *xxx*

Device type: *xxx*

Unit number: *n*

Device code (octal): *n*

MRC slot number (hex):

Execute (Y/N):

37. These are the same questions you answered before. Disk Jockey retains the answers you gave then as defaults. If you don't want your system disk to be mirrored, take the defaults for everything. With a CRT, press the Execute function key (F1), or at the *Execute?* prompt type Y⤶; with a hardcopy terminal, press CTRL–A and then NEW LINE for each question, and answer Y and NEW LINE to the last. Then skip to the next step.

    If you specified multiple images earlier, Disk Jockey will lead you through device specification screens for every image. Disk Jockey will provide defaults, based on device name, for all questions. Generally, you can take the defaults for all device questions. To take the defaults on a CRT, press EXECUTE (F1). On a hardcopy terminal, press CTRL–A to redisplay each default; then press NEW LINE; and when you reach the *Execute?* question, type Y and press NEW LINE.

38. Disk Jockey asks the ID of the system area to receive the microcode:

    System area ID: 1001

    The microcode file will be loaded into the system area as well as into the following root logical disk.

39. Choose the default system area ID. For example,

    ⤶

    Disk Jockey displays other questions about the LDU:

    LDU filename: xxx (*xxx* is the default.)

40. Specify the same filename you gave earlier. Generally, you can take the default, *xxx*. Even if you specified mirroring, all images must have the same LDU filename. With a CRT, press NEW LINE; with a hardcopy terminal, press CTRL–A and then NEW LINE.

LDU unique ID: xxx

41. Specify the same LDU unique ID you specified earlier for this image (for example, ROOT.IMAGE1). Generally, if there's only one image, you can take the default. For example,

↲

If you specified multiple images earlier, indicate the unique IDs of all images involved (as with units above). Separate unit names with an exclamation point. For example, if you assigned the unique IDs ROOT.IMAGE1 and ROOT.IMAGE2 earlier, type ROOT.IMAGE1!ROOT.IMAGE2↲.

Install from tape or disk (T = Tape, D = Disk) T

42. This question lets you install microcode directly from tape (Disk Jockey loads the file into the root directory, and then installs it from disk) or from disk (Disk Jockey looks on disk for the file you specify, and then installs it).

You want to install from tape. Take the default. For example,

Pathname: xxx

43. The system media tape supplied with your computer has the SCP/ADEX system and microcode in tape file 0, and the microcode file in AOS/VS II dump format in file 1. So the program prompts for, and you must specify, file 1. If the default shows the name of your tape unit, take the default.

If Disk Jockey doesn't show the correct name and code, type them. Type the tape unit name (such as MTC0 or MRCTAPE000A00) followed by :1 to specify tape file 1. For example,

MTD0:1↲ (or MRCTAPE000A00:1↲)

As before, Disk Jockey needs to know the address of the tape unit. It displays the Device Specification screen.

Device Specification

Device name:	*xxx*
Bus type (ECL or MRC):	*xxx*
Device type:	*xxx*
Unit number:	*n*
Device code (octal):	*n*
MRC slot number (hex):	
Execute (Y/N):	

44. These are the same questions you answered several times before. Disk Jockey retains the previous tape values, so you can take defaults for everything. With a CRT, press the EXECUTE key (F1); with a hardcopy terminal, press CTRL–A and then NEW LINE for each question and answer Y and NEW LINE to the last.

Execute? (Y or N):

45. Confirm the microcode load by typing

Y⤶

Disk Jockey advances the tape to load the microcode file into the LDU root directory (with the filename xxx.MCF, where xxx is your computer model). This takes a few minutes. Then it displays the filename(s) loaded and asks for confirmation before installing the default file:

Install file xxx.MCF in microcode system area (Y or N)

46. By DG convention, microcode filenames end in .MCF. Generally, use the default; type Y and press NEW LINE. (But if the display shows more than one microcode file, and the default is not the microcode file you want, type N and press NEW LINE. The program will ask *Type filename (or press NEW LINE to exit)*. Type the filename you want, and then press NEW LINE; for example, if you have an MV/4000 with hardware floating-point unit, type MV4000FP.MCF⤶. Or if you changed your mind and don't want to install a microcode file, don't type the filename; just press NEW LINE.)

To install the default file, type

Y⤶

Disk Jockey copies the disk file into the reserved microcode system area, from which a bootstrap program can load it on startup. Finally, the program rewinds the tape. When done, it displays

Press NEW-LINE to continue.

47. Press NEW LINE:

↵

Disk Jockey returns control to the Install System Software Menu:

Install System Software Menu [SOFTWARE]

1. *Install an AOS/VS II release or update*
2. *Install bootstrap programs*
3. *Install microcode*

Enter choice:

48. You're finished running Disk Jockey from tape. Exit from Disk Jockey by typing BYE and pressing NEW LINE:

BYE↵

SCP-CLI...>

You've left Disk Jockey and returned to the SCP CLI. Next you'll bring up Disk Jockey from disk and size your system configuration.

Sizing Your System Hardware

The Disk Jockey sizing routine checks all hardware that's turned on, and then creates a file that describes this hardware. The file is named SIZER.CFG, in the root directory. If this file already exists, the routine asks if you want to overwrite it; then, if you answer Yes, it replaces the old file with a new one. The SIZER.CFG file can serve as accurate input to VSGEN (eliminating the need for you to add devices with VSGEN); it also provides needed device information for on-line diagnostics if you have them.

To run the sizing routine, you must start Disk Jockey from disk and access Disk Jockey's Technical Maintenance Menu, as described in the following steps. Starting Disk Jockey from disk will also make sure the AOS/VS II bootstrap programs were installed correctly.

49. Turn on all devices you want supported by the tailored AOS/VS II system, and place them online. The sizing routine can't detect any device that isn't on and online. Devices you must turn on and place online include

- Disk units
- Tape units
- Line printers

Devices within the computer chassis, like intelligent asynchronous controllers and battery backup units, are always on; therefore they will be detected without action on your part. You need not turn on user terminals. There are certain devices, like non-DG devices, that you will want the sizing routine to skip. You'll get a chance to specify these later on. After making sure power is on to all devices you want supported, continue.

50. The SCP CLI prompt remains on the system console. Type the RESET command:

SCP-CLI> RESET⤶
SCP-CLI>

51. Type the BOOT command, using the form BOOT n, where n is the correct device code from the following table.

Disk Type	Device Code	MRC Node (Slot) Number
DPJ	24 (octal)	Does not apply
DPF	27 (octal)	Does not apply
DPI	33 (octal)	Does not apply
MRCDISK	116 (octal)	0E (hex)

For example,

BOOT 24⤶ (or, for MRC, BOOT 116⤶)

If the system disk is on a standard ECLIPSE controller, skip to step 53. With the disk on an MRC subsystem (you typed BOOT 116), the hardware needs to know what MRC slot the disk controller is in and what the disk unit number is.

52. With the disk on an MRC, you see the question

Enter [NODE,UNIT] of MRC boot device in hex. [x,y]

As when you started (so long ago, at the beginning of this chapter), the value of the default, *x,y*, depends on the last default set. If a default has never been set, it shows *No default available*. Generally, the primary MRC disk controller is in node 0E (slot number 0E, in hex) and the unit is number 0, so type 0E,0⤶.

After you answer, the hardware will ask if you want the new value to be the default. If you're sure your answer was correct, you can respond Yes by typing Y and pressing NEW LINE (since you want the default to be the disk you generally boot AOS/VS II from).

The hardware tries to read from the specified device. If you see a *Timeout* message or nothing happens, this means the system disk is not in the unit you specified. Press the break sequence. Then make sure the disk is on and on line; type BOOT 116 and press NEW LINE again, and specify the correct slot (hex) and unit number.

53. The hardware reads the AOS/VS II bootstrap from disk; the bootstrap displays

Operating System Load Menu

1. Continue immediately with operating system load
2. Enter the Technical Maintenance Menu
3. Load and verify microcode
4. Run diagnostics (Displayed only if an ADEX area is reserved on disk)

Loading will continue automatically unless you respond within 45 seconds.

Enter choice [1]:

54. Type 2 and press NEW LINE as follows. You want to enter the Technical Maintenance Menu.

2⤶

If the Operating System Load Menu does not appear on the system console, perhaps you made a mistake installing the bootstrap programs. Press the break sequence — CMD and BREAK/ESC keys on CRT terminals — then type RESET⤶ and repeat this step. If there's still no response, press the break sequence again and type RESET⤶, and then install the bootstrap progams again: use the BOOT command in the form BOOT n,where n is the tape device code (for example, BOOT 22⤶ or, for a tape on an MRC, BOOT 116 ⤶). When Disk Jockey shows its Main Menu, type BOOTSTRAPS⤶; then answer the questions to install the bootstrap programs. Type BYE⤶ and return to step 50 in this section.

The following messages appear.

Starting File Loader (This is a bootstrap program that loads files from disk.)

Loading Requested File
:DJ
Load complete

Then Disk Jockey displays the Technical Maintenance Menu:

Technical Maintenance Menu [TMM]

1. Load and start the default operating system
2. Load and verify microcode
3. Enter the SCP CLI
4. View or change startup parameters
5. Run diagnostics
6. Run a specified program
7. Enter the Disk Jockey Main Menu
8. Boot from a different disk unit
9. Size system configuration

Loading will continue automatically unless you respond within 30 seconds

Enter choice:

** System Configuration file not found – recommend you run Sizer ** (This message appears if there is no :SIZER.CFG file in the root directory.)

55. Type 9 and press NEW LINE as follows. You want to size your system configuration.

9⤶

The program displays another menu:

Size System Configuration

List of devices to skip:
Device Code *Slot Number*
....

——————————————————————

Pick one: (1. Add device 2. Remove device 3. Print 4. Execute)

56. You should tell the program to skip any device that the sizing operation may confuse. This includes non–DG devices. Generally, you won't have any nonstandard devices and won't need to specify anything here. If this is true, skip to step 58.

57. If you have a non–DG device, type 1 and press NEW LINE. The program then asks if the device is on an ECLIPSE or MRC bus. If the device is on an ECLIPSE bus, type ECL and press NEW LINE; then, when prompted, type the octal device code and press NEW LINE. If the device is on an MRC bus, type MRC and press NEW LINE; then, when prompted, type the device code of the MRC controller — for example, 116 — press NEW LINE, and then type the slot number, in hex, that the controller occupies in the MRC chassis. If you add a wrong device code, you can remove it using choice 2.

58. Make sure your disks, tapes, and printers are powered on, as described earlier.

    If you have a disk that's shared with another system (a multiported disk), make sure the other system does not have it initialized when you run the sizing routine. The sizing routine issues an I/O reset to each device it finds, and this reset might cause users who had files open on the disk to lose work.

    When ready, confirm by typing 4 and pressing NEW LINE:

    4↵

    The sizing routine runs. You'll see messages about device codes and devices, and finally a message about a file being created. If the program asks about overwriting the old file, confirm with Yes. Finally you'll see

    Press NEW LINE to continue

59. Press NEW LINE.

    Disk Jockey redisplays the Technical Maintenance Menu:

    Technical Maintenance Menu

    1. Load and start the default operating system
    ...
    Enter choice:

Continue to the next section.

Bringing Up the AOS/VS II Starter System

After all this effort, you're ready to start AOS/VS II from your system LDU. Disk Jockey is displaying the Technical Maintenance Menu on the system console.

Technical Maintenance Menu

1. Load and start the default operating system
...
6. Run a specified program
...
Enter choice:

60. You want to run a specified program, the starter system, :SYSGEN:SYS.PR. Type 6:

6↵

Pathname?

61. Type the starter system pathname, :SYSGEN:SYS.PR:

:SYSGEN:SYS.PR↵

A fairly long pause occurs. Then you will see

Loading Requested File
:SYSGEN:SYS.PR
...
AOS/VS II Release x.xx

Date (MM/DD/YY) ?

The system skips this *Date* and the following questions, through step 64, on systems that have a working boot clock: MV/40000, MV/20000, MV/15000, and others.

62. Type the date as numbers for month, day, and year. You can use spaces or slashes to separate numbers. For example, for August 23, 1990, type

3 23 90↵

Time (HH:MM:SS) ?

63. Type the time, based on a 24-hour clock, in hours, minutes, and seconds. (Minutes and seconds are optional. If you omit them, the system sets each to 0.) Use spaces or colons to separate items. For example, for 2:30 p.m., type

14 30↵

Offset from Universal Time [+00:00] ?

64. Universal time is Greenwich Mean Time (GMT). Setting this offset may be useful if your system will communicate with systems in different time zones. Don't set it now, though; take the default.

NOTE: If your hardware doesn't include an MRC subsystem, you may now see the message *Cannot initialize MRC channel on device code n (octal) Bypassing all devices on this channel.* This message is normal if you don't have an MRC subsystem.

65. *Override default specs [N] ?*

Specs means software parameters in the system specification file created during system generation (this has not occurred yet). Take the default, No, by pressing

↵

Standard SYS.PR load devices are

MTC0	*(device code 22)*
MTJ0	*(device code 23)*
MTD0	*(device code 62)*
MTJ10 and MTJ11	*(device code 63)*
MRCTAPE000A00	*(channel device code 116, slot A)*

Do you want to specify a nonstandard load device? [N]

The starter system displays this message to let you specify a nonstandard load device. You may need to use the starter system to load other software — for example if you have the XTS or TCP/IP network system. Therefore identifying the tape unit is important.

66. If your system contains any of the load devices listed, answer No, the default. You must answer Yes only if you have a nonstandard configuration, which may be true if your system includes a 10-slot MRC. Generally, take the default by pressing

↵

If you answered No, skip to step 76. If you answered Yes, the system prompts as follows:

Enter device name: [xxx] (*xxx* is the default, MRCTAPE000A00 or MTD0)

67. You can specify any valid filename here. The name you specify is temporary; it will be used only while the starter system runs this time. For convenience, you can take the default, MRCTAPE000A00 or MTD0. Press

↵

Enter bus type: [xxx] (*xxx* is the default, MRC or ECL)

68. The starter system derives the default from the bus typed you booted from, so the default will generally be correct. If not, specify the correct type: MRC if the tape will be loaded from a unit on an MRC bus, or ECL if if will be loaded from a unit on an ECLIPSE bus. Generally, take the default by pressing

↵

After you answer, the system asks questions to identify the tape unit.

For unit on an MRC, it asks	**For unit on an ECLIPSE, it asks**
Enter unit number: [0]	*Enter device type (MTB, ...MTJ): [MTD]*

69. For a unit on an MRC, skip to step 73. For a unit on an ECLIPSE, continue with the next numbered step. For a unit on an ECLIPSE bus, the system is asking

Enter device type (MTB, MTC, MTD, MTJ): [MTD]

70. You can determine the tape unit type as follows.

Tape Unit Model Number	Unit Type
6026 (1600/800 b/pi dual mode)	MTB
6125, 6231, 6311	MTC
4307, 6299, 6300 (6250/1600 b/pi dual mode on ECLIPSE bus)	MTD
6340, 6341, 6351, 6352, 6577, 6588, 6589, 6590, 6591, 6656, 6679 (cartridge tape units)	MTJ

Type the correct unit type and press NEW LINE. Then the system asks

Enter unit number [0]:

71. Generally, the tape unit you will load from will be the same as the tape unit you originally booted from. If so, this unit number is 0 and you can take the default. If for some reason you want to load from a unit other than 0, specify it here.

After you answer, the system asks

Enter device code [n]: (*n* is the default)

72. If the default n is correct for the controller of the unit you will load from, you can take the default. If not, type the device code of the unit controller and press NEW LINE. After you answer, go to step 76.

73. For a unit on an MRC, the system is asking

Enter unit number: [0]

Generally, the tape unit you will load from will be the same as the tape unit you originally booted from. If so, specify the unit number of the tape unit on its controller that you originally booted from. Often this unit number is 0 but for an MRC it need not be 0. After you answer, the system asks

Enter device code [116]:

74. This indicates the device code of the chassis controller of the MRC that will run the tape unit. If the default is correct, take it. If not, type the correct chassis controller device code and press NEW LINE. You must specify the MRC same chassis (channel) you booted from. After you answer, the system asks

Enter MRC slot number (hex): [0A]

75. For a 23-slot MRC, the primary MRC tape controller is generally in slot 0A; if the controller of the unit you will use is in that slot, take the default. For a

10-slot MRC, the tape controller slot varies depending on the number of other boards in the chassis. For a 10-slot MRC, type the slot number of the tape controller; for example

5 ⤶

76. Quite a long pause — several minutes — occurs here. Then you'll see

AOS/VS II CLI Release xxx date time
)

Congratulations! You've brought up AOS/VS II and its CLI. The CLI prompt,), tells you that it is ready for a command.

The CLI is more sophisticated than any program you've been using. It has many commands, fine error handling, and a Help feature. You'll use it extensively. (CLI control characters, if you need them, are described in Chapter 1, Table 1–2.)

You've proved you can warm start AOS/VS II. Next, you'll try to cold start, to check microcode load and other settings.

77. Shut down AOS/VS II by typing

BYE⤶

Do you really want to shut the system down?

78. Confirm by typing Y:

Y⤶

System shutdown
...
SCP-CLI>

79. Turn computer power off.

80. If the computer has a lock switch, put it in the LOCK position. Turn computer power on. After a pause, the system console displays its *POWER UP* message.

81. If it displays the Automatic Program Load Menu, press NEW LINE.

It displays the Operating System Load Menu:

Operating System Load Menu

1. Continue immediately with operating system load
2. Enter the Technical Maintenance Menu
...
Loading will continue automatically unless you respond within 45 seconds.
...
Enter choice:

82. As before, select the Technical Maintenance Menu by typing 2:

2⤶

The bootstrap program displays microcode loading messages, and then the Technical Maintenance Menu, as follows.

Microcode is required to load software.
Loading the default microcode now.
...
Loading file:
:DJ

Technical Maintenance Menu

1. Load and start the default operating system
...
6. Run a specified program
...
Enter choice:

83. As before, select choice 6; then specify :SYSGEN:SYS.PR as explained in steps 60 through 64. Answer No to the *Override default specs* question (step 65). Run through the load device questions again.

A pause will occur. Ultimately, you'll see

AOS/VS II CLI Release xxx date time
)

When you see the AOS/VS II CLI prompt, you know that microcode has been loaded from disk. (AOS/VS II can't run until microcode has been loaded.)

If, instead of the prompt, you see an error message about microcode, you must reload microcode from your computer's SCP SYSTEM MEDIA tape as described in the 014-series "Starting" manual supplied with your computer or in Appendix E. After you load micrcode, repeat the microcode installation as follows:

- Boot from the disk (as in BOOT 24) or BOOT 116)) with an MRC disk and answer the node/unit question with 0E,0).
- From the Operating System Load Menu, select choice 2, the Technical Maintenance Menu.
- From the Technical Maintenance Menu, select choice 7, "Run Disk Jockey."
- From the Disk Jockey Main Menu, type SOFTWARE).
- Follow all the steps in the section "Installing Microcode on the System LDU," earlier (since the SCP SYSTEM MEDIA tape is already mounted, begin with step 35 in this section).
- Try a cold start (step 79w68) to verify the automatic loading of microcode.

84. You're done with DG-supplied system tapes. Remove the tape from the unit and clip the cover ring around it (if there is one). You may need it again. Clip cover rings on all DG-supplied tapes (if applicable) and store them safely.

Well done! You've powered up; formatted at least one LDU; installed an AOS/VS II release, update, and microcode on it; and brought up AOS/VS II. Next, you'll proceed to Chapter 4 to generate your tailored AOS/VS II system.

If you're interested in the files on the system tapes, see Table 2-4; all of these files are now on your LDU. The LDU also contains directory :UPDATE, with files to update certain programs. Also, the LDU contains the microcode file, named in the form MVxxx.MCF. A file with the pathname form :UTIL:n.nn_AOSVSII_FILES (n.nn is the release number) lists all the files in the current release.

Figure 2–1, after the table, is a summary of all the steps you've taken — from turning on the system console to testing cold start and microcode load.

Table 2–4 AOS/VS II System Tapes File Format

Tape File Number	Program Filename	Tape File Contents
0	TBOOT	On each tape, file 0 holds TBOOT, a tape bootstrap program that loads file 1 (Disk Jockey) from this tape.
1	DJ	On each tape, file 1 holds the Disk Jockey utility, which formats physical disks into LDUs, loads AOS/VS II system software, and installs microcode on the system LDU. TBOOT loads Disk Jockey into memory and executes it after you boot from tape via BOOT 22 (or 62 or 116).
2	AOS/VS II Dump File	File 2 on each tape is a dump file. The dump files include the AOS/VS II starter system, all system program files — CLI, Agent, peripheral manager (PMGR), bootstrap programs, and the programs in tape files 0 and 1. They also include all AOS/VS II support software, including • CONTEST system exerciser • Disk File Editor (FED) program • DISPLAY file display program • Error message file (ERMES) and error message object files (.OBs) • EXEC and PREDITOR programs • HELP directory and files • LABEL tape labeler • LDUINFO LDU report utility • Link and Library File Editor programs • Macroassembler (MASM) • Process Environment Display (PED) • Release Notice • SED and SPEED text editors • UP.CLI, DOWN.CLI, and other system macros • Utility program symbol table files (filename.ST) • SYSGEN directory with VSGEN system generation program and libraries

Starting Disk Jockey from the AOS/VS II Tape

NOTE: To take the default, as specified in the steps below, do the following:

- On a CRT, press NEW LINE.
- On a hardcopy terminal, press CTRL–A and then NEW LINE.

1. Get and mount AOS/VS II tape number 1.
2. *SCP–CLI>* RESET ↓ (To the SCP, type RESET and press NEW LINE)
3. *SCP–CLI>* BOOT 22 ↓ (Use BOOT with tape unit device code: for MTB or MTC unit, 22; for MTD, 62; for MTJ, 23; for an MRC tape, 116 or other)
4. With the tape on an MRC bus, it asks

   Enter NODE,UNIT of MRC...: 0A,0 ↓ (Or for 10–slot MRC, other node, unit)
5. *Loading tape file 1; please wait*

   Disk Jockey Rev x.xx

   Set System Date and Time
6. *Date (MM/DD/YY):* 3 23 90 ↓ (Type current date)
7. *System Time [HH:MM:SS]:* 14:30 ↓ (Type current time in 24–hour notation)
8. *Offset to GMT [+HH:MM:SS]:* ↓ (Take default, as shown before step 1)

   Disk Jockey Main Menu [Keyword is MAIN]

   1. Format a physical disk
   ...

   If the disk has been formatted under AOS/VS II, skip all the way to "Installing AOS/VS II System Software on the System LDU." If the disk has not been formatted under AOS/VS II, continue.

Formatting the System Disk into an LDU

9. *Enter choice:* 1↓ (Select choice 1)

   Physical Disk Format Menu [Keyword is PDISK]
   ...
   1. Software format a physical disk
   ...
10. *Enter choice:* 1↓ (Select choice 1)

Figure 2–1 Installing AOS/VS II and Bringing Up the Starter System (continued)

11. *Disk unit name:* DPJ0↵ (or MRCDISK00E00)	(Type disk unit name, usually DPJ0 or, for an MRC disk, MRCDISK000E00)
Device Specification *Device name: DPJ0* ...	(It displays Device Specification screen, with the device name you typed)
12. *Bus type (ECL or MRC):* ECL↵ (or MRC)	(For ECLIPSE–bus, type ECL; for an MRC–bus, MRC)
13. *Device type:* DPJ↵ (or MRCDISK)	(Indicate disk type: DPJ or DPF for an ECLIPSE–bus disk, MRCDISK for a MRC–bus disk)
14. *Unit number:* 0↵	(Indicate unit number: 0 for an an ECLIPSE–bus disk, 0 or other unit number for an MRC–bus disk)
15. *Device code (octal):* 24↵ (or 27 or 116)	(Device code for an ECLIPSE–bus disk is 24 for DPJ or 27 for DPF. For an MRC–bus disk, it's 116 octal or 10E hex)
16. *MRC slot number (hex):* 0E↵	(Asked only for an MRC–bus disk; the first disk controller is in slot 0E hex)
17. *Execute (Y/N)* Y↵	(After checking your answers, confirm)
Disk Jockey returns to the previous menu:	
18. *Test for bad blocks (surface analysis):* N↵	(Answer N for most DPJ disks and all DPF disks with a valid bad block table; otherwise, answer Y)
19. *Number of test patterns (1 – 5): n* 5↵	(If you are asked, we suggest 5)
20. *Format as a bootable disk: Y* ↵	(Take default, as shown before step 1)
21. *Reserve a diagnostic area on this disk:* Y↵	(Or N)
22. *Size of diagnostic area in blocks (decimal):* 12000↵	(Or other number)
23. M*aximum number of user–defined system areas: 10* ↵	(Take default, as shown before step 1)

Figure 2–1 Installing AOS/VS II and Bringing Up the Starter System (continued)

24. *Maximum number of LDU pieces:* *8* ↵ (Take default)

25. *Maximum number of entries in the bad block table: n* ↵ (Take default)

26. *Execute? (Y or N):* Y ↵ (Confirm)

27. If you chose patterns, wait for them to run.

28. Disk Jockey creates tables on disk. You'll see messages about this.

29. Return to Main Menu. On a CRT terminal, press CANCEL/EXIT (F11); on a hardcopy terminal, press ESC and C.

Disk Jockey Main Menu [MAIN]

1. Format a physical disk
2. Create, view, or modify a logical disk unit

30. *Enter choice:* 2↵ (Select choice 2)

Logical Disk Unit Menu [LDMENU]

1. Create a one–piece LDU
2. Create a multiple–piece LDU

31. *Enter choice:* *1* ↵ (Take default)

32. *LDU filename:* ROOT ↵ (Assign a filename; we suggest ROOT)

33. *Number of images:* 1 ↵ (Or if you want to mirror the LDU, specify 2 or 3)

Create One–Piece LDU (It displays another menu)
LDU filename: xxx

34. *Disk unit name:* DPJ0↵ (or MRCDISK000E00) (Specify unit name as before: DPJ0 or DPF0 or, for MRC, MRCDISK000E00)

Device Specification (It displays Device Specification screen)

Device name:	*DPJ0*	(or *MRCDISK000E00*)
Bus type (ECL or MRC):	*ECL*	(or *MRC*)
Device type:	*DPJ*	(or *MRCDISK*)
Unit number:	*0*	
Device code (octal):	*24*	(or *27 or 116*)
MRC slot number:	*0E*	
Execute? (Y/N)		

35. Take defaults for all questions: on a CRT, press Execute (F1); on a hardcopy terminal, take defaults for each answer and, to *Execute?*, type Y↵ .

Figure 2–1 Installing AOS/VS II and Bringing Up the Starter System (continued)

36. *LDU unique ID:* ROOT.IMAGE1 ↵ (Assign a unique ID; we suggest ROOT.IMAGE1)

37. *Size: n* ↵ (Take default)

38. *Starting address (octal): n* ↵ (Take default)

39. If you specified multiple images in step 33, define other images via steps 34–38.

40. *Change default LDU parameters? (Y or N) N* ↵ (Take default)

41. E*xecute? (Y or N)* Y ↵ (Confirm)

Disk Jockey creates the LDU and returns to the Logical Disk Menu.

42. Return to the Main Menu. For a CRT terminal, press CANCEL/EXIT (F11); for a hardcopy terminal, press ESC and C.

Installing AOS/VS II System Software on the System LDU

Disk Jockey Main Menu

1. Format a physical disk
2. Create, view, or modify a logical disk unit
3. Install system software
4. View or change startup parameters
5. Run Disk Polisher

1. *Enter choice:* 3 ↵ (Select choice 3)

Install System Software Menu [SOFTWARE]

1. Install an AOS/VS II release or update
...

2. *Enter choice:* 1 ↵ (Select choice 1)

3. *Disk unit name: DPJ0* (or *MRCDISK000E00*) (If the default is correct, take it. Otherwise, specify the unit name: For an ECLIPSE–bus disk, DPJ0 or DPF0; for an MRC–bus disk, MRCDISK000E00. If you specified multiple images, identify all units, using the form unit!unit)

Figure 2–1 Installing AOS/VS II and Bringing Up the Starter System (continued)

Device Specification (It displays Device Specification screen)

Device name:	*DPJ0* (or *MRCDISK000E00*)
Bus type (ECL or MRC):	*ECL* (or *MRC*)
Device type:	*DPJ* (or *MRCDISK*)
Unit number:	*0*
Device code (octal):	*24* (or *27* or *116*)
MRC slot number:	*0E*
Execute? (Y/N)	

4. If you answered these questions earlier for the disk, the defaults are correct; take defaults for all questions: on a CRT, press EXECUTE (F1); on a hardcopy terminal, take defaults for each answer and, to *Execute?*, type Y)

   If you didn't answer these questions earlier for the disk, specify correct information; for example, MRC, MRDISK, 0, 116, 0E, and Y. If the images are mirrored, specify correct information for each image.

5. Disk Jockey program returns to the previous menu.

6. *LDU filename: ROOT* (If you identified the LDU earlier, take the default; otherwise type the LDU filename and press NEW LINE)

7. *LDU unique ID: ROOT.IMAGE1* (If you identified the LDU earlier and it's not mirrored, take the default. Otherwise, give correct information. If the LDU is mirrored, identify all units, form id!id)

8. It displays a menu requesting load information.

9. Verify that the AOS/VS II tape is ready and on line.

10. *Load from tape or diskettes (T = Tape...) : T*) (Take default)

11. *Pathname to load from: MTC0:2*) (Identify tape unit and tape file, form tape-unit-name:2. The default for an ECLIPSE unit is MTC0:2, MTD0:2, or MTJ0:2; for MRC tapes, it is MRCTAPE000A00:2)

    Device Specification (Disk Jockey displays the Device Specification screen)

    Device name: MTC0:2 (or *MRCTAPE000A00:2*)

    Bus type (ECL or MRC): ECL (or *MRC*)

    ...

12. *Bus type (ECL or MRC):* ECL) (or MRC) (For ECLIPSE-bus, type ECL; for an MRC-bus, MRC.)

Figure 2-1 Installing AOS/VS II and Bringing Up the Starter System (continued)

13. *Device type:* MTC↵ (or MRCTAPE) (Indicate tape type: MTB or MTD for an ECLIPSE–bus tape unit, MRCTAPE for an MRC–bus tape unit)

14. *Unit number:* 0↵ (Indicate unit number: 0 for an ECLIPSE–bus tape, 0 or other unit number for an MRC–bus tape)

15. *Device code (octal):* 22↵ (or 62 or 116) (Device code for an ECLIPSE–bus MTB/MTC tape is 22 or for MTD, 62. For an MRC–bus tape, it's 116)

16. *MRC slot number (hex):* 0A↵ (Asked only for an MRC–bus tape; the first tape controller is in slot 0A)

17. *Execute (Y/N)* Y↵ (After checking the answers, confirm)

    Disk Jockey returns to the previous menu.

18. *Pathname template: #* ↵ (Take default)

19. *Delete existing files with same names as files you are loading, or ask for confirmation? (D = Delete, C = Confirm): D* ↵ (Take default)

20. *List files loaded? (P = Printer, F = File, T = Terminal only): T* ↵ (Take default)

21. *Execute (Y or N)?* Y↵ (Confirm)

22. Disk Jockey loads files from tape file 2. Depending on the unit, this may take 10 to 50 minutes.

    Load completed.
    Do you have another release or update tape to load (Y or N): N

23. Get second AOS/VS II tape and mount it on same unit.

24. Type Y↵

    Please mount the tape on unit MTC0 (or *MRCTAPE000A00*)
    Press NEW LINE when unit is on line and ready:

25. Press NEW LINE. Disk Jockey loads files.

    Load completed.
    Do you have another release or update tape to load (Y or N): N

26. If you received an update tape, type Y and press NEW LINE. If you didn't receive one, type N and press NEW LINE and skip to step 30.

27. Dismount AOS/VS II release tape; mount AOS/VS II update tape on same unit.

Figure 2–1 Installing AOS/VS II and Bringing Up the Starter System (continued)

28. Confirm by pressing NEW LINE. Disk Jockey loads the update files.

Load completed.
Do you have another release or update tape to load (Y or N): N

29. If you did not receive a *second* update tape, type N and press NEW LINE. If you did receive one, type Y and press NEW LINE; mount the tape; press NEW LINE. Disk Jockey will load the files and rewind the tape.

30. *Do you want to install bootstrap programs (Y or N):*

31. To install, type Y↵

    Disk Jockey installs them, displaying *Copying* and *Installing* messages.

32. *Press NEW LINE to continue* ↵ (Press NEW LINE)

Installing Microcode on the System LDU

33. Dismount the AOS/VS II tape.

34. Mount the SCP SYSTEM MEDIA tape.

35. *Enter choice:* 3↵ (Select choice 3)

    Install Microcode [Keyword is LOADMCODE]

36. *Disk unit name:* DPJ0↵ (or MRCDISK000E00) (Take default if it's correct: for an ECLIPSE–bus disk, DPJ0 or DPF0; for an MRC–bus disk, MRCDISK000E00. If you specified multiple images, identify all units, form unit!unit)

    Device Specification (It displays Device Specification screen)

Device name:	*DPJ0* (or *MRCDISK000E00*)
Bus type (ECL or MRC):	*ECL* (or *MRC*)
Device type:	*DPJ* (or *MRCDISK*)
Unit number:	*0*
Device code (octal):	*24* (or *27* or *116*)
MRC slot number:	*0E*
Execute? (Y/N)	

37. Take defaults for all questions: on a CRT, press EXECUTE (F1); on a hardcopy terminal, take defaults for each answer and, to *Execute?*, type Y↵.

    If you specified multiple images earlier, Disk Jockey asks for device information for each image, based on disk unit name. Since you specified this information before, when you loaded AOS/VS II software, you can take the defaults on all questions.

Figure 2–1 Installing AOS/VS II and Bringing Up the Starter System (continued)

Disk Jockey asks the microcode area ID:

38. *System area ID: 1001* ⤶ (Take default)
The microcode file will be loaded....

39. *LDU filename:* ROOT ⤶ (Specify the LDU filename you typed before)

40. *LDU unique ID: ROOT.IMAGE1* ⤶ (If you specified multiple images, type the the unique IDs you typed in step 7; otherwise, take the default)

42. *Install from tape or disk (T = Tape, D = Disk): T* ⤶ (Take default)

43. *Pathname: MTC0:1* ⤶ (or MRCTAPE000A00:1) (Specify the tape unit name and file number. For ECLIPSE-bus tapes, this is MTC0:1, MTD0:1, or MTJ0:1; for MRC-bus tapes, it is MRCTAPE000A00:1)

Device Specification (It displays Device Specification screen)

Device name:	*MTC0*	(or *MRCTAPE000A00*)
Bus type (ECL or MRC):	*ECL*	(or *MRC*)
Device type:	*MTC*	(or *MRCTAPE*)
Unit number:	*0*	
Device code (octal):	*22*	(or *62 or 116*)
MRC slot number:	*0A*	
Execute? (Y/N)		

44. The tape unit information should be correct from questions 12–17 in the section "Installing AOS/VS II Software on the System LDU." To make sure they are correct, see those questions; respecify answers as necessary. If the defaults for all questions are correct, accept them: on a CRT, press EXECUTE (F1); on a hardcopy terminal, take defaults for each answer, and to *Execute?*, type Y ⤶

The previous screen returns and asks for confirmation.

45. *Execute ? (Y/N)* Y ⤶ (Confirm)

The tape advances.

46. *Install file xxx.MCF in microcode system area (Y or N):* Y ⤶ (Take default, or if it displays multiple names and you want a different file, type N ⤶; then type the filename you want and ⤶)

Disk Jockey installs the file.

Figure 2–1 Installing AOS/VS II and Bringing Up the Starter System (continued)

47. *Press NEW-LINE to continue:* ⤶ (Press NEW LINE)

48. Disk Jockey returns to the Install System Software Menu. Leave program by typing

    BYE⤶

Sizing Your System Hardware

49. Turn on all devices you want your tailored AOS/VS II system to support: tape units, disk units, and line printers.

50. *SCP-CLI>* RESET⤶ (Type the RESET command)

51. *SCP-CLI>* BOOT 24⤶ (Use BOOT with the disk device code: for DPJ, 24; for DPF, 27; for an MRC-bus disk, 116 octal or 10E hex)

52. With the disk on an MRC bus, it asks

    Enter NODE:UNIT of MRC boot device...: 0E,0⤶ (Type 0E,0)

53. *Operating System Load Menu*

    1. Continue immediately with operating system load
    2. Enter Technical Maintenance Menu
    ...

54. *Enter choice:* 2⤶ (Select choice 2)

    It displays the Technical Maintenance Menu:

    Technical Maintenance Menu

    1. Load and start the default operating system
    ...
    9. Size system configuration
    ...
    Enter choice:

55. *Enter choice:* 9⤶ (Type 9 to size system)

    It displays another menu:

    Size System Configuration

    List of devices to skip:
    ...
    ...

    Pick one: (1. Add device 2. Remove device 3. Print 4. Execute

56. If you don't have any non-DG devices, skip to step 58.

Figure 2-1 Installing AOS/VS II and Bringing Up the Starter System (continued)

57. If you have any non–DG devices, add their device codes and/or MRC slot numbers: type 1 and press NEW LINE, answer the ECLIPSE/MRC question and specify the device.

58. Make sure all devices are powered on as mentioned in step 49 above; then select choice 4:

    4 ↵

    The sizing routine runs and displays messages.

59. *Press NEW LINE to continue:* ↵ (Press NEW LINE)

    Disk Jockey redisplays the Technical Maintenance Menu:

    Technical Maintenance Menu

    1. Load and start the default operating system

    ..

    Enter choice:

Bringing Up the AOS/VS II Starter System

The system console is displaying the Technical Maintenance Menu:

Technical Maintenance Menu

1. Load and start the default operating system

...

6. Run a specified program

60. *Enter choice:* 6 ↵ (Select choice 6)

61. *Pathname:* :SYSGEN:SYS.PR ↵ (Type :SYSGEN:SYS.PR)

    AOS/VS II Release n

62. *Date (MM/DD/YY)?* 3 23 90 ↵ (If asked, type the date; this question and the next two are skipped on computers that have a boot clock)

63. *Time (HH:MM:SS)?* 14 30 ↵ (Specify time, in 24–hour format)

64. *Offset from Universal Time [+00:00]* ↵ (Take default)

65. *Override default specs? [N]* ↵ (Take default)

Figure 2–1 Installing AOS/VS II and Bringing Up the Starter System (continued)

Standard SYS.PR load devices are

MTC0	*(device code 22)*
MTJ0	*(device code 23)*
MTD0	*(device code 62)*
MTJ10 and MTJ11	*(device code 63)*
MRCTAPE000A00	*(channel device code 116, slot A)*

Do you want to specify a nonstandard load device? [N]

66. If you have any load device listed, answer No, the default. Answer Yes only if you have a nonstandard configuration, which may be true if you want to load from a 10-slot MRC. Take the default (No), or specify Yes.

    If you answered No, skip to step 76. If you answered Yes, the system prompts

67. *Enter device name: [xxx]* ⤶ (*xxx* is MRCTAPE000A00 or MTD0. Take default.)

68. *Enter bus type: [xxx]* ⤶ (*xxx* is MRC or ECL. Take default or specify type.)

For unit on an MRC, it asks	**For unit on an ECLIPSE, it asks**
Enter unit number: [0]	*Enter device type (MTB, ...MTJ): [MTD]*

69. For a unit on an MRC, skip to step 73. For a unit on an ECLIPSE, continue here. For a unit on an ECLIPSE bus, the system is asking

70. *Enter device type (MTB, MTC, MTD, MTJ): [MTD]* xxx⤶ (Specify tape unit type as shown in this step earlier.)

71. *Enter unit number [0]:* ⤶ (Take the default or specify the unit number.)

72. *Enter device code [n]:* n⤶ (Specify the tape controller device code; then go to step 76.)

73. For a unit on an MRC, the system is asking

    Enter unit number [0]: (Take the default or specify the unit number.)

74. *Enter device code [116]:* n ⤶ (Specify the tape controller device code.)

75. *Enter MRC slot number (hex): [0A]* n⤶ (For a 23-slot MRC, the default may well be correct; if so, take it. For a 10-slot MRC, specify the slot number.)

76. A long pause occurs here. Then

    AOS/VS II CLI Release xxx date time
)

Figure 2-1 Installing AOS/VS II and Bringing Up the Starter System (continued)

77. Start AOS/VS II shutdown by typing

    BYE ⤶

78. *Do you really want to shut the system down?* Y ⤶ (Confirm)

79. Turn computer power off.

80. If computer has a lock switch, place it in lock position. Turn computer power on.

81. If it displays Automatic Program Load Menu, take default. It then displays the Operating System Load Menu.

    Operating System Load Menu

    1. Continue immediately with operating system load
    2. Enter the Technical Maintenance Menu

82. *Enter choice:* 2 ⤶

    ... (Microcode loading messages, followed by *Loading file* message) ...

    Technical Maintenance Menu

    1. Load and start the default operating system
    ...
    6. Run a specified program

83. Select choice 6, then specify :SYSGEN:SYS.PR as in steps 60 throught 64. When asked *Override default specs?*, answer N, as in step 65.

    AOS/VS II CLI Release xxx date time
)

84. You're done! Remove tape from unit and store all tapes safely.

Figure 2–1 Installing AOS/VS II and Bringing Up the Starter System (concluded)

What Next?

Your next step is to generate a tailored AOS/VS II system. If you want to do this now, go to Chapter 4. If you have an MRC I/O subsystem and would like some background on MRC installations, proceed to Chapter 3 before going to Chapter 4.

If you want to stop for a while, fine. You can leave the system running. Or you can shut AOS/VS II down by typing BYE and pressing NEW LINE, and then confirming with Y and NEW LINE. When you are ready to generate a tailored AOS/VS II system, go to Chapter 4 — or if you have an MRC I/O subsystem and would like some background on MRC installations, proceed to Chapter 3 before going to Chapter 4.

End of Chapter

Chapter 3
Configurations with MRC I/O Subsystems — Some Sample Installations

Read this chapter

- If your hardware includes an MRC I/O Subsystem, and you want to understand how to design and implement a system that uses the MRC efficiently.
- For ideas on how to use the Data General MRC subsystem.

This chapter shows some sample computer installations that include an MRC subsystem. There are six examples, each of which illustrates a different type of application. Each example is a major section in the chapter. The major sections in the chapter are

- VSGEN and Device Names
- Creating a Single–Host Configuration with an ECLIPSE MV/40000 HA Computer, ECLIPSE Channel Subsystem, and MRC Subsystem
- Creating a Multiple–Host Configuration by Adding an MRC Subsystem to Existing Systems
- Creating a Multiple–Host Configuration by Adding an ECLIPSE MV/40000 HA Computer, ECLIPSE Channel Subsystem, and MRC Subsystem to an Existing System
- Creating a Multiple–Host, Client–Server Configuration by Adding an ECLIPSE MV/40000 Computer and MRC Subsystem to Existing Systems
- Creating a Single–Host, Large–Capacity Configuration with an ECLIPSE MV/40000 HA Computer, ECLIPSE Channel Subsystem, and Two MRC Subsystems
- Creating a Single–Host, High–Availability Configuration with an ECLIPSE MV/40000 HA Computer, ECLIPSE Channel Subsystem, and MRC Subsystem

Each "Creating" section addresses a specific need or goal, as follows.

Section	Comments
Creating a Single-Host Configuration with an ECLIPSE MV/40000 HA Computer, ECLIPSE Channel Subsystem, and MRC Subsystem	This system consists of newly purchased hardware; the site has no other DG hardware. The MV/40000 HA computer with an ECLIPSE Channel Subsystem provides expandability — you can add job processors, device controllers, disk and tape units, and even other host systems as needed.
Creating a Multiple-Host Configuration by Adding an MRC Subsystem to Existing Systems	This is a multiple-host system created at a site that already has DG computers. It expands I/O power and flexibility. You might choose it if you had one or more DG computers with adequate computing power and wanted to use them as a base for future expansion.
Creating a Multiple-Host Configuration by Adding an ECLIPSE MV/40000 HA Computer, ECLIPSE Channel Subsystem, and MRC Subsystem to Existing Systems	This expands both the computing and I/O power of an existing system. It provides the basis for the server configuration described next.
Creating a Multiple-Host, Client-Server Configuration by Adding an ECLIPSE MV/40000 Computer and MRC Subsystem to Existing Systems	Like the previous example, this adds both computing and I/O power to a site that already has DG computers. And using the MV/40000 as a server provides a base for data sharing and easy addition of other systems.
Creating a Single-Host, Large-Capacity controllers, Configuration with an ECLIPSE MV/40000 HA Computer, ECLIPSE Channel Subsystem, and Two MRC Subsystems	With two MRCs and 32 disk this provides a very large storage capacity — enough space for practically the largest database. As shown, the capacity is 64 Gbytes; it could have as many as 128 Gbytes.
Creating a Single-Host, High-Availability Configuration with an ECLIPSE MV/40000 HA Computer, ECLIPSE Channel Subsystem, and MRC Subsystem	This arrangement satisfies applications that require high availability. The system can withstand failure of any hardware component. This kind of availability is obtainable even with multiple hosts and multiple MRC subsystems.

Each section begins with a description of the hardware involved. This is followed by two figures. The first figure shows the hardware before VSGEN, the second shows the hardware after VSGEN has assigned device names. Each section ends with comments and a description of the routes between hosts and devices.

VSGEN and Device Names

During VSGEN, each host computer and device controller is assigned a name. This name identifies the host and device — and, for every host, it identifies the route to the device.

For an ECLIPSE–bus device, one host "owns" the device; the route between the host and device is hard–wired and can't be changed via software. For example, for a disk unit

```
hostname
   |
disk–controller–name
   |
disk–unit–name
```

For an MRC–bus device, the hierarchy is more elaborate and more flexible. There can be one or more hosts attached to the MRC, which in turn owns the device. The route to a disk unit in a system with an MRC is

```
hostname
   |
MRC–channel–name
   |
disk–controller–name
   |
disk–unit–name
```

With an MRC, you can make routing decisions via software (VSGEN). You establish the route between a host, MRC channel, and MRC disk/tape controller during VSGEN.

Multiple hosts can access a disk or tape unit if you grant access while defining the unit at VSGEN. However, only one host at a time can use an LDU (but if there are two LDUs on a disk unit, a different host can access each). Only one host at a time can use a tape unit.

Default MRC Device Names Assigned by VSGEN

Default MRC chassis names are MRC_CHASSIScc, where cc is null for the first MRC, 01 for the second MRC, and so on.

Default MRC channel names are MRCmm_CHANNELnn, where mm stands for the chassis number and nn stands for the channel number. The mm is null for the first chassis; nn is 00 for the first channel, 01 for the second channel, and so on. For example, MRC_CHANNEL00 indicates the first channel on the first MRC; MRC_CHANNEL01 indicates the second channel on the first MRC; and MRC01_CHANNEL00 indicates the first channel on the second MRC.

Default MRC disk and tape controller names have the form MRCxxxx_CONTROLLER_ccdd, where xxxx is DISK or TAPE (depending on device type), cc is the MRC chassis number (00 for the first, 01 for the second, and so on), and dd is the number of the slot (in hex) that holds the controller. Generally, in a

23–slot MRC chassis, the first disk controller ships in MRC slot 0E. Therefore, the default device name of the first MRC disk controller is MRCDISK_CONTROLLER_000E. And, since the first tape controller ships in slot 0A, the default device name of the first MRC tape controller is MRCTAPE_CONTROLLER_000A.

Default MRC disk and tape *unit* names have the form MRCxxxxccdduu, where xxxx is DISK or TAPE (depending on device type), cc is the MRC chassis number (00 for the first, 01 for the second, and so on), dd is the number of the slot (in hex) that holds the controller, and uu is the unit number (in hex). Since by default, in a 23–slot MRC chassis, the first MRC disk controller ships in slot 0E, the default name of the first disk unit is MRCDISK000E00. This is the system disk. The default name of the second disk on this controller is MRCDISK000E01. The disk unit name is used only when the disk is initialized (generally this occurs without human intervention, via the system UP macro, when the system is brought up). After a disk is initialized, users access it by the LDU filename, not the unit name; therefore, people will rarely need to type these long names.

And since the first tape controller ships in MRC slot 0A, the default name of the first tape unit is MRCTAPE000A00. The default name of the second unit is MRCTAPE000A01. Users can use these names to access the units.

Disks with multiple connections (multiported disks) need special names. These disks and names are described in Chapter 4.

I/O Channels

An I/O channel connects computer memory to I/O devices. An ECLIPSE I/O channel is a printed circuit board that connects to the ECLIPSE I/O bus in the computer chassis. AOS/VS II can access devices on ECLIPSE channels solely by octal device code; it does not see ECLIPSE I/O channels as separate devices.

An MRC I/O channel includes more hardware: a printed circuit board called the channel processor (CP) in the host computer chassis, a board in the MRC chassis called the system interface (SI), and a pair of copper or fiber–optic cables (called the ICL) to connect the two boards. MRC channels have device names and octal device codes. To access a unit on an MRC channel, AOS/VS II follows the route defined in VSGEN. This route is based on the channel's device code, MRC slot number, and unit number.

Device names, routes, and channels are also described in the next chapter. We have explained them here to provide background for the figures and help you understand the importance of device names.

Creating a Single–Host Configuration with an ECLIPSE MV/40000 HA Computer, ECLIPSE Channel Subsystem, and MRC Subsystem

This section describes a single–host configuration with an ECLIPSE MV/40000 HA computer, MRC susbystem, and ECLIPSE channel subsystem. This variation is based on newly purchased hardware; it includes no existing DG equipment acquired earlier.

The hardware is

- MV/40000 HA computer with one job processor (CPU) board, 32 Mbytes of main memory, and one MRC channel processor board.
- One ECLIPSE channel subsystem (ECS) with one Intelligent TermController (ITC/128) board, TermManager hardware and TermServer software, and one line printer controller board.
- Ninety–six Data General DASHER CRT terminals, two hardcopy terminals, and four modems.
- One 23–slot MRC subsytem with one MRC system interface board, one MRC controller board (MRCC), one tape controller board, and two disk controller boards.
- Two Model 6299 6250–bpi tape units; at 140 Mbytes per unit, this provides 280 Mbytes of backup capacity on line.
- Six Rapid Access Mass Storage (R.A.M.S.) 500–Mbyte disk units; this provides 3.0 Gbytes of on–line disk storage.
- Two data channel line printers.

The system has two I/O channels: an ECLIPSE channel to the ECLIPSE Channel Subsystem that handles nonmagnetic devices, and an MRC channel to the MRC subsystem that handles magnetic storage devices.

Figures 3–1 and 3–2 show the hardware configuration before VSGEN and after VSGEN has assigned device names.

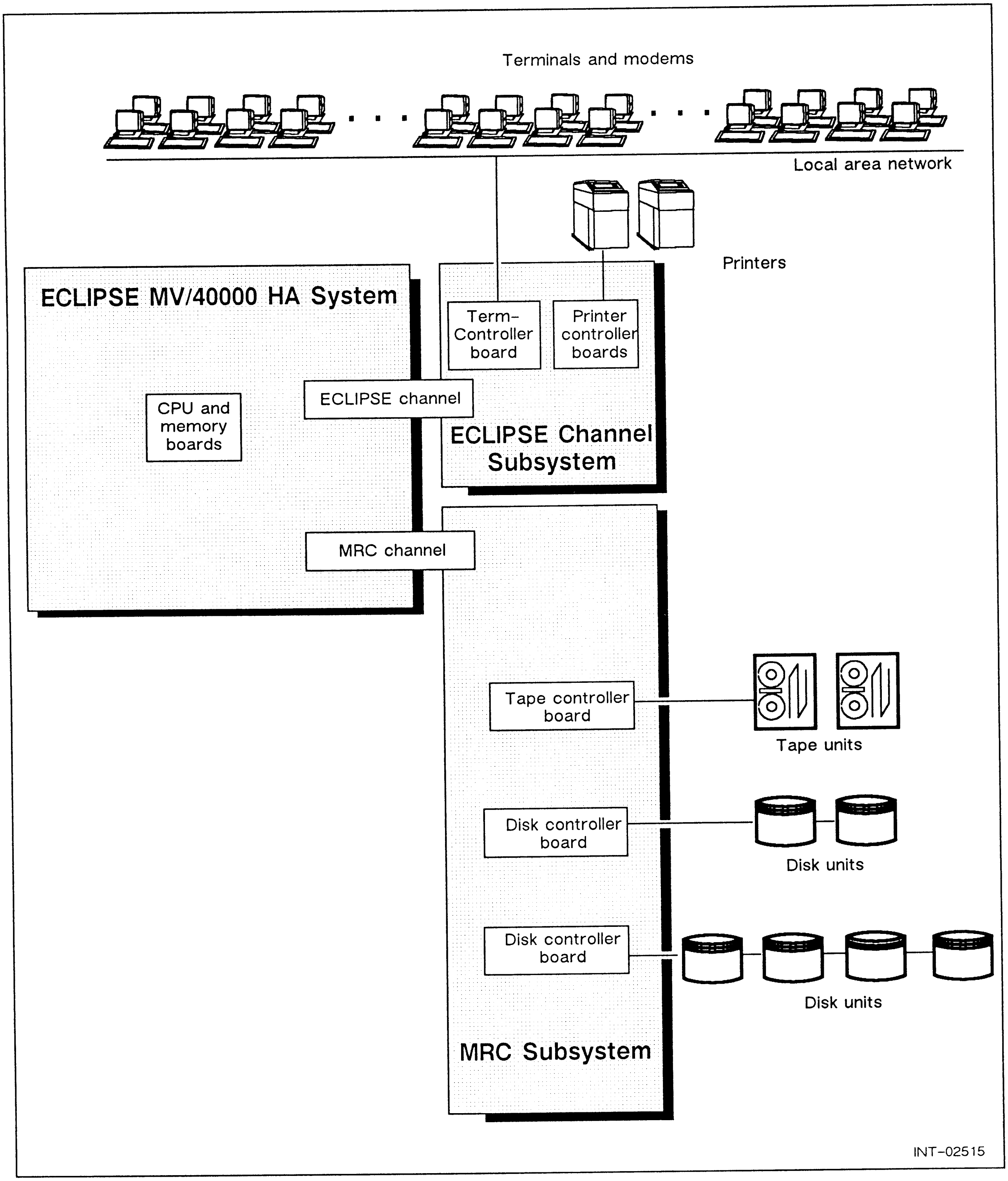


Figure 3-1 Single-Host Configuration with ECLIPSE MV/40000 HA, ECLIPSE Channel Subsystem, and MRC Subsystem — Before VSGEN

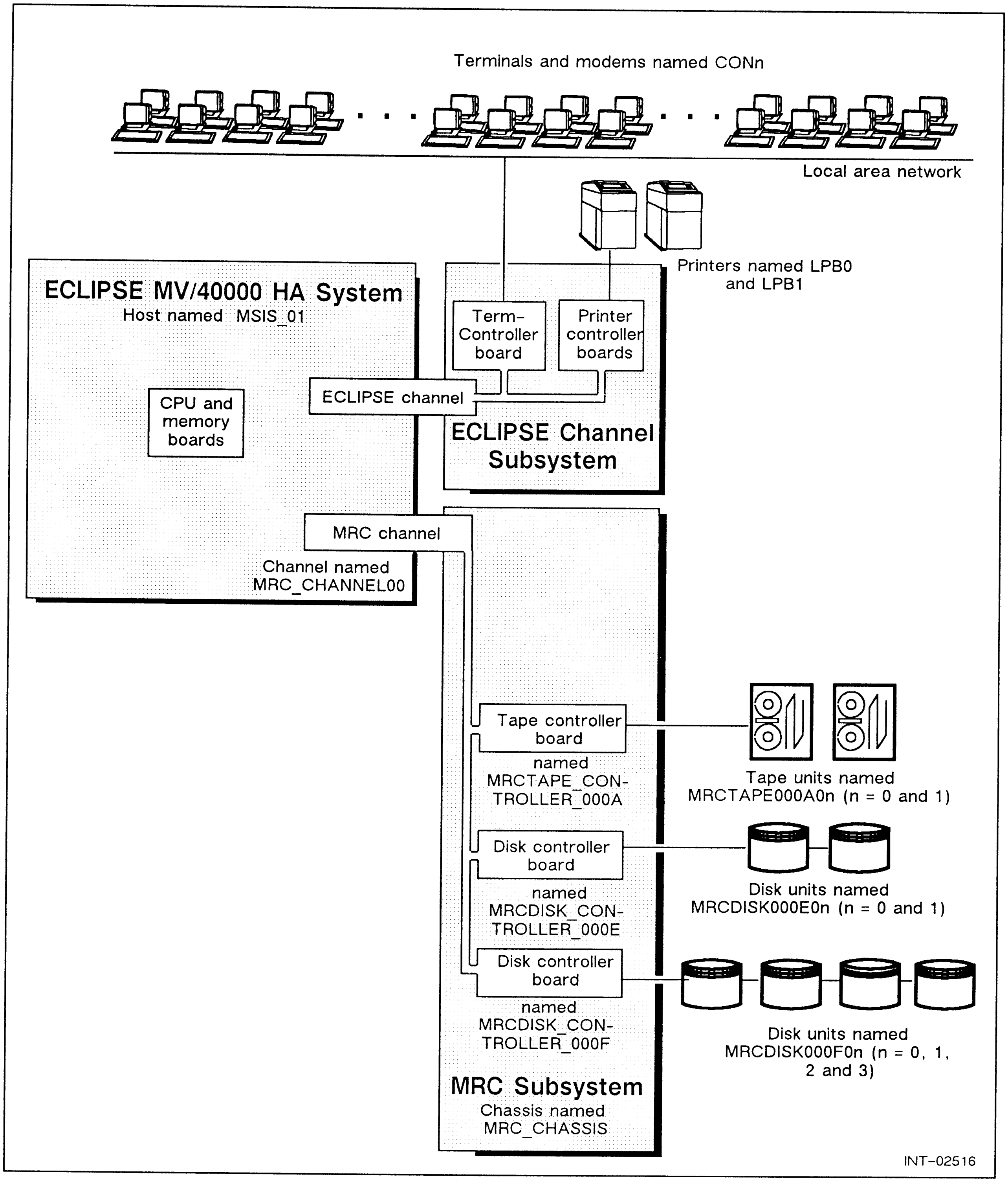


Figure 3–2 Single-Host Configuration with MV/40000 HA, ECLIPSE Channel Subsystem, and MRC Subsystem — Showing Device Names and Routes After VSGEN

Host-to-Device Routes

For the configuration shown in this section, the Table 3-1 shows the devices owned by each host.

Table 3-1 Host and Device Routes for the Configuration Shown in Figure 3-2

Host	Device Name	Comments
MSIS_01	MSIS_01	The hostname is part of the specification for each device; it gives a host "ownership" of the device. More than one host can be defined in a VSGEN configuration file.
	ECLIPSE Channel Subsystem	ECLIPSE channel subsystems (ECS) don't have names; you define an ECS in VSGEN by device code, not by channel name. In this system, all controllers except those for disk and tape units work from the ECS.
	MRC_CHANNEL00	An MRC channel includes a board in the computer, cables, and a board in the MRC. It has its own device code, which you use to boot devices on the MRC. This channel connects the host to all disk and tape controllers in the MRC.
	MRCTAPE_CONTROLLER_000A	This is the default name of the first MRC tape controller. MRC disk/tape controller names are based on MRC chassis number and controller slot number.
	MRCTAPE000A00, MRCTAPE000A01	These are the default names of the first and second MRC tape units. MRC disk/tape unit names are based on their controller names. Users access tape units by these names.
	MRCDISK_CONTROLLER_000E, MRCDISK_CONTROLLER_000F	These are the default names of the first and second disk controllers.
	MRCDISK0000E00, MRCDISK0000E01, MRCDISK0000F00, MRCDISK0000F01, MRCDISK0000F02, MRCDISK0000F03	These are the default names of the disk units: two on the first controller, four on the second controller. The disk unit name is used only when the disk is initialized. After a disk is initialized, users access it by LDU filename, not unit name; therefore, people will rarely need to type these long names.
	MRC_CHASSIS	This is the default name of the MRC chassis.

Creating a Multiple–Host Configuration by Adding an MRC Subsystem to Existing Systems

This section describes a multiple–host system created at a site that already has two DG computers. The change expands I/O power and flexibility; it also provides higher availability by giving two hosts access to MRC disks and tape units. You might choose this configuration if you had one or more DG computers with adequate computing power and wanted to use them as a base for future expansion.

The original hardware was

- MV/15000 computer with 8 Mbytes of main memory, two 594–Mbyte disk units, a dual–mode 1600/800–bpi tape unit, data channel line printer, and 24 terminals
- MV/10000 computer with 8 Mbytes of main memory, two 192–Mbyte removable–pack disk units, a dual–mode 1600/800 tape unit, data channel line printer, and 16 terminals

The new hardware is

- One 23–slot MRC subsytem with two ECLIPSE MRC channel interface boards (these go in the existing MV/15000 and MV/10000 computers), two MRC system interface boards, one MRC controller board (MRCC), one tape controller board, and one disk controller board.
- Two Model 6299 6250–bpi tape units; at 140 Mbytes per unit, this adds 280 Mbytes of backup capacity on line.
- Four Rapid Access Mass Storage (R.A.M.S.) 500–Mbyte disk units; this adds 2.0 Gbytes of on–line disk storage.

Figures 3–3 and 3–4 show the hardware configuration before VSGEN and after VSGEN has assigned device names.

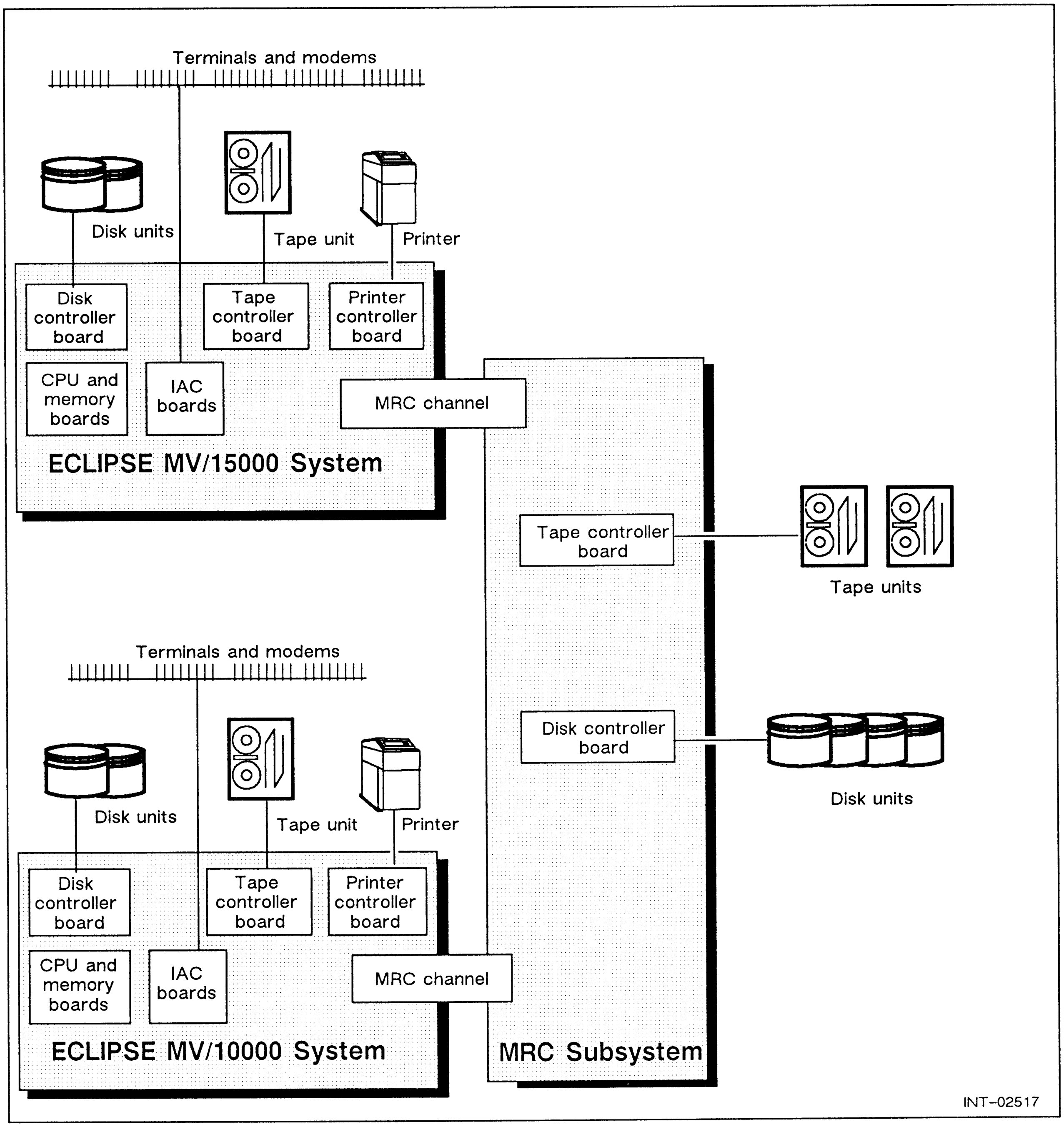


Figure 3-3 Multiple-Host Configuration with MV/15000 and MV/10000 Systems and MRC Subsystem — Before VSGEN

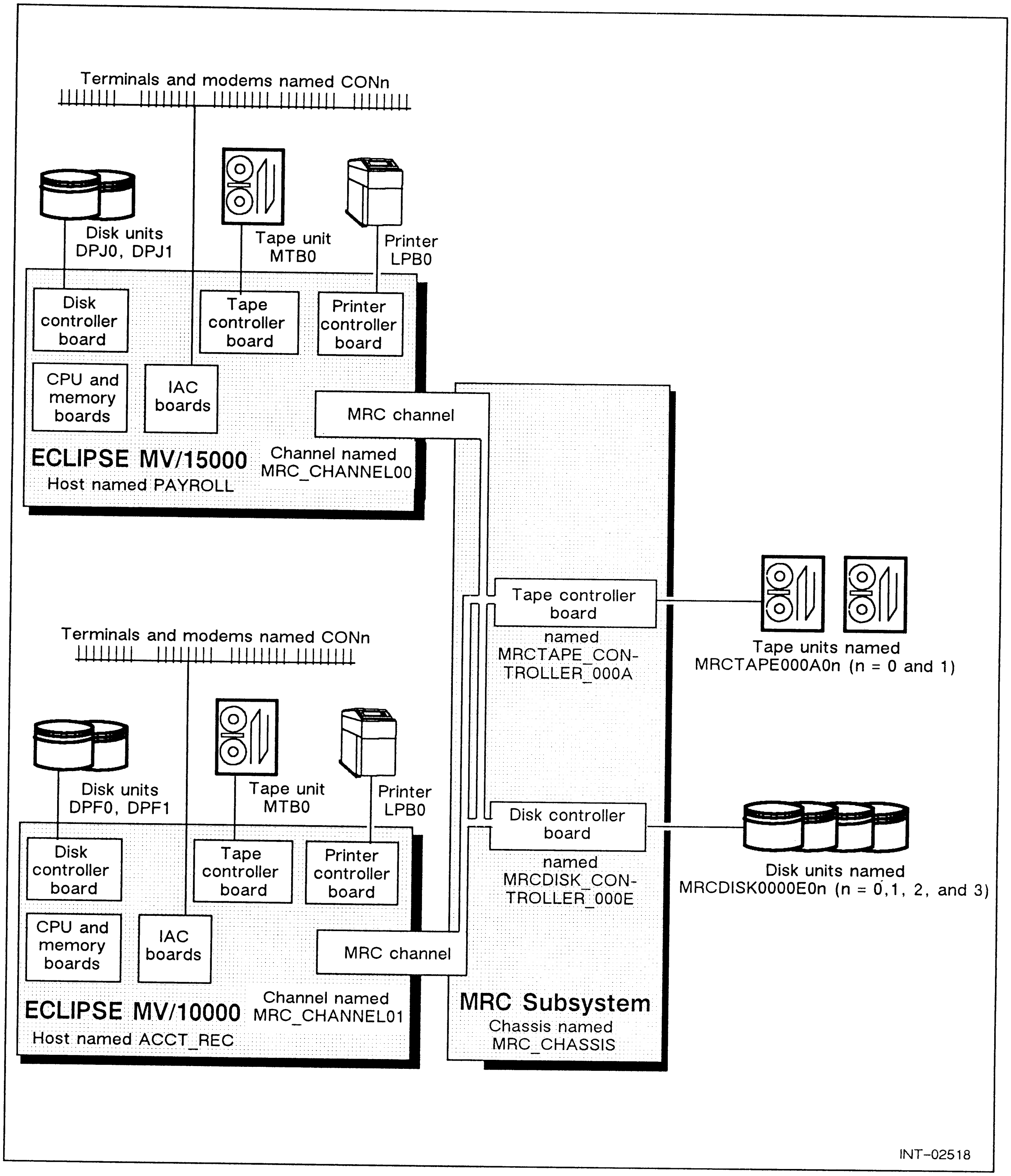


Figure 3-4 Multiple-Host Configuration with MV/15000 and MV/10000 Systems and MRC Subsystem — Showing Device Names and Routes After VSGEN

Host-to-Device Routes

Table 3-2 shows routes between hosts and devices for the configuration in Figure 3-4.

Table 3-2 Host and Device Routes for the Configuration Shown in Figure 3-4

Host	Device Name	Comments
PAYROLL	PAYROLL	This host is an MV/15000. The hostname is part of the specification for each device; it gives a host "ownership" of the device. Host PAYROLL owns all local devices (DPF0, MTB0, IACs, and so on). Via the MRC, this host can access MRC tape and disk units. This is the first host defined in the VSGEN configuration file.
	MRC_CHANNEL00	An MRC channel includes a board in the computer, cables, and a board in the MRC. It has its own device code, which you use to boot devices on the MRC. This channel connects host PAYROLL to all disk and tape controllers in the MRC.
	MRCTAPE_CONTROLLER_000A	This is the default name of the first MRC tape controller. MRC disk/tape controller names are based on MRC chassis number and controller slot number.
	MRCTAPE000A00, MRCTAPE000A01	These are the default names of the first and second MRC tape units. MRC disk and tape unit names are based on their controller names. Users access tape units by these names.
	MRCDISK_CONTROLLER_000E, MRCDISK_CONTROLLER_000F	These are the default names of the first and second disk controllers.
	MRCDISK0000E00, MRCDISK0000E01, MRCDISK0000E02, MRCDISK0000E03	These are the default names of the MRC disk units: four on the first controller. The disk unit name is used only when the disk is initialized. After a disk is initialized, users access it by LDU filename, not unit name; therefore, people will rarely need to type these long names.
	MRC_CHASSIS	This is the default name of the MRC chassis.

(continued)

Table 3-2 Host and Device Routes for the Configuration Shown in Figure 3-4

Host	Device Name	Comments
ACCT_REC	ACCT_REC	This is the hostname for ECLIPSE host ACCT_REC. Like the PAYROLL host, ACCT_REC owns all local devices (DPF0, MTB0, IACs, and so on). Via the MRC, this host can access MRC tape and disk units. This is the second host defined in the VSGEN configuration file.
	MRC_CHANNEL01	This channel connects host ACCT_REC to all disk and tape controllers in the MRC. In addition to the MRC devices, ACCT_REC has its own local channel, with local devices.
	MRCTAPE_CONTROLLER_000A, MRCDISK_CONTROLLER_000E, MRCDISK_CONTROLLER_000F	These are the MRC tape and disk controllers, also accessible from the other host.
	MRCTAPE000A00, MRCTAPE000A01, MRCDISK0000E00, MRCDISK0000E01, MRCDISK0000E02, MRCDISK0000E03	These are the MRC disk and tape units, also accessible from the other host.
	MRC_CHASSIS	This is the default name of the MRC chassis.

(concluded)

All the MRC disk and tape units have the same name for access by the hosts. Each host, PAYROLL and ACCT_REC, can use the MRC devices.

Creating a Multiple–Host Configuration by Adding a New ECLIPSE MV/40000 HA Computer with MRC and ECLIPSE Channel Subsystem to an Existing System

This new hardware expands both the computing and I/O power of an existing system. It provides the basis for the server configuration described next. You might choose this configuration if you had one or more DG computers and wanted to add computing power and I/O bandwidth and provide a space for future expansion.

The original hardware was

- MV/15000 computer with 16 Mbytes of main memory, two 594–Mbyte disk units, a dual–mode 1600/800–bpi tape unit, data channel line printer, intelligent asynchronous controllers (IACs), and 24 terminals.

The new hardware is

- MV/40000 HA computer with one job processor (CPU) board, 32 Mbytes of main memory, and one MRC channel processor board.
- One ECLIPSE channel subsystem (ECS) with one Intelligent TermController (ITC/128) board, TermManager hardware and TermServer software, and one line printer controller board.
- Three intelligent asynchronous controller (IAC) boards.
- Ninety–six Data General DASHER CRT terminals, two hardcopy terminals, and four modems.
- One data channel line printer.

- One 23-slot MRC subsytem with one ECLIPSE MRC channel interface board (this goes in the existing MV/15000 computer), two MRC system interface boards, one MRC controller board (MRCC), two tape controller boards, and three disk controller boards.

- Four Model 6299 6250-bpi tape units; at 140 Mbytes per unit, this adds 560 Mbytes of backup capacity on line.

- Twelve Rapid Access Mass Storage (R.A.M.S.) 500-Mbyte disk units; this adds 6.0 Gbytes of on-line disk storage.

Figures 3-5 and 3-6 show the hardware configuration before VSGEN and after VSGEN has assigned device names.

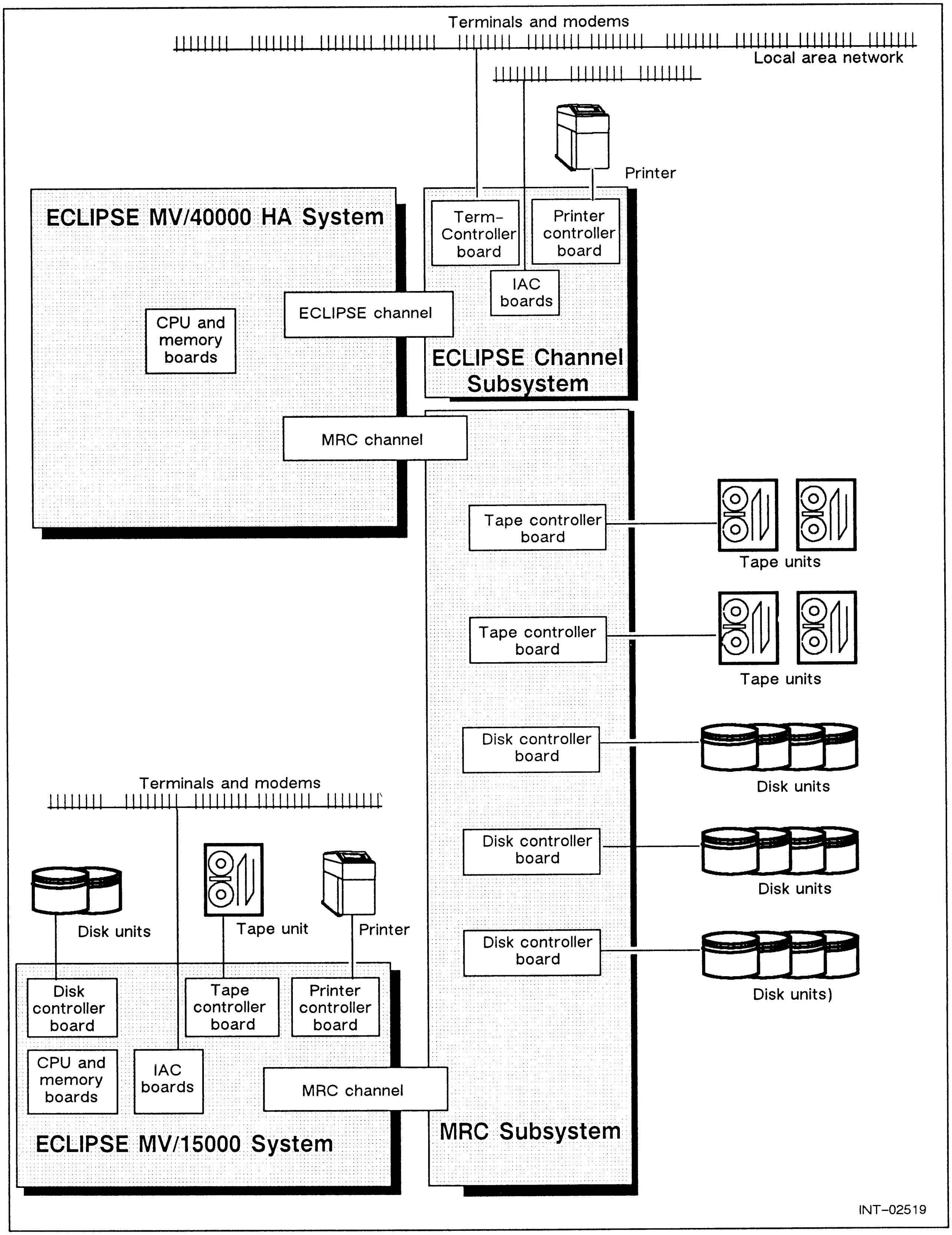


Figure 3-5 Multiple-Host Configuration with MV/40000 HA, MV/15000, ECLIPSE Channel Subsystem, and MRC Subsystem — Before VSGEN

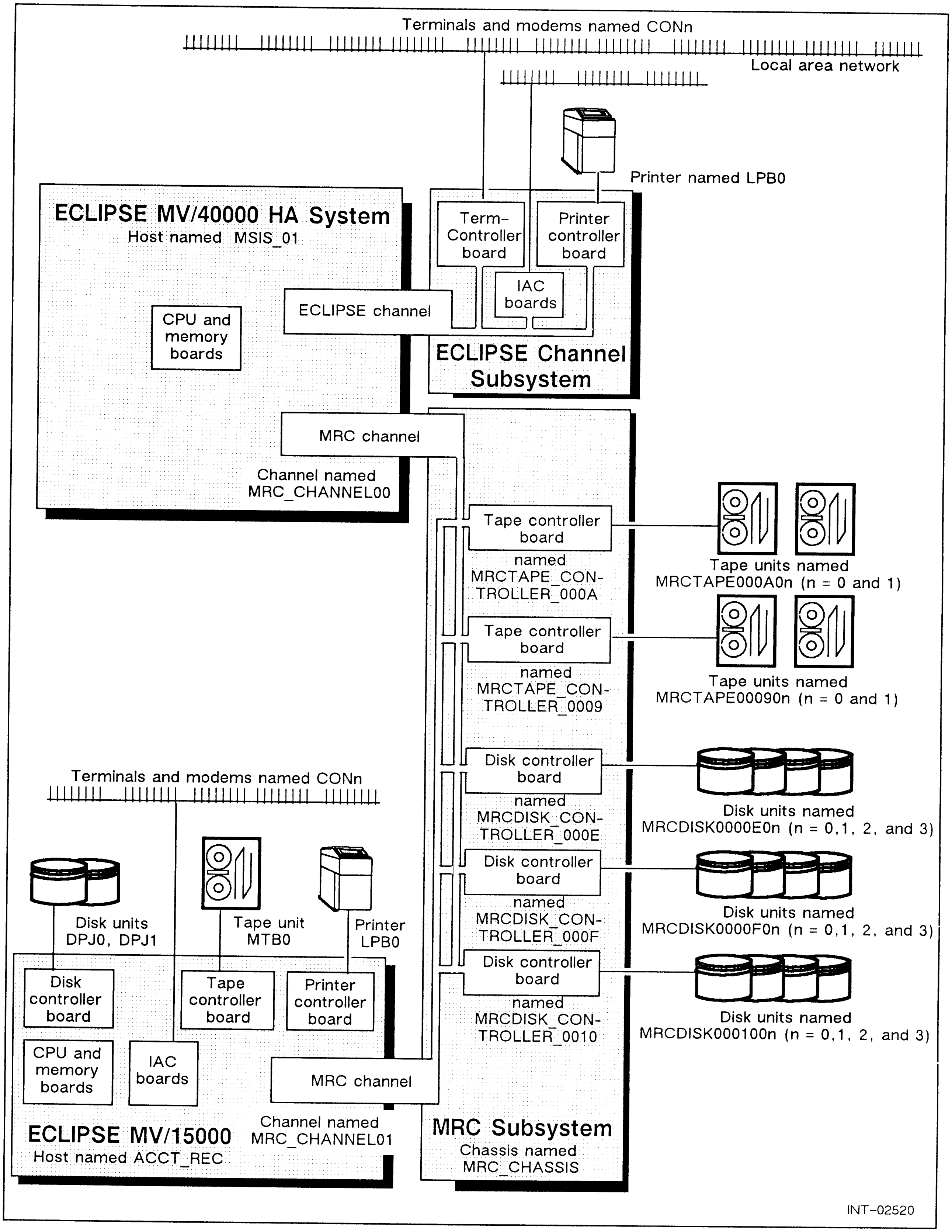


Figure 3–6 Multiple–Host Configuration with MV/40000 HA, MV/15000, ECLIPSE Channel Subsystem, and MRC Subsystem — with Device Names and Routes After VSGEN

Host-to-Device Routes

Table 3-3 shows routes between hosts and devices for the configuration in Figure 3-6.

Table 3-3 Host and Device Routes for the Configuration Shown in Figure 3-6

Host	Device Name	Comments
MSIS_01	MSIS_01	This host is an MV/40000 HA. The hostname is part of the specification for each device; it gives a host "ownership" of the device. This is the first host defined in the VSGEN configuration file.
	ECLIPSE Channel Subsystem	ECLIPSE channel subsystems (ECS) don't have names; you define an ECS in VSGEN by device code, not by channel name. In this system, host MSIS_01 uses the ECS to run all asynchronous, communications, and printer controllers.
	MRC_CHANNEL00	This channel connects host MSIS_01 to all disk and tape controllers in the MRC.
	MRCTAPE_CONTROLLER_000A, MRCTAPE_CONTROLLER_0009	These are the MRC tape controllers. The name ending in A is the default name of the first MRC tape controller. MRC disk/tape controller names are based on MRC chassis number and controller slot number.
	MRCTAPE000A00, MRCTAPE000A01, MRCTAPE000900, MRCTAPE000901,	These are the default names of the four tape units. Users access units by these names.
	MRCDISK_CONTROLLER_000E, MRCDISK_CONTROLLER_000F, MRCDISK_CONTROLLER_0010	These are the default names of the three disk controllers.
	MRCDISK000E0n (n is 0, 1, 2, or 3), MRCDISK000F0n (n is 0, 1, 2, or 3), MRCDISK00100n (n is 0, 1, 2, or 3)	These are the default names of the 12 disk units. After a disk is initialized, users access it by the LDU filename, not the unit name.
	MRC_CHASSIS	This is the default name of the MRC chassis.

(continued)

Table 3-3 Host and Device Routes for the Configuration Shown in Figure 3-6

Host	Device Name	Comments
ACCT_REC	ACCT_REC	This is an MV/15000. Host ACCT_REC owns all local devices (DPJ0, MTB0, IACs, and so on). Via the MRC, this host can access MRC tape and disk units. This is the second host defined in the VSGEN configuration file.
	MRC_CHANNEL01	This channel connects host ACCT_REC to all disk and tape controllers in the MRC.
	MRCTAPE_CONTROLLER_000A, MRCTAPE_CONTROLLER_0009, MRCDISK_CONTROLLER_000E, MRCDISK_CONTROLLER_000E, MRCDISK_CONTROLLER_0010	These are the MRC tape and disk controllers, also accessible from the other host.
	MRCTAPE000A0n (n is 0 or 1), MRCTAPE00090n (n is 0 or 1), MRCDISK000E0n (n is 0, 1, 2, or 3), MRCDISK000F0n (n is 0, 1, 2, or 3), MRCDISK00100n (n is 0, 1, 2, or 3)	These are the MRC tape units (8) and disk units (12), also accessible from the other host.
	MRC_CHASSIS	This is the default name of the MRC chassis.

(concluded)

Creating a Multiple–Host, Client–Server Configuration by Adding an ECLIPSE MV/40000 Computer and MRC Subsystem to Existing Systems

This section shows a confiuration in which a server (MV/40000 with MRC) was added to two existing systems. Like the previous example, this adds both computing and I/O power to a site that already has DG computers. And using the MV/40000 as a server provides a base for data sharing and easy addition of acting client systems. As with the previous example, you might choose this configuration if you had one or more DG computers and wanted to add computing power and I/O bandwidth and provide a space for future expansion. Since it uses an MV/40000 (not an MV/40000 HA), it provides less expandibility than the previous example (because MV/40000s are limited to one CPU and have fewer high–availability features).

The original hardware was

- MV/15000 computer with 16 Mbytes of main memory, two 594–Mbyte disk units, a dual–mode 1600/800–bpi tape unit, data channel line printer, and 24 terminals.
- MV/10000 computer with 8 Mbytes of main memory, two 192–Mbyte removable–pack disk units, a dual–mode 1600/800–bpi tape unit, data channel line printer, and 16 terminals.

The new hardware is

- MV/40000 computer with one job processor (CPU) board, 32 Mbytes of main memory, and one MRC channel processor board.
- One Intelligent TermController (ITC/128) board, TermManager hardware and TermServer software, and one line printer controller board.
- One data channel line printer.

- One 23–slot MRC subsytem with two ECLIPSE MRC channel interface boards (these go in the existing MV/15000 and MV/10000 computers), three MRC system interface board, one MRC controller board (MRCC), two tape controller boards, and three disk controller boards.

- Four Model 6299 6250–bpi tape units; at 140 Mbytes per unit, this adds 560 Mbytes of backup capacity on line.

- Twelve Rapid Access Mass Storage (R.A.M.S.) 500–Mbyte disk units; this adds 6.0 Gbytes of on–line disk storage.

Figures 3–7 and 3–8 show the hardware configuration before VSGEN and after VSGEN has assigned device names.

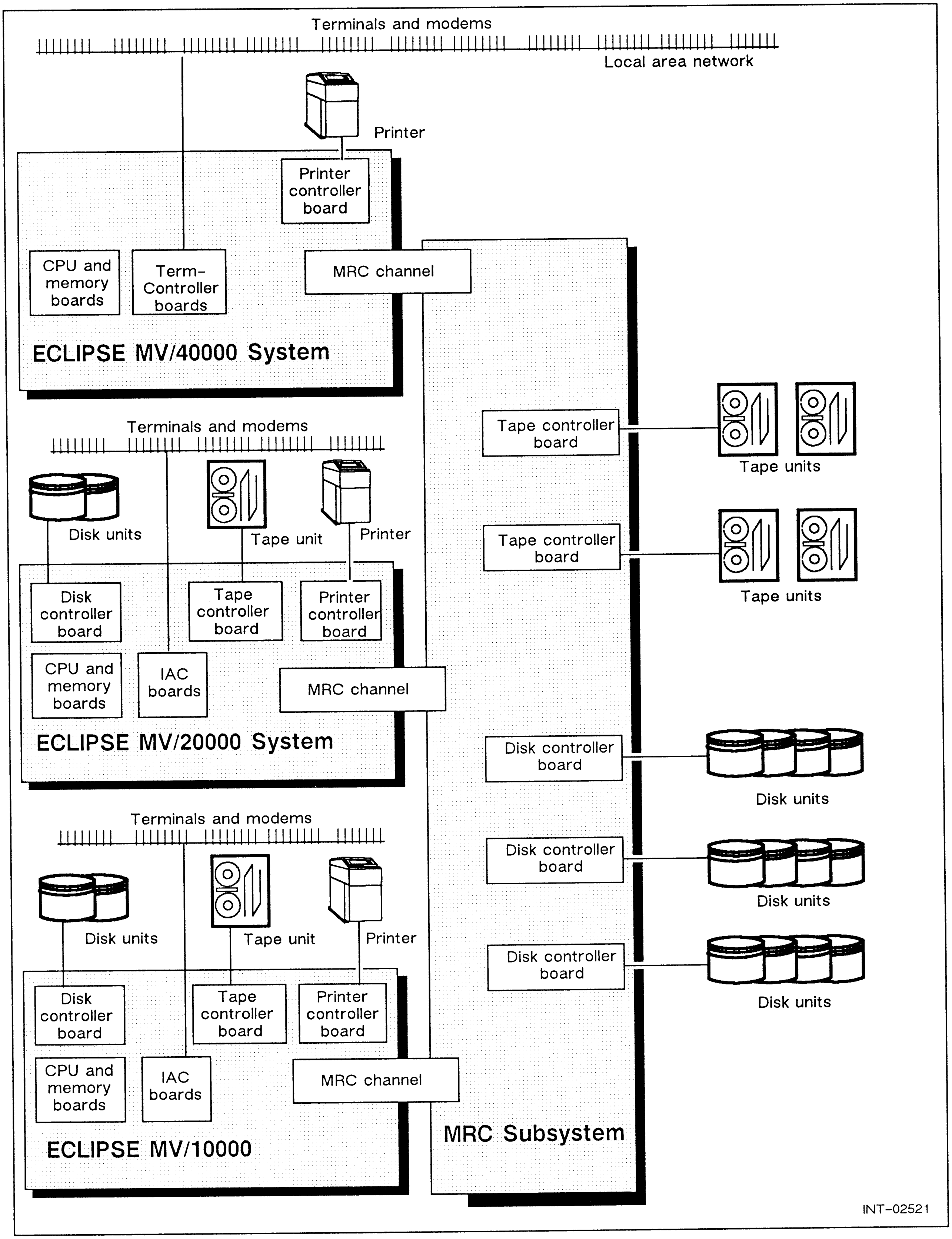


Figure 3-7 *Multiple-Host Configuration with MV/40000, MRC Subsystem, MV/20000, and MV/10000, Using the MV/40000 and MRC as Server — Before VSGEN*

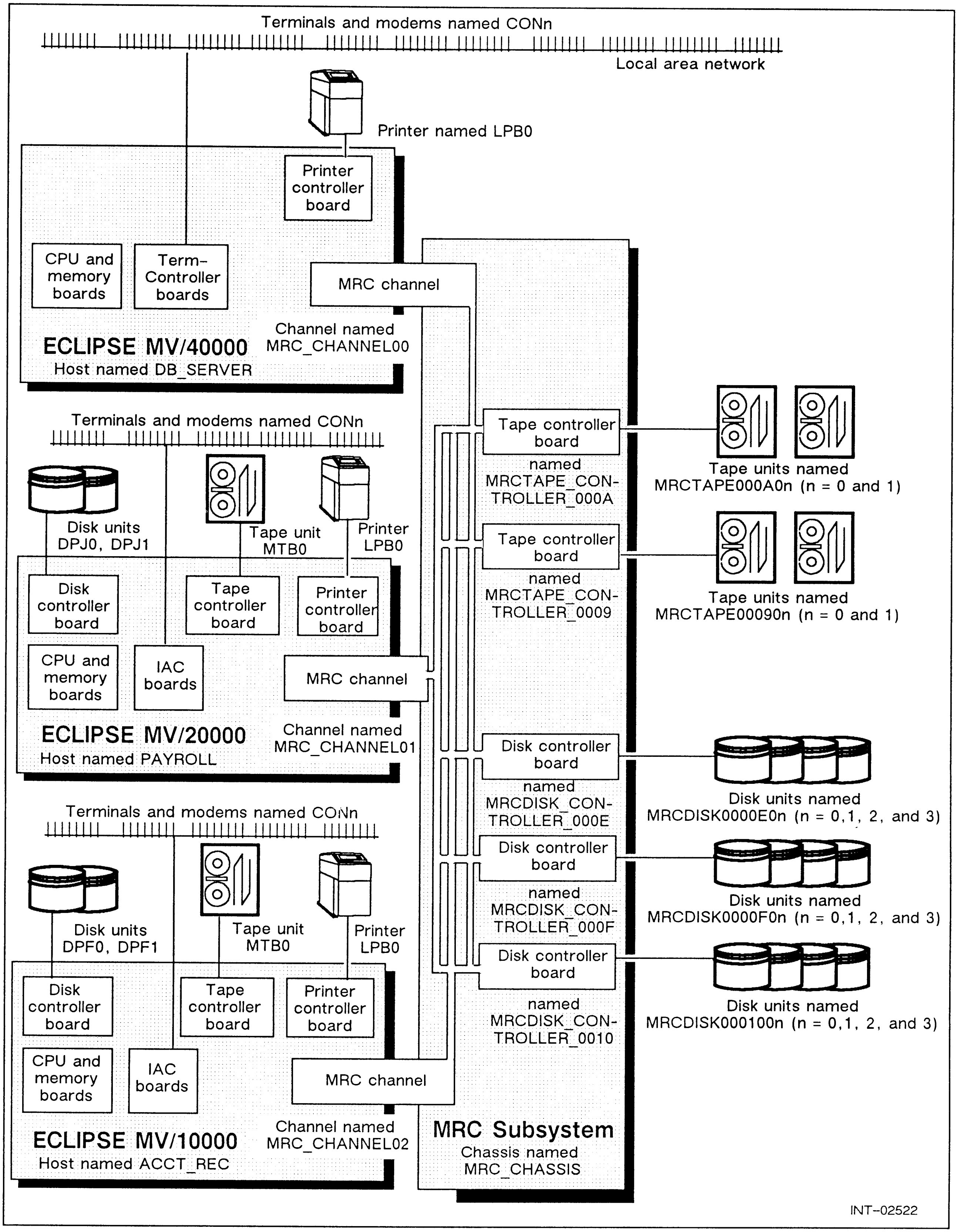


Figure 3–8 Multiple-Host Configuration with MV/40000, MRC Subsystem, MV/20000, and MV/10000, Using the MV/40000 and MRC as Server — with Device Names and Routes After VSGEN

Host-to-Device Routes

Table 3-4 shows routes between hosts and devices for the configuration in Figure 3-8.

Table 3-4 Host and Device Routes for the Configuration Shown in Figure 3-8

Host	Device Name	Comments
DB_SERVER	DB_SERVER	Host DB_SERVER is an MV/40000. It is the first host defined in the VSGEN configuration file.
	MRC_CHANNEL00	This channel connects host DB_SERVER to all disk and tape controllers in the MRC.
	MRCTAPE_CONTROLLER_000A, MRCTAPE_CONTROLLER_0009	These are the MRC tape controllers. The name ending in A is the default name of the first MRC tape controller.
	MRCTAPE000A00, MRCTAPE000A01, MRCTAPE000900, MRCTAPE000901	These are the default names of the four tape units. Users access units by these names.
	MRCDISK_CONTROLLER_000E, MRCDISK_CONTROLLER_000F, MRCDISK_CONTROLLER_0010	These are the default names of the three disk controllers.
	MRCDISK000E0n (n is 0, 1, 2, or 3), MRCDISK000F0n (n is 0, 1, 2, or 3), MRCDISK00100n (n is 0, 1, 2, or 3)	These are the default names of the 12 disk units. After a disk is initialized, users access it by the LDU filename, not the unit name.
	MRC_CHASSIS	This is the default name of the first MRC chassis.

(continued)

Table 3-4 Host and Device Routes for the Configuration Shown in Figure 3-8

Host	Device Name	Comments
PAYROLL	PAYROLL	This is an MV/15000. Host PAYROLL owns all local devices (DPJ0, MTB0, IACs, and so on). Via the MRC, this host can access MRC tape and disk units. This is the second host defined in the VSGEN configuration file.
	MRC_CHANNEL01	This channel connects host PAYROLL to all disk and tape controllers in the MRC.
	MRCTAPE_CONTROLLER_000A, MRCTAPE_CONTROLLER_0009, MRCDISK_CONTROLLER_000E, MRCDISK_CONTROLLER_000E, MRCDISK_CONTROLLER_0010	These are the MRC tape and disk controllers, also accessible from the other hosts.
	MRCTAPE000A0n (n is 0 or 1), MRCTAPE00090n (n is 0 or 1), MRCDISK000E0n (n is 0, 1, 2, or 3), MRCDISK000F0n (n is 0, 1, 2, or 3), MRCDISK00100n (n is 0, 1, 2, or 3)	These are the MRC tape units (8) and disk units (12), also accessible from the other hosts.
	MRC_CHASSIS	This is the default name of the first MRC chassis.

(continued)

Table 3-4 Host and Device Routes for the Configuration Shown in Figure 3-8

Host	Device Name	Comments
ACCT_REC	ACCT_REC	This system is an MV/10000. Like the other hosts, host ACCT_REC owns all local devices (DPJ0, MTB0, IACs, and so on). Via the MRC, this host can access MRC tape and disk units. This is the third host defined in the VSGEN configuration file.
	MRC_CHANNEL02	This channel connects host ACCT_REC to all disk and tape controllers in the MRC.
	MRCTAPE_CONTROLLER_000A, MRCTAPE_CONTROLLER_0009, MRCDISK_CONTROLLER_000E, MRCDISK_CONTROLLER_000E, MRCDISK_CONTROLLER_0010	These are the MRC tape and disk controllers, also accessible from the other hosts.
	MRCTAPE000A0n (n is 0 or 1), MRCTAPE00090n (n is 0 or 1), MRCDISK000E0n (n is 0, 1, 2, or 3), MRCDISK000F0n (n is 0, 1, 2, or 3), MRCDISK00100n (n is 0, 1, 2, or 3)	These are the MRC tape units (8) and disk units (12), also accessible from the other hosts.
	MRC_CHASSIS	This is the default name of the MRC chassis.

(concluded)

All the MRC disk and tape units have the same name for access by the hosts. Each host, DB_SERVER, PAYROLL and ACCT_REC, can use the MRC devices. This provides access to the database from any of the hosts.

Creating a Single-Host, Large-Capacity Configuration with an ECLIPSE MV/40000 HA Computer, ECLIPSE Channel Subsystem, and Two MRC Subsystems

This section shows a configuration deisgned for great storage capacity. With two MRCs and 32 disk controllers, this provides a very large storage capacity — enough space for practically any database. As shown, the capacity is 64 Gbytes; it could range up to 128 Gbytes.

The hardware is

- MV/40000 HA computer with two job processors (CPUs), 256 Mbytes of main memory, and two MRC channel processor boards.
- One ECLIPSE channel subsystem (ECS) with four Intelligent TermController (ITC/128) boards, TermManager hardware and TermServer software (providing 512 asynchronous line connections over a LAN), and one line printer controller board.
- Four IAC (Intelligent Asynchronous Controllers) boards, each with 24 lines. These provide 96 direct asynchronous line connections.
- 500 Data General DASHER CRT terminals, 10 hardcopy terminals, and 20 modems.
- Two data channel line printers.
- Two 23–slot MRC subsytems, each with one MRC system interface board, one MRC controller board, two tape controller boards, and 16 disk controller boards. Two I/O slots remain in each chassis for additional disk or tape controllers.
- Eight Model 6299 6250–bpi tape units; at 140 Mbytes per unit, this adds 1120 Mbytes of backup capacity on line.
- 128 Rapid Access Mass Storage (R.A.M.S.) 500–Mbyte disk units for 64 Gbytes of on–line disk storage. There are four disks on each controller. Since each controller can support up to eight disks, on–line storage can be expanded to 128 Mbytes.

Figures 3–9 and 3–10 show the hardware configuration before VSGEN and after VSGEN has assigned device names.

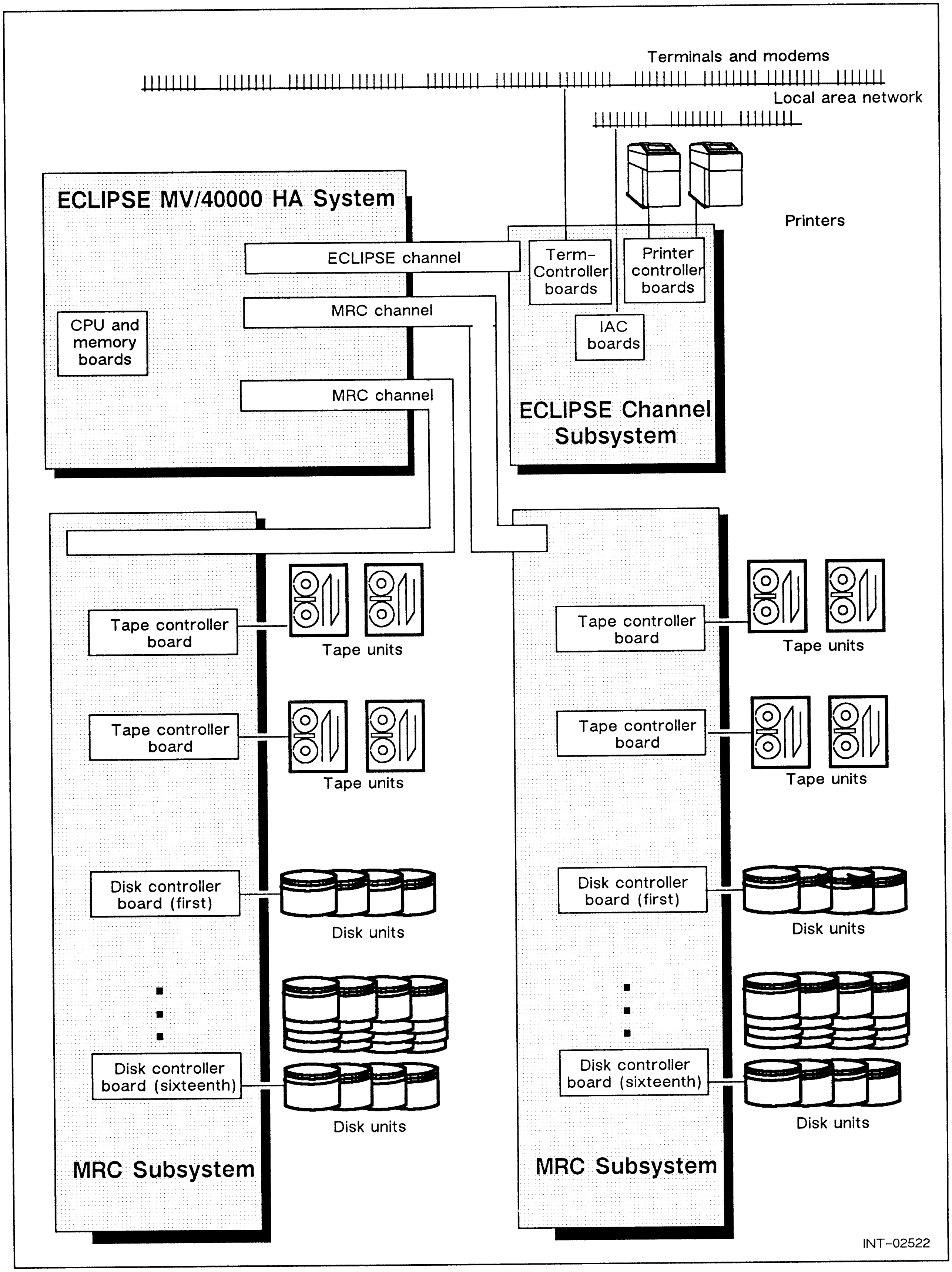


Figure 3-9   A Large Capacity Configuration Before VSGEN

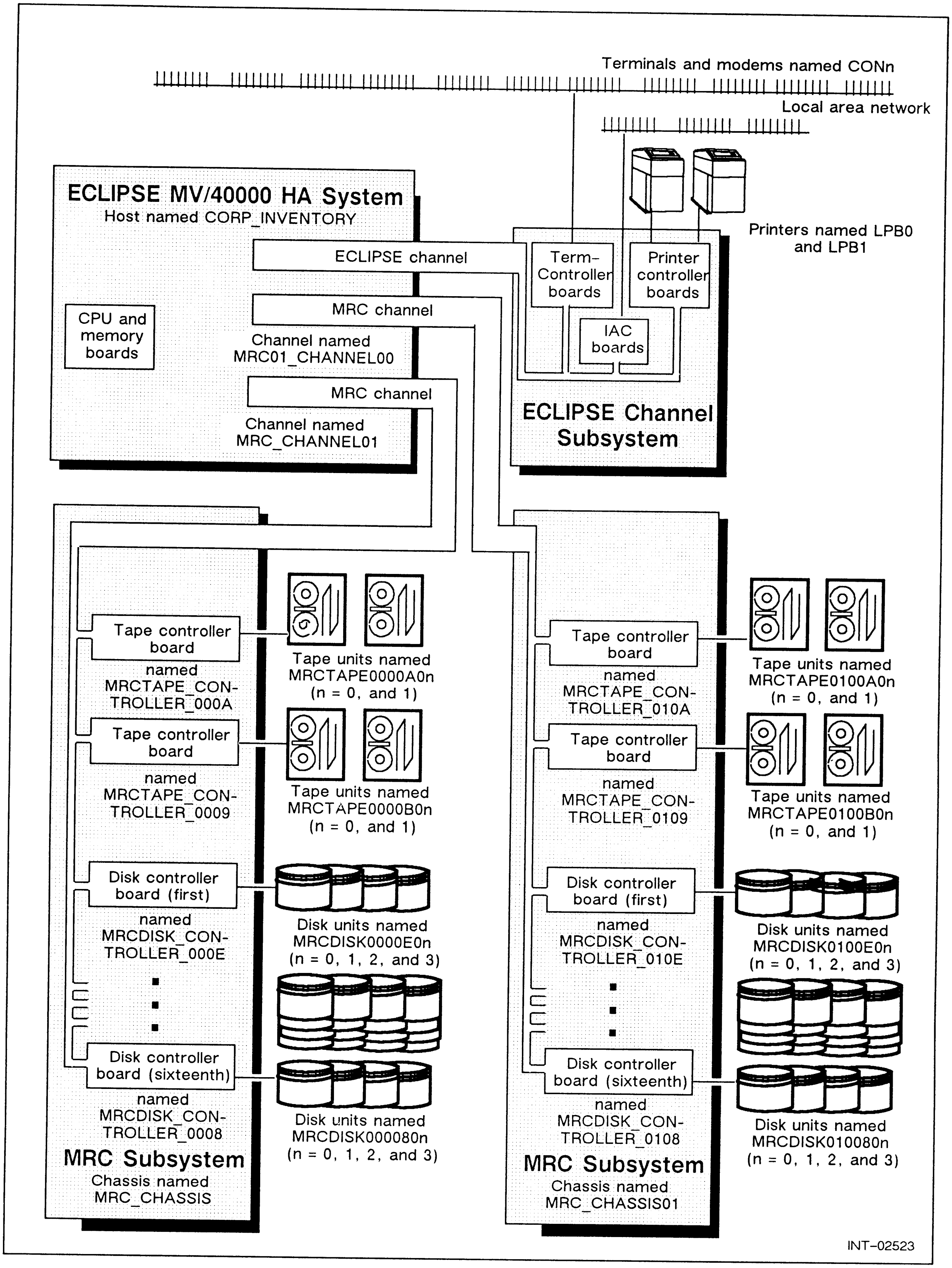


Figure 3-10 A Large Capacity Configuration with Device Names and Routes After VSGEN

Host-to-Device Routes

Table 3-5 shows routes between hosts and devices for the configuration in Figure 3-10.

Table 3-5 Host and Device Routes for the Configuration Shown in Figure 3-10

Host	Device Name	Comments
SERVER	SERVER	This host is an MV/40000 HA.
	ECLIPSE Channel Subsystem	ECLIPSE channel subsystems (ECS) don't have names; you define an ECS in VSGEN by octal device code, not by name. The host uses the ECS to run all asynchronous, communications, and printer controllers.
	MRC_CHANNEL00	This channel connects the host to disk and tape controllers in the first MRC chassis.
	MRCTAPE_CONTROLLER_000A, MRCTAPE_CONTROLLER_0009	These are the MRC tape controllers. The name ending in A is the default name of the first MRC tape controller. There are two tape controllers in this MRC chassis.
	MRCTAPE000A00, MRCTAPE000A01, MRCTAPE000900, MRCTAPE000901	These are the default names of the four tape units. Users access units by these names.
	MRCDISK_CONTROLLER_000E, MRCDISK_CONTROLLER_000F, MRCDISK_CONTROLLER_0010, MRCDISK_CONTROLLER_00mm	These are the names of the disk controllers. The names ending in E, F, and 10 are the default names of the first three controllers. There are 13 other controllers, for a total of 16 disk controllers in this MRC chassis.
	MRCDISK000E0n (n is 0, 1, 2, or 3), MRCDISK000F0n (n is 0, 1, 2, or 3), MRCDISK00100n (n is 0, 1, 2, or 3), MRCDISK00mm0n (n is 0, 1, 2, or 3)	These are the disk unit names. There are four disks on each of the 16 controllers — making a total of 64 units on this channel. After a disk is initialized, users access it by the LDU filename, not unit name.
	MRC_CHASSIS	This is the name of the first MRC chassis.

(continued)

Table 3-5 Host and Device Routes for the Configuration Shown in Figure 3-10

Host	Device Name	Comments
SERVER (cont.)	MRC01_CHANNEL01	This is the second MRC channel. This channel connects host SERVER to all disk and tape controllers in the second MRC chassis.
	MRCTAPE_CONTROLLER_010A, MRCTAPE_CONTROLLER_0109	These are the MRC tape controllers. There are two tape controllers in this MRC chassis.
	MRCTAPE010A00, MRCTAPE010A01, MRCTAPE010900, MRCTAPE010901	These are the default names of the four tape units. Users access units by these names.
	MRCDISK_CONTROLLER_010E, MRCDISK_CONTROLLER_010F, MRCDISK_CONTROLLER_0110, MRCDISK_CONTROLLER_01mm	These are the names of the disk controllers. There are 13 other controllers, for a total of 16 disk controllers in this MRC chassis.
	MRCDISK010E0n (n is 0, 1, 2, or 3), MRCDISK010F0n (n is 0, 1, 2, or 3), MRCDISK01100n (n is 0, 1, 2, or 3), MRCDISK01mm0n (n is 0, 1, 2, or 3)	These are the disk unit names. There are four disks on each of the 16 controllers — making a total of 64 units on this channel.
	MRCDISK_CONTROLLER_010E (and 010F, 0110, and 13 others)	These are the names of the MRC disk controllers in the second MRC chassis. Like the first chassis, this has 16 disk controllers in this MRC chassis.
	MRC_CHASSIS01	This is the name of the second MRC chassis.

(concluded)

Creating a Single–Host, High–Availability Configuration with an ECLIPSE MV/40000 HA Computer, ECLIPSE Channel Subsystem, and MRC Subsystem

This section shows a configuration that has redundant devices and disk mirroring to provide high availability. It's designed for an application that requires continuous processing. The system can withstand failure of any hardware component. You can obtain this kind of availability even with multiple hosts and multiple MRC subsystems. Configuring a high–availability system is further described in Chapter 4.

The hardware is

- MV/40000 HA computer with two job processors (CPUs), 32 Mbytes of main memory, an extra memory module to serve as backup, and two MRC channel processor boards.
- One ECLIPSE channel subsystem (ECS) with two Intelligent TermController (ITC/128) boards, TermManager hardware and TermServer software (providing 256 asynchronous line connections over a LAN), and one line printer controller board.
- Two IAC (Intelligent Asynchronous Controller) boards, one with 24 lines, another with 8 lines. These provide 32 direct asynchronous line connections.
- 270 Data General DASHER CRT terminals, 10 hardcopy terminals, and 8 modems.
- Two data channel line printers.

- One 23–slot MRC subsytem with two MRC system interface boards, two MRC controller boards, two tape controller boards, and four disk controller boards.
- Four Model 6299 6250–bpi tape units; at 140 Mbytes per unit, this yields 560 Mbytes of backup capacity on line.
- Sixteen Rapid Access Mass Storage (R.A.M.S.) 500–Mbyte disk units for 8.0 Gbytes of on–line disk storage. Since all LDU images are mirrored, effective storage capacity is 4.0 Gbytes.

Figures 3–11 and 3–12 show the hardware configuration before VSGEN and after VSGEN has assigned device names.

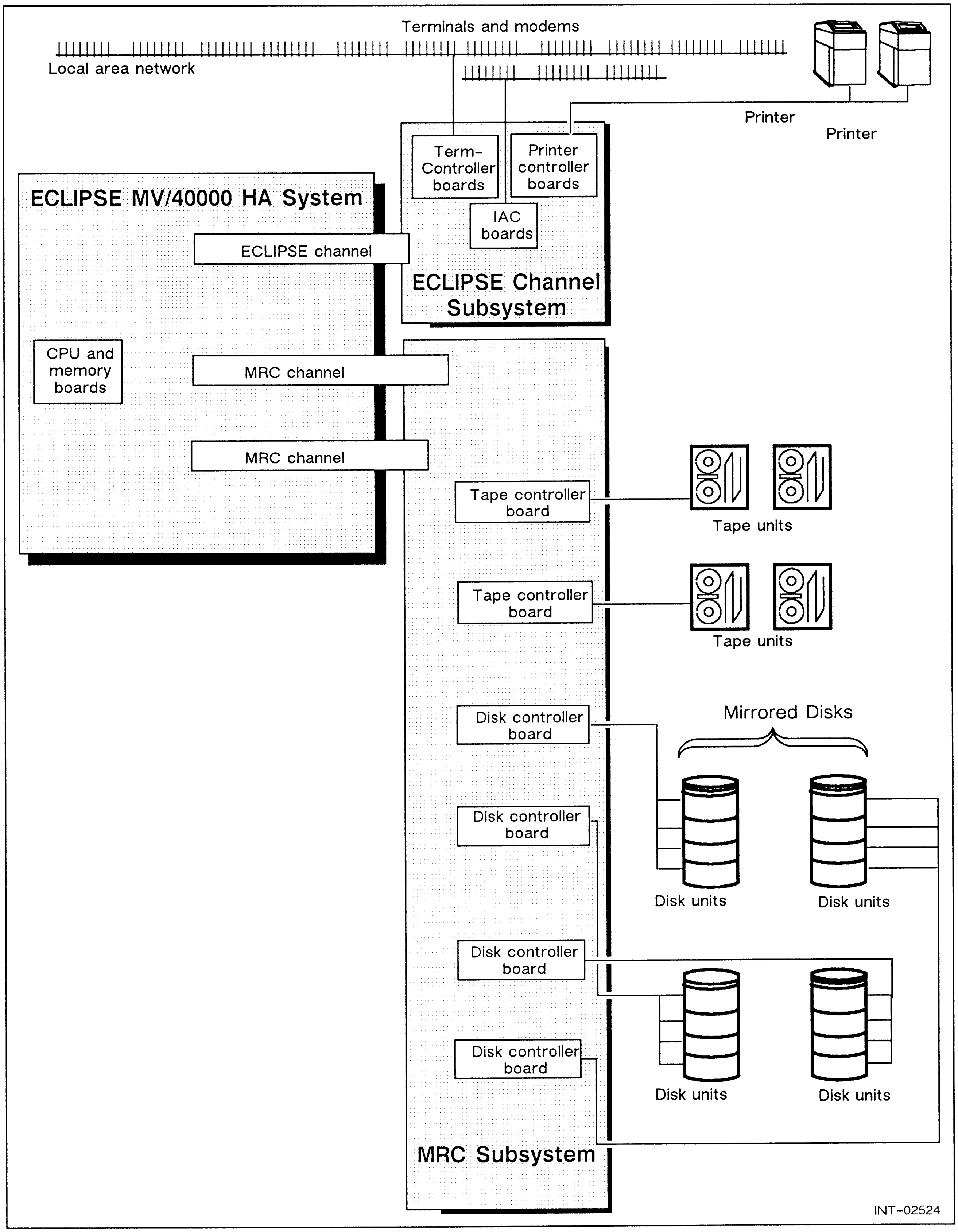


Figure 3-11 A High Availability Configuration with MV/40000 HA, ECLIPSE Channel and MRC Subsystems — Before VSGEN

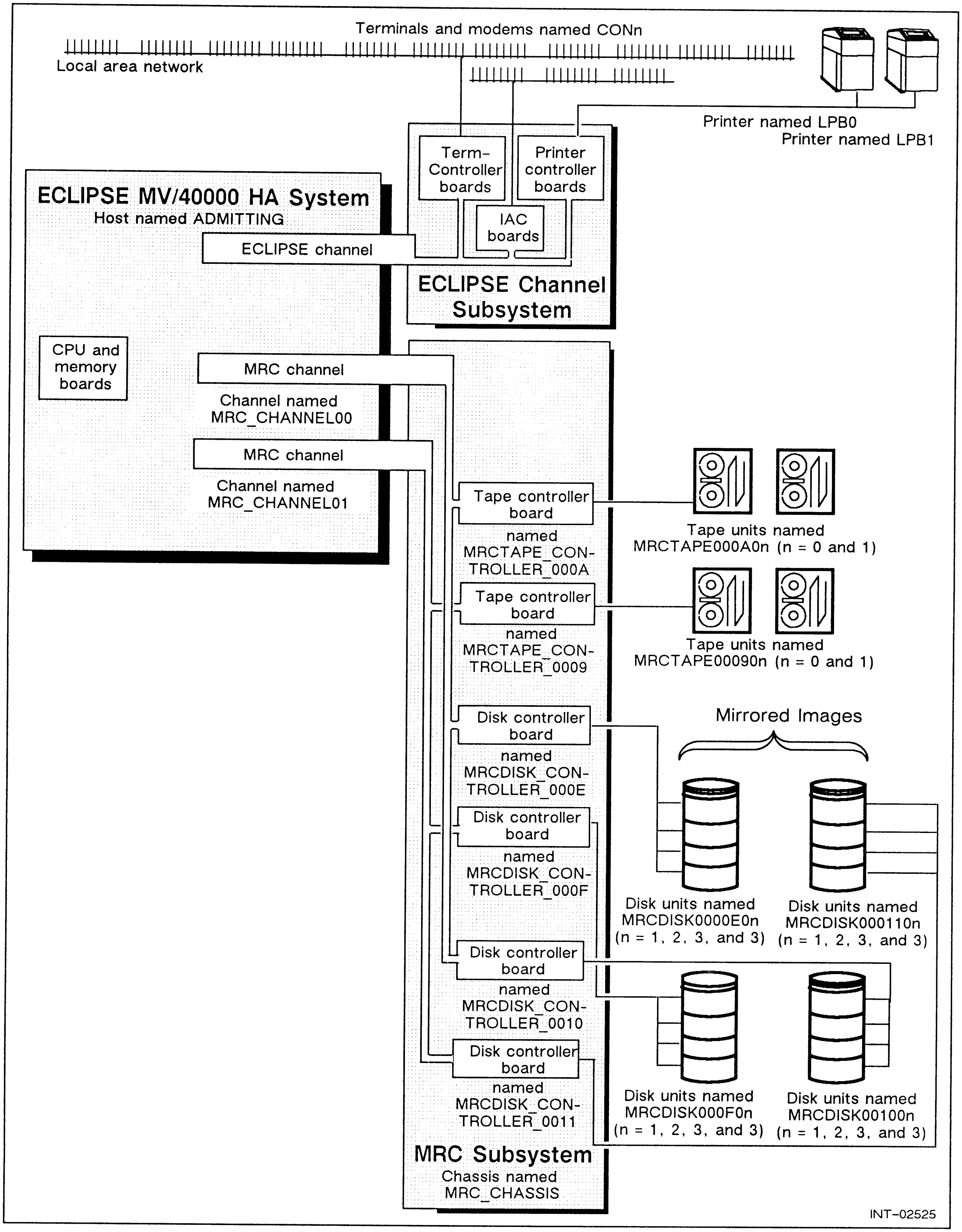


Figure 3–12 A High Availability Configuration with MV/40000 HA, ECLIPSE Channel and MRC Subsystems — with Device Names and Routes After VSGEN

Host-to-Device Routes

Table 3-6 shows routes between hosts and devices for the configuration in Figure 3-12.

Table 3-6 Host and Device Routes for the Configuration Shown in Figure 3-12

Host	Device Name	Comments
ADMITTING	ADMITTING	This is an MV/40000 HA system with one channel to an ECLIPSE Channel Subsystem and two channels (one a redundant channel) to the MRC chassis.
	ECLIPSE Channel Subsystem	The MV/40000 HA host uses the ECLIPSE channel subsystem (ECS) to run all asynchronous, communications, and printer controllers.
	MRC_CHANNEL00	This is the first MRC channel. It is connected via VSGEN to the tape controller MRCTAPE_CONTROLLER_000A, disk controllers MRCDISK_CONTROLLER_000E and MRCDISK_CONTROLLER_0010, and all units on those controllers. The other channel will provide continuous operation if this channel or any controller or disk on it fails.
	MRCTAPE_CONTROLLER_000A	This is the default name of the first MRC tape controller.
	MRCTAPE000A0n (n is 0 or 1	These are the default names of tape units on the first tape controller.
	MRCDISK_CONTROLLER_000E, MRCDISK_CONTROLLER_0010	These are the names of the first and second MRC controllers on the first channel. The disk units attached to these controllers are software mirrored with disks controlled by the other channel.
	MRCDISK000E0n (n is 0, 1, 2, or 3), MRCDISK00100n (n is 0, 1, 2, or 3)	These are the default names of the MRC disk units on controllers on this channel. These disks are software mirrored between two sets of MRC disk controllers.

(continued)

Table 3-6 Host and Device Routes for the Configuration Shown in Figure 3-12

Host	Device Name	Comments
ADMITTING (cont.)	MRC_CHANNEL00	This is the second MRC channel. It is connected via VSGEN to the tape controller MRCTAPE_CONTROLLER_0009, disk controllers MRCDISK_CONTROLLER_000F and MRCDISK_CONTROLLER_0011, and all units on those controllers.
	MRCTAPE_CONTROLLER_0009	This is the default name of the first MRC tape controller. It is connected to the second MRC channel.
	MRCTAPE00090n (n is 0 or 1	These are the default names of tape units on the second tape controller.
	MRCDISK_CONTROLLER_000F, MRCDISK_CONTROLLER_0011	These are the names of the first and second MRC controllers on the first channel. The disk units attached to these controllers are software mirrored with disks controlled by the other channel.
	MRCDISK000F0n (n is 0, 1, 2, or 3), MRCDISK00110n (n is 0, 1, 2, or 3)	These are the default names of the MRC disk units on controllers on this channel. These disks are software mirrored between two sets of MRC disk controllers.
	MRC_CHASSIS	This is the default name of the MRC chassis.

(concluded)

What Next?

This chapter provided some background on MRC subsystems, MRC devices, and routes to devices on MRCs. Having examined the pertinent examples, you can proceed to Chapter 4 to generate a system tailored to support your configuration.

End of Chapter

Chapter 4
Generating a Tailored AOS/VS II System

Read this chapter

- When you want to generate your first tailored AOS/VS II system.
- Whenever you want to generate a new AOS/VS II system.

This chapter tells how to run VSGEN, the AOS/VS II system generation program. First, it explains some shortcuts. Then it describes system startup (in case you shut down AOS/VS II earlier), choosing a terminal, and updating system files. Next it explains VSGEN choices for the host computer, devices, and parameters, and shows how to build the system. Finally, it shows how to test the new system and make it the default system.

Do You Need to Read This Whole Chapter?

This chapter is long because it gives all details needed to generate a system from scratch. But usually you won't be working from scratch; you'll have an accurate VSGEN configuration file from AOS/VS II Release 1.10 or later; an accurate spec file from an earlier release of AOS/VS or AOS/VS II; or a a Disk Jockey system sizer output file.

If you have an accurate VSGEN configuration or spec file, you don't need to run VSGEN interactively. If you have installed the latest update software (explained in Chapter 2 for your first system and Chapter 8 for later systems), you can run VSGEN noninteractively in the form VSGEN/BATCH=configuration-filename. For example,

) SUPERUSER ON; DIR :SYSGEN; SEARCHLIST :UTIL↵
Su) VSGEN/BATCH=MSIS_01↵ (Use your system filename, without suffix, not MSIS_01.)

If EXEC is running, you can run VSGEN in batch by inserting QBATCH in front of the VSGEN command. For example, you might type QBATCH VSGEN/BATCH=MSIS_01↵. After VSGEN runs, update the new system, test it, and make it the default system as described in major sections later in this chapter.

If you have a Disk Jockey sizer output file and a new hardware configuration like an MRC I/O subsystem, use a similar technique, but rename the host and edit the terminal lines as needed (since the Disk Jockey sizer can't recognize nondefault devices, like modems, at the end of terminal lines). After installing the latest update software (as directed in Chapter 2 for your first system and Chapter 8 for later systems), you can just type

) SUPERUSER ON; DIR :SYSGEN; SEARCHLIST :UTIL↵
Su) VSGEN/DEFAULT=:SIZER.CFG↵

In VSGEN, rename the host, edit terminal line groups, and build the new system. Leave VSGEN with the BYE command. Then update the new system, test it, and make it the default system as described in major sections later in this chapter.

Or you can run VSGEN interactively as above, list the configuration, and then read only about selected topics; for example, "Specifying Host Parameters," "Specifying Disk Units (ECLIPSE and MRC)," and "Specifying Line Printers." For a summary of a VSGEN session, see Figure 4–17 (tab divider VSGEN Summary) near the end of this chapter.

The major sections in this chapter are as follows. For this chapter only, because the chapter is so long, we include the starting page number with the section header.

VSGEN is a menu–driven program with context–sensitive help. Running VSGEN is easy — the only tricky parts are specifying terminal lines and — with an MRC — routes for high availability with multiported disks. Other VSGEN settings you may want to examine (and perhaps change) are hostname, host parameters, disk controllers and units, tape controllers and units, and line printer controllers. The session may take only a few minutes.

In practically all cases, you won't start from scratch; a configuration file describing the system you want will serve as input to VSGEN. This configuration file may be an existing configuration or pre–Release 1.10 spec file. Or if you have no configuration or spec file, use the output file from Disk Jockey's sizer routine (which Chapter 2 instructed you to run).

There must be an AOS/VS II system running before you can run VSGEN. This can be either the DG–supplied starter system (:SYSGEN:SYS.PR) or your own previously generated tailored system.

Using LDU Mirroring for Higher Availability

This section provides some background on LDU mirroring — information you will find useful before running VSGEN.

LDU mirroring lets AOS/VS II maintain two (or three) copies of an LDU — providing one (or two) extra copies in case something goes wrong with the primary copy.

If an LDU is mirrored and one of the units that holds a mirrored image fails, AOS/VS II will automatically break the mirror (stop I/O to the bad image) and transfer control to the LDU image on the good unit — providing continuous processing without interruption. AOS/VS II lets you use either software mirroring (where the images can be anywhere on any type of unit on any controller) or hardware mirroring (where the images must be in identical areas of disk units on the same controller). You set up mirroring with Disk Jockey when you format the disks and create LDUs. You tell the system *to use* mirroring — and the kind to use — with CLI INITIALIZE and MIRROR commands.

The advantages and disadvantages of software and hardware mirroring are as follows:

- Software mirroring — The major advantage is flexibility; you need not use the same disk type for all images. You can create an LDU image wherever you have disk space; the controller type, unit type, and disk addresses need not be the same. If disks are multiported to the same secondary controller, AOS/VS II can reroute around a failed controller, eliminating the controller as a single point of failure even with hardware mirroring.

  The major disadvantage of software mirroring is synchronization speed. This disadvantage pertains only with R.A.M.S. (rapid access mass storage) disks, since hardware and software synchronization times for other disk types are similar.

  To *maintain* synchronization (after the images are synchronized), overhead is as follows. Software mirroring requires slightly more CPU time on disk writes, since the system must write to multiple images. Disk seek time (for reads and writes) may be less with hardware or software mirroring, depending on the application.

- Hardware mirroring — The major advantage is synchronization speed. With R.A.M.S. disks, hardware mirroring provides much faster synchronization than software mirroring (a few minutes versus several hours). With other disk types, software and hardware image synchronization requires similar amounts of time.

  One drawback of hardware mirroring is that mirrored units must be on one disk controller. If this controller fails, all images will become inaccessible, unless the images are multiported to the same secondary controller. If the hardware images are multiported to the same secondary controller, AOS/VS II will seek another route to the images if the primary controller fails. If you have an MRC with two channels and a channel fails, AOS/VS II will seek a route through the good channel. Another disadvantage of hardware mirroring is that each image's disk addresses must be the same, which may complicate the task of creating the images.

A system with disks connected and formatted for hardware mirroring can use either type of mirroring, software or hardware.

If you plan to mirror your system LDU and this LDU is on an ECLIPSE–bus controller, be sure to create the secondary image on unit 0 of its controller. This is needed because you can boot AOS/VS II system software only from unit 0 of an ECLIPSE–bus controller. One consequence of this restriction is that, with ECLIPSE–bus disks, you must use software mirroring for the system LDU (since hardware mirroring requires LDUs to be on the same controller). With LDUs on an MRC–bus, this restriction does not apply, since you can boot AOS/VS II from any MRC–bus disk unit.

The next three sections show examples of disk mirroring. For simplicity, each LDU as an entire disk. (An LDU need not occupy an entire disk.)

Using Software Mirroring

If your LDUs are not connected for hardware mirroring (the images you want to mirror are not on units connected to one controller), you must use software mirroring. Figure 4–1 shows three mirrored LDUs. The mirrored LDUs are the root (:), UDD1, and CEO.

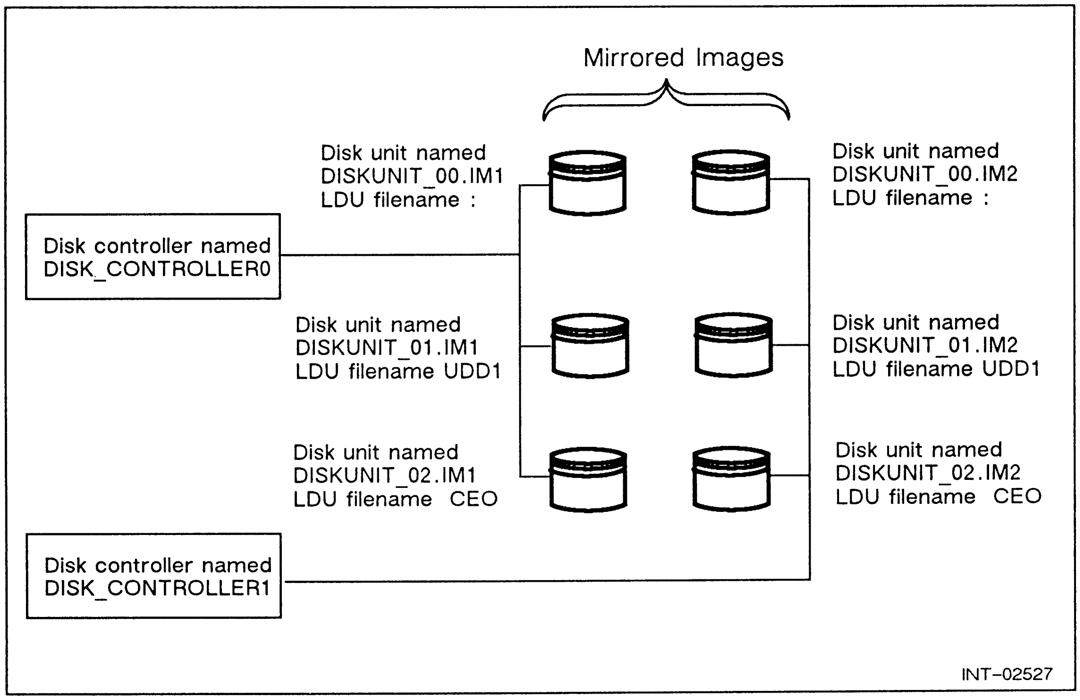


Figure 4-1 Disk Controllers and Units with Software Mirroring

With software mirroring, the mirrored disks are usually on separate controllers. If a disk unit fails, AOS/VS II continues using the mirror image. If a controller fails, AOS/VS II keeps running using the remaining *controller* and its set of images. If a controller fails and the disk units are multiported to another working controller, AOS/VS II will maintain the mirror.

(The device names shown are hypothetical. Typical device names for MRC devices are MRCDISK_CONTROLLER_000E and MRCDISK000E00; typical ECLIPSE-bus device names are DPJ_CONTROLLER_0 and DPJ0.)

Using Hardware Mirroring

You can use hardware mirroring if your LDUs are connected for hardware mirroring (the images you want to mirror are on units connected to one controller). Figure 4–2 shows three LDUs set up for hardware mirroring. As with the previous figures, the mirrored LDUs are the root (:), UDD1, and CEO.

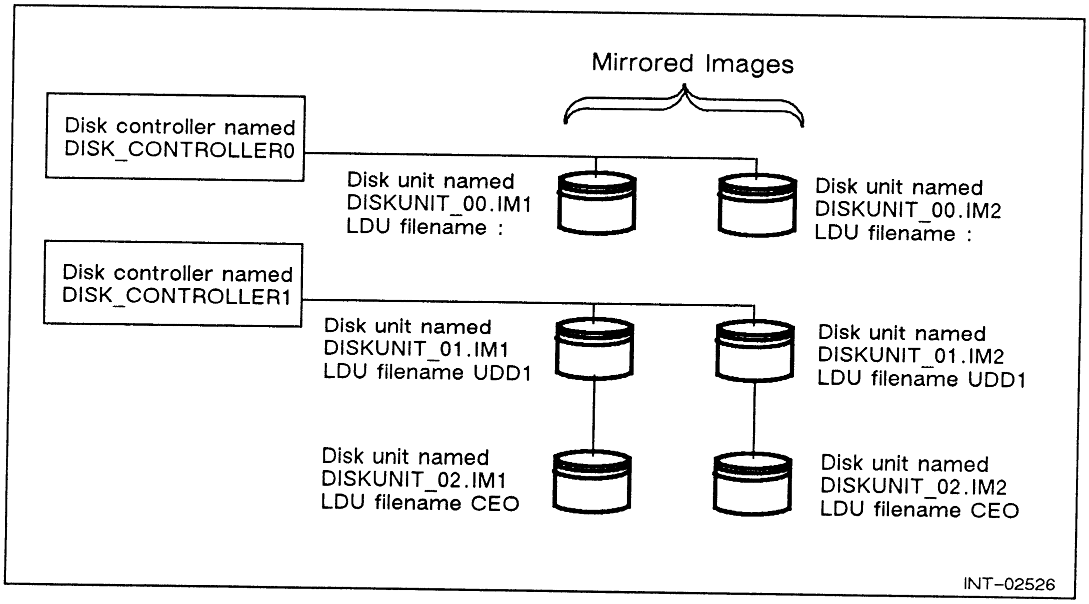


Figure 4–2 Disk Controllers and Units with Hardware Mirroring

With hardware mirroring, the mirrored LDUs must be on the same controller. As shown, with identical disks, this structure allows either hardware or software mirroring. With hardware mirroring, this arrangement provides fast sychnronization time.

Using Mirroring with an MRC

Figure 4–3 shows a system with host computer, two MRC channels, MRC subsystem, disk controllers, disk units, and software mirroring. Figure 4–4 shows the same configuration with hardware mirroring.

The device names shown are the defaults for MRC disk controllers and units. They may seem cumbersome, but they have the strong advantage of fully identifying the route to each unit.

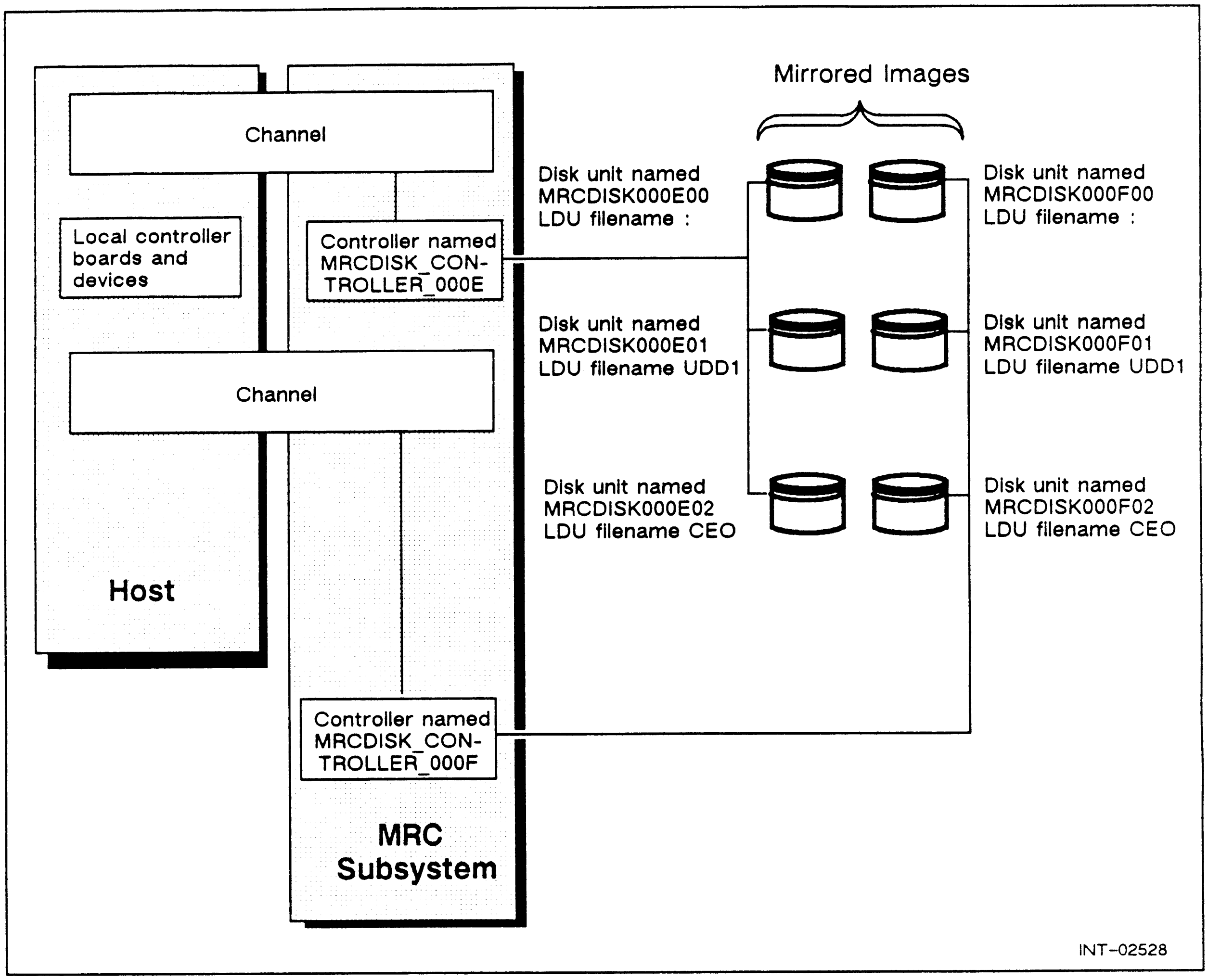


Figure 4–3 High–Availability System with MRC, Multiple Channels, Multiple Controllers, and Software Mirroring

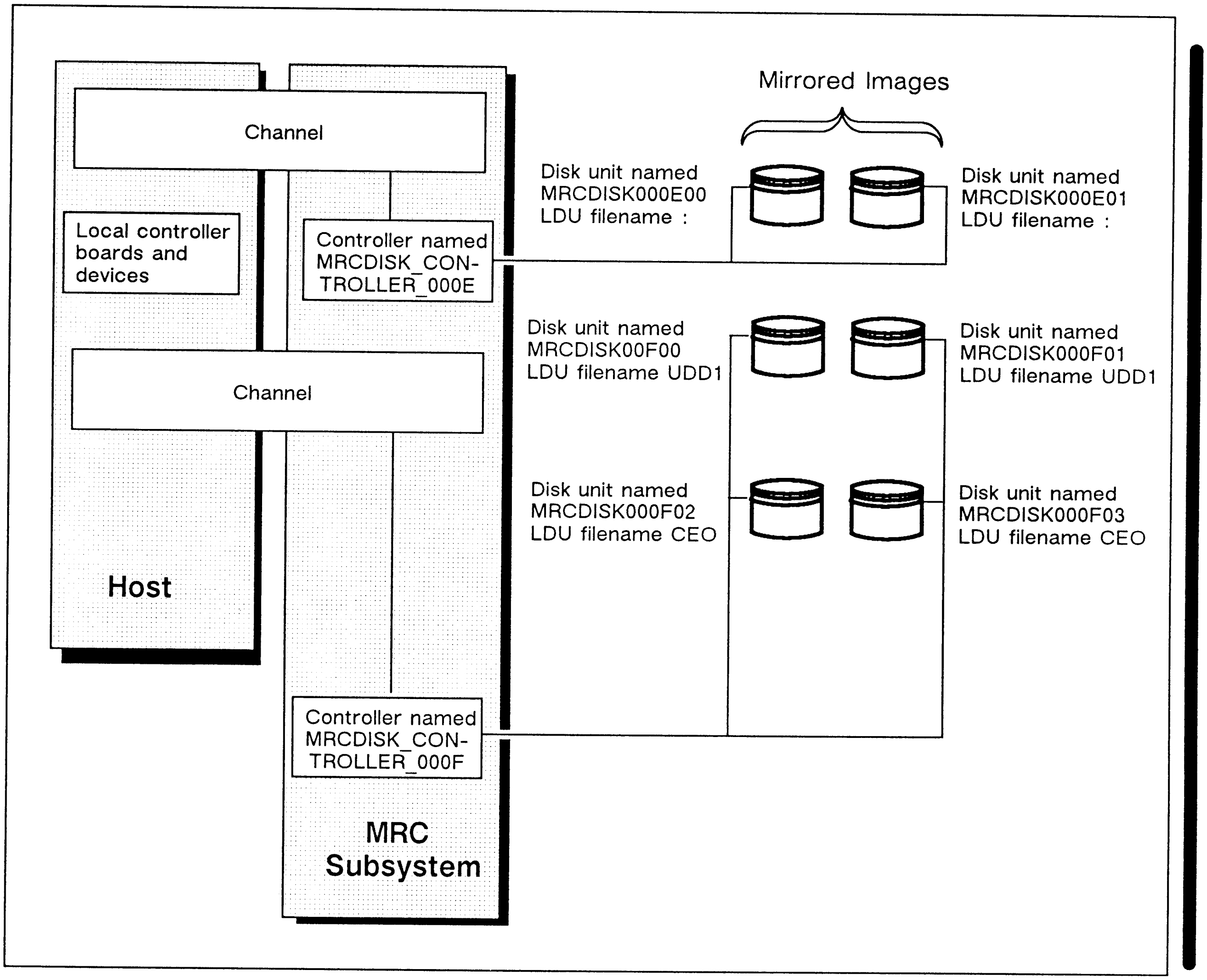


Figure 4–4 High–Availability System with MRC, Multiple Channels, Multiple Controllers, and Hardware Mirroring

Multiporting Disk Units

Another way to increase the availability of disk units is to *multiport* them via cables attached to two different controllers. The disk controllers may or may not be on different ECLIPSE hosts or MRC channels. Multiporting protects against controller failure. With MRC systems, configuring the MRC disk controller on several MRC channels provides even more availability in event of a channel failure. Even if you do not use mirroring, multiporting can increase the availability of disk-based information by providing an alternative path to a disk in event of controller or MRC channel failure.

Figure 4–5 shows the mirrored system and nonsystem LDUs from Figure 4–4 multiported to the other controller. As with the previous figures, the mirrored LDUs are the root (:), UDD1, and CEO.

The arrangement shown in Figure 4–5 provides the high availability of mirroring. The two MRC channels provide continuous processing if a channel fails. If any disk unit fails, the AOS/VS II system will automatically break the mirror and continue running on the other image. If an MRC channel or disk controller fails, AOS/VS II will try to reroute to its disks via the secondary route. Because the secondary route keeps the mirrored disks on the same controller, the hardware mirrors will be maintained after a controller failure.

Disk controller MRCDISK_CONTROLLER_000E has its primary routes to the root images; this controller has secondary routes to the UDD1 and CEO images. Disk controller MRCDISK_CONTROLLER_000F has its primary routes to the UDD1 and CEO images and secondary routes to the root images.

On any failure, hard error messages will be displayed on the system console and written to the system error log to notify the operator. He or she can then plan repair or replacement of the unit.

When you use multiporting to increase controller availability, you may need to edit routes to optimize this availability. For example, if you want to use hardware mirroring, you will want to make sure the primary route for both images has the same controller. And if you want hardware mirroring to continue after a disk controller failure, you must make sure that the mirror images are multiported to the same secondary controller. Selecting routes is explained later in this chapter, in the section "Selecting Routes to MRC Devices."

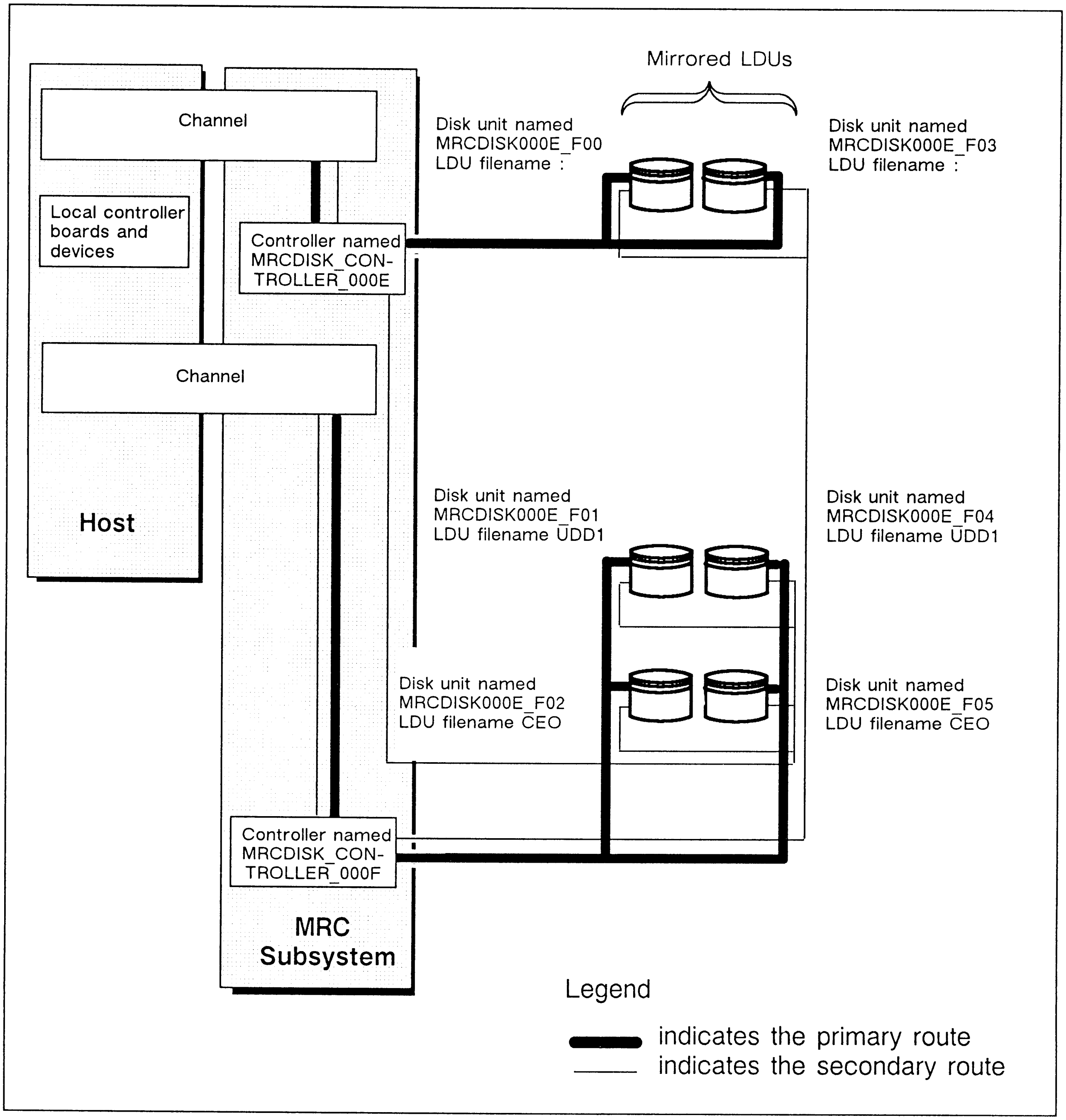


Figure 4–5 High–Availability System with MRC, Multiple Channels, Multiple Controllers, and Hardware Mirroring

System Startup (with Power On)

Read this section only if AOS/VS II is *not running.* If it is running — shown by the CLI prompt (a parenthesis) — skip to the next section.

The SCP CLI prompt (*SCP–CLI>*) should be showing. Type your response, as follows:

SCP–CLI> RESET↵
SCP–CLI> BOOT 24↵ (or BOOT 116) (Use BOOT with the primary disk unit device code. For an ECLIPSE–bus disk, it is 24 for DPJ–type disks, or 27 for DPF–type disks. For an MRC–bus disk, it's 116; after typing BOOT 116↵, when the system console asks about node and unit, type 0E,0↵.)

NOTE: All ECLIPSE and MRC device codes that you boot from, including 22, 23, 62, and 116, appear in octal in this book. The default radix on some MV/40000s is hex. If, with an MV/40000, you use the BOOT command with an octal radix and receive no response, type the break sequence and display the radix by typing RADIX. If the radix is H (hex), type RADIX O, press NEW LINE, and try the BOOT command again.

The system console displays

Operating System Load Menu

1. Continue immediately with operating system load
2. Enter the Technical Maintenance Menu
...
Enter choice [1]:

Type 2↵

If asked *Date (MM/DD/YY)?,* type today's date. For example, for August 23, 1990, type 8 23 90↵. To answer *Time (HH:MM:SS)?*, type the time, using a 24–hour clock. For example, for 4:30 p.m., type 16 30↵. To answer the *Offset* question, type 0↵.

The bootstrap program displays the Technical Maintenance Menu:

Technical Maintenance Menu

. . .
6. Run a specified program
. . .
Enter choice [1]:

Type 6↵.

Pathname?

Type the pathname of the AOS/VS II starter system, :SYSGEN:SYS.PR

:SYSGEN:SYS.PR↵

The computer displays *Loading* messages. It may then ask date and time questions or skip them, as follows:

Date (MM/DD/YY) ? 2 23 90↵ (Type the current date. These date and time questions are skipped on computers that have a boot clock.)

Time (HH:MM:SS) ? 15 20 ↵ (Type the current time.)

Offset from Universal time [+00:00] ↵ (Use default offset.)

Override default specs [N] ? ↵

Standard SYS.PR load devices are

MTC0	*(device code 22)*
MTJ0	*(device code 23)*
MTD0	*(device code 62)*
MTJ10 and MTJ11	*(device code 63)*
MRCTAPE000A00	*(channel device code 116, slot A)*

Do you want to specify a nonstandard load device? [N]

The starter system displays this message to let you specify a nonstandard load device. You may need to use the starter system to load other software — for example, if you have the XTS or TCP/IP network system. Therefore you may need to identify the tape unit. If you have any of these tape devices listed, press NEW LINE. If not, see Chapter 2, step 66.

... (A long pause occurs here) ...

AOS/VS II CLI Release n date time
)

The master CLI process is running. You can run VSGEN to generate a tailored system.

Choosing a Terminal for VSGEN

You can run VSGEN interactively (answering its questions one by one) or in batch mode (telling it to generate a system without asking questions). Using batch mode is far easier, but requires an accurate configuration file (created by a previous VSGEN).

If you can't use batch mode, as when you want to check settings or change a tailored system, you must run VSGEN interactively. Interactive mode involves a lot of dialog. This dialog, like any dialog, is easier if you use a CRT display instead of a hardcopy terminal. Therefore, we suggest that, if possible, you run VSGEN on a CRT. This is easy if the system console is a CRT, but even if the system console is a printing terminal, you can run VSGEN from a user terminal that's a CRT. After generating the system, you must walk to the system console to shut down the old system and try the new system, but the overall effort is less than a hardcopy terminal requires. (A user terminal works only when you're running a tailored system; it doesn't work with the starter system, because the starter system doesn't support user terminals.)

If you need to run VSGEN interactively and must use a hardcopy terminal, go ahead. Use the DEL key and press CTRL–U (to delete the current line of text) as needed.

NOTE: If your system console is a CRT attached to a slave printer, VSGEN will treat it as a hardcopy terminal. To have VSGEN treat it like a CRT, you must disconnect the slave printer from the CRT before running VSGEN.

If You Have the XTS II, TCP/IP, or DG/OTS Network Transport System

XTS is Data General's XODIAC™ Transport Service networking software. There is an XTS version, that runs with both AOS/VS and AOS/VS II, and an XTS II, Model 31641, that runs with AOS/VS II only.

TCP/IP is Data General's Transport Control Protocol/Internet Protocol (TCP/IP) network system. There is a TCP/IP that runs under both AOS/VS and AOS/VS II, and an AOS/VS II TCP/IP, Model 31758, that runs under AOS/VS II only.

DG/OTS, Model 31715, is the Data General Open Systems Interconnect (OSI) transport system.

If you have XTS (not XTS II) or the TCP/IP other than AOS/VS II TCP/IP, your network product runs independently of AOS/VS II; you can skip the rest of this section. And if you do not have any of the network products named above, you can skip the rest of this section.

But with XTS II (Model 31641), AOS/VS II TCP/IP (Model 31758), or DG/OTS (Model 31715), the network transport services are integrated with the operating system. Having AOS/VS II provide the transport service lets the network run faster, but it requires that you load the network product onto your system LDU before you run VSGEN. (To support the network, AOS/VS II requires certain routines included in the network software; you must load the network software so that VSGEN can build the needed routines into your tailored system.)

The following steps are necessary for your AOS/VS II system to support your network.

1. Get the software release tape and mount it on a tape unit. Generally, the network software consists of a core transport product (called *core XTS*) and one of the other network product (XTS II, TCP/IP, DG/OTS). All the products are shipped on one tape.

2. Get to the proper directory and load the network software, as described in the Release Notice. Usually, the commands are

) SUPERUSER ON↵	
Su) DIRECTORY :NET↵	(With CLI16, the Superuser prompt is *)
Su) xxx	(xxx represents the name of your tape unit. For an ECLIPSE–bus unit, this is @MTB0, @MTC0, @MTD0, or @MTJ0, depending on unit type; for an MRC–bus unit, the default name is @MRCTAPE000A00. If you are running the starter system, not a tailored AOS/VS II system, and are using an ECLIPSE MTB unit, specify the name as @MTC0.)
...(Messages)...	(The macro in tape file 0 executes.)
...(CLI verifies files loaded)...	

Would you like to print the ... online documentation?
(If you have a printer associated with the queue LPT, answer Y and read the printed text; otherwise, answer N.)

... tape may be removed from xxx
Hit NEWLINE to acknowledge

3. Remove the tape from the unit; press NEW LINE. The installation macro then may ask

   Would you like to edit the LINK_ERMES macro in :UTIL to add ... ermes files?

   If you do not see this question, skip to step 5.

4. If you are asked about LINK_ERMES: The LINK_ERMES macro builds a new error message file. Generally, you will not want to edit it now. There probably are files other than the network files you will add to it. A better technique is to create a macro to execute the LINK_ERMES macro, which is explained near the end of Chapter 5. We suggest you answer NO. But if you want to answer YES, the installation macro runs the SED text editor to let you add filenames to the LINK_ERMES macro (these are given in the ERMES section near the end of Chapter 5); add the filenames to the macro and leave SED.

   The installation macro may then ask

   Would you like to run the LINK_ERMES macro in :UTIL?

   There is no point to running LINK_ERMES unless you edited it. If you did edit it, answer YES; if not, answer NO.

5. The installation macro asks

   Do you have a VSGEN configuration set up?

   If you want (or need) to run VSGEN interactively, perhaps to change a parameter or add a device, answer NO and skip to the next numbered step. If your VSGEN configuration is correct for your needs, answer YES. The configuration pathname must end in .CONFIG and it must be in directory :SYSGEN (both conditions are true by default).

   If you answer YES, the installation macro asks

   Would you like to run VSGEN?

   If you know your system configuration pathname, you can have the installation macro run VSGEN and patch the tailored system — allowing you to skip most of the rest of this chapter. If you want it to do this, answer YES. If not (you will run VSGEN yourself), answer NO and skip to the next numbered step.

   If you answer YES, the installation macro asks

   What is the configuration name? name

   Type the AOS/VS II configuration filename, without directory specifier or .CONFIG suffix. For example, if the pathname is :SYSGEN:MYSYS.CONFIG, type MYSYS and press NEW LINE.

   The installation macro now tries to run VSGEN, using the configuration you specified; this takes 3 to 10 minutes, depending on your computer. If the macro cannot find the configuration file, it skips the VSGEN step.

6. You are done. The macro displays a reminder about moving ERMES to the root directory and terminates.

Having installed the network software, you can proceed. (The critical file to install is QNET.LB, since the QNET.LB shipped with AOS/VS II, is an abbreviated — stub — version. We ship it so sites without network software can build tailored AOS/VS II systems.)

NOTE: If you want to check QNET libraries with the FILESTATUS/AS command, file :SYSGEN:QNET.LB (the original stub version shipped with AOS/VS II) is less than 10,000 bytes long; file :NET:UTIL:QNET.LB (the working version shipped with network software) is more than 300,000 bytes long.

Installing an Update Before Running VSGEN

Your AOS/VS II release may have been shipped with an separate update tape, which contains an AOS/VS II update. DG ships AOS/VS II updates periodically to all customers who belong to the Software Subscription Service. An update contains files that have changed since the last release was shipped; it may also contain patches (corrections) to system files. The update is an essential part of AOS/VS II; your system is not complete and it may not operate correctly unless you install the update.

AOS/VS II updates have revision numbers of the form n.nn; for example, 2.03. They arrive with a printed update notice whose filename, in directory :UTIL, begins with the characters 078.

If an update arrives on its own tape (labeled UD), it must be installed on disk before you run VSGEN. For your first system, Chapter 2 had you install the update. But if you have received an AOS/VS II update tape since your first AOS/VS II system was built, then you must install this update now. If you know that the latest update is already installed, perhaps because you installed it or because the release tape included it, continue to the next section.

To install an AOS/VS II update, follow the steps explained in Chapter 8, section "Installing an AOS/VS II Update."

NOTE: For the new software to work correctly, you must install from the update tape using Disk Jockey. If you use a different method, like LOAD_II, you may not be able to boot AOS/VS II from disk.

About the VSGEN Program

VSGEN is a utility program that creates an operating system tailored for the host and peripheral devices and parameters you specify. You can list the current configuration to your terminal or a disk file, specify the name of the host system, edit or add devices and parameters, create a configuration file (a file from which VSGEN can build a system), or build a system (instruct VSGEN to build an operating system to the specifications in the configuration file).

If you have no VSGEN configuration file from a previous session, you'll use the Disk Jockey sizer output file (pathname :SIZER.CFG) as an input file. You will edit devices (particularly terminal lines) as needed. After building a system, you'll have a tailored VSGEN configuration file; you can use this file, as is or with minor changes, to build future systems.

If you have a VSGEN configuration file and don't want to change any settings in your AOS/VS II system, you can run VSGEN noninteractively using the form VSGEN/BATCH=spec-or-configuration-filename shown earlier. Typing the command this way will tie up your terminal until the new system is built. If EXEC is running, you can run the VSGEN command in batch. To run it in batch, just insert the command QBATCH before VSGEN in the VSGEN command line.

Whenever you run VSGEN and build a system, it creates a new system with the name and settings given in the spec or configuration file. It also creates a new configuration file with the form base-filename.CONFIG (for example, MSIS_01.CONFIG), and a names file for Disk Jockey to use with the form base-filename.NAMES (for example, MSIS_01.NAMES).

By default, VSGEN is interactive. When you run it interactively, you can get context-sensitive help at any point by pressing the SHIFT key and F1 function key (leftmost key in the top row) simultaneously. Or, on a hardcopy terminal, press the ESC key and type H (as explained on the screen). VSGEN includes the following files:

VSGEN.CLI	CLI macro to run the VSGEN program.
VSGEN.DATA	File with configuration information.
VSGEN.PR	Program file.
VSGEN.ST	Program symbol table file.
VSGEN_ERMES	File with error message text.
VSGEN_HELP	File with Help text.
VSGEN.MTF	Menu tree file.
XVSGEN_TEXT	Screen menu text file.
XYZZY+	Files containing needed macroassembler macros and symbols.

Directory :SYSGEN — created by Disk Jockey the first time AOS/VS II is installed — holds all VSGEN files and needed system generation libraries. So directory :SYSGEN is ready for system generation.

Files VSGEN Creates

VSGEN creates several files, including temporary files, in directory :SYSGEN. The temporary files carry a .TMP filename suffix. Table 4–1 lists all files that VSGEN creates. Unless you specify another directory, all files are created in the working directory (:SYSGEN).

Table 4–1 Files VSGEN Creates

Filename	Description
hostname.PR	The tailored operating system file, ready to run. VSGEN creates it after you issue the BUILD keyword. The hostname is the name you give via the Host screen or with the RENAME keyword. For easy startups, you'll make this the default system via the Technical Maintenance Menu, "Change Startup Parameters" option.
hostname.ST	The operating system symbol table file, used by the Update tool for updates to the system .PR file.
xxx.CONFIG	The VSGEN configuration file. It describes host computer(s), devices, and parameters for one or more tailored operating systems. It uses a format that VSGEN can read, but the CLI commands TYPE and PRINT cannot. VSGEN creates it after you use the SAVE or BUILD keyword. The default filename is hostname.CONFIG. You can specify any legal pathname, but unless there are multiple hosts defined in the file (therefore a hostname might be misleading), we suggest the default. VSGEN can build a system from this file via the /DEFAULT= or /BATCH= switch.
hostname.NAMES	The VSGEN names file. Disk Jockey uses this file to identify devices. It uses a format that Disk Jockey and diagnostics programs can read. Without this file, stand–alone Disk Jockey must ask the device specifications for every disk unit you try to access (even the system disk). For Disk Jockey to use this file, you must make it the default names file via the Technical Maintenance Menu, "Change Startup Parameters" choice.
?n.hostname.CONFIG.TMP ?n.hostname.KS_IN.TMP ?n.hostname.KS_OUT.TMP	Temporary files that persist if VSGEN terminates abnormally. The n is the process ID. You can delete these files using the form DELETE/V ?–.hostname.+TMP
hostname.KS_IN.n.TMP hostname.KS_OUT.n.TMP hostname.CONFIG.n.TMP	Temporary input and output files. When you run VSGEN interactively, it asks if you want to build in maintenance mode; a Yes answer saves these files. The KS_IN file contains CLI commands to build a system. The KS_OUT file contains any error messages from the system build. If the new system does not run properly, rerun VSGEN and build in maintenance mode; then from the CLI type the KS_OUT file and look for error messages. The n is the process ID.

Devices You Don't Have

During VSGEN, you may want to specify devices you don't have – perhaps if you plan to get them and want to eliminate the need for a future VSGEN session. Generally, this is a bad idea. It may cause problems later and always costs something in terms of main memory for the operating system. You can, however, specify lines that are not currently connected to terminals. For example, if you plan to buy terminals for lines 10 through 15, you can specify them to VSGEN before they are connected. Just don't expect to use the lines before you connect the new terminals.

Correcting Mistakes

If you type an incorrect answer to a VSGEN question, and have not yet pressed NEW LINE to enter the answer, press the DEL key or CTRL–U to erase the wrong characters.

If you already have pressed NEW LINE, but haven't confirmed by answering the *Execute?* question, you can back up and change the answer. To do this on a CRT, use the cursor control uparrow key or BACK FIELD function key (SHIFT–F11) to back up to the wrong answer, then correct it. With a hardcopy terminal, you can move backward one field by pressing CTRL–W (press the CTRL key, and while holding it down, press W).

Even after confirming at the *Execute?* question, you can edit the device or parameter to change answers. To change a device name, use the RENAME keyword.

When you verify a configuration, or use BUILD (verification occurs automatically), VSGEN may signal errors. You must find the screen where each illegal value was specified and correct it; then issue the VERIFY keyword to make sure your answer fixed the error.

If you want to abandon the VSGEN session and start over, use the BYE keyword. VSGEN will ask if you want to save the configuration, and you can answer No. Or if you're desperate to stop, you can type CTRL–C CTRL–B to abort VSGEN. (CTRL–C CTRL–B aborts *any* program running under AOS/VS II, but it's extreme; use it only when you must.)

VSGEN Switches

A *switch* modifies the meaning of a command. It is a slash followed by a value. In nearly all cases, you will use the /DEFAULT= or /BATCH= switch when you execute VSGEN. You can include the following switches in the VSGEN command.

/ALPHA Alphabetizes listings by hostname and device name (for example, HOSTA, parameters, devices, HOSTB, parameters, devices). By default, VSGEN lists hosts in the order they were specified to VSGEN and devices by ascending device code. You can also specify alphabetical order when you list the current configuration.

/BATCH=configuration–pathname

Does not run an interactive session: builds a system using information in the file configuration–pathname, which must already exist.

This switch is useful when you have received a new release of AOS/VS II and want to build a tailored system with all the specifications of the old system. To find the configuration pathname, VSGEN searches for configuration–pathname.CONFIG; if the search fails, it searches for configuration–pathname.CFG. If this search fails, it looks for configuration–pathname.SSF; and if this search fails, it looks for configuration–pathname. Therefore you can always indicate the file you want by typing its full pathname, with suffix. (Just for your information, VSGEN appends the suffix .CONFIG to the filename you specify when you save or build a configuration; the suffix .CFG is part of the Disk Jockey sizer output filename; the suffix .SSF is part of the filename used for spec files before AOS/VS II release 1.10.) Details on configuration files appear in the following pages.

If the file you specify contains information for more than one host system, you must also include the /HOST=hostname switch. If you don't, VSGEN will build a system for each host defined.

If EXEC is running and you want to run VSGEN in a batch stream, precede the VSGEN command with the QBATCH command; for example, QBATCH VSGEN/BATCH=MSIS_01.

/DEFAULT=configuration–pathname

Runs an interactive session, but for default values uses information in the file configuration–pathname. Use this switch routinely, as a matter of course. If you do not have a tailored configuration file, specify :SIZER.CFG (the output file of Disk Jockey's sizer routine, run as in Chapter 2). VSGEN searches for the file you specify as described under the /BATCH= switch above.

/HOST=hostname

Uses system information for the host hostname. When you use /BATCH=, if a configuration file contains information for more than one host system, include this switch to tell VSGEN which host to build from. If the configuration file includes more than one host and you omit this switch, VSGEN will build a system for each host, with filename based on the hostname.

/NOALPHA

Sorts listings as follows: hosts in the order specified and devices by ascending device code. This was the default before AOS/VS II Release 2.00. You can also specify this order when you list the current configuration. For alphabetical order, see teh /ALPHA switch.

/SAVE

Saves temporary files. When you use the /BATCH= switch, VSGEN will delete the temporary files unless you also use this switch.

If you use a switch, put it after the VSGEN command, without a space. For example,

Su) VSGEN/DEFAULT=MSIS_01)

VSGEN Default Answers

Generally, you will use the /DEFAULT= or /BATCH= switch when you run VSGEN. If you have no existing configuration or spec file, run the Disk Jockey sizer — described in Chapter 2 — to create file :SIZER.CFG, and use VSGEN/DEFAULT=:SIZER.CFG to provide an accurate base for your tailored system.

To answer a VSGEN question with a default value, press NEW LINE. Or, with a hardcopy terminal, type CTRL–A to redisplay the default value; then press NEW LINE. For example, with a CRT,

VSGEN Main Menu

Host: MSIS_01

1. Change the Current Configuration

...

Enter choice: 1↵

Here, the default choice from the Main Menu is 1; pressing NEW LINE selects 1. When you don't want the default response, type the value you want and press NEW LINE. Or you can get help as described on the bottom of the screen; or you can sometimes display a range of choices by pressing the INDEX function key (press SHIFT and F2 on a CRT or ESC and I on a hardcopy terminal). To exit from the index display, press F11 or, for a hardcopy terminal, ESC–C).

If you omit switches, VSGEN uses its default configuration: hostname DEFAULT, DPJ disk controller with units 0 through 7, DPF disk controler with units 0 through 3, MTB tape controller with units 0 through 7, system console type CRT3, and battery backup unit (BBU); the system includes no asynchronous controllers or line printer. If you have different disk controllers, edit the disk controller(s) or delete and replace them.

VSGEN Configuration and Spec Files

A VSGEN configuration file is a disk file, usually in directory :SYSGEN, that contains all information VSGEN needs to build one or more tailored AOS/VS II systems. It contains host computer, channel, device name, device code, terminal line, and parameter information. You can have VSGEN take information from a configuration file by using the form VSGEN/DEFAULT=configuration–pathname, or you can have VSGEN build a system from it without interaction by using the form VSGEN/BATCH=configuration–pathname. And from VSGEN, you can create a configuration file that holds information on all current systems by using the SAVE or BUILD keyword.

For revisions of AOS/VS before AOS/VS II release 1.10, configuration files were called spec files. Release 1.10 VSGEN can take an (existing) spec file as input, and from it produce an AOS/VS II system and a configuration file that you can use as a source for future systems. You can use any AOS/VS Revision 7.50 or 7.60 or AOS/VS II release 1.00 spec file as a configuration default base for an AOS/VS II system.

To use a spec file or configuration file, start VSGEN using the switch /DEFAULT=configuration–pathname or /BATCH=configuration–pathname to specify the file. The /DEFAULT= switch runs VSGEN interactively; use it if you want to change any setting in the system or make use of any new VSGEN feature. The /BATCH= switch tells VSGEN to generate a system without asking questions; use /BATCH= when you don't want to change a setting in the system. When you use /BATCH=, the new configuration file and system files replace the old ones.

In the VSGEN session, update the host computer information, devices, and parameters as desired; then save the configuration under a pathname (use the default pathname to replace the old configuration filename with the new one), and generate a system with the new values. You can use the new configuration file as a default base for other systems if needed.

If you don't have a configuration file or spec file (perhaps because no one has run VSGEN at your site before), use the Disk Jockey sizer output file, :SIZER.CFG, as input to VSGEN (VSGEN/DEFAULT=:SIZER.CFG). The :SIZER.CFG file contains accurate information about your hardware (an equipment list). Chapter 2 describes running Disk Jockey's sizer. If this routine hasn't been run, return to the pertinent chapter now and run it; then return here and use :SIZER.CFG as input to VSGEN.

Generally, if you have both a pre-Release-1.10 spec file and a Disk Jockey sizer file, you can use the spec file as input to VSGEN, and then edit parameters and devices if you want to change any. But if you have an MRC I/O subsystem, use the sizer file instead of the spec file, and then edit the asynchronous lines to reflect your hardware. (MRC paths are complex enough to justify using the sizer, which provides correct path information, instead of the spec file.) Before running VSGEN with the sizer file as input, print your old spec file (form system-name.CSF) so that you can specify its asynchronous line settings to VSGEN.

If you use a pre-Release-1.10 spec file as input to VSGEN, you will probably want to delete units you don't have (by default, pre-Release-1.10 VSGEN generated all possible devices for its controllers). This isn't mandatory, but it may help prevent confusion later on, as you review your configuration.

Along with the configuration file, VSGEN creates a device names file in the form hostname.NAMES. This serves to tell Disk Jockey how to find devices based on their names.

After you create a tailored AOS/VS II system that you like, you will make its system and names file the default system and names files. This will make system startup easier in the future.

Configuration Filenames and Hostnames

The configuration filename is independent of the hostname. For example, the configuration filename may be DEFAULT.CONFIG while the hostname, which VSGEN uses as a base for the system filename, is MSIS_01. The two names need to be independent because the configuration file may describe many different hosts.

The default configuration filename is DEFAULT.CONFIG, but you can change this during VSGEN via the "Change VSGEN Defaults" menu choice. You can change the hostname (which selects the current host and provides the base for the filename of the tailored system) via the keyword HOST.

VSGEN and Unknown Devices in the Disk Jockey Sizer File

If VSGEN finds an unknown device in the Disk Jockey sizer output file (:SIZER.CFG), it will display a warning message; then it will set up a valid configuration without this device. If you're sure that this device is nonstandard, you can ignore the warning message and proceed to build a system. At runtime, the program that uses the device will need to define it via the system call ?IDEF.

Instead of building a system after receiving such a warning, you can run the Disk Jockey sizer again (Chapter 3), and tell the sizer to skip the offending device(s); the sizer will then create an output file that doesn't mention the device(s). Then run VSGEN again with the updated sizer file as input.

Creating and Using a Configuration File for Multiple Hosts

If your physical plant (department or building) has more than one DG computer, you can create a VSGEN configuration file that has specs for *all* computer systems at the site. You would then duplicate this file on all hosts, and each host would maintain only its own information in the file. If you plan to use multiported disks between different ECLIPSE hosts and you want AOS/VS II to protect the disk against corruption by the other host, you *must* define both hosts in the same configuration file.

Even if you don't plan to use multiported disks, a multiple host file offers the advantage of centralized information: the configuration file describes all systems, not just one. People can easily see what equipment is available. Your site can maintain configuration information and build systems in one place.

A site might set up and maintain such a centralized file as follows.

1. Each host system creates an accurate VSGEN configuration file as described above. Different hosts that connect to the same disk (a multiported disk) leave the default disk specs alone.

2. Each host brings a copy (probably on tape) of its configuration file to one host and has it loaded onto this host's system disk.

3. Someone on this central host runs VSGEN with the /DEFAULT switch in the form /DEFAULT=configuration-filename. He or she selects the current host with the HOST keyword. Then for each other host, this person uses the VSGEN Main Menu choice "Use a different configuration" and adds the other host's configuration file. This creates a global configuration file with specs for all hosts on the site.

4. For every case where two hosts connect to the same disk, the person on the central system edits the disk definition; for each host, he or she tells VSGEN to treat the disk as multiported and defines the other host. Then he or she renames the disk to a name that's meaningful to both systems (for example, SYS1.64.0_SYS844.0). Multiported disk issues are described later in this chapter.

5. The person on the central system tells VSGEN to build a system and tries it. Then he or she makes copies of the global configuration file and arranges to have it loaded onto other systems.

6. Each other system then uses VSGEN to generate its own tailored systems from the global configuration file. Each system maintains this file as necessary, making

changes to its own information as needed, and giving new copies to other hosts after any change.

If one person is acting as system manager on all systems, he or she can take responsibility for maintaining the single master file.

This global file arrangement is not mandatory; as long as two hosts do not share a disk, and do not want to use DG's data sharing architecture (DSA), each system can keep its own separate configuration file. Maintaining separate files is easier.

Generally if your organization has multiple hosts, and you will want to share disk units among them, using global configuration files is worth the extra effort. If multiple hosts will use Data General's Data Sharing Architecture to share a database, the software *requires* all hosts to be defined in one configuration file.

Device Names in AOS/VS II in and After Release 1.10

Before AOS/VS II release 1.10, device names were rigidly defined. They represented both a device type and address. For example, DPJ0 meant "a disk of type DPJ that is the first unit on the DPJ controller."

In release 1.10, a device name can be any valid AOS/VS II filename with as many as 31 characters. (A filename can include upper- and lowercase letters — lowercase are converted to uppercase — and numbers 0 through 9, periods, dollar signs, underscores, and question marks.) Device names are assigned during VSGEN; the names become effective when the new system runs. Because a device's name no longer indicates its address, you may need to tell VSGEN the route to each device (particularly disk units and tape units) in your system. For every device, VSGEN needs the device name (which can be any legal filename), the device type, and the device code (for a controller) or parent controller name (for a unit).

By default, when you use a configuration file or Disk Jockey sizer output file, VSGEN assigns the same device names as in previous revisions of AOS/VS and AOS/VS II. (For new devices, like MRC controllers and units, VSGEN assigns new names.) We suggest, unless you have very good reasons (for example, if you have a mirrored system disk or a multiported disk shared by different hosts), that you keep the default device names. If you use the default names, any system UP and DOWN macros you have from previous revisions will continue to work, and users will not need to learn different names. Users almost never see device names anyway; the only names they might see are tape unit names. For disks, as before, after an LDU in a disk unit is initialized, users access it by the LDU filename, not by its device name. Users access printers by queue name — for example, LPT — not by device name.

VSGEN Menus and Keywords

Normally, you add or edit devices and parameters via a sequence of menus. But instead of using menu sequences, you can go directly to a specific menu, bypassing intermediate menus, via the proper keyword. (A keyword is similar to a command — but it usually invokes a different screen or screen overlay that requests additional information. A command, on the other hand, works without interaction.) At the screen prompt, you need type only the keyword of a screen and press NEW LINE.

Some keywords, like SAVE, act directly instead of invoking menus. The VSGEN keywords and their functions are as follows in Table 4–2.

Table 4–2 VSGEN Keywords and What They Do

Keyword	What It Does
ADD	Adds a device (host, controller, unit, line group, MRC chassis, or MRC channel) to the configuration.
BALANCE	Establishes default routes between hosts and MRC devices; VSGEN tries to assign an equal load to each device.
BUILD	Creates (assembles and links) an AOS/VS II system file using the current configuration. The default name is hostname.PR.
BYE	Exits from VSGEN.
CHANGE	Changes or adds to the current configuration.
CLI	Runs the CLI from VSGEN. The BYE command returns you to VSGEN.
CURRENT	Lists the current configuration to your terminal or a disk file.
CUSTOMIZE	Displays or changes VSGEN default values.
DEFAULTS	Displays or changes VSGEN default values.
DEFINE	Defines a new terminal type to connect with an asynchronous line. The predefined types are TTY (hardcopy), CRT3 (standard DG CRT), CRT6 (graphics DG CRT), and MODEM_1200 (1200-baud modem).
DELETE	Deletes a device (host, controller, or unit) from the current configuration.
EDIT	Checks or changes a device, host, or host parameter.
HOST	Selects a different host (which must be defined in the current configuration file). To append another configuration file, use USE.
INFORM	Displays MRC channel-to-device routes.
LIST	Displays a device definition in the configuration.
MAIN	Displays the VSGEN Main Menu.
MODIFY	Lets you redefine MRC channel-to-device routes.
PARAMETER	Changes host parameters.
REMOVE	Deletes a definition of a terminal type (opposite of DEFINE).
RENAME	Renames a device (host, controller, or unit).
SAVE	Saves the current configuration in a file.
USE	Uses a different configuration file or add information from another configuration to this one. The file must exist.
VERIFY	Verifies usability of the current configuration.

This chapter shows the keyword next to the screen name, in brackets, for example

Change the Current Configuration [CHANGE]

From any point in VSGEN, you can get to this menu by typing CHANGE↵.

Keywords are most useful after you know VSGEN well. This chapter does not expect you to use them. Later, though, knowing them can save time.

VSGEN Function Keys

VSGEN recognizes several function keys on the top row of a CRT keyboard. They are noted on the keyboard template *AOS/VS and AOS/VS II Menu-Based Utilities* supplied with your system. For a hardcopy terminal, there are escape equivalents for several of these keys. The most important AOS/VS II function keys are explained in Table 4-3.

Table 4-3 AOS/VS and AOS/VS II Function Keys

Key Name	What It Does
BACK FIELD (SHIFT-F11 — SHIFT and function key 11)	Moves the cursor back to the previous field. This is useful when you want to change an answer that you have already specified (or taken the default for). On a hardcopy terminal, use CTRL-W to back up to a previous field.
CANCEL/EXIT (F11)	Exits from the current screen to the next higher-level screen (or, if you used a keyword, to the screen from which you typed the keyword). On a hardcopy terminal, press ESC and C instead.
EXECUTE (F1)	Tells VSGEN to use all values shown on the current screen. Use it when you like all values shown, instead of stepping manually through the defaults.
FIND (SHIFT-F6)	On a display screen (as when you are listing a configuration), this key lets you search forward for a string like a device name. VSGEN will ask for the string to search for. Type it and press NEW LINE; and VSGEN will try to find it and display it.
GOTO (SHIFT-5)	On a display screen (as when you are listing a configuration), this key lets you move to the beginning or end of the listing. Uparrow (↑) moves to the beginning, downarrow (↓) to the end.
HELP (SHIFT-F1)	Tells VSGEN to display context-sensitive Help text. To exit from the Help screen, use CANCEL/EXIT (F11). On a hardcopy terminal, press the ESC-H to get help; press ESC-C to exit.
INDEX (SHIFT-F2)	Tells VSGEN to display all entries that have already been specified. It's very useful when you're defining a device (like a disk unit) and want to see a list of controllers that were already specified.
NEXT SCREEN	On a display that consumes more than one screen (like the Parameters screen), displays the next screenful of questions.
PREVIOUS SCREEN (F3)	On a display that consumes more than one screen (like the Parameters screen), displays the previous screenful of text.

Starting VSGEN

This section and the following sections lead you through a VSGEN session in which you learn to use VSGEN and create a system tailored for your

- Host computer system
- MRC chassis, channels, and controllers
- Disk controllers and units
- Tape controllers and units
- System console
- Asynchronous controllers (for user terminals)
- Line printers
- Multiprocessor communications adapter
- Battery backup unit (BBU)
- Host parameters

A VSGEN summary is shown in Figure 4–17, toward the end of the chapter.

Before running VSGEN, type

```
) SEARCHLIST :UTIL↵
) SUPERUSER ON↵
Su) DIR :SYSGEN↵                (With CLI16, the Superuser prompt is *)
Su)
```

The SEARCHLIST command makes directory :UTIL your search list. (A search list is a list of directories the system scans when it can't find a file in the working directory.) The DIR (DIRECTORY) command makes :SYSGEN the working directory. You need to activate the Superuser privilege to create files in this directory.

Execute VSGEN as follows, using the form VSGEN/DEFAULT=configuration–filename to indicate your tailored configuration file (or :SIZER.CFG if you don't have a tailored configuration file). For example,

```
Su) VSGEN/DEFAULT=MSIS_01↵
```

```
VSGEN Rev n                                        date  time
               VSGEN Main Menu        [MAIN]

  1. Change the current configuration
  2. List the current configuration
  3. Verify the current configuration
  4. View, modify, or balance MRC routes
  5. Save the current configuration
  6. Build a system using the current configuration
  7. Use a different configuration file
  8. Customize VSGEN defaults or terminal types

   Enter choice:
```

Getting Help

To get Help, press the HELP function key (on a CRT, press SHIFT and F1, the leftmost function key; or on a hardcopy terminal, press ESC and H).

...VSGEN displays the Help message...

Exit from Help by pressing the CANCEL/EXIT function key (F11 or, on a hardcopy terminal, ESC and C).

VSGEN redisplays the Main Menu. Select choice 1:

Enter choice: 1⤶

VSGEN displays the Change the Current Configuration menu:

Default: xxx

Change the Current Configuration [CHANGE]

Host: xxx

1. *Add a device or host*
2. *Delete a device or host*
3. *Edit a device or host*
4. *List a device or host*
5. *Rename a device or host*
6. *Select a different host*
7. *View or change host parameters*

Enter choice: 1

Try Help again (SHIFT–F1 or ESC–H); notice that the message differs from the Help message that was displayed at the Main Menu. VSGEN Help is context sensitive; it provides help based on the current menu or question. Use Help whenever you have a question about VSGEN; it's easier and faster than referring to this chapter.

Exit from Help with CANCEL/EXIT or ESC–C. Try exiting from VSGEN via the BYE keyword:

Enter choice: BYE⤶

Su)

You're back in the CLI. CANCEL/EXIT, used at the Main Menu, would also take you out of VSGEN). Re-enter VSGEN as before, using the form VSGEN/DEFAULT=configuration-pathname. For example,

Su) VSGEN/DEFAULT=MSIS_01⤶

VSGEN Main Menu [MAIN]

1. *Change the current configuration*
2. *List the current configuration*

...

Enter choice: 1

Listing the Current Configuration

Next, you should get a listing of all devices and parameters in your current configuration.

At the Main Menu, type

LIST↵

To the question *Device name*, reply with the template + to indicate all devices. (You can only specify a template to this question after using LIST.) Specify a disk file for the listing as follows. To send output to a file, answer Y and press NEW LINE. To ask for a full listing, type F and press NEW LINE.

To the question *Alphabetize listing*, answer with Y and NEW LINE if you want an alphabetical listing of hosts followed by parameters and devices; the default listing is by ascending device code. To the question *pathname*, give a meaningful filename (for example, the hostname with the suffix ORIG.LS), and confirm by typing Y to the *Execute?* query. If your current system supports a line printer (the starter system does not support one), run the CLI (type CLI↵) and print the configuration listing. Try the QPRINT command; if this doesn't work, use the COPY command in the form COPY @LPx pathname (where x is B, D, E, or J, depending on your line printer type).

A printed listing of your configuration will help a lot; get one if you possibly can. The listing will show the controller and device names created by VSGEN; from it, you can see which devices (like terminal lines or parameters) you need to change. It will also show how many data channel slots on the A or B map the device is using (these slots are used by tape units, line printers, DPI disk units, and some other disk units).

From the CLI, return to VSGEN by typing BYE↵. And if you couldn't get a printed listing, display the configuration on your terminal (to the *Send output to a file?* prompt, answer N). On a CRT, you can scroll up and down using the F3 and F4 function keys. Note the hostnames, parameters, controller names, and unit names you see.

At any time when VSGEN is waiting at a prompt, you can list a device or host (with parameters) by typing the keyword LIST. Also, in many situations, you can get a list of all pertinent devices or items by using the INDEX function key (with a CRT, press SHIFT–F2; with a hardcopy terminal, press ESC–I). You can exit from either the Help or Index display via CANCEL/EXIT (with a CRT, press F11, with a hardcopy terminal, press ESC–C).

Verifying the Configuration (VERIFY Keyword)

VSGEN checks for obvious errors as you type each value. However, there are some interrelationships (like the ones between asynchronous controllers and terminal lines) that VSGEN doesn't check until you tell it to build a system. You can have VSGEN verify these interrelationships after you specify each device and/or parameter (instead of only when you build a system). VSGEN has three levels of verification, as follows:

Level 1 — Level 1 verification checks map slot allocation and any LDU specified for the PAGE and SWAP directory. If there are any conflicts or error conditions in these areas in the configuration, VSGEN describes them.

Level 2 — Level 2 verification checks for everything Level 1 does, and it checks devices and parameters against the CPU host model you specify. If the CPU model doesn't support a device specified in the configuration, it signals an error.

Level 3 — Level 3 verification checks for everything Level 2 does, and it verifies that the system will be bootable on the current CPU. VSGEN checks for specified CPU host model against the one you're actually running on, and it makes sure certain files needed to boot exist. The files it checks for are

- Initial IPC file (if specified in the Parameters section).
- AOS/VS Agent (:AGENT.PR), peripheral manager (:PMGR.PR and :LPMGR.PR), asynchronous controller operating systems IACRS.PR LACRS.PR, and so on), and initial program (by default, :CLI.PR).

If any of the level 3 checks fail, VSGEN will display an error message.

The default level is 1. VSGEN will always run a level 1 verification before building a system.

Generally, it's a good idea to run a quick level 2 verification after you finish adding a device (or possibly after editing a device or parameter). You can verify quickly by typing VERIFY and pressing NEW LINE; then press the EXECUTE function key or, with hardcopy, take all the defaults. The verification will catch errors and let you fix them while the device or parameter is fresh in your mind.

Finding Device Names

While VSGEN is displaying a listing (as when it is listing the current configuration or parameters), you can have it search forward for a string of text (like a device name or a comment). Just press SHIFT–F6. VSGEN will ask for the string; type it and press NEW LINE, and VSGEN will look for the string within the listing. The search is case insensitive for a maximum of six characters. For example

Configuration file listing for MYSYS

MYSYS				
...				
SHIFT–F6				(Press FIND function key)
	String to find: IAC1 ↵			(Specify the string to find)
...				VSGEN finds it and displays information)
IAC1		*050*	*IAC1*	*Terminal Controller*
Added February 19 by S Thompson				
Base line:	*24*			
IAC type	*24*			
...				

To move to the beginning or end of the listing, you can use the GOTO key, and then press uparrow (↑) to get to the beginning or downarrow (↓) to get to the end.

Changing VSGEN Defaults

You can change VSGEN defaults for items like the verbosity of listings, default configuration file pathname, default terminal type, and verification level. To do this, use the keyword CUSTOMIZE or from the VSGEN Main Menu, choose "Customize VSGEN Defaults or Terminal Types" choice, and then take choice 1.

You can override each VSGEN default when you complete the specific task that it involves. For example, when you list the current configuration, you can select either the default or nondefault choice. The VSGEN defaults and their meanings follow.

Send listing to a file? A setting of N makes your terminal the default device for listings. If you specify Yes, then a pathname, that pathname will become the default. VSGEN will delete, then recreate the file you specify before sending the listing to it.

Generate brief or full listings? A setting of *full*, the original default, includes host parameters and terminal line group definitions. A brief listing includes only device names, device codes (if pertinent) types, and specifics like tape buffer size (if pertinent). *Brief* is useful for quick checks on devices like tapes, disks, and MRC chassis. You can override the default when you ask for a listing.

Alphabetize listings? A setting of Y directs VSGEN to alphabetize all listings. A setting of N has VSGEN list hosts in the order they were specified and devices by ascending device code. You can override the default when you ask for a listing.

Default configuration file pathname? The configuration file is the file that serves as a base for the tailored AOS/VS II systems (for example, via the form VSGEN/DEFAULT=configuration-filename). The configuration file is independent of the hostname(s) and the names of the tailored system files. The original default pathname is :SYSGEN:DEFAULT.CONFIG; but if your configuration includes only one host, you might want to change this to the name of the host (for example, :SYSGEN:MSIS_01.CONFIG). We suggest placing the configuration file in :SYSGEN. You can override the default when you save the configuration (SAVE keyword).

Default terminal type? This sets the default terminal type, used when you define terminal line groups. The original default is CRT3, a nongraphics standard CRT. You might want to change this if most of your terminals are a different type. The predefined terminal types are CRT3, CRT6 (DG graphics CRT), MODEM_1200 (1200-baud modem), and TTY (hardcopy terminal). You can define other, custom types via the DEFINE keyword.

Default verification level (1, 2, or 3)? This sets the default verification level, explained above. The original default is 1. You might change this if you knew that you would generally want a different verification level.

Build in maintenance mode? In maintenance mode, VSGEN saves copies of temporary files that it uses to build a system. Use this if you suspect that there may be problems with VSGEN. After VSGEN runs, you, or a DG engineer, can check the temporary files (which carry a .TMP suffix) for clues to the problem.

After checking the values on this screen, correct any you want changed; then confirm by answering Y to the *Execute?* question. VSGEN imposes the new default immediately; you'll notice them as you perform tasks that relate to them. These defaults pertain only to the current configuration (which will be stored in the configuration file when you use the save or build function).

Identifying Your Host Computer

To identify your host computer, the configuration file has information on its hostname, CPU type, number of I/O channels (IOCs), and host parameters. If you used an accurate spec or configuration file, all these values should be correct as they are.

If you used a Disk Jockey sizer file (:SIZER.CFG) as input to VSGEN, the hostname will appear as SIZER. You will probably want to change this to the real hostname. Use the RENAME keyword to do so.

Check the listing (or display) of your current configuration for the hostname and other information. If these are accurate, you can skip the rest of this section (but you might want to read the next paragraph for background on the hostname).

The hostname (displayed at the top of each screen after *Host*) identifies the computer for which you're generating a system. The hostname serves as a basis for the AOS/VS II system and names filenames (for example, if the hostname is MSIS_01, the system filename will be MSIS_01.PR and the names filename will be MSIS_01.NAMES). Also, if this computer system shares a disk with a different system (that is, the disk is multiported to different computer systems), the hostname will serve at runtime to distinguish the two systems. The name will help prevent possible data corruption from having the disk initialized by a system other than the one that first initialized it. Thus if a system will share a disk with another system, the hostname *must be unique* among the systems that will connect to the disk. Ideally, the name will be unique among all systems. If your system will be part of a network and you know your network hostname, use that hostname. Otherwise, use your system ID (SYSID).

To edit host information, use the EDIT keyword. To *add* a different host to the current configuration, you can use the ADD keyword. However, if you want to add a host and have a configuration or spec file for that host, don't use the ADD keyword; instead, select the option "Use a different configuration" via the Main Menu or the USE keyword, and append the other host's configuration to the current one. To select a different host, if more than one is defined in the configuration file, use the HOST keyword. If you want to change the hostname, use the RENAME keyword.

If for any reason you want to delete a host, use the DELETE keyword to do so. Deleting a host deletes all devices supported by that host, including any MRC chasses and channels, controllers, and units. If a unit is shared by two hosts, deleting one of the two hosts does not delete the unit definition from the other host. VSGEN will not let you delete the only host in a configuration; if there is only one host defined (as when you first run VSGEN), you must either edit or add one.

When adding a host or renaming the current host, you can use any legal filename characters for the hostname. Do not use more than 13 characters, because the base portion of system filenames is limited to 13 characters.

For example, to edit host information on the current host:

VSGEN Main Menu

...

Enter choice: EDIT↵ (or ADD)

VSGEN asks

Device name:

Type the hostname. If you are editing existing host settings, the hostname appears near the top of the menu. VSGEN then displays the Host menu as follows.

Host	[HOST]
Hostname:	*hhh*
Comments:	
CPU model:	*MV/8000*
Number of IOC Channels:	*1*
Edit host parameters? (Y/N)	*No*
Execute? (Y/N)	

We will take these questions one by one. Seek help as you need it.

Hostname: *hhh*

VSGEN copies this question and value *hhh* from the previous screen; you can't change hhh on this screen. To change the hostname, you must use the RENAME keyword.

Comments:

All VSGEN device descriptions have a comment field. Comments you type here become part of the configuration file; they are quite useful for disk and tape controllers and units, and you can also use them to describe a host system (since a configuration file can hold information for more than one host system), or to identify yourself and the date. You can, if you want, leave the field empty.

You can type comments in upper- and lowercase, but the VSGEN menu handler converts them to uppercase. A sample comment line is

Comment: HOST MSIS_01. GENERATED FROM SPEC FILE BY S. JOHNSON. 3/10/90↵

CPU model: *xxx*

This specifies the model of the host computer on which the new system will run: MV/40000 (any model), MV/20000 (any model), MV/18000, and so on.

If the existing model name is correct, take the default (with a CRT, press NEW LINE; with a hardcopy terminal, press CTRL–A, and then NEW LINE).

To change the value, type the new value and press NEW LINE; for example,

MV/40000↵

Number of IOC channels: *1*

Every computer has at least one IOC (I/O channel between main memory and peripherals). MV/40000, MV/20000, MV/18000, and MV/10000 computers can have more than one IOC. But if you have a Message-based Reliable Channel (MRC) to handle all your I/O, the MRC has its own IOC(s); you don't specify MRC IOC(s) here. Generally, even with an MRC, you need an IOC to handle devices like asynchronous controllers; if you don't know how many IOCs you have, leave the answer at 1.

If you have an MV/40000 HA computer, its IOCs are in one or more separate chassis. Don't specify any IOCs in an MRC chassis. But do specify all IOCs you have in ECLIPSE Channel Subsystem (ECS) chassis. An MV/40000 HA can have up to 4 ECS subsystems, numbered 0 through 3 (with or without MRCs). Each ECS chassis is an IOC. (Later in VSGEN when you specify the controllers attached to each ECS, be sure to use the correct device code. On the first ECS, controller device codes have two digits; on the second ECS, they have three digits beginning with 1 to indicate the second channel; on the third ECS, controller device codes begin with 2; and on the fourth ECS, device codes begin with 3.)

If you have an MV/40000, MV/20000, MV/18000, or MV/10000 system, each IOC is a printed circuit board that fits into the computer chassis. If the host computer on which the new system will run has more than one IOC, type the number it has and press NEW LINE. (Later in VSGEN when you specify the controllers attached to the second IOC, be sure to use the correct three-digit device code. It begins with 1 to indicate the second channel. On the third IOC, controller device codes begin with 2.)

If the existing number of channels is correct, take the default (with a CRT, press NEW LINE; with a hardcopy terminal, press CTRL-A and then NEW LINE). To change the default, type the new value and press NEW LINE; for example,

```
2⤶
```

Edit host parameters: N

Parameters involve many different things, from memory management specs like the swap file to the system dump device. They are explained in their own section later in this chapter — where we would like you to edit them. For now, say No by taking the default:

```
⤶
```

Execute? (Y/N)

Review the answers you've given (or taken defaults for) on this menu. If there are any errors, back up and correct them as explained in the section "Correcting Mistakes," earlier in this chapter. When you're satisfied with the screen, confirm by typing Y and pressing NEW LINE:

```
Y⤶
```

VSGEN takes your answers and redisplays the Main Menu.

You've specified a host. Next you may want to edit (or add) information about MRC or non-MRC controllers. Skip to the section you want.

Specifying MRC Chassis, Channel, Disk, and Tape Controllers

An MRC (Message–based Reliable Channel) subsystem can provide I/O between an MV/40000 HA host and disk and tape units. This section explains how to specify one or more MRC chassis, channels, and disk and tape controllers to VSGEN.

If the hardware you want to support doesn't include an MRC — that is, if the host computer is not an MV/40000 HA or if it is an MV/40000 HA that uses only ECLIPSE channel subsystems (ECS) for I/O, skip to the next major section, "Specifying ECLIPSE Bus (Non–MRC) Disk Controllers" or to whatever section you want.

The AOS/VS II system must contain the following information for each MRC you want it to support.

- MRC chassis
- MRC channel (on an MV/40000 HA, each channel interface board providing two I/O channels)
- MRC disk or tape controller
- MRC disk or tape units

After MRC channels, controllers, and units have been identified, VSGEN establishes routes between the host system(s) and the units. You can examine these routes and, if you want, edit them as described in the section "Selecting Routes Between Hosts and MRC Devices (MRC Systems Only)," later in this chapter.

The amount of work you need to do depends on whether you ran the Disk Jockey sizer (Chapter 2) and used its output file (:SIZER.CFG) as input to VSGEN. If you did these things, all your MRC hardware has been correctly identified to VSGEN: you need not do anything else in this section. (You may want to edit information about your asynchronous controller lines as described later in this chapter.) If you are using a pre–Release 1.10 VSGEN spec file as input to VSGEN, you must add the MRC devices above.

The rest of this section assumes you need to add (or at least edit or list) MRC chassis, channel, or device controller specifications. (MRC disk or tape units are explained under the "Specifying Disk Units (ECLIPSE and MRC)" and "Specifying Tape Units (ECLIPSE and MRC)" sections, later in this chapter). Figure 4–6 shows a system with two host computers, channels, MRC subsystem, disk and tape controllers, and disk and tape units after VSGEN. There are more examples of MRC configurations in Chapter 3.

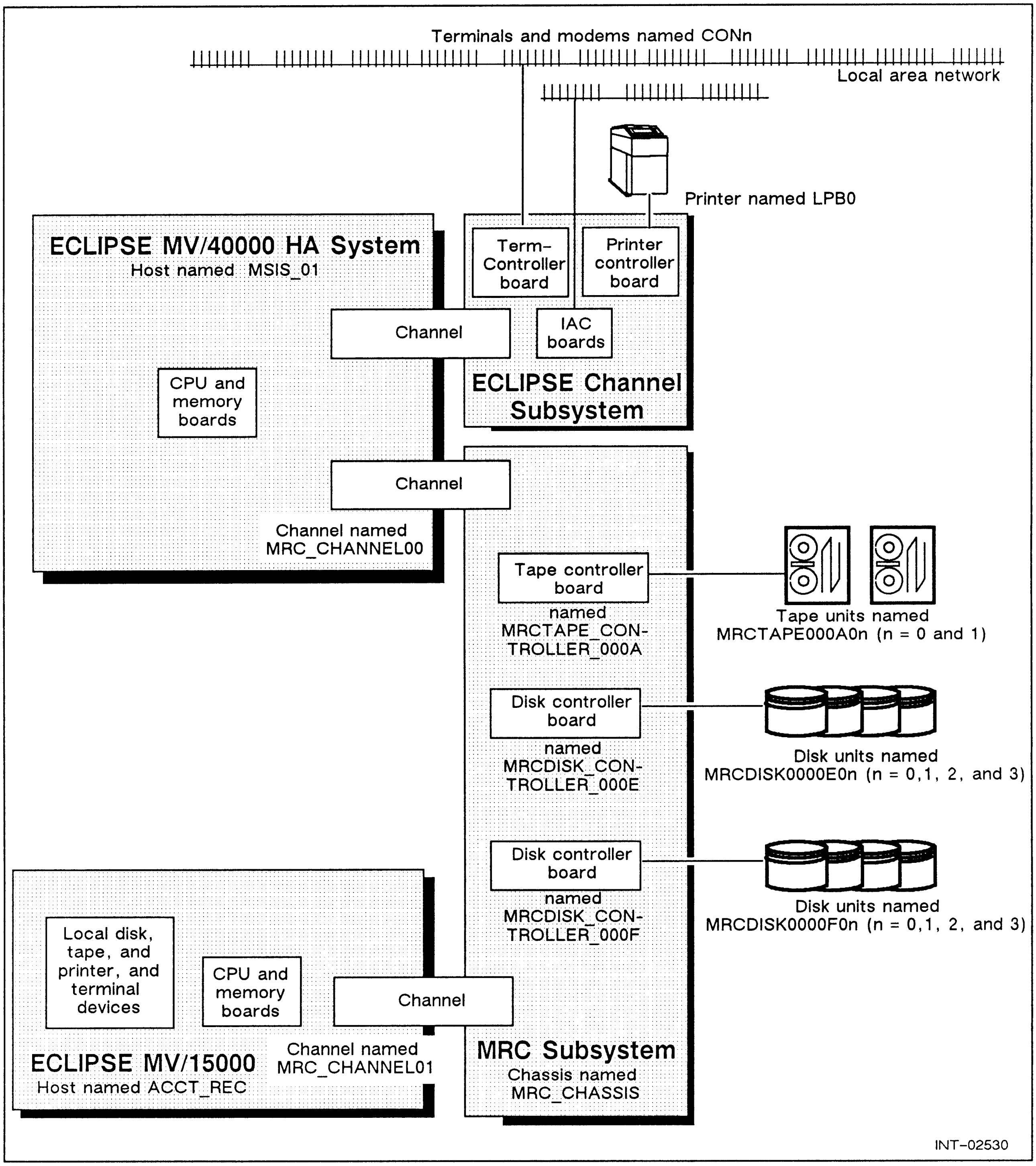


Figure 4–6 Computer System with MRC, Showing MRC Chassis, ECLIPSE Channel Subsystem, MRC Channels, Disk Controllers, and Tape Controllers

The following sections show how you specify an MRC chassis, channel, disk controllers, and tape controllers.

Editing or Adding MRC Chassis Information

Look at the listing (or display) of your current configuration for an MRC chassis. If you need to edit one, proceed as follows (to *add* an MRC chassis spec, use the keyword ADD instead of EDIT):

Enter choice: EDIT↵ (or ADD)

Device name:

You will need to remember the chassis name when you specify channels. So the name is important.

If you're editing, type the chassis name. Default chassis names have the form MRC_CHASSIScc, where cc is the number of the MRC, with null for the first chassis. MRC_CHASSIS indicates the first MRC, MRC_CHASSIS01 the second MRC, and so on. You can use the INDEX function key (SHIFT–F2 on a CRT, ESC–I on hardcopy) to list all devices. From the Index display, use CANCEL/EXIT (F11 or ESC–E) to return to this menu. Then type the name.

If you're adding, we suggest a name of the default form above.

If you're adding, VSGEN asks

Device type:

To specify a chassis, type

MRCCHASSIS↵

VSGEN displays the MRC Chassis Screen:

MRC Chassis Screen [MRCCHASSIS]

Chassis name: *xxx*

Comments:

Unique chassis ID (hex):

Number of slots (decimal):

Managing hostname:

MRC controller slot (hex):

Execute? (Y/N)

As before, we'll proceed through these fields one by one.

Chassis name: *xxx*

The name *xxx* is copied from the previous screen; you can't change it.

Comments:

Comments can help other people who use this configuration later on. You can leave the field blank, but might want to include something about the chassis, and/or include your name and the date; for example,

MRC CHASSIS #1. GENERATED FROM :SIZER.CFG BY S. THOMPSON. 3/4/90.⤶

Unique chassis ID (hex):

Each MRC chassis has a unique ID (range 0 through FF in hex) assigned by a Data General field engineer. This number is displayed on the control panel of the MRC chassis. If you're editing, a default is displayed; check it against the one displayed on your chassis. If the displayed default is correct, take it; if not, type the number shown on the chassis and press NEW LINE.

If no default ID is displayed, make sure the MRC chassis is powered up, check the display for the unique ID, and type it here, followed by NEW LINE.

Number of slots (decimal): *n*

An MRC chassis can have 23 slots or 10 slots. If a default is displayed, take it. If no default number is displayed, type the correct number of slots (23 or 10) and press NEW LINE.

Managing hostname: *xxx*

Generally, when an MRC error occurs, the MRC sends the error message back to the host whose I/O request cause the error. But some MRC errors, like MRC power faults, fan faults, or controller faults, have no originating host. The answer to this question selects the host whose error log file (:ERROR_LOG, on the system LDU) will receive such MRC error messages.

If you're generating a system in which more than one host will use this MRC, you must choose a hostname. Generally, if one or more of the connected hosts has a RAC (remote assistance call-in) number, specify one of those hosts — so that DG field personnel who log on remotely can read the MRC error entries in the log file. If you're generating a system for only one host, the answer should be the hostname as specified on the host device screen and shown at the top of this screen. In either case, if the default is correct, take it. If the default is not correct, type the hostname you want and press NEW LINE.

MRC controller slot (hex):

This field shows the number of each slot in the MRC chassis that holds an MRC bus controller board. There can be one of these boards, in slot B (hex) or two boards, in slot B and C (hex). If there is a default value, take it; if not, specify the correct value (0 or 0,1) and press NEW LINE.

Execute? (Y/N)

Look at the answers on the menu; if any seem wrong, back up and fix them. When you're satisfied with the values on the menu, confirm by typing

Y⤶

You've now specified an MRC chassis. If you have any more chassis to add or edit, return to the beginning of this section. If not, you can continue to the next section and specify an MRC channel.

Editing or Adding MRC Channel Information

An MRC channel includes several pieces of hardware: the channel processor (CP) board in the host computer chassis, the channel medium (copper or fiber-optic cable), and the system interface board (SI) in the MRC chassis. A channel processor is also known by the name MVCI or CI, depending on the computer they connect to the MRC. (If you don't have an MRC, your system uses ECLIPSE channels. VSGEN generates ECLIPSE channels implicitly from information provided on the host screen; don't continue in this section.)

For an MRC disk or tape controller to work, an MRC channel must be defined in VSGEN to the MRC chassis that contains them.

Before you can specify an MRC channel, this system must also include at least one MRC chassis. (VSGEN needs the chassis name.) Examine the listing or display of your current configuration for an MRC chassis; then look for MRC channels. To specify a chassis, see the previous section. To edit an MRC channel, proceed as follows (to *add* an MRC channel, use the ADD keyword instead of EDIT):

Enter choice: EDIT⤶ (or ADD)

VSGEN asks

Device name:

You will need to remember the channel name when you specify controllers. So the name is important.

If you're editing, type the channel name. Default channel names have the form MRCmm_CHANNELnn, where mm is the number of the MRC chassis (null for the first chassis, 01 for the second, and so on), and nn indicates the number of the *channel*, also beginning with 00. MRC numbers are in hex. So MRC_CHANNEL00 indicates the first MRC chassis, first channel; MRC_CHANNEL01 indicates the first MRC, second channel; and MRC01_CHANNEL00 indicates the second MRC, first channel. You can use the INDEX function key (SHIFT-F2 on a CRT, ESC-I on hardcopy) to list all devices. From the Index display, use CANCEL/EXIT (F11 or ESC-E) to return to this menu. Then type the name.

If you're adding, we suggest a name of the form above. Type the name you want the controller to have and press NEW LINE.

If you're adding, VSGEN asks

Device type:

For an MRC channel, type

MRCCHANNEL⤶

VSGEN then displays the MRC Channel Screen :

MRC Channel [MRCCHANNEL]
Host: hhh

Channel name: *xxx*

Comments:

Device code (octal): *n*

Chassis name:

SI slot number (hex):

Execute? (Y/N)

As before, we'll proceed through these fields one by one.

Host: *hhh*

The name *hhh* is the name of the current host. You cannot change the hostname here, but you can (from the previous menu) select a different host with the HOST keyword.

Channel name: *xxx*

The channel name is filled from the previous screen. You can't change it here.

Comments:

You can leave this field blank or include information people might find useful, like your name and the date; for example

MRC CHANNEL 1. GENERATED FROM :SIZER.CFG BY S. THOMPSON. 3/4/89.

Device code (octal): *n*

This provides the device code, from the host computer side, of the MRC channel. The original default device code for the primary MRC channel is 116 (octal); for an EMRC channel, it's 16 (octal). For the first channel, generally take the default. For the second channel, the original default device code is 156 (octal); for an EMRC channel, it's 56 (octal). For channels other than the first, if you used an accurate Disk Jockey sizer file (:SIZER.CFG) as input to VSGEN, take the default. For cases other than these two, determine the device code of the channel (octal), type it, and press NEW LINE.

Chassis name: *xxx*

This field specifies the name of the MRC chassis that holds the channel controller. Someone gave this name or took the default when identifying the MRC chassis to VSGEN.

If there is a default, take it. If there is no default, type the name of the MRC chassis that contains this channel and press NEW LINE. (You can use the INDEX function key to display a list of chassis supported by the current configuration.)

SI slot number (hex): *n*

This provides the slot number (which means the same thing, in the MRC world, as the device code) of the MRC channel. If you're editing and you used an accurate Disk Jockey sizer file (:SIZER.CFG) as input to VSGEN, take the default. If you're adding or there is no accurate sizer file, determine the slot number in the MRC chassis that holds the channel, type it, and press NEW LINE.

If there is a default value, take it; if not, specify the correct value — generally the SI is in slot 0D (hex) — and press NEW LINE.

Execute? (Y/N)

Check the answers on the menu; if any seem wrong, back up and fix them. When you're satisfied with the values on the menu, confirm by typing

```
Y↵
```

You've now specified an MRC channel. If you have any more channel information to add or edit, return to the beginning of this section. If not, you can continue to the next section and specify MRC storage controllers.

Editing or Adding an MRC Disk or Tape Controller

An MRC disk or tape controller differs from an ECLIPSE (BMC or data channel) controller. (If you don't have an MRC I/O subsystem, your computer uses ECLIPSE controllers; don't continue in this section.)

Before you can specify an MRC controller, this system must also include at least one MRC chassis. VSGEN requires the chassis name. (For an MRC controller to work, an MRC channel must also be defined, but VSGEN does does not require a channel to be defined.) Examine the listing (or display) of your current configuration for an MRC chassis and channel; then look for for MRC controllers. If you need to add or edit a chassis or channel, see the previous sections. If you need to edit controller information, proceed as follows (to add instead of editing, use the ADD keyword instead of EDIT):

Enter choice: EDIT↵ (or ADD)

Device name:

You will need to remember the controller name when you specify disk and tape units. So the controller name is important.

If you're editing, type the controller name. Default controller names have the form MRCxxxx_CONTROLLER_ccnn, where xxxx is DISK or TAPE, cc is the number of the MRC chassis (00 for the first chassis, 01 for the second, and so on), and nn indicates the node (MRC slot) number that holds the *controller*. By default, in a 23-slot MRC, disk controllers start with slot E (hex) and proceed through F (hex), 10 (hex) and so on. And by default, tape controllers start with slot A (hex).

So the first MRC disk controller in the first MRC chassis is MRCDISK_CONTROLLER_000E; the second disk controller in the first MRC chassis is MRCDISK_CONTROLLER_000F; and the first tape controller in the first MRC chassis is MRCTAPE_CONTROLLER_000A. You can use the INDEX function key (SHIFT–F2 on a CRT, ESC–I on hardcopy) to list all devices. From the Index display, select the name or return to this menu via CANCEL/EXIT (F11 or ESC–E) and type the name.

If you're adding, we suggest a name of the form above. Type the name you want the controller to have and press NEW LINE.

The next question is skipped if you're editing.

Device type:

Specify the controller type as follows. For a disk controller, type MRCDISK↵; for a tape controller, type MRCTAPE↵. These names apply regardless of the disk/tape unit model.

VSGEN displays the MRC Storage Controller screen:

	MRC Disk or Tape Controller	[MRCCONTROLLER]
Controller name:	*xxx*	
Controller type:	*xxx*	
Comments:		
Chassis name:	*xxx*	
MRC slot number (hex):	*xxx*	
Execute? (Y/N)		

We'll take the questions one by one.

Controller name: *xxx*

Controller type: *yyy*

VSGEN copies these questions and the values *xxx* and *yyy* from the previous screen; you can't change them on this screen. You can change the name *xxx* using the RENAME keyword, but cannot change the type *yyy*.

Comments:

You can leave this field blank or include information people might find useful, like your name and the date; for example

MRC CONTROLLER 1. SHADOW DISKS 1 2 3. BY S. THOMPSON. 3/4/89.↵

Chassis name: *xxx*

This field specifies the name of the MRC chassis that holds the channel controller. Someone specified this name or took the default when identifying the MRC chassis to VSGEN.

If there is a default, take it. If there is no default, type the name of the MRC chassis that contains this channel and press NEW LINE. (You can use the INDEX function key to display a list of chassis supported by the current configuration.)

MRC slot number (hex): *n*

This provides the node slot number (which means the same thing, in the MRC world, as the device code) that holds this controller. If you're editing and used an accurate Disk Jockey sizer file (:SIZER.CFG) as input to VSGEN, take the default. If you're adding, or if there is no accurate sizer file, determine the slot number in the MRC chassis that holds the channel, type the slot number, and press NEW LINE. By default, for Release 1.10, the first MRC disk controller is in slot 0E (hex) and the first tape controller is in slot 0A (hex).

Execute? (Y/N)

Check the answers on the menu; if any seem wrong, back up and fix them. When you're satisfied with the values on the menu, confirm by typing

Y⤶

You've now specified an MRC disk or tape controller. If you have any more controllers to add or edit, return to the beginning of this section.

If not, you can continue past the next section and specify actual tape and disk units.

Specifying ECLIPSE Bus (Non-MRC) Disk Controllers

This section describes how to specify controllers for ECLIPSE-bus (non-MRC) disk units. It may interest you if the hardware you want to support doesn't include an MRC — that is, the host computer is not an MV/40000 HA, or it is an MV/40000 HA that uses only ECLIPSE channel subsystems (ECSs) for I/O. For MRC controllers, see the previous section.

The amount of work you need to do depends on whether you used an accurate configuration file (spec file) or an accurate Disk Jockey sizer file (:SIZER.CFG) as input to VSGEN (VSGEN/DEFAULT=filename). If you used an accurate file as input, all your disk and tape controller hardware has been correctly identified to VSGEN; you need not do anything else in this section or the next. (You may want to edit your asynchronous controller lines as described later in this chapter, in section "Specifying Terminal Lines").

If you need to edit an existing controller or add a new one, proceed as follows

Enter choice: EDIT↵ (or ADD)

VSGEN then asks

Device name:

If you are editing, type the name of the device. Default ECLIPSE controller names have the form DPx_CONTROLLER_n, where x is J, F, I, or M (depending on the disk type, shown next) and n indicates the number of the controller, proceeding 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, A, B, C, D, E, F, G, H, I, J, ... Z; for example, DPJ_CONTROLLER_0, DPJ_CONTROLLER_1, ... DPJ_CONTROLLER_Z. You can use the INDEX function key (SHIFT-F2 on a CRT, ESC-I on a hardcopy terminal) to list all devices. From the Index display, select the name or return to this menu via CANCEL/EXIT (F11 or ESC-E) and type the name. Skip to the Disk Controller screen, shown later.

If you are adding, read the following for background. You will need the controller name to define units. So the controller name is important. We suggest a name of the default form DPx_CONTROLLER_n, as explained above. If you try to add a controller with a default name and you used an accurate configuration file, VSGEN will display the message *Device already exists*; you do not need to add the device.

Type the name you want the controller to have and press NEW LINE. Determine the type of disk or diskette as shown in the following table.

Model Number	**Type**
6060, 6061, 6067, 6160, 6161, 6122, and 6214	DPF
6236, 6239, 6357, and multiple-unit models 6237, 6240, 6398, and 6399; 6446, 6492, 6578, 6579, 6581, 6582, 6584, and 6621	DPJ
4514	DPM
6234	DPI

VSGEN skips the next question if you're editing.

Device type:

Specify the controller type as shown in the previous table; for example, DPJ↵.

VSGEN displays the Disk Controller screen:

Eclipse Disk Controller [DISKCONTROLLER]
Host: *hhh*

Controller name: *xxx*

Controller type: *xxx*

Comments:

Device code (octal): *xxx*

Execute? (Y/N)

We'll take the questions one by one.

Host: *hhh*

The name *hhh* is the name of the current host. You cannot change the hostname here, but you can (from the previous menu) select a different host with the HOST keyword.

Controller name: *xxx*

Controller type: *yyy*

VSGEN copies these questions and the values *xxx* and *yyy* from the previous screen; you can't change them on this screen. You can change the name *xxx* using the RENAME keyword, but cannot change the type *yyy*.

Comments:

You can leave this field blank or include information people might find useful, like your name and the date; for example

DPJ CONTROLLER 1 FOR SHADOW DISKS 1 2 AND 3. BY S. THOMPSON. 3/4/89.↵

Device code (octal): *n*

This provides the device code of the disk controller. AOS/VS II supports as many controllers as will fit in a chassis. If you're editing and used an accurate Disk Jockey sizer file (:SIZER.CFG) as input to VSGEN, take the default, and skip to the next question.

If you're adding, or if there is no accurate sizer file, determine the controller device code, type it, and press NEW LINE. The default device codes of the first and second disk controllers are shown in the following table. (There are no default codes for the third and subsequent controllers; such codes are determined at controller installation.) Each device code you type must be unique. If a controller is connected to the second I/O channel (IOC), insert a leading 1 (for example, for the second DPJ controller connected to the second IOC, use 164, or for the second DPJ controller connected to the third IOC, use 264).

Disk Type	Default Device Code (octal)
DPF (first controller)	27
DPF (second controller)	67
DPJ (first controller)	24
DPJ (second controller)	64
DPI (first controller)	33
DPI (second controller)	73
DPM (first controller)	20
DPM (second controller)	60

If you're adding, type the device code of the controller. If you're editing and want to take the default, do so. For example,

44↲

Execute? (Y/N)

Review the answers on the menu; if any seem wrong, back up and fix them. When you're satisfied with the values on the menu, confirm by typing

Y↲

You've now specified an ECLIPSE-bus (non-MRC) disk controller. If you have any more controllers to add or edit, return to the beginning of this section. If not, you can continue to the next section and specify actual disk units.

Specifying Disk Units (ECLIPSE and MRC)

This section tells how to specify disk units attached to ECLIPSE and MRC disk controllers.

The amount of work involved depends on whether you used an accurate configuration file (spec file) or an accurate Disk Jockey sizer file (:SIZER.CFG) as input to VSGEN (using the form VSGEN/DEFAULT=filename.) If you used an accurate file as input, your disk hardware has been correctly identified to VSGEN. If any disk on this host is shared (between two hosts or on an MRC disk controller), you should read the pertinent section on multiporting later in this chapter before continuing; the sections are "Understanding Multiported Disks on ECLIPSE Computers — A Summary" or "Summary of Multiported Disk Configuration on an MRC Controller." But if none of your host's disks are multiported and you used an accurate configuration file, you need not do anything in the section you're reading.

If you're not sure about the accuracy of the configuration, check the listing (or display) of your current configuration for disk units. Before you can specify disk units, the VSGEN configuration must include at least one disk controller for ECLIPSE bus or MRC bus, as described in the previous sections. Then if you need to add or edit one, proceed as follows.

If you need to edit unit information, proceed as follows (to add instead of editing, use the ADD keyword keyword instead of EDIT):

Enter choice: EDIT↵ (or ADD)

VSGEN asks

Device name:

Default Disk Unit Names

Default disk unit names (created by VSGEN from configuration or spec files) have different forms for ECLIPSE and MRC. Default ECLIPSE disk unit names have the form

DPxcu

where

x	is F, J, I, or M, depending on the unit type.
c	is the controller number, null indicating 0, in hex. Numbers range from null (as in DPJ) through Z (as in DPJZ); this provides 36 default controller names.
u	is the unit number on the controller, beginning with 0 (numbers range from 0 through 7).

So the disk unit name indicates the address of the device: DPJ0 means controller type DPJ, first controller, unit 0; and DPJ73 controller type DPJ, eighth controller, unit 3.

Default MRC disk unit names have the form

MRCDISKccnnuu

where

- cc — is the MRC chassis number, two hex digits, begining with 00.
- nn — is the node (slot) number in the MRC chassis that holds the controller, also two hex digits. By default, in a 23–slot MRC, disk controllers start with slot E (hex) and proceed through F (hex), 10 (hex), and so on. And by default, tape controllers start with slot A (hex).
- uu — is the unit number on the controller, also two hex digits.

So the default name for the first disk unit on the first controller on the first chassis is MRCDISK000E00; the default name for the second disk unit on the first controller on the first chassis is MRCDISK000E01; and the default name for the first disk unit on the second controller is MRCDISK000F00.

The disk unit names you choose with VSGEN will be the unit names when the new system runs. The UP.CLI macro that starts the multiuser environment will initialize LDUs on these disks using these unit names. (As always, after an LDU is initialized, people will access it by its LDU filename; for example, :UDD1. And if you need to release this LDU, you will do so by LDU filename.) So although the MRC names may seem long and tedious, they do uniquely identify each disk unit, and users won't need to type them anyway.

Generally, we suggest that while adding or editing you use the existing default name format. Having the device name indicate the device address is quite useful; it will help system operators and DG engineers understand your system's disk structure. However, VSGEN does allow you to use any name that suits your needs.

For a list of existing device names, use the INDEX function key to list all devices. From the Index display, use CANCEL/EXIT to return to this menu.

When you're ready, type the name of the unit; for example,

DPJ13↵

The next question is skipped if you're editing.

Device type:

You're adding a device of type DISK, so type

DISK↵

Identifying the Disk Unit

VSGEN displays the Disk Unit screen:

Disk Unit	[DISK]
Host: hhh	
Unit name:	*xxx*
Comments:	
Controller name:	
Unit number:	
Hostname(s):	+
Treat this disk as multiported? (Y/N)	
Execute? (Y/N)	

We'll take the questions one by one.

Host: *hhh*

The name *hhh* is the hostname of the current host. You cannot change the hostname here, but you can (from the previous menu) select a different host with the HOST keyword.

Unit name: *xxx*

VSGEN copies value *xxx* from the previous screen; you can't change *xxx* on this screen. To change *xxx*, you must use the RENAME keyword.

Comments:

For disk units, comments are particularly useful. Useful information might include the controller, device code (or MRC slot), and unit number on the controller, and a note on multiporting, if the disk is multiported; for example

3RD DISK ON 4TH CONTROLLER - DC 44. THIRD UDD DISK. SPEC'D 3/8/90.⤶

Controller name:

VSGEN wants the name of the controller to which this disk unit is attached. (If the disk is multiported, type the *primary* controller name; that is, the name of the controller that will normally use the disk.) For a list of existing controller names, you can use the INDEX function key. From the Index display, use CANCEL/EXIT to return to this menu.

If you used the conventional unit naming rules, you can determine the controller name from the unit name as follows. For ECLIPSE disks, conventional disk controller names are

DPx_CONTROLLER_n

where

x is F, J, M, or I, as in the unit name (for example, in DPF0, it's F).

n is determined from the unit name as follows:

```
DPx n u
 |  | |
 |  | unit number
 |  controller number
unit type
```

If n and u comprise only a single digit (0, 1, 2, 3, 4, 5, 6, or 7; for example, the unit name is DPJ1), the controller is number 0; its name has the form DPx_CONTROLLER_0. If n and u comprise 2 digits (for example, DPJ13), the controller is number is n. For example, on an ECLIPSE controller, if the unit name is DPJ10, the controller name is DPJ_CONTROLLER_1; if the unit name is DPJF7 (hex), the controller name is DPJ_CONTROLLER_F.

MRC disk controllers have the form MRCDISK_CONTROLLER_ccnn. To identify an MRC controller from the default unit name, replace

MRCDISKccnnuu
with
MRCDISK_CONTROLLER_ccnn

For example, for disk unit MRCDISK000E00, the controller is MRCDISK_CONTROLLER_000E. And for disk unit MRCDISK000F07, the controller is MRCDISK_CONTROLLER_000F.

If the disk is multiported, type the *primary* controller name here; you will provide other port information later on. If the default is correct, press NEW LINE (on a CRT) or press CTRL-A and then NEW LINE (on a hardcopy terminal). If you want to change the default, type the controller name and press NEW LINE; for example

DPJ_CONTROLLER_2↲

Unit number:

Depending on type, a disk controller can support up to eight disk units, numbered 0 (first unit) through 7 (last unit). Controls on the disk unit itself select the unit number. If you don't have an MRC system, the system disk must be the first one (number 0) on its controller.

If you're editing and used an accurate Disk Jockey sizer file (:SIZER.CFG) as input to VSGEN, take the default and skip to the next question.

If you're adding, or if there is no accurate sizer file, determine the number of the unit on the controller, type it, and press NEW LINE. If you used the default unit name earlier, the unit number is the last digit. For example, if the unit name is MRCDISK000103, the unit number is

3↓

The next question is asked for units on MRC controllers only; for units on ECLIPSE–bus controllers, VSGEN bypasses the question, selecting the default answer.

Hostname(s): +

This question determines which host systems will be allowed to access the disk. The original default is +, which specifies all hosts. If you're generating a system for one host, and the disk won't be multiported, + is a good answer. For a unit on an ECLIPSE–bus controller, the answer *must* be +; VSGEN does not let you choose. (Filename templates, analogous to wildcard characters in other vendors' systems, are explained in *Managing AOS/VS and AOS/VS II* and the CLI user's manual.)

If the new system will support more than one host connected to an MRC, you need to decide which hosts will be allowed to access this disk. Only one host at a time can access an LDU on a disk. If there are several LDUs on a disk, a different host can use each LDU — but only if you allow the hosts access in this question. The operating system will safeguard the LDUs against access by more than one host at a time, so for greatest flexibility, you may want to use the + template. To specify more than one hostname in a template, separate names with a comma; for example, MSIS_01,PAYROLL. Decide on your answer and type it and press NEW LINE; or take the default.

Treat this disk unit as multiported? (Y/N)

AOS/VS II can support multiported disks, in which two disk controllers (ECLIPSE or MRC) are connected to the same disk. Using multiported disks can provide higher data availability, as explained earlier in this chapter, in the section on high availability.

If a disk is multiported to two ECLIPSE controllers, only one host at a time can use the disk, regardless of the number of LDUs on the disk. If a disk is multiported to MRC controllers connected to different hosts, only one host at a time can use an LDU on it (but if the disk has more than one LDU, each host can use an LDU at the same time). The number of disk controllers (ECLIPSE or MRC) that can share a disk is limited to two. If a multiported disk unit is part of a multiple–disk LDU, you will need to describe all the other units to VSGEN as multiported.

In response to the VSGEN question *Treat this disk as multiported,* if this unit has only one port (it's not connected to a second controller or host), the answer must be No. Answer No, or take the default if it is No; VSGEN skips to the *Execute?* question. Review the answers and change any wrong ones; then confirm with Y and NEW LINE. If you have additional disks to specify, return to the beginning of this section.

If this disk is multiported, you may need to change this answer to Yes, since the Disk Jockey sizer identifies all disk units as not multiported. So if you think any of your disks are multiported, continue in this section.

Answering Yes to the multiporting disk question serves two purposes: (1) through VSGEN it ensures that both hosts will use the same name for the disk unit, and (2) it builds into AOS/VS II a routine that checks for (and prevents) possible disk corruption when the wrong host tries to initialize the disk. These checks are important. Therefore, for any disk that is multiported — particularly to ECLIPSE controllers — it is very important to answer Yes.

However, VSGEN won't let you define a disk as multiported unless both hosts (or MRC disk controllers) are defined in the current configuration file. If the disk is multiported to different ECLIPSE hosts or MRC controllers and both hosts/controllers aren't defined in this configuration, we suggest that you exit from this screen (CANCEL/EXIT), save the current configuration, rerun VSGEN to set up a multiple-host (global) configuration file, and then define the multiported units (for both hosts) as multiported. The benefits, drawbacks, and techniques of multiple-host configuration files are explained earlier, in the section "Creating and Using a Configuration File with Multiple Hosts."

If you answer Yes to the *Treat this unit as multiported* question, and the disk is on an ECLIPSE controller, continue to the next section. If you answer Yes and the disk is on an MRC controller, skip to the section "Specifying a Multiported Disk Unit Connected to Different MRC Controllers."

Specifying a Multiported Disk Unit Connected to Different ECLIPSE Controllers

After you answer Yes to the *Treat this disk as multiported* question, if the disk is connected to two different ECLIPSE disk controllers, VSGEN asks

Other hostname:

Type the name of the other host whose controller is attached to the disk. This host and controller must be defined in the current configuration. Or if the default is correct, take it. You can use the INDEX function key to list all hosts in the current configuration. For example, if the secondary hostname is MSIS_01, type

MSIS_01 ↵

Other controller name:

Type the name of the disk controller, within the other host you just specified, that connects to the disk. Or if the default value is correct, take it. (Here, the INDEX function key is not helpful, since it will list the names of all controllers on the current host, not on the other host.)

For example, if the other controller is DPJ_CONTROLLER_1, type

DPJ_CONTROLLER_1 ↵

Execute (Y/N)?

Review the answers on the screen; if any seem wrong, back up and fix them. When you are satisfied with all values on the screen, confirm by typing

Y↲

Now you should rename the disk unit to a name that indicates which systems share the disk. This will help make operations clearer later, when this disk unit name exists in the :PER directory of the system using the disk. It will also allow each host to use the same unit name when it initializes the disk in its UP macro. You might use the form hostname.unitaddress_hostname.unitaddress, where address shows the controller device code and unit number; for example, HOSTA.64.3_HOSTB_44.2. Type RENAME and press NEW LINE; then type the old name, new name, and confirm your response.

You've now specified a multiported disk connected to an ECLIPSE controller. If you have any more disk unit information to add or edit, return to the beginning of the "Specifying Disk Units (ECLIPSE and MRC)" section. You may want to edit the other host's disk unit information and delete this disk and from that host's configuration (since the disk is defined for both hosts in the one host's configuration file).

Understanding Multiported Disks on ECLIPSE Controllers – A Summary

This section shows a summary of the steps you need to specify a multiported disk that's connected to two controllers, each on a different host system.

Figure 4–7 shows a multiported disk unit connected to two hosts, HOSTA and HOSTB. The default disk unit names on HOSTA are DPJ20 and DPJ21; on HOSTB they are DPJ10 and DPJ11. The primary host is HOSTA. But if HOSTA failed and HOSTB started using the disk, the default HOSTA unit name of the shared disk (DPJ21) would be misleading; so the disk unit has been renamed to HOSTA.24.1_HOSTB.44.2.

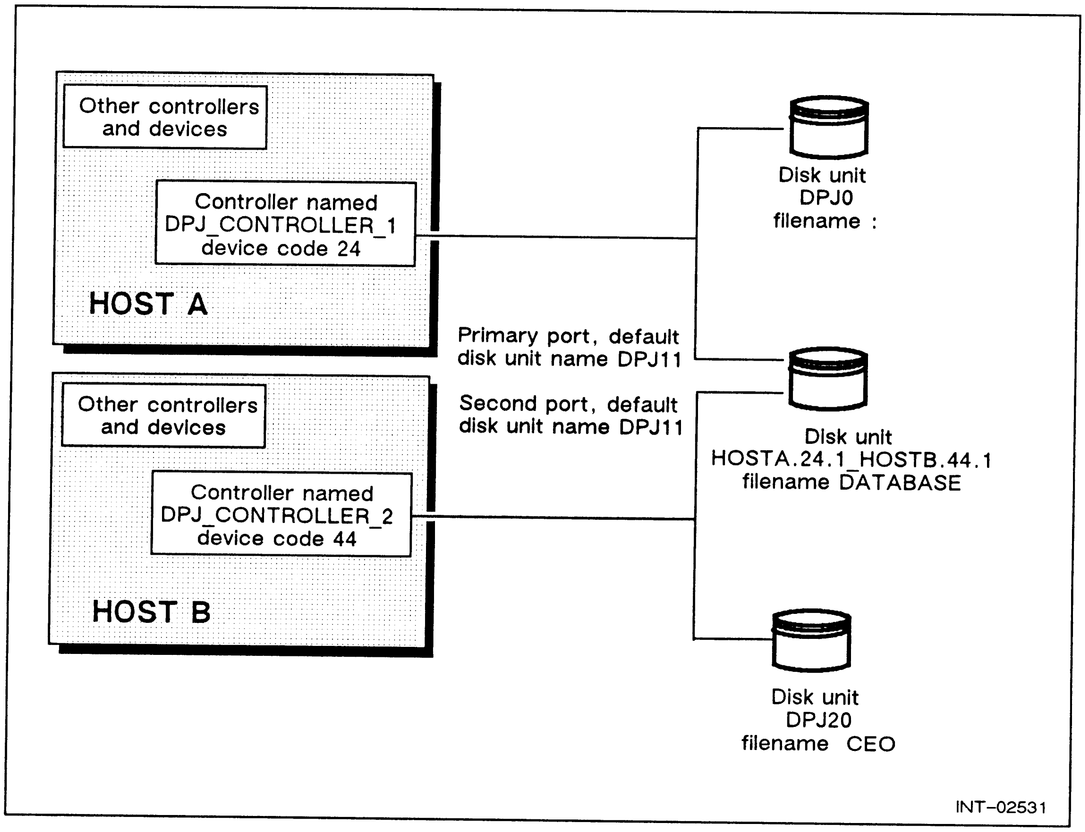


Figure 4–7 Two ECLIPSE Hosts Configured with a Multiported Disk Unit

To set up the structure shown in Figure 4–7, you need to do the following:

- Acquire the computers and disk hardware and have them set up with the appropriate disk attached to the appropriate controller.
- On each system as needed, use Disk Jockey to format disks (either of the two systems can format the multiported disk). Then install AOS/VS II, and run the Disk Jockey sizer as explained in Chapter 2 or 3. Do not tell the sizer to skip the disk. On each system, use VSGEN to create a tailored system (but leave the default unit names of the multiported disks alone).
- Have the system managers of all hosts meet and agree on a central host that will create and maintain the global configuration file. Say this is HOSTA. HOSTB brings its configuration file, on tape, to HOSTA. HOSTA runs

VSGEN/DEFAULT=HOSTA; then, via VSGEN's "Use a different configuration" choice, it adds the HOSTB configuration. This adds all the HOSTB specs, under the hostname HOSTB, to the configuration file.

- In the HOSTA VSGEN session, use the HOST keyword to make the default system name HOSTB. Delete disk unit DPJ11 from HOSTB's configuration. Then use the HOST keyword to make the default system name HOSTA, and delete disk unit DPJ11 from HOSTA's configuration.

- Having deleted the multiported disk from both configurations, add it as a multiported disk. The current host is still HOSTA. Add a disk unit and fill in the Disk Unit screen as follows:

  Enter choice: ADD⤶

Device name:	HOSTA.24.1_HOSTB.44.1⤶
Device type:	DISK⤶

  Comments: M'PORTED DISK. HOSTA: DC 24 UNIT 1. HOSTB: DC 44 UNIT 1.⤶

Controller Name:	DPJ_CONTROLLER_1⤶
Unit Number:	1⤶
Hostname(s):	+⤶
Treat this disk as multiported? (Y/N):	Y⤶
Other hostname:	HOSTB⤶
Secondary port controller name:	DPJ_CONTROLLER_2⤶

  Execute: Y⤶

- Finish describing the configuration, verify, and build and test the system.

- Copy the configuration file to tape and load it on HOSTB. On HOSTB, start VSGEN with the central configuration file (VSGEN/DEFAULT=HOSTA). Use the VSGEN keyword HOST to make the default host HOSTB. Verify and build the system; then leave VSGEN and test the system on HOSTB.

- While both HOSTA and HOSTB systems run normally, HOSTA has use of the multiported disk. If HOSTA fails, or when it has not initialized the disk, HOSTB can initialize and use the disk.

AOS/VS II protects multiported disks from inadvertent trespass by the other system as described in a few pages, in section "How the Multiported Disk Protection Mechanism Works."

Specifying a Multiported Disk Unit Connected to Different MRC Controllers

If the disk ports are connected to different controllers in an MRC, you can specify the disk as multiported only if both controllers are defined in the current configuration file. If both disk controllers are not defined, define them (keyword ADD or EDIT, device type MRCDISK) as explained earlier.

While you are defining a disk unit on an MRC controller, after you answer Yes to the *Treat this disk as multiported* question, VSGEN asks the following question.

Other controller name:

If you're adding a disk unit or want to specify a unit other than the default, type the name of the other MRC controller that's attached to the disk unit. This MRC controller must be defined in the current configuration. If the default is correct, press NEW LINE (on a CRT) or press CTRL–A, and then NEW LINE (on a hardcopy terminal). You can use the INDEX function key, SHIFT–F2 or ESC I, to list all controllers in the current configuration. For example, if the other controller name is MRCDISK_CONTROLLER_000F, type

MRCDISK_CONTROLLER_000F↲

VSGEN will divide the load equally between devices on the two controllers. You can change this if you want by editing the routes to the units, as explained later on, in the section on selecting routes.

VSGEN then asks you to confirm:

Execute (Y/N)?

Review the answers on the menu; if any seem wrong, back up and fix them. When you're satisfied with the values on the menu, confirm by typing

Y↲

You've now specified a multiported disk that's connected to two MRC controllers. If you have any more disk units to add or edit, return to the beginning of the section "Specifying Disk Units (ECLIPSE and MRC)."

Now, you may want to rename the disk unit name to a name that indicates which controllers share the disk. This will help make operations clearer later, when this disk unit name exists in the :PER directory of the system using the disk. You might use the standard MRC unit name but include an identifier for both controllers; for example, if MRC disk controllers MRCDISK_CONTROLLER_000E and MRCDISK_CONTROLLER_000F are connected to a disk, and the disk is unit 0 on both controllers, you might call it MRCDISK000E_F00. Type RENAME and press NEW LINE; then type the old name, new name, and confirm with Y and NEW LINE.

Summary of Multiported Disk Unit Configuration on an MRC Controller

This explains the steps you need to specify a multiported disk that's connected to two MRC controllers.

Figure 4–8 shows a multiported disk unit connected to an MRC that has two disk controllers, MRCDISK_CONTROLLER_000E and MRCDISK_CONTROLLER_000F. The default disk unit names on MRCDISK_CONTROLLER_000E are MRCDISK000E00 and MRCDISK000E01; the default disk unit names on MRCDISK_CONTROLLER_000F are MRCDISK000F00 and MRCDISK000F01. The multiported disk was defined, then renamed, as suggested earlier, to MRCDISK000E_F01.

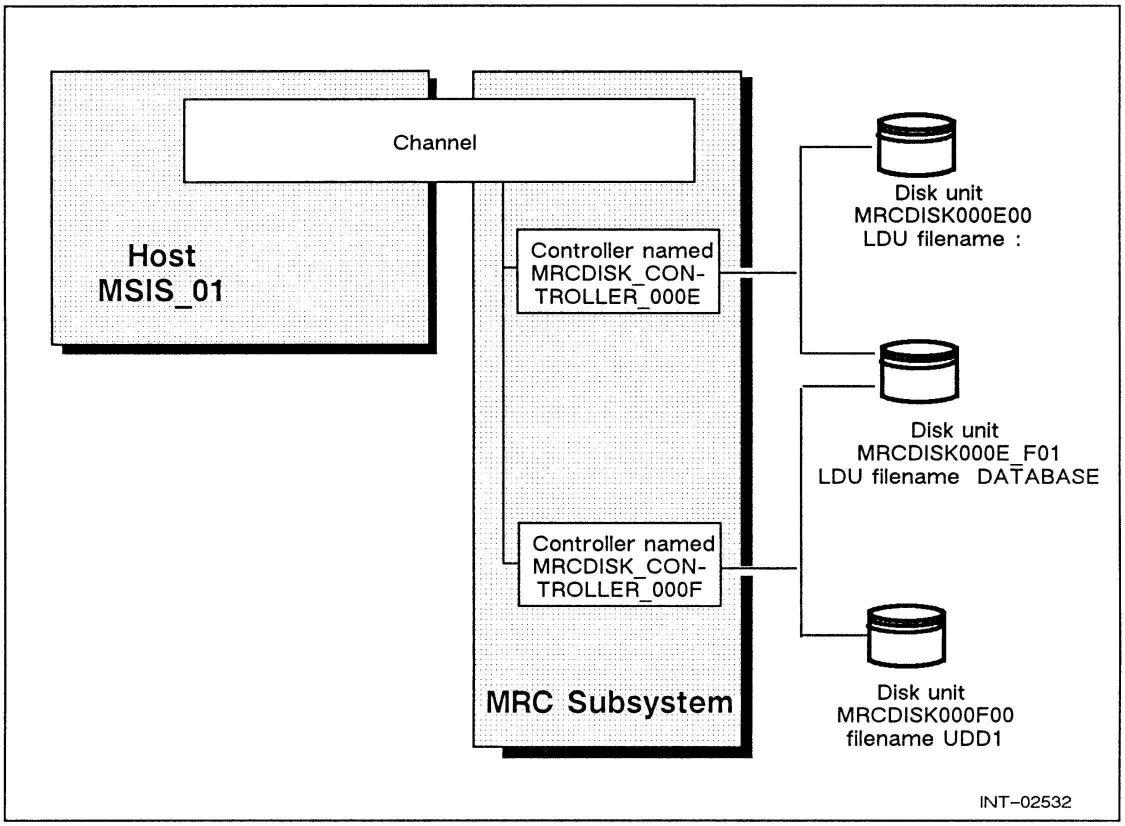


Figure 4–8 Two MRC Controllers with a Multiported Disk Unit

To set up the structure shown in Figure 4–8, you need to do the following:

- Acquire the computer and disk hardware and have them set up with the appropriate disk attached to the appropriate controller.

- On each system as needed, use Disk Jockey to format disks (the multiported disk can be formatted via either controller). Then install AOS/VS II and run the Disk Jockey sizer as explained in Chapter 2.

- Run VSGEN and examine your system configuration. To configure each multiported disk unit, delete one of the two disk units created from the Disk Jockey sizer file. (The sizer sees a multiported disk as two disk units, one on each controller. For example, the sizer would see the multiported disk unit in Figure 4–8 as disk units MRCDISK000E01 and MRCDISK000F01.) After deleting one of the units, rename the other unit to a name that indicates its multiported status. Then edit the unit to include both disk controllers. For example, if VSGEN has run using a Disk Jockey sizer file based on the system in Figure 4–8, you would do the following:

  - Delete disk unit MRCDISK000F01.

  - Rename disk unit MRCDISK00E00 to MRCDISK000E_F01 (or some other name that indicates its multiported state).

  - Edit disk unit MRCDISK000E_F01 as follows:

Enter choice: EDIT↵

Device name: MRCDISK0000E_F01

Disk Unit
Host: MSIS_01

Unit name: *MRCDISK0000E_F01*

Comments: MULTIPORTED DISK ON MRC DISK CONTROLLERS 0 AND 1.↵

Controller Name: *MRCDISK_CONTROLLER_000E* ↵

Unit Number: *1*↵

Hostname(s): +↵

Treat this disk as multiported: Y↵

Other controller name: MRCDISK_CONTROLLER_000F↵

Execute: Y↵

- Finish describing the configuration, verify, and build and test the system.

Multiported Disk Protection

When a disk is connected to two different controllers using it requires care, to avoid having one host accidentally corrupt the disk structure created by another host. This is particularly true when different hosts use the controller. When different hosts are involved, AOS/VS II needs to keep track of the host that “owns” the disk.

To keep track of the host that owns the disk, AOS/VS II writes a special identifier to the disk after any host initializes it. For an ECLIPSE–bus disk, the identifier is the hostname. For an MRC–bus disk, the identifier is a number: a composite of the bus controller serial number and system interface slot number. When the host releases the LDU (as at normal shutdown), AOS/VS II deletes the identifier from the disk.

When a process on one host tries to initialize a disk, AOS/VS II compares the host identifier (hostname or composite number) with the identifier on the disk. If the identifier on the disk indicates that a different host has the disk initialized, AOS/VS II does not open the disk; instead, it displays one of the following error messages:

Device reserved by another port

Disk is marked as owned by another system

System area is marked as owned (MRC only)

Any of these messages means that another host has the disk — or an LDU on it — initialized. The other host may still be running or it may have failed. When you get one of these messages, you can trespass (force initialization) on the disk by using the INITIALIZE /TRESPASS switch. Trespassing is advisable only if the owning system has failed; if you trespass and the owner system is still running, disk information may be corrupted and users on the owner system may get I/O errors.

The scope of multiported disk protection depends on the controller type, as follows.

Type of Controller That Initialized the Disk	Protection Scope and Comments
ECLIPSE	Entire disk; no part of this disk can be accessed without /TRESPASS or release by last host.
MRC	LDU; this LDU cannot be accessed without /TRESPASS or release by last host. Any other LDU not owned by the other host can be initialized and accessed as usual.

This means that some changes you make with VSGEN could force you to trespass, if your system failed and you started the new system immediately. Such changes include changing your system hostname, having the MRC bus controller changed, or having the MRC system interface board moved to another slot.

Normally, in a site that uses multiported disks, the system managers must agree on which host will have primary ownership of a multiported disk or, with an MRC controller, LDUs on a multiported disk. (The system managers need to agree on a central host if they want to use a global — multiple-host — configuration file, explained earlier.) Both hosts should specify the disk to VSGEN in a common configuration file (so that each can use it without booting a different AOS/VS II system). However, only the primary system will initialize the disk in its UP macro. No other system will try to initialize the disk unless the primary owner system has developed problems. Therefore, you will use the /TRESPASS switch only after you receive one of the error messages above and (1) your system needs access to the multiported disk's information, and (2) you are *sure* that the primary host failed.

Specifying ECLIPSE Bus (Non–MRC) Tape Controllers

This section tells how to specify controllers for ECLIPSE–bus (non–MRC) tape units. It may interest you if the hardware you want to support doesn't include an MRC; that is, the host computer is not an MV/40000 HA, or it is an MV/40000 HA that uses only ECLIPSE channel subsystems (ECSs) for I/O. For MRC controllers, see an earlier section.

The amount of work you need to do depends on whether you used an accurate configuration file (spec file) or an accurate Disk Jockey sizer file (:SIZER.CFG) as input to VSGEN (VSGEN/DEFAULT=filename). If you used an accurate file as input, all your tape controller and tape unit hardware has been correctly identified to VSGEN; you need not do anything else in this section or the next. (You may want to edit your asynchronous controller lines as described later in this chapter.)

If you need to edit controller information, proceed as follows (to add instead of editing, use the ADD keyword instead of EDIT):

Enter choice: EDIT↵ (or ADD)

VSGEN asks

Device name:

People don't use the controller name to access the unit (they use the unit name), but you will need the controller name to define units. So the controller name is important.

Type the name of the device. Default ECLIPSE controller names have the form MTx_CONTROLLER_n, where x is B, C, D, or J (depending on the tape type, shown next), and n indicates the number of the controller; for example, MTB_CONTROLLER_0, MTB_CONTROLLER_1, and so on. You can use the INDEX function key (SHIFT–F2 on a CRT, ESC–I on a hardcopy terminal) to list all devices. From the Index display, select the name or return to this menu via CANCEL/EXIT (F11 or ESC–E) and type the name. Skip to the Disk Controller screen, shown later.

If you're adding, read the following for background. You will need the controller name to define units. So the controller name is important. We suggest a name of the default form, MTx_CONTROLLER_n, as explained above. If you try to add a controller with a default name and you're working from an accurate configuration file, you'll get a *device already defined* error message; you don't need to add the device.

Table 4–4 lists ECLIPSE tape model numbers and default controller and unit names, and describes the units themselves.

Table 4-4 ECLIPSE Tape Controller Types and Names

Model Number	Type	Default Device Code		Comments
		Primary	Secondary	
6026	MTB	22	62	An MTB unit has a panel DENSITY switch; density can be 1600 or 800 bits per inch (b/pi). The default device name has the form MTB_CONTROLLER_n, where n is 0 for the first controller, 1 for the second, and so on. A controller can handle eight units. On the first controller, default unit names are MTB0, MTB1, MTB2, ..., MTB7.
6125, 6231 6311	MTC	22	62	Model 6125 has reels side by side, with density of 1600 bpi; other models are cartridge tapes with density of 6400 bpi. The default device name has the form MTC_CONTROLLER_0. A controller can handle one unit, default name MTC0.
4307, 6299, 6300	MTD	62	none	Models 6299/6300 have touch sensitive switches. All offer densities of 6250 or 1600 bpi. On an ECLIPSE bus, the default controller device name has the form MTD_CONTROLLER_n, where n is 0 for the first controller. On an MRC bus, the name has the form MRCTAPEccnn, where cc is the MRC chassis number and nn is the node number.) A controller can handle four units. On the first ECLIPSE-bus controller, default unit device names are MTD0, MTD1, MTD2, and MTD3.
6340, 6341, 6351, 6352, 6577, 6588, 6589, 6656 6679 6690 6691	MTJ	23	63	Models 6340 and 6341 have reels side by side. Model 6351 uses specially formatted cartridge tape that holds 21 Mbytes. Model 6352 (cartridge) holds 120 Mbytes at 6400 b/pi. Models 6577, 6656, and 6679 are 1/4-inch cartridge tape units with a capacity of 139 Mbytes. Models 6588 and 6589 are 6250 b/pi tape units with a capacity of 140 Mbytes. Models 6590 and 6591 units have a capacity of 2 Gbytes per tape; they perform best with a buffer size of 32,768 bytes (32K). The default controller name has the form MTJ_CONTROLLER_n; n is 0 for the first controller. A controller can handle four units. On the first controller, default device names of units are MTJ0, MTJ1, MTJ2, and MTJ3.

If you're adding, type the name you want the controller to have, and press NEW LINE. We suggest the default names shown in the previous table. If you're editing, type the name of the device. Default names have the form MTx_CONTROLLER_n (as listed in the table). You can use the INDEX function key to list all devices. From the Index display, use CANCEL/EXIT to return to this menu.

VSGEN skips the next question if you're editing.

Device type:

Specify the controller type as shown above; for example, MTB↵. Be sure to indicate the correct controller type here. After you specify the type, VSGEN displays the Tape Controller screen:

Tape Controller

Controller name: *xxx*

Controller type:

Comments:

Device code (octal):

Execute? (Y/N)

We'll take the questions one by one.

Controller name: *xxx*

VSGEN copies this question and value *xxx* from the previous screen; you can't change *xxx* on this screen. To change *xxx*, you must use the RENAME keyword.

Controller type: *xxx*

VSGEN copies this question and value *xxx* from the previous screen. When you're adding a controller, you can't change this; but when you're editing, you *can* change it. If VSGEN lets you change the type and you want to do so, do it. Controller types are explained earlier.

Comments:

Comments are generally useful. You might want to include information people might find useful, like your name and the date; for example

CONTROLLER 1 FOR MTB TAPES 1 2 AND 3. BY S. THOMPSON. 8/4/90.↵

Device code (octal):

This provides the device code of the tape controller. AOS/VS II supports as many tape controllers as will fit in a chassis. If you're editing and used an accurate Disk Jockey sizer file (:SIZER.CFG) as input to VSGEN, take the default and skip to the *Execute?* prompt.

If you're adding, or if there is no accurate sizer file, determine the controller device code, type it, and press NEW LINE. Each device code must be unique. Default device codes of the first and second tape controllers are shown in Table 4–4. There are no default codes for the third and subsequent controllers; such codes are determined at controller installation. If a controller is connected to the second IOC, insert a leading 1 (for example, 162 for the second MTD controller connected to the second IOC).

Specify the device code of the controller; if you're editing and want to take the default, do so. For example, to add a controller on device code 44, type

44↓

Execute? (Y/N)

Review the answers on the menu; if any seem wrong, back up and fix them. When you're satisfied with the values on the menu, confirm by typing

Y↓

You've now specified an ECLIPSE–bus tape controller. If you have any more controller information to add or edit, return to the beginning of this section.

If not, you can continue to the next section and specify actual tape units.

Specifying Tape Units (ECLIPSE and MRC)

This section describes how to specify a tape unit attached to an ECLIPSE or MRC tape controller.

As with all other devices, the work involved depends on whether you used an accurate configuration file (spec file) or an accurate Disk Jockey sizer file (:SIZER.CFG) as input to VSGEN (VSGEN/DEFAULT=filename). If you used an accurate file as input, your tape hardware has been correctly identified to VSGEN; you need not do anything in this section.

Before you can specify tape units, the VSGEN configuration must include at least one tape controller for ECLIPSE bus or MRC bus, described in the previous sections. If you're not sure about the accuracy of the configuration, check the listing (or display) of your current configuration for tape units. Then if you need to add or edit one, proceed as follows.

If you need to edit unit information, proceed as follows (to add instead of editing, use the ADD keyword instead of EDIT):

Enter choice: EDIT⤶ (or ADD)

VSGEN asks

Device name:

Default Tape Unit Names

Default tape unit names (created by VSGEN from configuration or spec files) have different forms for ECLIPSE and MRC.

Default ECLIPSE tape unit names have the form

MTxcu

where

x	is B, C, D, or J, depending on the unit type.
c	is the controller number, null indicating 0, in hex. Numbers range from null (as in MTB) through (as in MTBF).
u	is the unit number on the controller, beginning with 0 (numbers range from 0 through 7).

So the tape unit name indicates the address of the device: MTB0 means controller type MTB, first controller, unit 0; and MTB73 means controller type MTB, eighth controller, unit 3.

Default MRC tape unit names have the form

MRCTAPEccnnuu

where

cc is the MRC chassis number, two hex digits, begining with 00.
nn is the node (slot) number in the MRC chassis that holds the controller, also two hex digits. By default, in a 23-slot MRC, tape controllers start with slot A (hex); the secondary slot is B (hex).
uu is the unit number on the controller, also two hex digits.

So the default name for the first tape unit on the first controller on the first chassis is MRCTAPE000A00, and the default name for the second tape unit on the first controller on the first chassis is MRCTAPE000A01.

The tape unit names you choose at VSGEN will be the unit names when the new system runs. Users will use these names to access tape units, if they have access to tape units; system operators will use the names for file backup and restorations, and to load other software. If you have tapes on an MRC, the MRC names may seem long and tedious, but they *do* uniquely identify each tape unit. If users will often need to type MRC tape unit names, the system UP macro can create links (with shorter names) in directory :PER to these names.

Generally, we suggest that while editing you retain the default names and when adding you use the default name format. Having the device name indicate the device address is quite useful; it will help system operators and DG engineers understand your system.

For a list of existing device names, use the INDEX function key to list all devices. From the Index display, use CANCEL/EXIT to return to this menu.

When you're ready, type the name; for example,

MTB13⤶ (or MRCTAPE000A04⤶)

The next question is skipped if you're editing.

Device type:

You're adding a device of type TAPE, so type

TAPE⤶

Identifying the Tape Unit

VSGEN displays the Tape Unit screen:

Tape Unit [TAPE]
Host: *hhh*

Unit name: xxx

Comments:

Controller name:

Unit number:

Default density: *xxx*

Max buffersize (K):

Hostname(s): +

Execute? (Y/N)

We'll take the questions one by one.

Host: *hhh*

The name *hhh* is the name of the current host. You cannot change the hostname here, but you can (from the previous menu) select a different host with the HOST keyword.

Unit name: *xxx*

VSGEN copies value *xxx* from the previous screen; you can't change *xxx* on this screen. To change *xxx*, you must use the RENAME keyword.

Comments:

Information that people might find useful includes the controller, device code (or MRC slot), and unit number on the controller, and your name and the date. For example,

Comments: 3RD TAPE ON 2ND CONTROLLER. SPEC'D 3/4/89.

Controller name:

VSGEN wants the name of the controller to which this tape unit is attached. For a list of existing controller names, you can use the INDEX function key. From the Index display, use CANCEL/EXIT to return to this menu.

If you used the default unit naming rules, you can determine the controller name from the unit name as follows. For ECLIPSE tapes, default tape controller names are

MTx_CONTROLLER_n

where

x is B, C, D, or J, as in the unit name (for example, in MTB0, it's B).

n is determined from the unit name as follows:

```
MTx n u
 |  | |
 |  | unit number
 | controller number
unit type
```

x is B, C, D, or J, depending on the unit type;
c is the controller number, null indicating 0 (first controller), 1 indicating the second controller, 2 the third, 3 the fourth, and so on.
u is the unit number on the controller, beginning with 0; numbers range from 0 through 7.

For example, MTB0 means a controller type of MTB, the first controller, unit 0; and MTJ13 means a controller of type MTJ, second controller, unit 3.

MRC tape controller names have the form MRCTAPE_CONTROLLER_ccnn. To identify an MRC controller from the default unit name, take the unit name and replace

TAPEccnnuu
with
TAPE_CONTROLLER_ccnn

For example, for tape unit MRCTAPE000A00, the controller is MRCTAPE_CONTROLLER_000A. And for tape unit MRCTAPE000907, the controller is MRCTAPE_CONTROLLER_0009.

So for an ECLIPSE or MRC tape unit, the default tape unit name indicates the address of the device. To list all devices, you can use the INDEX function key (SHIFT-F2 on a CRT, ESC-I on hardcopy). From the Index display, select the name or return to this menu via CANCEL/EXIT (F11 or ESC-E) and type the name.

After you determine the controller name, type it and press NEW LINE; for example

MTB_CONTROLLER_2⤶

Unit number:

Depending on type, a tape controller can support as many as eight units, numbered 0 (first unit) through 7 (last unit). On some units, a thumbwheel control on the tape unit itself can change the unit number at runtime.

If you're editing and used an accurate Disk Jockey sizer file (:SIZER.CFG) as input to VSGEN, take the default and skip to the next question.

If you're adding, or if there is no accurate sizer file, determine the number of the unit on the controller, type it, and press NEW LINE. If you used the default unit name earlier, the unit number is the last digit. For example, if the unit name is MRCTAPE000A00, the unit number is

0↲

Default density:

This sets the default density at which the unit will write (and, to a lesser extent, read) tapes. Valid answers are as follows:

ADM Tells VSGEN to select Automatic Density Matching for this unit. When this unit reads a tape, the new AOS/VS II system will try to match controller density to tape density, regardless of the DENSITY switch setting (if any). When either an 800/1600 bpi unit or an 1600/6250 bpi unit will use the tape panel DENSITY switch setting (800, 1600, or 6250 bpi). Users can override the write default by specifying a valid density with the /DENSITY= switch on CLI commands.

n where n is 1600, 800, or 6250 (bpi). Tells VSGEN to select density n as default for this unit. At runtime, this will override the tape unit's DENSITY switch, if any. Automatic density matching will occur on 1600/6250 bpi units and MRCTAPE units; it won't occur on other units. Users can override the default n via software with the /DENSITY= switch in CLI commands.

NC Tells VSGEN to choose no change (NC) from current density. (The current density is the density last specified with the /DENSITY= switch in a CLI command. But on an 800/100 bpi Model 6026, if no one has used the /DENSITY= switch, the current density is that selected with the DENSITY *panel* switch. If no density has been specified on a 1600/6250 bpi Model 4307/6300, the current density is the density selected by panel switch.) On reads or writes, only the current density will be used. Users can override the current density with the /DENSITY= switch in CLI commands.

Generally, ADM (or for a 1600/6250 bpi unit, 6250) is the best general-purpose choice. We recommend this unless you know that you want another choice. If you are adding or want to change the current default density, specify the default density you want. If you are editing and want to take the default, press NEW LINE (on a CRT) or press CTRL-A and then NEW LINE (on a hardcopy terminal).

For example, if you want automatic density matching, type

ADM↲

Max buffersize (K):

Your answer to this question selects the maximum size of the buffer used for tape I/O. Valid answers are 2 (2K, which equals 2,048 bytes), 4, 6, and so on, through 32.

For a Model 6026, 6231, or 6311 unit, 8 (8K) is a good general-purpose choice; it's big enough for efficient reads and writes, yet not so big that it may slow down the program doing the I/O. For a Model 6231 cartridge unit, 8 (8K) is *required.* For a Model 4307 or 6300 unit at 6250 bpi, 32 (32K) is a good general-purpose choice. For any tape unit of Model 6340 through 6352, 16 (16K) is required. For an MRCTAPE unit, 32K is a good choice.

For all tapes, the buffer size affects the amount of data a tape can hold. A larger buffer size increases the amount of data a tape can hold by producing fewer gaps between records.

Users can select any buffer size up to the maximum with a /BUFFERSIZE= switch on a LOAD or DUMP command; or they can take the default size 2 (2K) by omitting the /BUFFERSIZE= switch. The same buffer size used to write a tape must be used to read it back. The LOAD_II (and optional LOAD_3) programs match the dump buffer size when they read a tape, if the unit allows automatic density matching. But with the LOAD command (not with LOAD_II or LOAD_3), a user must specify the correct buffer size to read a tape written at a nondefault buffer size.

If you are adding or want to change the maximum buffersize, type the value you want and press NEW LINE. If you are editing and want to take the default, do so.

The next question is asked for units on MRC controllers only. For units on ECLIPSE-bus controllers, VSGEN bypasses the question, selecting the default answer.

Hostname(s): +

This question determines which host systems will be allowed to access the tape unit. The original default is +, which specifies all hosts. If you're generating a system for one host, + is a good answer. For a unit on an ECLIPSE-bus controller, the answer *must* be +; VSGEN does not let you choose. If this tape unit is attached to an MRC, and multiple hosts are also attached to the MRC, all hosts you specify here can share the unit. All hosts you specify must be defined in the current configuration file. For example, assume hosts PAYROLL, PERSONNEL, and MSIS_01 are all attached to an MRC with a controller running tape unit MRCTAPE000A01. You want PAYROLL and MSIS_01, but not PERSONNEL, to use the unit MRCTAPE000A01. You would type

```
PAYROLL, MSIS_01)
```

Users on PAYROLL and MSIS_01 will be able to access the unit (by name MRCTAPE000A01). Users on host PERSONNEL will get a *File does not exist* message if they try to access this unit.

When the new system runs, AOS/VS II will protect a tape being used by one host from access by another. For example, if Sue on PAYROLL is using the unit and Joan on MSIS_01 tries to use it, Joan will get the error message *Device already in use* or *Device in use by another port.* However, as with shared disk units, there is a way for a user on one host to pre-empt a tape unit owned by another host. To do this, a user on any host can type the REWIND command with the /TRESPASS switch. System Manager privilege is required for this command. For example, after Joan has determined that Sally is no longer using the tape (perhaps Sally forgot she was using it), and if Joan has System Manager privilege, she could type

```
) PRIVILEGE SYSTEMMANAGER ON↵                    (CLI32 only)
Sm) REWIND/TRESPASS @MRCTAPE000A01↵
```

After AOS/VS II receives a valid REWIND/TRESPASS command, it will rewind the tape and close the unit for access by the next user.

Execute? (Y/N)

Review the answers on the menu; if any seem wrong, back up and fix them. When you're satisfied with the values on the menu, confirm by typing

Y↵

You have specified a tape unit. If you have any more units to add or edit, return to the beginning of this section. If not, you can continue to the next section and specify MRC routes, or skip to the following section and specify the system console; or skip to the section you want.

Selecting Routes to MRC Devices

This section explains routes between a host and devices (like channels, disk/tape controllers, and disk/tape units) on systems with MRCs. VSGEN creates these routes for you; it also lets you edit primary route information. Editing routes is meaningful only if you have more than one MRC channel or multiported disk units.

Routes and Automatic Rerouting

A route is the path from a host system though an MRC channel and controller to a unit. The host-to-channel portion and the controller-to-unit portion of the route are established in hardware; you cannot change them with software. However, there are two routing decisions you can make with VSGEN, or you can have VSGEN make the decisions for you. If you have multiported disk units, you can decide which controller will drive the unit. Or if there is more than one channel connecting the host to the MRC chassis, you can decide which channel will send I/O requests to each unit.

When VSGEN generates a system to support an MRC, it takes the information you enter and selects the main route (primary route) between each host and each disk and tape unit. If your MRC has multiple controllers for a disk unit or if your computer has multiple channels to the same MRC chassis, VSGEN will create a list of secondary routes to disk units. (If you have multiple channels, VSGEN will also create a list of secondary routes to tape units.) If any disk unit is multiported, VSGEN recognizes the route through each port; therefore if any unit is multiported, there are always at least two routes (primary and secondary) to it. If a unit is multiported and there are two channels to the MRC, there are four routes to the unit — a primary and secondary on each channel.

If later a failure occurs in a controller and there is a secondary route to this controller's units, the tailored operating system will automatically reroute, selecting the most appropriate secondary route. During the route switch, I/O with the failed controller will be suspended. When the route switch is complete, I/O will resume via the secondary route. Similarly, if an MRC channel fails and the host has a second channel to that MRC, the tailored system will try to reroute around the failed channel.

Automatic rerouting (called auto-reroute) can increase the availability of your system — over and above the additional disk availability provided by disk mirroring.

If there is only one channel and the disk units are not multiported, there is only one route to each unit. Figure 4-9 shows such a system: it has one MRC channel, one MRC disk controller, and four disks.

The channel device code is important because you use it to indicate the channel to VSGEN or when you boot from disk.

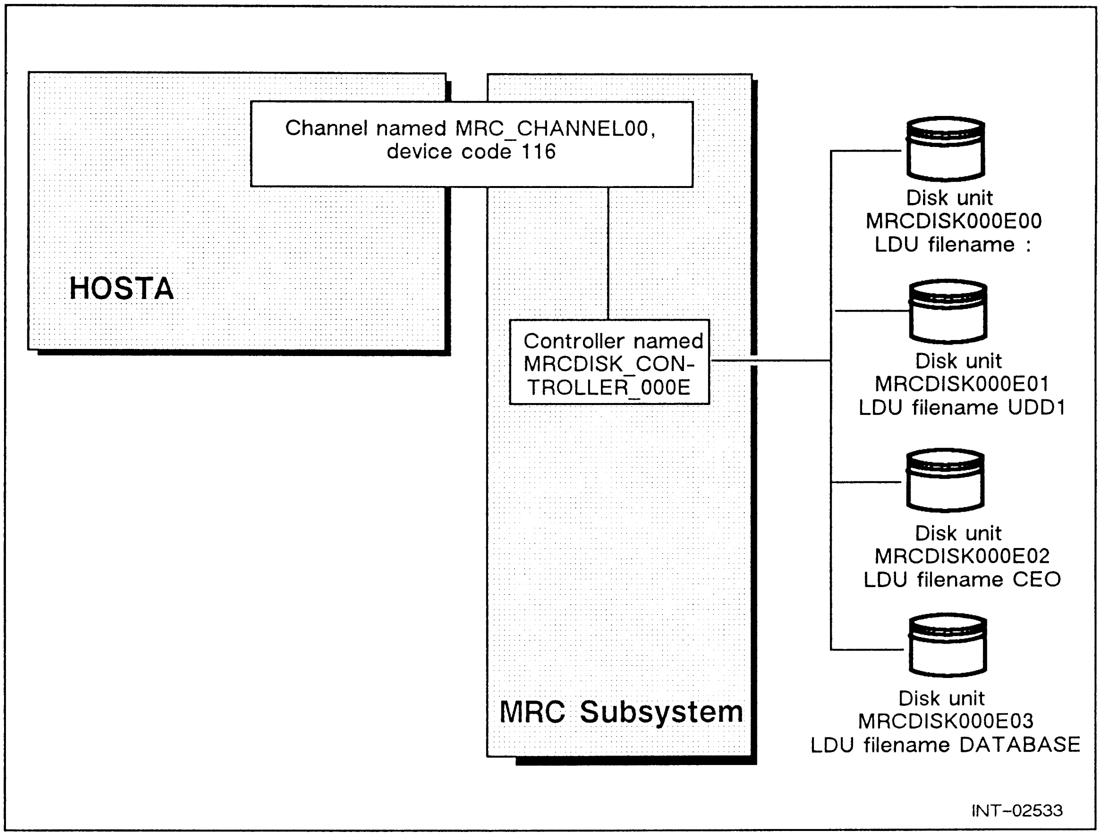


Figure 4-9 Routes with One MRC Channel Without Multiported Disks

In Figure 4-9, there is only one route between the host and disk units:

```
HOSTA
 |
 |
MRC_CHANNEL00, device code 116
 | (this connection is selected by VSGEN)
 |
MRCDISK_CONTROLLER_000E
 |
 |
MRCDISK000E00, MRCDISK000E01, MRCDISK000E02, MRCDISK000E03
(LDU filenames :, UDD1, CEO, and DATABASE)
```

After you build a system or use the Balance screen (or the BALANCE keyword), the VSGEN route display for this system will look like this:

[INFORM]

Host: HOSTA

Unit Name	*Primary*	*Controller Name*	*Channel Device Code*
MRCDISK000E00	*P*	*MRCDISK_CONTROLLER_000E*	*116*
MRCDISK000E01	*P*	*MRCDISK_CONTROLLER_000E*	*116*
MRCDISK000E02	*P*	*MRCDISK_CONTROLLER_000E*	*116*
MRCDISK000E03	*P*	*MRCDISK_CONTROLLER_000E*	*116*

If a host has two or more MRC channels or has multiported disk units, there is a choice of primary route. If there is a choice, VSGEN will select the primary route when you balance or build the system. When VSGEN chooses a primary route, it selects the route that divides the disk units equally across channels and controllers. However, since VSGEN cannot determine the I/O load on each unit, it may not pick the best route for your needs. This is one reason to edit routes.

Figure 4–10 shows a system with two MRC channels, two disk controllers, and four multiported disks. Note that the disk unit names show that the disks are multiported. The disk units were identified to VSGEN as explained earlier in section "Specifying a Multiported Disk Unit Connected to Different MRC Controllers."

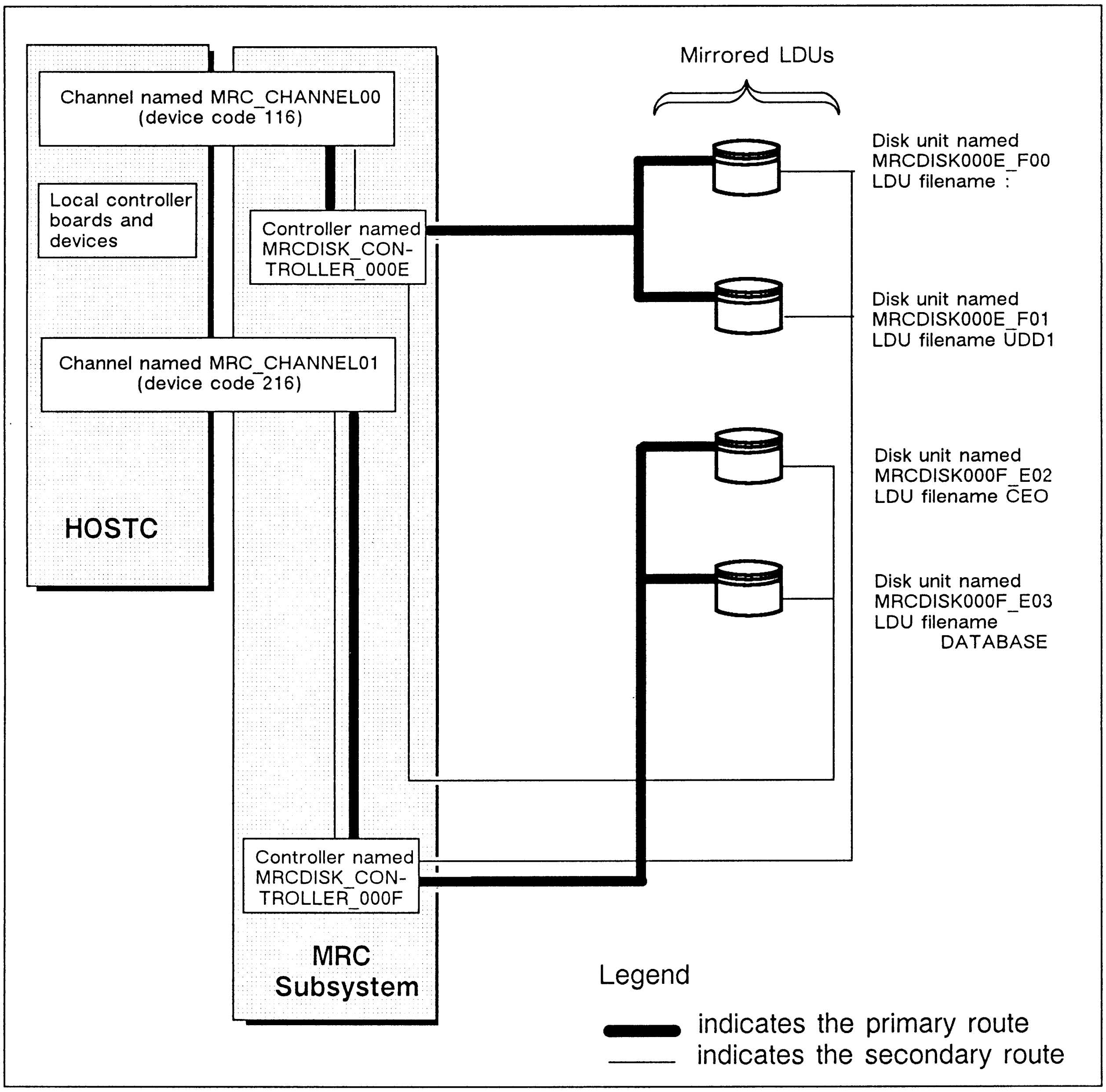


Figure 4–10 Routes with Two MRC Channels, Two Controllers, and Multiported Disks

In Figure 4–10, the primary routes are shown by heavy lines and the secondary routes by light lines. There are four routes in all. The primary routes are

HOSTB
|
MRC_CHANNEL00, device code 116
|
MRCDISK_CONTROLLER_000E
|
MRCDISK000E_F00 and
MRCDISK00E_F01
(LDU filenames : and UDD)

HOSTB
|
MRC_CHANNEL01, device code 216
|
MRCDISK_CONTROLLER_000F
|
MRCDISK000E_F02 and
MRCDISK000E_F03
(LDU filenames CEO and DATABASE)

The VSGEN route display for the routes in Figure 4–10, showing primary routes, would look like the following.

Host: HOSTB

Unit Name	*Primary*	*Controller Name*	*Channel Device Code*
MRCDISK000E_F00	*P*	*MRCDISK_CONTROLLER_000E*	*116*
MRCDISK000E_F01	*P*	*MRCDISK_CONTROLLER_000E*	*116*
MRCDISK000E_F02	*P*	*MRCDISK_CONTROLLER_000F*	*216*
MRCDISK000E_F03	*P*	*MRCDISK_CONTROLLER_000F*	*216*

Normally, the VSGEN default routes work quite well, and a system can run comfortably using the defaults. But if the load on the disks varies widely, the default rules may not work most efficiently. Assume, for example, that there are four disks in Figure 4–10 and that the DATABASE disk takes 45 percent of the total of disk I/O. You would want to edit routes in VSGEN to give the DATABASE disk its own MRC disk controller. Since the disks are multiported, you can do this easily without rewiring disk units. The easiest way is to use the MODIFY keyword to access the Modify MRC Routes screen; then move the CEO disk to the first MRC disk controller, the one on channel 0. This would put three disks on the the first controller, on channel 0; and the disk with LDU DATABASE on the second controller, uses channel 1. The new routes would be

HOSTB
|
MRC_CHANNEL00, device code 116
|
|
MRCDISK_CONTROLLER_000E
|
MRCDISK000E_F00,
MRCDISK00E_F01, and
MRCDISK00E_F02 (LDU filenames :,
UDD, and CEO)

HOSTB
|
MRC_CHANNEL01, device code 216
|
|
MRCDISK_CONTROLLER_000F
|
MRCDISK000E_F03 (LDU
filename DATABASE)

And the VSGEN route display for the new primary routes above would look like this:

Host: HOSTB

Unit Name	*Primary*	*Controller Name*	*Channel Device Code*
MRCDISK000E_F00	*P*	*MRCDISK_CONTROLLER_000E*	*116*
MRCDISK000E_F01	*P*	*MRCDISK_CONTROLLER_000E*	*116*
MRCDISK000E_F02	*P*	*MRCDISK_CONTROLLER_000E*	*116*
MRCDISK000E_F03	*P*	*MRCDISK_CONTROLLER_000F*	*216*

Generating Alternative Routes for Higher Availability

Another reason to edit route information is to make sure the primary routes allow the highest availabilty. For example, if you want hardware mirroring, you will want to make sure the primary route for each set of images has the same controller. Because VSGEN does not know which images are mirrored, it might not automatically generate the primary routes you want — so you would edit primary routes to ensure the ones you want.

For example, take the system shown in Figure 4–10, add four disk units, and hardware mirror the LDUs, as shown in Figure 4–11. The disk unit names show that the disks are multiported and mirrored. The units were identified to VSGEN as explained in "Specifying a Multiported Disk Unit Connected to Different MRC Controllers."

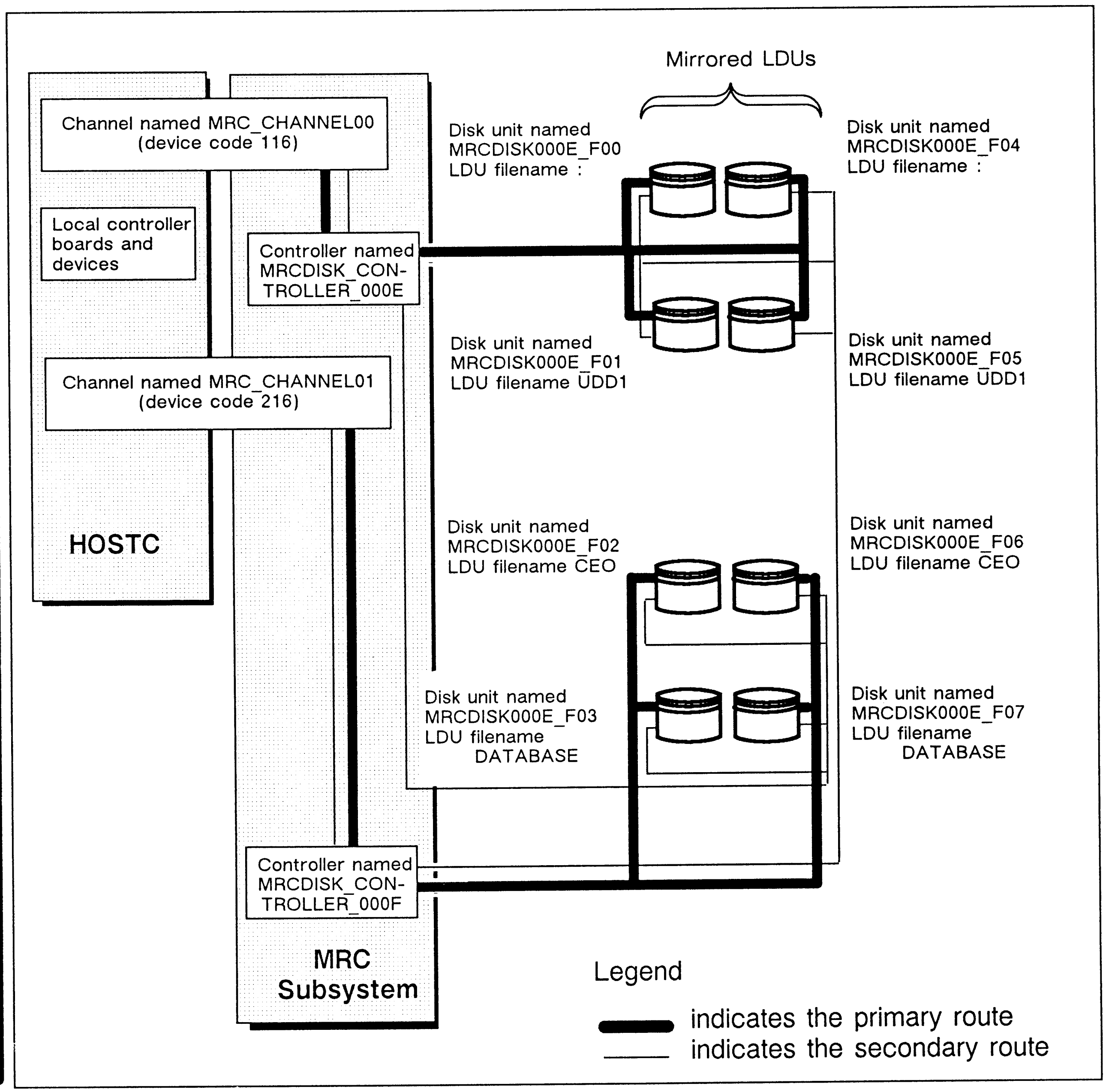


Figure 4–11 Routes in a High–Availability System with Mirrored LDUs

The system shown in Figure 4–11 has redundant MRC channels, disk controllers, and disk units. If any disk unit fails, AOS/VS II will automatically break the mirror, release the faulty image, and continue running on the good image — therefore a disk failure cannot bring the system down. If a channel or controller fails, AOS/VS II will route around the failed controller or channel. Because VSGEN does not know which images are mirrored, it might not generate the routes you want automatically, so you would edit routes to ensure the routes shown in the figure, as follows.

```
HOSTC                                  HOSTC
 |                                      |
 |                                      |
MRC_CHANNEL00                          MRC_CHANNEL01
 |                                      |
 |                                      |
MRCDISK_CONTROLLER_000E                MRCDISK_CONTROLLER_000F
 |                                      |
 |                                      |
MRCDISK000E_F00,                       MRCDISK000E_F04,
MRCDISK000E_F01                        MRCDISK000E_F05,
MRCDISK000E_F02    ,                   MRCDISK000E_F06,
MRCDISK000E_F03                        MRCDISK000E_F07
(mirrored LDUs with filenames :        (mirrrored LDUs with filenames CEO
and UDD1)                              and DATABASE)
```

And the VSGEN route display for the routes above would look like this:

[INFORM]

Host: HOSTC

Unit Name	*Primary*	*Controller Name*	*Channel Device Code*
MRCDISK000E_F00	*P*	*MRCDISK_CONTROLLER_000E*	*116*
MRCDISK000E_F01	*P*	*MRCDISK_CONTROLLER_000E*	*116*
MRCDISK000E_F02	*P*	*MRCDISK_CONTROLLER_000E*	*116*
MRCDISK000E_F03	*P*	*MRCDISK_CONTROLLER_000E*	*116*
MRCDISK000E_F04	*P*	*MRCDISK_CONTROLLER_000F*	*216*
MRCDISK000E_F05	*P*	*MRCDISK_CONTROLLER_000F*	*216*
MRCDISK000E_F06	*P*	*MRCDISK_CONTROLLER_000F*	*216*
MRCDISK000E_F07	*P*	*MRCDISK_CONTROLLER_000F*	*216*

VSGEN will generate alternative routes for higher availability in any MRC configuration that has multiple channels and/or multiported disk units. When editing routes for a mirrored LDU, if you want the load to be balanced, be sure to edit routes for both LDU images.

Selecting Routes with VSGEN

When you balance routes or build a system, VSGEN automatically selects a primary route to each unit. You can modify any VSGEN–selected route with the Modify Route Information screen (accessible from the View, Modify, or Balance MRC Routes screen) or use the MODIFY keyword. You may want to modify a route if you plan to hardware mirror one or more LDUs, or if the load on any LDU is far greater or less than on others.

A good way to approach the route issue is to list all routes, primary and secondary. Then examine the list carefully and decide if the primary routes selected are the ones you want. If not, change the primary routes. You may want to run your application for a while to see if you really need to modify routes.

The VSGEN screen that lets you select routes is accessible from the VSGEN Main Menu, which is itself accessible via the keyword MAIN. The Main Menu is

VSGEN Rev n *date time*

VSGEN Main Menu [MAIN]

1. Change the current configuration
2. List the current configuration
3. Verify the current configuration
4. View, modify, or balance MRC routes
5. Save the current configuration
6. Build a system using the current configuration
7. Use a different configuration file
8. Customize VSGEN defaults or terminal types

Enter choice:

Select choice 4:

Enter choice: 4↵

VSGEN displays the View, Modify, or Balance MRC Routes menu:

View, Modify, or Balance MRC Routes [MAINTAIN]

1. View MRC Routes
2. Modify MRC Routes
3. Balance MRC Routes

Enter choice: 1

Balancing Routes

VSGEN does not create any routes until you balance routes or build a system. With the Balance screen, you can choose to override the current routes (which will create default routes based on VSGEN's estimate of the load on each unit), or you can not override and simply execute (which will create routes to only the devices you have added in this VSGEN session).

The VSGEN screen that balances routes is accessible from the VSGEN Main Menu (and others) via the keyword BALANCE. Or from the View, Modify, or Balance MRC Routes menu, you can type 1. For example

Enter choice: BALANCE ↲

VSGEN displays the Balance MRC Routes screen.

```
-------------------- Balance MRC Routes ----- [BALANCE]
          Override current routes (Y/N):      N

          Execute?   Y
```

We will take these questions one by one.

Override current routes (Y/N): *N*

If you answer Yes, VSGEN will erase all routes currently defined in this configuration and impose its own defaults (dividing disk units equally across channels and controllers). Generally, you will want to override only the first time you run VSGEN or when you want to discard all routes and have VSGEN set up its original defaults. If you answer No, VSGEN will balance routes only for devices added since the system was last balanced; VSGEN will not change tailored routes.

NOTE: Do not answer Yes for any system whose routes you edited in an earlier VSGEN session, unless you want to restore the original VSGEN defaults.

Decide on your answer and specify it.

Execute? *Y*

Review the answer on the screen. If it is what you want, type Y; VSGEN then creates routes for new devices or restores its original defaults. If you decide not to have VSGEN balance all routes, type N and press NEW LINE (or press CANCEL/EXIT).

VSGEN returns to the previous menu.

Listing Routes

The VSGEN screen that lists routes is accessible from the VSGEN Main Menu (and others) via the keyword INFORM. Or from the View, Modify, or Balance MRC Routes menu, you can type 1. (If you have added MRC an channel, disk controller, or disk unit in this session and have not balanced, do so to create the routes; then list routes.)

For example, to list routes,

Enter choice: INFORM↲

VSGEN displays the List MRC Route Information screen:

List MRC Route Information [INFORM]

Hostname(s): +

Send listing to a file: *N*

Pathname:

List only primary routes? (Y/N) *Y*

Execute? (Y/N)

We will take the questions one by one.

Hostname(s): +

VSGEN is asking about the hostnames for which you want routes listed. If you know you want a listing for one host only, type its name or a suitable template. To list routes from all hosts, take the default, +.

Send listing to a file: *N*

If you want the listing sent to your terminal, take the default, N. But generally, you will want a hardcopy listing to review. To get a hardcopy listing, you must answer Yes. If you answer Yes (Y↲), VSGEN asks the next question; otherwise it skips to the *List only primary routes* question.

Pathname:

You can specify a disk file in any directory to which you have write access — or you can specify the line printer queue, default name @LPT. If you choose a disk file, give it a meaningful name, say HOST.ROUTES. If the file already exists, VSGEN will give you a chance to specify another name before it deletes and recreates the file. If you are running the starter system, which does not support a line printer, you won't be able to print the listing until you boot a tailored system; you might want to wait until then before you edit routes.

List only primary routes? (Y/N) *Y*

Normally, VSGEN lists only the primary routes, marked with a P in the display. The primary routes are those the tailored system will use for routine operation. The system will try to use a secondary route only if a controller or channel fails. The reasons to list secondary routes are (1) if you want hardware mirroring, to select a primary route that puts the mirrrored disks on the same controller; or (2) manually to balance the I/O load on disk units. If you answer No, VSGEN will list all routes.

Execute? (Y/N)

Review the answers on the menu; if any seems wrong, back up and fix it. When you are satisfied with the values on the menu, confirm by typing

Y↵

VSGEN sends the route information to the file you specified, or to the terminal if you answered No to the question *Send listing to a file*. Then it returns to the previous menu. We suggest you examine the listing carefully before you modify routes, as explained next. A sample route display, showing only primary routes, follows.

Host: HOSTC

Unit Name	*Primary*	*Controller Name*	*Channel Device Code*
MRCDISK000E00	*P*	*MRCDISK_CONTROLLER_000E*	*116*
MRCDISK000E01	*P*	*MRCDISK_CONTROLLER_000E*	*116*
MRCDISK000E02	*P*	*MRCDISK_CONTROLLER_000E*	*116*
MRCDISK000E03	*P*	*MRCDISK_CONTROLLER_000E*	*116*
MRCDISK000F00	*P*	*MRCDISK_CONTROLLER_000F*	*216*
MRCDISK000F01	*P*	*MRCDISK_CONTROLLER_000F*	*216*
MRCDISK000F02	*P*	*MRCDISK_CONTROLLER_000F*	*216*
MRCDISK000F03	*P*	*MRCDISK_CONTROLLER_000F*	*216*

Modifying Routes

The VSGEN screen that lets you modify routes is accessible from the VSGEN Main Menu (and others) via the keyword MODIFY. Or from the View, Modify, or Balance MRC Routes menu, you can type 2. (If you have added MRC an channel, disk controller, or disk unit in this session and have not balanced, do so to create the routes; then list or modify routes.)

For example, to modify routes,

Enter choice: MODIFY↵

VSGEN displays the Modify MRC Roiute Information screen:

```
-------------------- Modify  MRC Route Information ---------[MODIFY]
          Hostname: +

          Execute:   Y
```

VSGEN wants the hostnames whose routes you want to modify. To modify routes for one host only, type its name or a suitable template. To modify routes from all hosts, take the default, +. If you take the default, VSGEN will display hostnames for route editing in the order in which the hosts were defined in the configuration.

After you answer the *Hostname* question, confirm by answering the *Execute* question. VSGEN then displays the Modify MRC Route Information screen:

Modify MRC Route Information [MODIFY]

Route	*Hostname*	*Unit name*	*Controller name*	*Channel Device Code*
001	*HOSTC*	*MRCDISK000E00*	*MRCDISK_CONTROLLER_000E*	*116*
002	*HOSTC*	*MRCDISK000E01*	*MRCDISK_CONTROLLER_000E*	*116*
003	*HOSTC*	*MRCDISK000E02*	*MRCDISK_CONTROLLER_000E*	*116*
004	*HOSTC*	*MRCDISK000E03*	*MRCDISK_CONTROLLER_000E*	*116*
005	*HOSTC*	*MRCDISK000F00*	*MRCDISK_CONTROLLER_000F*	*216*
006	*HOSTC*	*MRCDISK000F01*	*MRCDISK_CONTROLLER_000F*	*216*
007	*HOSTC*	*MRCDISK000F02*	*MRCDISK_CONTROLLER_000F*	*216*
008	*HOSTC*	*MRCDISK000F03*	*MRCDISK_CONTROLLER_000F*	*216*

Choose the routes you would like to modify.

Route(s):

VSGEN lets you modify primary routes only. Select the number of the route you want to modify. For example, from the previous display, assume you want to change the primary route of disk unit MRCDISK000E03 from channel (device code) 116 to 216. Select the number of the route to that unit:

4↵

VSGEN then displays the line that describes the route you specified, allowing you to edit it. For example,

004 HOSTC MRCDISK000E03 MRCDISK_CONTROLLER_000E 116

The cursor moves directly to the *Controller name* field. To modify the contents of a field, simply type the new value. To skip a field while retaining its current value, press NEW LINE. On a CRT, you can use the BACK FIELD function key to return to a previous field. To list all controllers, use the INDEX function key.

Since you want to change the *Channel/Device Code* entry, press NEW LINE to skip over the *Controller name* field. The cursor moves to the *Channel/Device code* field. To list all channels, use the INDEX function key. When ready, type the new value:

216↵

VSGEN now applies your change. You can exit from the Modify screen by pressing CANCEL/EXIT. You might want to list the routes again. (As with any change you make, route changes will not replace any in the original configuration file until you save this configuration.)

NOTE: Any changes you made to existing VSGEN routes on this host will be overridden if you (or anyone) uses the VSGEN Balance function and answers Yes to *Override current routes*. Therefore you should avoid Balance with Override current routes for any system whose routes you have edited, unless you want to restore the VSGEN defaults.

Specifying the System Console

The system console is the terminal connected directly to the computer; unlike other terminals, it does not connect through a separate asynchronous controller.

Generally, if you used an accurate configuration file or Disk Jockey sizer file (:SIZER.CFG) as input to VSGEN, the system console has been correctly specified; you can skip the rest of this section.

But if you want to list or edit the system console, the default name is CON0. Type EDIT (or ADD), then the name, usually CON0. VSGEN displays the System Console screen:

```
                         System Console (CON0)

System console name:  xxx
Comments:

Terminal definition:            xxx
Terminal type:                  xxx
Input buffer length:   xxx
Output buffer length:  xxx
Lines per page:                 xxx
Characters per line:   xxx
Break key function:    MBxx
Characteristics:                xxx xxx xxx

Execute? (Y/N)
```

The only setting that really pertains to the system console is *Terminal definition*, but we'll explain them all briefly. You may want to do more with these settings for user terminals (in the next major section).

System console name: xxx

VSGEN copies value *xxx* from the previous screen; you can't change *xxx* on this screen. To change *xxx*, you must use the RENAME keyword.

Comments:

You may want to include information that people configuring this system will find useful in the future. For the system console, this might include terminal definition. You can, if you want, leave the field blank.

Terminal definition: xxx

The terminal definition tells the system what kind of terminal this is. Several other settings on the screen depend on this value. DG–defined definitions include CRT3 (standard CRT), CRT6 (model 6130 CRT), and TTY (hardcopy). You can create your own terminal definition via an entry on the "Change the Current Configuration" menu, and insert it here (for example, specify screen settings that apply to a group of user terminals, and then assign a unique name to them). For the system console, however, there's little point in creating a definition, since AOS/VS II expects the standard setting for CRTn or TTY.

To take the default, press NEW LINE (for a CRT) or press CTRL–A and then NEW LINE (for a hardcopy terminal). To change the value, type the new one and press NEW LINE. For a list of valid answers (as always), you can use the INDEX function key. From the Index display, use CANCEL/EXIT (F11 or ESC–E) to return to this menu.

Terminal type: *xxx*

Valid terminal types for the system console include CRT3 (standard CRT), CRT6 (model 6130 CRT), and TTY (hardcopy). This value may be the same as *Terminal definition*. Generally, take the default; but if the default is not correct, specify the correct type and press NEW LINE.

Input buffer length:	*xxx*
Output buffer length:	*xxx*
Lines per page:	*xxx*
Characters per line:	*xxx*
Break key function:	*MBxx*
Characteristics:	*xxx xxx xxx*

The *buffer length* questions relate to buffers used by the system to communicate with the device; the original default for both questions for the system console is 128 (bytes). Take the defaults.

The number of lines per page and characters per line varies, depending on whether the terminal is a CRT or hardcopy. Take the defaults on these.

The Break key function determines how the operating system will respond to the break sequence. This setting doesn't apply to the system console; on the system console, the break sequence brings up the SCP CLI. Take the default.

Characteristics determine how the system handles things like echoing, lower–to–uppercase conversion, start and stop bits, and so on. For the system console, take the default characteristics. (If you *do* want to specify nondefault characteristics, Table 4–5, later on, describes the mnemonics you can use.)

Execute? (Y/N)

Review the answers on the screen; if any seem wrong, back up and fix them. When you're satisfied with the values on the screen, confirm by typing

Y↵

You're done with the system console. You can continue to the next section and specify asynchronous controllers and user terminals; or you can skip to the section you want.

Asynchronous line controllers run lines to user terminals, modems, and letter–quality and laser printers. AOS/VS II supports up to 1,360 lines on asynchronous controllers. There are several different kinds of asynchronous controllers. The intelligent asynchronous controller (IAC) is the most common.

The configuration file must identify each asynchronous controller that you want the new system to support. The configuration must also identify the terminal lines connected to the controller. For example, if you want to add an IAC to the configuration, you would add the IAC (via the IAC screen), and then add the terminal lines (via the TERMINAL or LINES screen).

Generally, as with other devices, the amount of work involved depends on the accuracy of the configuration file (or spec file) you used as input to VSGEN. An accurate VSGEN configuration file or Disk Jockey sizer output file (:SIZER.CFG) will provide correct information about all asynchronous *controllers* in your system. However, the Disk Jockey sizer cannot tell what kind of device is connected to a terminal line; therefore it assumes that all lines are connected to the default device (a CRT3 "standard CRT" terminal). So if you use an autosizer file as input to VSGEN, you must edit information about terminal lines that are connected to nonstandard devices like modems and specify the nonstandard settings. If you use an accurate VSGEN configuration file as input, all terminal lines will be defined accurately in the new system and you don't need to edit the definitions.

Soft Controllers

In addition to hardware controllers (controller boards like IACs and LTCs), you can specify one or more *soft controllers* to VSGEN. A soft controller is a routine within the operating system that handles communications with nonproprietary or networked terminals (for example, PCs or virtual terminals connected through XTS or TCP/IP software). Soft controllers do not have device codes. There is usually a hardware controller, like an Intelligent LAN Controller (ILC) involved, but you specify that controller to other communications software (like NETGEN), not to VSGEN.

AOS/VS II Release 2.00 supports the following soft controllers:

- PAD (packet assembler/disassembler, for terminals to be connected to a public data network via a PAD box);
- PCVTSERVER (for personal computers to be connected via Data General personal computer integration software (DG/PC*I);
- TELNET (for terminals to be connected via the TCP/IP application TELNET); and
- VTASERVER (for virtual terminals to be connected via XTS).

The VSGEN treatment of PCs differs from that in earlier revisions. Before Release 2.00, you specified the number of PCs as a VSGEN software parameter. If you are using a pre–Release 2.00 configuration file that has PCs specified, VSGEN will automatically generate the correct soft controller (PCVTSERVER) with the number of lines specified as the number of PCs in the configuration file. You do not need to specify that controller and lines manually.

The VSGEN treatment of virtual terminals also differs from that in previous revisions. This is explained in detail later, in the section that explains the VTASERVER controller.

If you want to have the operating system to support a terminal connected via PAD, DG/PC*I, TCP/IP TELNET, or XTS, you must generate the appropriate soft controller and one line group for it. If you do not do this, a user on that kind of terminal will not be able to communicate with this AOS/VS II system. (Users may be able to communicate with the system via a network interface, but they will not be able to communicate directly — which is faster.)

For a PAD, PCVTSERVER, or VTASERVER soft controller to work properly, the correct release of XTS software (with PC and PAD support) must have been loaded, and its QNET.LB moved into :SYSGEN, before VSGEN builds a system. For a TELNET soft controller to work properly, the correct release of TCP/IP software (with TELNET support) must have been loaded, and its QNET.LB moved into :SYSGEN, before VSGEN builds a system. Loading XTS and moving QNET.LB are explained earlier in this chapter.

Asynchronous Controller Summary

The asynchronous controllers — standard and soft — are as follows in alphabetical order. Each is described in detail later on, under its own section.

- CPI/24 (Computer-PBX-Interface) — a device that connects an ECLIPSE MV/Family computer, via Private Branch Exchange switch, to as many as 24 phone lines. You identify it to VSGEN as a CPI.

- DRT (Dual asynchronous Receiver-Transmitter) — a controller that's part of the IOC board on integrated (desk-side) systems; supports up to 10 lines. You identify it to VSGEN as a DRT.

- IAC (Intelligent Asynchronous Controller) — available in 24-line, 16-line, and 8-line versions. You identify it to VSGEN as an IAC type 24, 16, 8.

- ITC (Intelligent TermController) — supports as many as 128 or 64 lines, depending on type, on a LAN. (The 64-line version is called an LTC/64.) The LAN connects in turn to devices called TermServers that handle terminal lines. You identify an ITC or LTC to VSGEN as an IAC type 128 or type 64.

- LAC (Local-bus Asynchronous Controller) — available in 32-line and 12-line versions, on MV/2500 DC, MV/2000 DC, MV/1400 DC only. It is available in a 16-line version for the MV/1000 DC. Normally, these computers are shipped with a tailored AOS/VS II system already installed. You need to generate a different AOS/VS II system for these computers only if you want a nonstandard line configuration for the LAC. See "Specifying Local-Bus Asynchronous Controllers (LACs)," later in the chapter, for more information.

- LMC (Local-Bus Modem Controller) — supports 8 modem or nonmodem lines on MV/2500 DC, MV/2000 DC, and MV/1400 DC integrated systems only. As with the LAC, these computers are shipped with a tailored AOS/VS II system already installed. You need to generate a different system only if you want a nonstandard line configuration for the LMC. See "Specifying Local-Bus Modem Controllers (LMCs)," later in the chapter, for more information.

- L/RMSC (LORAL/Rolm Mil-Spec Computer) — supports 16 lines in a Rolm HAWK/32 computer. You specify it to VSGEN as IAC type L/RMSC.

- LTC/64 (Local-bus TermController) — supports 64 lines on a LAN. You identify an LTC to VSGEN as an IAC type 64.

- MCP1 (Multicommunications Processor) — one board with three controllers: an 8-line asynchronous controller, a 2-line synchronous controller, and a line printer controller. Each controller has its own device code. You specify the asynchronous controller to VSGEN as an IAC type 8.

- PAD (for terminals to be connected via to a public data network via PAD, using X.29 virtual terminal protocol). The number of lines a PAD soft controller can support is limited only by the number of lines specified to other asychronous controllers.) If any terminals will connect to your system via a PDN using PAD protocol, you must specify a PAD (device type PAD) and line group for the AOS/VS II system.

- PCVTSERVER (Personal Computer Virtual Terminal, for personal computers connected via DG/PC*I software. The number of lines a PCVTSERVER soft controller can support is limited only by the number of lines specified to other asychronous controllers.) If any PCs will connect to your system via DG/PC*I software and LAN controller hardware, you must specify a PCVTSERVER controller and line group for the AOS/VS II system.

- PIM (Processor Interface Module) — one board with a controller and four host interface processors (HIPs). There are two versions of PIM. The PIM-E supports up to 128 lines; you identify it to VSGEN as a PIM. The PIM/T1 supports up to 192 lines; you identify it to VSGEN as an IAC type 192.

- TELNET (for terminals connected via TCP/IP application TELNET). TELNET is a program that runs under TCP/IP network software — it allows users to log on other systems and is widely used on systems that run UNIX. TELNET is analogous to the XTS agent VTA. The number of lines a TELNET soft controller can support is limited only by the number of lines specified to other asychronous controllers.) If any terminals will connect to your system via TELNET, you must specify a TELNET controller and line group for the AOS/VS II system.

- UAC (Universal Asynchronous Controller) — controller type that includes only LAC devices. If you specify an LAC as a UAC (instead of IAC), the new system will try to size the device and determine which type it is. Generally, this type is used only to create preinstalled AOS/VS II systems. There's no point in using UAC when you generate a tailored system unless you want the default characteristics (local lines, CRT3 default) for all lines on the LAC.

- VTASERVER (for virtual terminals to be connected via XTS and the operating system). Formerly these terminals were supported by the XODIAC network process SVTA. The VTASERVER controller or the network process allows users on AOS/VS and AOS/VS II to log on other other systems in the network. The number of lines a VTASERVER soft controller can support is limited only by the number of lines specified to other asychronous controllers. If you want remote users to be able to log on your system using VTA protocol, you can choose either a VTASERVER or the network SVTA process. If you choose a VTASERVER, you cannot also run SVTA (the network up macro will report errors if it tries to communicate with the SVTA process). Generally, performance will better with a VTASERVER.

Different computers can have different asynchronous controllers, as follows.

Computer	Asynchronous Controllers
MV/40000 (any model), MV/20000 (any model) MV/18000 (any model) MV/15000 (any model)	CPI/24, IAC-24, IAC-16, IAC-8, MCP1, PIM, and/or ITC/128; soft controllers PAD, PCVTSERVER, TELNET, and/or VTASERVER.
MV/10000 (any model),	CPI/24, IAC-24, IAC-16, IAC-8, MCP1, PIM, and/or ITC/128; soft controllers PAD, PCVTSERVER, TELNET, and/or VTASERVER.
MV/8000 II MV/8000 C	CPI/24, IAC-24, IAC-16, IAC-8, MCP1, PIM, and/or ITC/128; soft controllers PAD, PCVTSERVER, TELNET, and/or VTASERVER.
MV/8000	IAC-24, IAC-16, IAC-8, soft controllers PAD, PCVTSERVER, TELNET, and/or VTASERVER.
MV/7800 XP MV/7800 C MV/7800	CPI/24, IAC-24, IAC-16, IAC-8, MCP1, PIM, and/or ITC/128; soft controllers PAD, PCVTSERVER, TELNET, and/or VTASERVER.
MV/7800 DCX MV/7800 DC	IAC-24, IAC-16, IAC-8, MCP1, and/or ITC/128; soft controllers PAD, PCVTSERVER, TELNET, and/or VTASERVER.
DS/7500	DRT; soft controllers PAD, PCVTSERVER, TELNET, and/or VTASERVER.
MV/6000	IAC-24, IAC-16, IAC-8; soft controllers PAD, PCVTSERVER, TELNET, and/or VTASERVER.
MV/4000	CPI/24, IAC-24, IAC-16, IAC-8, MCP1; soft controllers PAD, PCVTSERVER, TELNET, and/or VTASERVER.
MV/4000 DC, MV/4000 SC, DS/4000-Series	IAC-24, IAC-16, IAC-8, or MCP1; soft controllers PAD, PCVTSERVER, TELNET, and/or VTASERVER.
MV/2500 DC MV/2000 DC MV/1400	DRT, LAC-12, LAC-32 (except MV/2000), LMC, and/or LTC/64; soft controllers PAD, PCVTSERVER, TELNET, and/or VTASERVER.
MV/1000 DC	DRT, LAC-16; soft controllers PAD, PCVTSERVER, TELNET, and/or VTASERVER.
HAWK/32	L/RMSC.

Specifying Base-Line Numbers

If your system has more than one asynchronous controller, you can specify the sequence of line numbers from board to board during VSGEN. (This section applies to hardware controllers only, not soft controllers; for a soft controller, skip to the appropriate controller section.)

For each asynchronous controller, you specify a controller type (which indicates the number of lines it has) and a base-line number. After you finish with a controller, you define (as separate devices) the terminals on its lines. The lines on the first controller are numbered from 0 to n–1, where n is the highest number line on the controller — n is 191, 127, 63, 31, 23, 15, 11, or 7, depending on whether the controller has 192, 128, 64, 32, 24, 16, 12, or 8 lines. The lines on each subsequent controller run from at least the highest existing number + 1 to the number of lines on that controller.

The base-line numbers need not be sequential across controllers. For example, you might choose to make your modem base line 80. But if you want to keep terminal line numbers sequential from controller to controller, specify a base-line number equal to the total number of lines on all previous controllers. For example, if the first controller has 24 lines (lines 0–23), specify 24 as the base line for the second controller.

For the third and each subsequent controller, use a base-line number that equals

base-line-of-preceding-controller
+
total-number-of-lines-on-preceding-controller (8, 12, 16, 24, 32, 64, or 128)

For example, if the base-line number of the preceding IAC is 24 and it can support 24 lines, specify a base-line number of 48.

Each base line must be larger than the preceding controller's base line and each must be divisible by 2. (VSGEN imposes this rule to ensure unique console filenames, so that your multiuser system will work properly.)

When the new system runs, each terminal line on the asynchronous controller will have the console filename based on the formula

@CON (base-line-number + line-number-on-this-controller + 2)

For example, assume that the first controller has 24 lines and you specify its base-line number as 0. The terminal on the third line (line 2) will have the console filename of @CON(0+2+2), or @CON4. Further assume you give the second asynchronous controller a base-linenumber of 24. Line 7 on the second controller will have the console filename of @CON(24+7+2) or @CON33.

NOTE: If the terminals are not labeled, someone should label them — preferably with the terminal's console filename, @CONn. You can use sticky-backed tape for this. If you don't know a terminal's console filename, you can figure it out from the line number, as described in "Specifying Terminal Lines," later. Labeling the terminals will make things a lot easier later on.

The following sections describe each asynchronous controller, in alphabetical order, as follows: CPI/24, DRT, IAC, ITC/128, LAC, LMC, MCP1, and PIM. Find the section for the device you want.

Specifying CPI/24 Controllers

A CPI/24 (Computer–PBX–Interface controller) is a board that connects an ECLIPSE MV/Family computer to a Private Branch Exchange (PBX) telephone switch. Phone lines from the PBX, instead of computer–to–terminal cables, can then connect to user terminals. The CPI/24 device is named for the CPI software interface, T1/DS–1 version.

PBX line configurations are arranged by the PBX manufacturer — a telecommunications manufacturer like Northern Telecom. Each line is set up for dialing in (users make the connection) or direct outward calling (the computer makes the connection).

Most PBX lines connected to a computer are dial–in lines. After EXEC has enabled the console filename (as with any terminal), a user dials the computer's number, the connection is made, and the user logs on. (A device called a data–access module, DAM, is needed at the user's phone set.) To VSGEN, you specify a PBX dial–in line as a standard terminal line.

Direct outward calling is useful for a line without a human dialer; for example, a line connected to a printer. (A DAM is also needed for outward calling.) If a printer/DAM is attached to a PBX line set up for outward calling, and this line has been specified to VSGEN, the printer can be enabled by EXEC just as if it were on cables — users can access it through QPRINT commands just like any other printer. When you specify the terminal line characteristics of a PBX direct outward line (you identify these as a separate device of type TERMINAL, explained later), you must specify the nonstandard characteristic MCALLOUT (for CALLOUT).

For a PBX dial–in or direct–outward line to work, the DAM, terminal, and VSGEN line specifications should match. (The host computer will try to match the baud rate, number of data bits, and the number of stop bits set in the DAM if these settings differ from the VSGEN settings.)

You specify a CPI/24 to VSGEN as a CPI. CPIs have the following requirements:

- Each CPI/24 requires two sequential device codes. VSGEN asks for only one — the even–numbered code. It then tries to assign the device code you type, and the next one, to the CPI/24. For example, if you type 30↲, VSGEN tries to assign code 30 and 31 to the CPI.
- A CPI can support as many as 24 PBX lines — dial–in or call–out, in any combination.
- CPIs don't offer modem support.
- When you specify the terminal line group for a call–out line, you must specify the MCALLOUT (CALLOUT) characteristic.

Configuring a CPI

Check the listing of your configuration; if you're sure you want to add a CPI (or if you want to edit information about one), continue. (To edit instead of adding, use the EDIT keyword instead of ADD.)

Enter choice: ADD↲ (or EDIT)

Device name:

People don't use the controller name to access terminals (they use the terminal console filename, form @CONn), but you will need to remember the controller name to define units.

If you're adding, we suggest a name of the default form, CPIn, where n is null for the first CPI, 1 for the second, and so on. If you're editing or listing, specify the CPI you want. You can use the INDEX function key to list all devices. From the Index display, use CANCEL/EXIT to return to the menu. When you're ready, type the device name; for example,

CPI1 ⮐

If you're adding, VSGEN asks the device type. Respond with CPI:

Device type: CPI ⮐

VSGEN displays the CPI screen:

CPI Terminal Controller

Controller name: *xxx*

Comments:

CPI requires 2 consecutive device codes, specify only the first
Device code (octal): *nn*

Base line number:

VT100 terminal support? (Y/N) *x*

Asian language support? (Y/N) *x*

Execute? (Y/N)

VSGEN fills in the controller name *xxx*; you can change this only via the RENAME keyword. We'll take the remaining questions one by one.

Comments:

This field can be blank or it can include information people might find useful, like the lines on this controller or your name and the date; for example

CPI1 FOR SECRETARIAL POOL. BY S. THOMPSON. 3/4/90. ⮐

CPI requires 2 consecutive device codes, specify only the first
Device code (octal):

Type the first of the two device codes, or accept the default value (on a CRT, press NEW LINE; on a hardcopy terminal, press CTRL–A and then NEW LINE).

Base line number:

The base-line number will determine the console filenames of terminals (and modems and printers) attached to lines on this controller. The number you specify must be larger than the last line number specified for any asynchronous controller. We suggest you specify the lowest number available (the total number of lines on all asynchronous controllers already specified). For the first such controller, this number is 0. More information on base-line numbers appears earlier, in the section "Specifying Base-line Numbers."

Type the line number and press NEW LINE, or accept the default value.

VT100 terminal support? (Y/N) x

If you want this CPI to support VT100-compatible terminals (terminals compatible with Digital Equipment Corporation's VT100 display terminal), you should answer Yes. (For VT100 support to work properly when the new system runs, the MXLT characteristic must also be selected. This characteristic is explained later in this chapter, in the section "Specifying Terminal Lines." You can select it at VSGEN or later with a CHARACTERISTICS command.)

A Yes answer reserves memory space for code needed to handle VT100 control characters; this reduces the amount of IAC memory available for I/O buffers and might affect processing speed on all lines. Also, enabling VT100 support via the MXLT characteristic incurs some processing overhead. Thus VT100 support is not without cost.

If you want this AOS/VS II system to support non-DG VT100 compatible terminals, we suggest you concentrate these terminals on specific controllers and select VT100 terminal support only for those controllers.

If you know you want VT100 terminal support on this CPI, answer Y for Yes. If the default is what you want, take it.

Asian language support? (Y/N) x

This question pertains to use of Asian languages like Japanese or Chinese. It allows the system to translate phonetic characters typed on a Kanji keyboard into ideographs on the screen. This also includes support to handle Kanji characters, which require 2 bytes of storage instead of the standard 1 byte. Generally, you will want to select this option only if a Kanji terminal is attached to one or more lines on this controller.

A Yes answer will tell the operating system to load Asian-language handling code into the controller. This will reduce the amount of memory available for I/O buffers and might affect processing speed on all lines; thus it is not without cost. If you want Asian language support, we suggest you concentrate the terminals on specific controllers and select Asian language support only for those controllers.

If you know that you want Asian language support, this answer should be Yes. (Later, when you identify terminal lines, for each terminal line that will use Asian language you should also select the 2-byte characteristic — M16B — explained later in "Specifying Terminal Lines.")

Execute? (Y/N)

Look at the answers on the screen; if any seem wrong, back up and fix them. When you're satisfied with the values on the screen, confirm by typing

Y↵

VSGEN takes your changes, if any, and makes them part of the configuration.

You've specified a CPI terminal controller. Now while the controller name is still fresh in your mind, we suggest that you add, edit, or list terminal line information on this controller. To do this, add (or edit) a device of the TERMINAL group (the default name of the first such group is CPIn_LINE_GROUP_0, where n is the number of the CPI you just specified). Specifying devices of type TERMINAL is described in the section "Specifying Terminal Lines," later in this chapter.

CPI/24 Example

This example shows editing of CPI controller information.

CPI Terminal Controller

Controller name: *CPI* ↵

Comments: CONTROLS PBX LINES 0 – 23. BASE NUMBER 16. CONS 16-39↵

CPI requires 2 consecutive device code, specify only the first
Device code (octal): *70*↵

Base line number: *16*↵

VT100 terminal support: (Y/N) N ↵

Asian language support: (Y/N) N ↵

Execute? (Y/N) Y↵

The person typing might now list or edit line groups for this controller.

Specifying a DRT Controller

A Dual asynchronous Receiver/Transmitter (DRT) is part of each DS/7500, MV/4000 DC, MV/4000 SC, DS/4000-series, MV/2000 DC, and MV/1400 DC computer. It is on the system board or multifunction I/O controller board (IOC). The DRT is on device code 34.

On DS/4000-series computers, a DRT has one asynchronous line that can support a local terminal or modem. On DS/7500 and MV/2000 DC computers, a DRT has four asynchronous lines; line 0 can support a modem, line 1 is attached to the system console, and lines 2 and 3 can support user terminals. On MV/1400 DC systems, a DRT has 10 lines; the first 4 are similar to those on an MV/2000 DC, and lines 2–9 can support terminals. On a DS/7500, you can use an inexpensive terminal as the system console and attach a more expensive pixel-mapped (graphics) terminal to line 2 or 3.

If you have an IAC or an MCP1, use it to handle terminal and/or modem lines; do *not* identify the DRT to VSGEN. If you don't have an IAC or MCP1, you can identify the DRT to VSGEN.

Configuring a DRT

Check the listing of your configuration; if you're sure you want to edit DRT information (or if you want to add a DRT), continue. To add instead of editing, use the ADD keyword instead of EDIT:

Enter choice: EDIT↵ (or ADD)

Device name:

People don't use the controller name to access terminals (they use the terminal console filename, form @CONn) but you will need the controller name to define terminal lines. So the controller name is important.

If you're adding, we suggest the default name, DRT. If you're editing or listing, specify the DRT you want. You can use the INDEX function key to list all devices. From the Index display, use CANCEL/EXIT to return to the menu. When you're ready, type the device name; for example,

DRT↵

If you're adding, VSGEN asks the device type. Respond with DRT, as follows.

Device type: DRT↵

VSGEN displays the DRT screen:

DRT Terminal Controller

Controller name: *DRT*

Comments:

Base line number:

Execute? (Y/N)

VSGEN fills in the controller name; you can change this only via the RENAME keyword. We'll take the remaining questions one by one.

Comments:

This field can be blank or it can include information people might find useful, like the lines on this controller or your name and the date; for example,

Comments: DRT FOR SECRETARIAL POOL. BY S. THOMPSON. 3/4/89.↲

Base line number:

The base-line number will determine the console filenames of terminals (and modems and printers) attached to lines on this controller. The number you specify must be larger than the last line number specified for any asynchronous controller. We suggest you specify the lowest number available (the total number of lines on all asynchronous controllers already specified. For the first such controller, this number is 0. More information on base-line numbers appears earlier, in the section "Specifying Base-line Numbers."

Type the line number and press NEW LINE, or accept the default value.

Execute? (Y/N)

Review the answers on the screen; if any seem wrong, back up and fix them. When you're satisfied with the values on the screen, confirm by typing

Y↲

VSGEN takes your changes, if any, and makes them part of the configuration.

You've specified a DRT terminal controller. Now while the controller name is still fresh in your mind, we suggest that you add, edit, or list information on the terminal lines on this controller. To do this, add (or edit) a device of the TERMINAL group (the default name of the first such group is DRT_LINE_GROUP_0). Specifying devices of type TERMINAL is described in the section "Specifying Terminal Lines," later in this chapter.

DRT Example

This example shows the editing of DRT controller information.

	DRT Terminal Controller
Controller name:	*DRT*
Comments:	CONTROLS LINES 2 3, CONS 4 5↲
Base line number:	0↲
Execute? (Y/N)	Y↲

The person typing might now list or edit line groups for this controller.

Specifying Intelligent Asynchronous Controllers (IACs)

There are several types of IACs. (An IAC is a device sold by DG as an IAC. Devices such as CPIs, LACs, LMCs, L/RMSCs, MCP1s, and ITC TermControllers, which you *specify* as IACs, are described in their own sections elsewhere in this chapter.).

IAC Models 4622/4623 and 4624/4625 are newer designs that support RS–422 and RS–232 signals. Models 4622 and 4623 are IAC–24s (they support 24 lines); Models 4624/4625 are IAC–8s (they support 8 lines). IAC Models 4367 through 4370 are older designs that support 20 milliampere lines; Models 4368 and 4370 are IAC–16s (they support 16 lines); Models 4367 and 4369 are IAC–8s (they support 8 lines).

An IAC–24 or IAC–16 can support lines attached to terminals and printers, but not modems. IAC–24s and IAC–16s are not designed to support modems; a modem connected to one of them may not work or may open security risks by allowing users to log on other users' sessions. Do not connect a modem to an IAC–24 or IAC–16 line.

An IAC–8 (any model) can handle a total of 8 lines, which can be attached to terminals, printers, *and* modems. (IAC Model 5916G can handle 16 terminal, printer, and modem lines, but this is actually two IAC–8s, each with its own device code, on a single board. If you have a Model 5916G, make sure it's specified as two IAC–8s to VSGEN.)

Configuring an IAC

Check the listing of your configuration; if you're sure you want to edit IAC information (or if you want to add an IAC), continue. To add instead of editing, use the ADD keyword instead of EDIT.

Enter choice: EDIT↵ (or ADD)

Device name:

People don't use the controller name to access terminals (they use the terminal console filename, form @CONn), but you will need to remember the controller name to define units.

The default name has the form IACn, where n is null for the first IAC, 1 for the second, 2 for the third, and so on. If you're editing or listing, specify the IAC you want. You can use the INDEX function key (SHIFT–F2 on a CRT, ESC–I on hardcopy) to list all devices. From the Index display, use CANCEL/EXIT (F11 or ESC–E) to return to the menu. If you're adding, we suggest a name of the default form. When you're ready, type the device name. For example,

IAC1↵

If you're adding, VSGEN asks the device type. Respond with IAC:

Device type: IAC↵

VSGEN displays the IAC screen. The IAC questions are as follows.

IAC Terminal Controller

Host: hhh

Controller name:	*xxx*
Comments:	
Device code (octal):	*nn*
IAC type:	
Base line number:	
VT100 terminal support? (Y/N)	*x*
Asian language support? (Y/N)	*x*
Execute? (Y/N)	

VSGEN fills in the controller name *xxx*; you can change this only via the RENAME keyword. You can change to a different host only via the HOST keyword and you can change the controller name only via the RENAME keyword.We'll take the remaining questions one by one.

Comments:

This field can be blank or it can include information people might find useful, like the lines on this controller or your name and the date; for example,

```
IAC 1 FOR SECRETARIAL POOL. BY S. THOMPSON. 3/4/90.↲
```

Device code (octal):

If you used an accurate configuration file or autosizer file, VSGEN will display an accurate default. If not, and you're adding an IAC, accept the default if it's accurate; the original defaults are 65 octal (first IAC), 50 octal (second IAC), 51 octal through 56 octal (third through eighth IACs), and 70 octal through 74 octal (ninth through 13th IACs). Note that on an MV/2500 DC, MV/2000 DC, or MV/1400 DC, a LAC — which you specify as an IAC–12 or IAC–32 — can fit in the top row (row A) or the bottom row (row B) of the chassis. For this device, you must select the nonstandard device code 40 for row A, or 41 for row B.

If you want to change the default value, type the value you want and press NEW LINE. To accept the default value on a CRT, press NEW LINE; on a hardcopy terminal, press CTRL–A and then NEW LINE.

IAC type:

For most controllers, the type is simply the number of lines the device supports. Valid answers include 192 (for a PIM–T1 controller), 128 (for an ITC/128 TermController), 64 (for an LTC/64 TermController), 32 (for an LAC–32), 24, 16, 12 (for a LAC–12), 8, or L/RMSC (a 16-line IAC hardened for use in a Rolm HAWK/32 computer). If the default for this device is accurate, take the default. If there is no default or you want to change it, type the correct number or answer and press NEW LINE.

Base line number:

The base-line number will determine the console filenames of terminals (and modems and printers) attached to lines on this controller. The number you specify must be larger than the last line number specified for any asynchronous controller.

For the first asychronous controller, the base-line number is 0. For other IACs, the base-line number must be at least as large as the result of the following formula.

base-line-of-preceding-asynchronous-controller
+
total-number-of-lines-on-all-preceding-asynchronous-controllers

For example, if the base line of the preceding IAC is 0 and it can support 24 lines, you could specify a base-line number of 24. We suggest you specify the lowest number available (the total number of lines on all asynchronous controllers already specified). More information on base-line numbers appears earlier, in the section "Specifying Base-line Numbers."

Type the line number and press NEW LINE, or accept the default value.

VT100 terminal support? (Y/N) x

If you want this IAC to support VT100-compatible terminals (terminals compatible with a Digital Equipment Corporation VT100 display terminal), you should answer Yes. (For VT100 support to work properly when the new system runs, the MXLT characteristic must also be selected. This characteristic is explained later in this chapter, in the section "Specifying Terminal Lines." You can select it at VSGEN or later with a CHARACTERISTICS command.)

A Yes answer reserves memory space for code needed to handle VT100 control characters. This reduces the amount of IAC memory available for I/O buffers and might affect processing speed on all lines. Also, enabling VT100 support via the MXLT characteristic incurs some processing overhead. Thus VT100 support is not without cost.

If you want this AOS/VS II system to support non-DG VT100 compatible terminals, we suggest you concentrate these terminals on specific controllers and select VT100 terminal support only for those IACs.

If you know you want VT100 terminal support on this IAC, answer Y for Yes. If the default is what you want, take it.

Asian language support? (Y/N) *x*

This question pertains to use of Asian languages like Japanese or Chinese. It allows the system to translate phonetic characters typed on a Kanji keyboard into ideographs on the screen. This also includes support to handle Kanji characters, which require 2 bytes of storage instead of the standard 1 byte. Generally, you will want to select this option only if a Kanji terminal is attached to one or more lines on this controller.

A Yes answer will tell the operating system to load Asian–language handling code into the controller. This will reduce the amount of memory available for I/O buffers and might affect processing speed on all lines; thus it is not without cost. If you want Asian language support, we suggest you concentrate the terminals on specific controllers and select Asian language support only for those controllers.

If you know that you want Asian language support, this answer should be Yes. (Later, when you identify terminal lines, for each terminal line that will use Asian language you should also select the 2–byte characteristic — M16B — explained later in "Specifying Terminal Lines.")

For an IAC–8 or an L/RMSC only, VSGEN asks

Split baud: x

If this IAC–8 or L/RMSC will support any terminals with attached slave printers, or if you know you want it to support split baud rate, specify the secondary baud rate. (You will indicate the primary rate when you specify the line groups for this IAC.) If the default is what you want, take it.

Execute? (Y/N)

Review the answers on the screen; if any seem wrong, back up and fix them. When you're satisfied with all values, confirm them by typing

Y↵

VSGEN takes your changes, if any, and makes them part of the configuration.

You've specified an IAC terminal controller. Now while the controller name is still fresh in your mind, we suggest that you add, edit, or list the terminal lines on this controller. To do this, add (or edit) a line group. The default name of the first such group has the form IACn_LINE_GROUP_0, where n is the number of the IAC you just specified, or null for the first IAC. The device type of a line group is TERMINAL. Specifying devices of type TERMINAL is described in "Specifying Terminal Lines," later in this chapter.

IAC Example with IAC–24 and IAC–8

This example shows a session in which someone edits settings for two IACs named IAC and IAC1.

VSGEN Main Menu

. . .

Enter choice: EDIT⤶

Device name: IAC⤶

IAC Terminal Controller

Host: MSIS_01

Controller name: *IAC*

Comments: CONTROLS LINES 0–23. BASE NUMBER 0. CONS 2–25⤶

Device code (octal): *65*⤶

IAC type: *24* ⤶

Base line number: 0⤶

VT100 terminal support? (Y/N) *Y* ⤶

Asian language support? (Y/N) N ⤶

Execute? (Y/N) Y⤶

VSGEN Main Menu

. . .

Enter choice: EDIT⤶

Device name: IAC1⤶

IAC Terminal Controller

Host: MSIS_01

Controller name: *IAC1*

Comments: LINES 24–31. MODEMS ON 24 & 25. BASE LINE 24. CONS 26–33⤶

Device code (octal): *50* ⤶

IAC type: *8*⤶

Base line number: *24*⤶

VT100 terminal support? (Y/N) *Y* ⤶

Asian language support? (Y/N) N ⤶

Split baud: 1200 ⤶

Execute? (Y/N) Y⤶

The person might now list or edit line groups for this controller. A full example, with IACs and terminal lines, is shown later in the chapter in Figure 4–16.

Specifying ITC/128s and LTC/64s (Intelligent TermControllers)

An ITC/128, Intelligent TermController, Model 4586, is a 128-line controller that works with a LAN and devices called TermServers and an optional TermManager processor to provide a pool of terminal lines. A TermManager is needed only if the TermServers lack a boot device like a diskette (the boot device lets them boot themselves). The hardware multiplexes line signals over the LAN, allowing one LAN cable to connect an ECLIPSE MV/Family system with hundreds of terminals.

An LTC/64 works the same way as an ITC/128, but supports 64 lines and is available on MV/2500 systems.

The only part of a TermServer network relevant to VSGEN is the ITC or LTC and the protocol that runs in the LAN network. Configuring other parts of the TermServer network is described in *Managing Your TermServer Network*.

For the ITC/LTC to operate correctly, you must have the appropriate revision of network software loaded before running VSGEN, so that VSGEN can copy the needed code from the QNET.LB library. After the system is built, you will need to start it, and then generate and bring up the network software.

If you have not loaded the network software yet, finish running VSGEN and create a configuration file, but do not build a system. Load the network software and move the QNET file as explained earlier, in the section "If You Have the XTS II, TCP/IP, or DG/OTS Network Transport System." Then, to build the tailored system, run VSGEN using the form VSGEN/BATCH=configuration-pathname.

Depending on which network protocol you choose for the LAN, it can support exclusively DG devices or a mixure of DG devices and UNIX systems. Figure 4-12 shows a TermServer network with the default XNS protocol; Figure 4-13 shows a TermServer network with TCP/IP protocol.

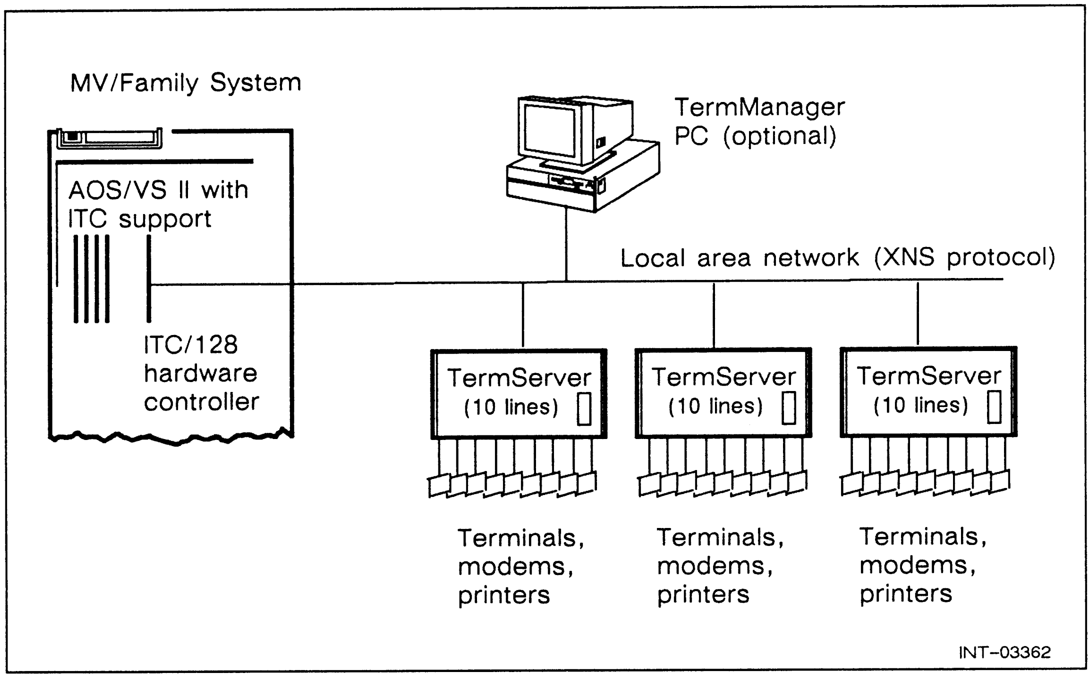


Figure 4-12 An ITC/128 TermController in a TermServer Network — XNS Protocol

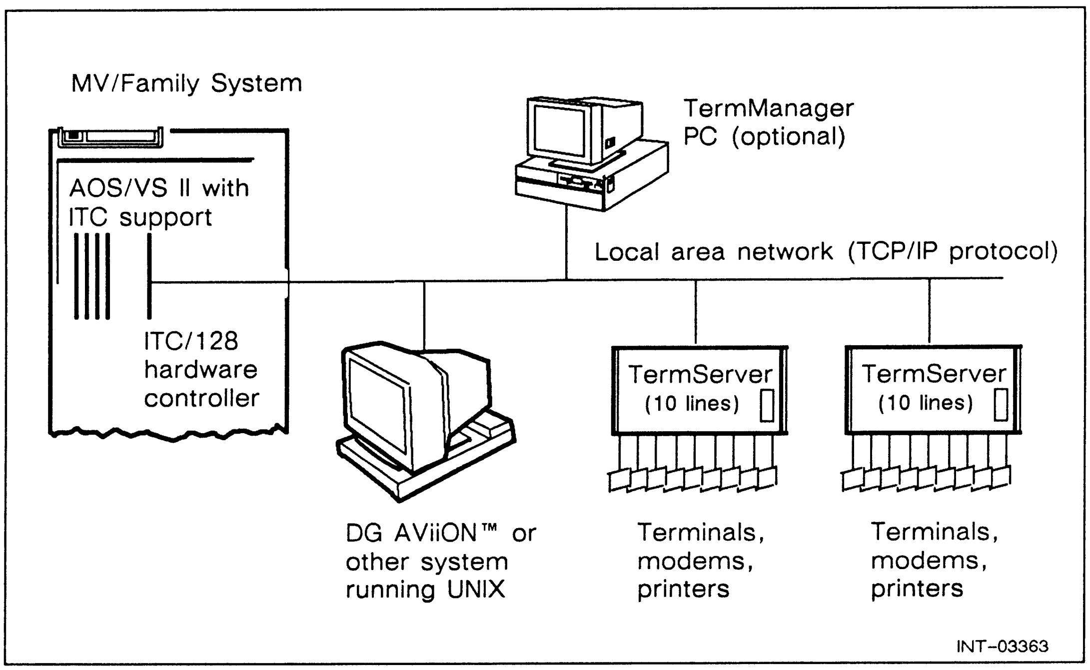


Figure 4-13 An ITC/128 TermController in a TermServer Network — TCP/IP Protocol

As you can see, the kind of devices the LAN supported depend on the protocol loaded. You can determine the protocol when you identify the ITC or LTC to VSGEN.

At AOS/VS II system startup, the peripheral manager program loads the ITC with code to manage the lines; then it ensures that the TermServers are loaded with code they need. If a TermServer has a boot device, it can load itself; otherwise, the TermManager loads it.

ITC/128 and LTC/64 Dialog

Check the listing of your configuration; if you are sure you want to edit ITC or LTC information (or if you want to add one), continue. To add instead of editing, use the ADD keyword instead of EDIT.

Enter choice: EDIT↵ (or ADD)

Device name:

People do not use the controller name to access terminals (they use the terminal console filename, form @CONn), but you will need to remember the controller name to define terminal lines.

For the first ITC, we suggest the name ITC, followed by ITC1, ITC2, and so on. Similarly, for the first LTC, we suggest LTC.

If you are editing or listing, specify the device you want. The INDEX function key (SHIFT–F2 on a CRT, ESC–I on hardcopy) lists all devices. From the Index display, use CANCEL/EXIT (F11 or ESC–E) to return to the menu. If you are adding, use a name of the default form. When ready, type the device name. For example,

ITC↵

If you're adding, VSGEN asks the device type. Respond with IAC:

Device type: IAC↵

VSGEN displays the menu. Questions are as follows.

IAC Terminal Controller

Host: hhh

Controller name: *xxx*

Comments:

Device code (octal): *nn*

IAC type:

Base line number:

VT100 terminal support? (Y/N) *x*

Asian language support? (Y/N) *x*

TERMANAGER down-load? (Y/N) x

Execute? (Y/N)

VSGEN fills in the controller name *xxx*; you can change this only via the RENAME keyword. You can change to a different host only via the HOST keyword. We will take the remaining questions one by one.

Comments:

This field can be blank or it can include information people might find useful, like the lines on this controller or your name and the date; for example,

ITC1 FOR SECRETARIAL POOL. BY S. THOMPSON. 3/4/90.)

Device code (octal):

If you used an accurate configuration file or autosizer file, VSGEN will display an accurate default. If not, and you are adding an ITC/LTC, accept the default if it is accurate; the original defaults are 65 octal (first IAC–type device), 50 octal (second IAC–type device), 51 octal through 56 octal (third through eighth IAC–type devices), and 70 octal through 74 octal (ninth through 13th IAC–type devices).

If you want to change the default value, type the value you want and press NEW LINE. To accept the default value on a CRT, press NEW LINE; on a hardcopy terminal, press CTRL–A and then NEW LINE.

IAC type:

For an ITC/128, specify type 128; for an LTC/64, specify 64. If the default for this device is accurate, take the default. If there is no default or you want to change it, type the correct number or answer and press NEW LINE.

VT100 terminal support? (Y/N) x

If you want this controller to support VT100–compatible terminals (terminals compatible with a Digital Equipment Corporation VT100 display terminal), you should answer Yes. (For VT100 support to work properly when the new system runs, the MXLT characteristic must also be selected. This characteristic is explained later in this chapter, in the section "Specifying Terminal Lines." You can select it at VSGEN or later with a CHARACTERISTICS command.)

A Yes answer reserves memory space for code needed to handle VT100 control characters. This reduces the amount of controller memory available for I/O buffers and might affect processing speed on all lines. Also, enabling VT100 support via the MXLT characteristic incurs some processing overhead. Thus VT100 support is not without cost.

If you want this AOS/VS II system to support non–DG VT100 compatible terminals, we suggest you concentrate these terminals on specific controllers and select VT100 terminal support only for those controllers.

If you know you want VT100 terminal support on this controller, answer Y for Yes. If the default is what you want, take it.

Asian language support? (Y/N) x

This question pertains to use of Asian languages like Japanese or Chinese. It allows the system to translate phonetic characters typed on a Kanji keyboard into ideographs on the screen. This also includes support to handle Kanji characters, which require 2 bytes of storage instead of the standard 1 byte. Generally, you will want to select this option only if a Kanji terminal is attached to one or more lines on this controller.

A Yes answer will tell the operating system to load Asian–language handling code into the controller. This will reduce the amount of memory available for I/O buffers and might affect processing speed on all lines; thus it is not without cost. If you want Asian language support, we suggest you concentrate the terminals on specific controllers and select Asian language support only for those controllers.

If you know that you want Asian language support, this answer should be Yes. (Later, when you identify terminal lines, for each terminal line that will use Asian language you should also select the 2-byte characteristic — M16B — explained later in "Specifying Terminal Lines.")

TERMANAGER down-load? (Y/N) x

This question determines which transport protocol file will be loaded into the ITC/LTC at system startup. If you have a TermManager processor and want it to load the default protocol file (XNS protocol), answer Yes. If you have a TermManager and want to use a different protocol (like TCP/IP, to communicate with systems that run UNIX), answer No. By answering No, you will be able to specify a user-defined protocol (in a file named as shown below). If you do not have a TermManager, answer No. If you answer Yes, skip to the *Execute* question.

If you answer No to the TERMANAGER question, VSGEN asks

Transport protocol: *x* (*x* is the default, initially XNS)

The transport protocols are as follows.

For This Transport Protocol	Specify This to VSGEN	Pathname That System Will Load into ITC or LTC at Startup
XNS	XNS	:XNS_ITC_IMAGE.PR (for an ITC) or :XNS_LTC_IMAGE.PR (for an LTC)
TCPIP	TCPIP	:TCPIP_ITC_IMAGE.PR (for an ITC) or :TCPIP_LTC_IMAGE.PR (for an LTC)
xxx (user-defined protocol)	xxx	:xxx_ITC_IMAGE.PR (for an ITC) or :xxx_LTC_IMAGE.PR (for an LTC)

Specify the protocol that you want. For example,

TCPIP ↲

Execute? (Y/N)

Review the answers on the screen; if any seem wrong, back up and fix them. When you're satisfied with all values, confirm them by typing

Y↲

You've specified an ITC or LTC terminal controller. Now while the controller name is still fresh in your mind, we suggest that you add, edit, or list the terminal lines on this controller. To do this, add (or edit) a line group. The default name of the first such group has the form ITCn_LINE_GROUP_0, or LTC_n_LINE_GROUP_0, where n is the number of the ITC you just specified, or null for the first ITC. The device type of a line group is TERMINAL. Specifying devices of type TERMINAL is described in "Specifying Terminal Lines," later in this chapter.

Terminal console filenames on a TermController are handled the same way as IAC names: the device name is @CON followed by the line number plus 2. For example, the device on line 0 is @CON2; the device on line 1 is @CON3; the device on line 31 is @CON33; and the device on line 127 is @CON129. For a TermServer network, the line-terminal assignments (line 0 to @CON2, for example) are fixed only at system startup. When a user logs on through a TermServer, he or she may be assigned the next available line (in other words, using the same terminal, a user might log on to console filename @CON102 in the morning and console filename @CON95 in the afternoon).

ITC/128 TermController Examples

This example shows a session in which someone edits settings for an ITC/128 and selects standard (XNS) protocol.

VSGEN Main Menu

...

Enter choice: EDIT⤶

Device name: ITC⤶

IAC Terminal Controller

Host: MSIS_01

Controller name: *ITC*

Comments: TERMCONTROLLER WITH DEFAULT PROTOCOL. CONS 26-153⤶

Device code: 52⤶

IAC type: *128*⤶

Base line number: *24* ⤶

VT100 terminal support? (Y/N) *Y* ⤶

Asian language support? (Y/N) N ⤶

TERMMANAGER down-load? (Y/N) *Y* ⤶

Execute? (Y/N) Y⤶

The person might now list or edit line groups for this controller.

This example shows a session in which someone edits settings for an ITC/128 and selects nonstandard (TCPIP) protocol.

VSGEN Main Menu

. . .

Enter choice: EDIT⤶

Device name: ITC⤶

IAC Terminal Controller

Host: MSIS_01

Controller name:	*ITC*
Comments: TERMCONTROLLER WITH TCP PROTOCOL. CONS 26-153⤶	
Device code:	52⤶
IAC type:	*128*⤶
Base line number:	*24* ⤶
VT100 terminal support? (Y/N)	*Y* ⤶
Asian language support? (Y/N)	N ⤶
TERMANAGER down-load? (Y/N)	N⤶
Transport protocol:	TCPIP ⤶
Execute? (Y/N)	Y⤶

The person might now list or edit line groups for this controller.

Specifying Local-Bus Asynchronous Controllers (LACs)

LACs are available on MV/2500 DC, MV/2000 DC, MV/1400 DC and MV/1000 DC desk-side systems only. Normally, these computers are shipped with AOS/VS or AOS/VS II *preinstalled*. In a preinstalled system, LACs are generated as type UAC (Universal Asynchronous Controller) devices. The UAC device defines all lines as standard. Any nonstandard characteristics (like those needed for modems or printers) are applied via the CHARACTERISTICS command in the UP macro.

You need to generate a different AOS/VS II system for a desk-side computer only if you want a nonstandard system, and cannot create the configuration you want by tailoring the preinstalled system UP macro.

If you want to generate a nonstandard AOS/VS II system for a computer on which AOS/VS II is preinstalled, use a system that is running preinstalled AOS/VS II, to make use of the preinstalled system configuration file, AOSVSII_SMI.CONFIG. On the deskside system, run VSGEN in the form

Su) VSGEN/DEFAULT=AOSVSII_SMI↵

Next, for each LAC whose lines you want to change, delete the UAC; then add the LAC as an IAC of the appropriate type (12, 16, or 32). For a LAC on the first LAC device code, 40, use a base-line number of 10. For a LAC on the second device code, 41, use a base-line number of 10 plus the number of lines on the first LAC. Specify the terminal lines on each controller as desired. Specify a LAC-12 as an IAC type 12, a LAC-16 as an IAC type 16, and a LAC-32 as an IAC type 32.

There are two versions of the LAC-32: Model 4626, with RS-232-C support only; and Model 4627, with both RS-232-C and RS-422 support. There are two versions of the LAC-32: Model 4626, with RS-232-C support only; and Model 4627, with both RS-232-C and RS-422 support. Likewise, there are two versions of the LAC-16: Model 4713, with RS-232-C support, and Model 4712, with both RS-232 and RS-422 support. (LAC-16 are available on MV/1000 DC systems only.) If you are configuring one LAC in slot A, assign the lines according to the following tables.

LAC-12 Lines

VSGEN Line Numbers	Device(s) Supported	Terminal Filenames (first LAC only, using file AOSVSII_SMI)
0–9	terminals	@CON12–@CON21
10–11	modems	@CON22–@CON23

LAC-16 Lines

VSGEN Line Numbers	Device(s) Supported	Terminal Filenames (first LAC only, using file AOSVSII_SMI)
0–2	modems, printers, or terminals	@CON12–@CON14
3	printers or terminals	@CON15
4–15	terminals only	@CON16–@CON27

LAC-32 Lines

VSGEN Line Numbers	Device(s) Supported	Terminal Filenames (first LAC only, using file AOSVSII_SMI)
0–5	modems, printers, or terminals	@CON12–@CON17
6–7	printers or terminals	@CON18–@CON19
8–31	terminals only	@CON20–@CON43

If you are adding a second LAC in row B, assign the base-line number as 10+number-of-lines-on-first-LAC, as mentioned above.

LAC Example

This example shows a session in which someone edits settings for an LAC-32. Before adding the LAC controller, he must delete the UAC controller.

VSGEN Main Menu

...

Enter choice: DELETE↵

Device name: UAC↵

Execute? (Y/N): Y↵

VSGEN Main Menu

...

Enter choice: ADD↵

Device name: LAC↵

Device type: IAC↵

IAC Terminal Controller

Host: BULLDOG

Controller name: *LAC*

Comments: L-BUS CONTROLLER. MUST BE GENNED AS IAC-32. CONS 12-43↵

Device code (octal): 40↵

IAC type: 32↵

Base line number: 10↵

VT100 terminal support? (Y/N) *Y* ↵

Asian language support? (Y/N) N ↵

Execute? (Y/N) Y↵

The person typing might now list or edit line groups for this controller. A full example, with terminal lines specified, is shown later in the chapter in Figure 4-16.

Specifying Local-Bus Modem Controllers (LMCs)

A local-bus modem controller (LMC) supports 8 modem or nonmodem lines on MV/2500 DC, MV/2000 DC, and MV/1400 DC integrated systems only.

These computers are shipped with a tailored AOS/VS II system already installed (preinstalled AOS/VS II). As with the LAC, you need to generate a different AOS/VS II system only you want a nonstandard line configuration for the LMC. You should use the spec file AOSVSII_SMI (VSGEN/DEFAULT=AOSVSII_SMI), as explained in the LAC section that precedes this one. To VSGEN, you add an LMC as an IAC type 8.

For an example of VSGEN dialog for LMCs, see the example for LAC, above. The only difference is the IAC type; for LMC, it is 8 (instead of 32, as shown).

Specifying L/RMSC Controllers

An L/RMSC controller, model 3580 or 3580A, supports 16 lines in a Rolm HAWK/32 computer (model 1900). The Hawk/32 is available from LORAL/Rolm Mil-Spec Computers. You specify an L/RMSC to VSGEN as IAC type L/RMSC.

For L/RMSC configuration information, see the explanation for IAC-16s under "Specifying Intelligent Asynchronous Controllers (IACs)" earlier in this chapter. The only difference is that an L/RMSC supports split baud rate (as does an IAC-8).

Specifying Multicommunications Processor Asynchronous Controllers (MCP1s)

A Multicommunications Processor asynchronous controller (MCP1), Model 4543, has the following features:

- It supports eight asynchronous lines, like an IAC-8, but only the first two lines can be connected to modems. A split baud rate is not available. You specify the asynchronous controller and its lines to VSGEN as if they were an IAC-8. The default device codes are the same as for IACs (first 65, second 50, and so on).

  Terminal console filenames on an MCP1 are numbered the same way as on the first IAC — the device on line 0 is has the filename @CON2; the device on line 1 has the filename @CON3, ..., and the device on line 7 has the filename @CON9.

- An MCP1 also supports two synchronous lines. If you want to use these, you must identify them to BSCGEN (later in the chapter) as an ISC-2.

- An MCP1 supports an LPB data channel line printer. If a line printer is connected to the MCP1 printer controller, you must specify it as a device of controller type LPB on device code 57. The VSGEN dialog for line printers appears later in this chapter, in the section "Specifying Line Printers."

For MCP1 configuration information, see the explanation for IAC-8s under "Specifying Intelligent Asynchronous Controllers (IACs)" earlier in this chapter. The only difference is that split baud rate is not available; do not select it.

Specifying a PAD Controller

A PAD (packet assembler/disassembler) is a soft controller that connects the operating system to a remote terminal — via a Public Data Network that uses X.29 virtual terminal protocol. The software and hardware arrangement is shown in Figure 4–14.

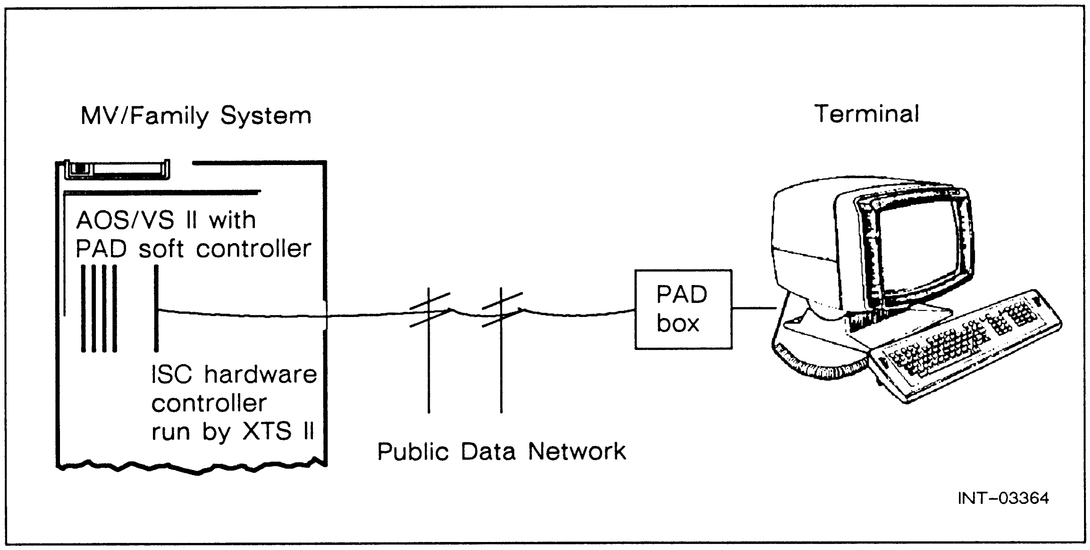


Figure 4–14 PAD Hardware and Software Configuration

With AOS/VS II Release 2.00, you have a choice of PAD terminal handlers: you can specify a PAD soft controller in VSGEN, or you can skip the PAD in VSGEN and let the network UP macro start the PAD terminal handling process SVTA (as before Release 2.00). If you specify a PAD controller and line group to VSGEN, the operating system and not the SVTA process will manage virtual terminals. Performance on the virtual terminals will be better if you do it via VSGEN; however, the network UP macro will report errors when it tries to create and direct the SVTA process. These are not serious errors, but they might be disconcerting.

If you want the operating system to support PAD terminals, you must specify a PAD (device type PAD) and line group for the AOS/VS II system. When you run the tailored system, VSGEN will create PADCON entries in directory PER.

For the PAD terminal(s) to operate correctly, you must have the appropriate revision of XTS II loaded before running VSGEN, so that VSGEN can copy the needed code from the QNET.LB library. After the system is built, you will need to start it, and then generate and bring up the network software. (If you have not loaded the network software yet, finish running VSGEN and create a configuration file, but do not build a system. Load XTS II and move the QNET file as explained earlier, in the section "If You Have the XTS II, TCP/IP, or DG/OTS Network Transport System." Then run VSGEN using the form VSGEN/BATCH=configuration–pathname to build the tailored system.)

Configuring a PAD

The PAD is not a hardware entity, therefore the Disk Jockey sizer routine cannot generate an entry for it. If a PAD has not been added to your system, you must add one. There can be only one PAD and one PAD line group per system. To add one, type

Enter choice: ADD↵ (Or to edit an existing PAD, use EDIT)

Device name:

People don't use the controller name to access terminals (they use the terminal console filename, form @PADCONn), but you will need to remember the controller name to define a line group. We suggest the name PAD1. For example,

PAD1↵

If you're adding, VSGEN asks the device type. Respond with PAD:

Device type: PAD↵

VSGEN displays the PAD screen as follows.

PAD Terminal Controller

Host: hhh

Controller name:	*xxx*
Comments:	
Accept reverse charging (Y/N)?	*N*
Specify PAD parameters (Y/N)?	*N*
Execute? (Y/N)	

VSGEN fills in the hostname *hhh* and the controller name *xxx*. You can change to a different host only via the HOST keyword and you can change the controller name only via the RENAME keyword. We'll take the remaining questions one by one.

Comments:

This field can be left blank or it can include information people might find useful, like the use of the controller, your name, and the date; for example,

PAD FOR PDN CONNECTION. BY S. THOMPSON. 3/4/90.↵

Accept reverse charging (Y/N): *N*

Normally, the PADCON terminal user is billed for line usage. A Yes answer allows the host to accept calls that specify that the host (your system) should be billed for line usage.

If you want to change the default value, type the value you want and press NEW LINE. To accept the default value on a CRT, press NEW LINE; on a hardcopy terminal, press CTRL–A, and then NEW LINE.

Specify PAD parameters? (Y/N) *N*

PAD parameters control functions in the terminal user's PAD box hardware. For example, some parameters direct the PAD box to echo characters locally or to write out its buffer. CCITT specification X.3 defines 22 PAD parameters. Other PAD boxes may define additional parameters. VSGEN imposes defaults on some parameters to ensure that the PAD communication mechanism will work properly; however, if you want to define different values and know what you are doing, you can do this by answering Yes to this question. VSGEN lets you specify up to 127 PAD parameters.

If you answer Yes, VSGEN will later ask you to define each parameter by number, reference, and value. If you answer No, VSGEN will impose the defaults and not ask. Decide on your answer (Y or N) and type it, followed by NEW LINE.

Execute? (Y/N)

Review the answers on the screen; if any seem wrong, back up and fix them. When you're satisfied with all values, confirm them by typing

Y↲

Now unless you answered Y to *Specify PAD parameters* above, VSGEN takes your changes, if any, and makes them part of the configuration. Control returns to the menu from which you specify ADD (or EDIT). Skip to the section "Continuing with PAD."

Specifying PAD Parameters

If you answered Yes to *Specify PAD parameters* above, VSGEN will later ask you to define each parameter by number, reference, and value. The display looks like this:

PAD Parameter Specification

		Host: hhh	
Parameter	*Parameter*	*Parameter*	
Number	*Reference*	*Value*	*Comment*

(1 – Add, 2 – Delete, 3 – Edit, 4– Insert, 5– Execute) *Choose option:*

This is the display screen, initially empty. (VSGEN default PAD parameters are defined internally, not displayed.) You can scroll the display using uparrow, downarrow, or the Next Page or Previous Page function keys. Via options 1 – 4, you can add, delete, edit, or insert a parameter; VSGEN will continue asking for a parameter to add, delete, edit, or insert until you press CANCEL/EXIT. You must add, delete, edit or insert parameters one at a time; VSGEN does not allow ranges. When you add, VSGEN asks for information as follows.

Add after:
Param Ref *Param Val* *Comment*

The number you specify after *Add after* must have been defined. For example, if only one parameter is defined and you want to add one, you must add it after number 1, not after number 2. The parameter reference is a place holder; the valid range is integers 0 through 127. The parameter value must be an integer 0 through 255. The comment can include any printable characters you like. Terminate each answer with NEW LINE.

When you delete or edit, VSGEN asks the parameter number, and then, if you are editing, it asks for new values. When you have specified all the parameters you want, return to the *Choose option* prompt and select choice 5, *Execute*. VSGEN will record your answers and return to the menu from which you chose the "PAD Terminal Controller" screen.

The following sample shows the screen after nine parameters have been specified.

PAD Parameter Specification
Host: TZONE

Parameter Number	*Parameter Reference*	*Parameter Value*	*Comment*
1	*1*	*0*	*NO RECALL CHAR*
2	*2*	*0*	*NO LOCAL ECHO*
3	*3*	*126*	*FORWARD ON CTRL CHARS AND DEL*
4	*5*	*0*	*NO DTE IFC*
5	*7*	*8*	*BREAK = ESC TO COMMAND MODE*
6	*0*	*0*	*INTERNATIONAL SEPARATOR*
7	*1*	*4*	*OVERCHARGE CUSTOMERS*
8	*20*	*0*	*FULL DUPLEX*
9	*36*	*0*	*DISABLE TELENET INTERVAL TIMER*

(1 – Add, 2 – Delete, 3 – Edit, 4– Insert, 5– Execute)   *Choose option:*

Continuing with PAD

You've specified a PAD terminal controller. Now while the controller name is still fresh in your mind, we suggest that you add or edit the terminal line group on this controller. To add a controller, we suggest that you name the PAD line group PAD_LINE_GROUP. The device type of a line group is TERMINAL. Specifying devices of type TERMINAL is described in "Specifying Terminal Lines," later in this chapter. The following example shows the line group specification.

PAD Example

This example shows a session in which someone adds a PAD controller and line group.

VSGEN Main Menu

...

Enter choice: ADD⤶

Device name: PAD1⤶

Device type: PAD⤶

Execute? (Y/N): Y⤶

PAD Terminal Controller

Host: MSIS_01

Controller name: *PAD1*

Comments: PAD FOR PDN CONNECTION. BY S. THOMPSON. 3/4/90.⤶

Accept reverse charging (Y/N): *N* ⤶

Specify PAD parameters (Y/N): *N* ⤶

Execute? (Y/N) Y⤶

VSGEN Main Menu

...

Enter choice: ADD⤶

Device name: PAD_LINE_GROUP⤶

Device type: TERMINAL⤶

Execute? (Y/N): Y⤶

Terminal Line Group
Host: MSIS_01

Line group name:	*PAD_LINE_GROUP*	
Comments:	TERMINAL LINES FOR PAD TERMINALS.⤶	
Controller name:	PAD1 ⤶	
Number of lines:	8 ⤶	(Allows system to support a maximum of 8 PAD terminals, named PADCON0 through PADCON7.)
Terminal definition:	*CRT3* ⤶	
Terminal type:	*CRT3* ⤶	
Input buffer length:	*128* ⤶	
Output buffer length:	*128* ⤶	
Lines per page:	*24* ⤶	
Characters per line:	*80* ⤶	
Break key function:	*MBBM* ⤶	
Characteristics:	*MST MEOC MULC MWRP MCTD* ⤶	

Execute? (Y/N) Y ⤶

Specifying a PCVTSERVER Controller

AOS/VS II can support IBM-compatible personal computers (PCs) just as if they were user terminals. Using PCs this way has many advantages: each PC user can access the DG system's applications software (like the CEO® electronic office, with mail and filing) while retaining the advantages of a PC (like MS-DOS® spreadsheet and word processing applications).

To support PCs as user terminals, your system needs a LAN controller and network software. Required software includes XTS II for the DG system and DG/PC*I software like the Workstation Transport System (WTS) for the PC(s). For this AOS/VS II system to support PCs, VSGEN must run using the XTS II library QNET.LB, loaded with the network software. (If you have not loaded the network software yet, finish running VSGEN and create a configuration file, but do not build a system. Load XTS II and move the QNET file as explained earlier, in the section "If You Have the XTS II, TCP/IP, or DG/OTS Network Transport System." Then run VSGEN using the form VSGEN/BATCH=configuration-pathname to build the tailored system.)

Before the connections will work, you must configure the LAN network using the XTS II network generation program. Also, since AOS/VS II will treat each PC user as a standard terminal user, you'll need to create a user profile for each user. Configuring a PC network is further described in *Installing and Using the Data General/PC*Integration Workstation Software*.

Regardless of the network hardware and generation steps, AOS/VS II can support PCs only if you specify a PC server, PCVTSERVER, and line group to VSGEN.

As mentioned earlier in this chapter, the VSGEN treatment of PCs in Release 2.00 differs from that in earlier revisions. Before Release 2.00, you specified the number of PCs as a host parameter. If you are using a pre-Release 2.00 configuration file that has PCs specified, VSGEN will automatically generate the correct soft controller (PCVTSERVER) with the number of lines specified as the number of PCs in the configuration file. You do not need to specify the soft controller and lines manually.

Configuring a PCVTSERVER

The PCVTSERVER is not a hardware entity, therefore the Disk Jockey sizer routine cannot generate an entry for it. If a PCVTSERVER has not been added to your system, you must add one. There can be only one PCVTSERVER and one PCVTSERVER line group per system. To add one, type

Enter choice: ADD↵ (Or to edit an existing PCVTSERVER, use EDIT)

Device name:

People don't use the controller name to access terminals (they use the terminal console filename, form @PCCONn), but you will need to remember the controller name to define a line group. We suggest the name PCVTSERVER1. For example,

PCVTSERVER1↵

If you are adding a controller, VSGEN asks the device type. Respond with PCVTSERVER:

Device type: PCVTSERVER⤶

VSGEN displays the PCVTSERVER screen as follows.

PCVTSERVER Terminal Controller

Host: hhh

Controller name: *xxx*

Comments:

Execute? (Y/N)

VSGEN fills in the host name *hhh* and the controller name *xxx*. You can change to a different host only via the HOST keyword and you can change the controller name only via the RENAME keyword. We'll take the remaining question.

Comments:

This field can be left blank or it can include information people might find useful, like the use of the controller, your name, and the date; for example,

CONNECTS TO PCS ON DG/PC*I. BY S. THOMPSON. 3/4/90.⤶

Execute? (Y/N)

When you're satisfied with the comments, confirm them by typing

Y⤶

Now VSGEN takes your changes and makes them part of the configuration. Control returns to the menu from which you specified ADD (or EDIT).

You've specified a PCVTSERVER terminal controller. Now while the controller name is still fresh in your mind, we suggest that you add or edit the terminal line group on this controller. To add a controller, we suggest that you name the line group PCVTSERVER_LINE_GROUP. The device type of a line group is TERMINAL. Specifying devices of type TERMINAL is described in "Specifying Terminal Lines," later in this chapter. The following example shows the line group specification.

PCVTSERVER Example

This example shows a session in which someone adds a PCVTSERVER controller and line group.

VSGEN Main Menu

...

Enter choice: ADD↵

Device name: PCVTSERVER1 ↵

Device type: PCVTSERVER ↵

Execute? (Y/N): Y↵

PAD Terminal Controller

Host: MSIS_01

Controller name: *PCVTSERVER1*

Comments: CONNECTS TO PCS ON DG/PC*I. BY S. THOMPSON. 3/4/90.↵

Execute? (Y/N) Y↵

VSGEN Main Menu

...

Enter choice: ADD↵

Device name: PCVTSERVER_LINE_GROUP↵

Device type: TERMINAL↵

Execute? (Y/N): Y↵

Terminal Line Group
Host: MSIS_01

Line group name:	*PCVTSERVER_LINE_GROUP*	
Comments:	TERMINAL LINES FOR PC TERMINALS.↵	
Controller name:	PCVTSERVER1 ↵	
Number of lines:	12 ↵	(Allows system to support a maximum of 12 PCs, numbered PCON0 through PCON11.)
Terminal definition:	*CRT3* ↵	
Terminal type:	*CRT3* ↵	
Input buffer length:	*128* ↵	
Output buffer length:	*128* ↵	
Lines per page:	*24* ↵	
Characters per line:	*80* ↵	
Break key function:	*MBBM* ↵	
Characteristics:	*MST MEOC MULC MWRP MCTD* ↵	

Execute? (Y/N) Y ↵

Specifying a Processor Interface Module (PIM)

A processor interface module (PIM) connects an ECLIPSE MV/Family computer to an Integrated Office Switching System (IOSS). The IOSS, Data General's integrated office switch, is a digital voice/data PBX telephone switch. An IOSS lets existing telephone wiring serve as cabling between the computer and user terminals.

There are two versions of PIM, PIM-E and PIM-T1. The PIM-E supports as many as 128 lines; you identify it to VSGEN as a PIM. A PIM-E has a controller and four host interface processors (HIPs). PIM-E requires five sequential device codes. You specify only the first code, and VSGEN reserves this code and the four that follow it.

A PIM-T1 supports as many as 192 lines. It requires only one device code. You identify it to VSGEN as an IAC type 192.

Configuring a PIM-E

This section explains configuring a 128-line PIM-E; PIM-T1s are explained later on. Examine the listing of your configuration; if you're sure you want to edit PIM-E information (or if you want to add a PIM-E), continue. To add instead of editing, use keyword ADD, not EDIT.

Enter choice: EDIT↵ (or ADD)

Device name:

People do not use the controller name to access terminals (they use the terminal console filename, form @CONn), but you will need to remember the controller name to define terminal lines. The default name has the form PIMn, where n is null for the first PIM; so the names are PIM, PIM1, and so on.

If you are editing or listing, specify the PIM you want. You can use the INDEX function key to list all devices. From the Index display, use CANCEL/EXIT to return to this menu. If you're adding, we suggest a name of the default form. Type the device name; for example,

PIM↵

If you are adding, VSGEN asks the device type. Respond with PIM:

Device type: PIM↵

VSGEN displays the PIM screen:

PIM Terminal Controller

PIM Controller name: xxx

Comments:

PIM requires 5 consecutive device codes, specify the first
Device code (octal) [0-277]: nn

Base line number:

HIPs to support (0 1 2 3):

VT100 terminal support? (Y/N)

Asian language support? (Y/N)
Execute? (Y/N)

VSGEN fills in the controller name *xxx*; you can change this only via the RENAME keyword. We'll take the remaining questions one by one.

Comments:

This field can be blank or it can include information people might find useful, like the personal call management (PCM) lines on this controller or your name and the date; for example,

PIM1 – LINES 32 – 48 FOR PCM. BY S. THOMPSON. 3/4/90.)

PIM requires 5 consecutive device codes, specify the first
Device code (octal) [0–277]:

Type the first of the 5 device codes, or accept the default value (on a CRT, press NEW LINE; on a hardcopy terminal, press CTRL–A and then NEW LINE).

Base–line number:

This determines the line numbers of all terminals attached to the PIM, including as many HIPs as you specified above. This number indicates line 0 of the first PIM you specified.

The number you specify must be larger than the last line number specified for any asynchronous controller. We suggest you specify the lowest number available (the total number of lines on all asynchronous controllers already specified). For the first such controller, this number is 0.

The number of the first line on each HIP depends on the base–linenumber (n) as follows:

- First HIP (HIP 0), first line is number n+0.
- Second HIP (HIP 1), first line is number n+32.
- Third HIP (HIP 2), first line is number n+64.
- Fourth HIP (HIP 3), first line is number n+96.

If the base–line number were 0, the AOS/VS II console filename @CON2 would correspond to HIP 0, line 0; @CON33 would correspond to HIP 0, line 31; @CON34 would correspond to HIP1, line 0 (base line of 32), and so on for the remaining HIPs.

Make sure that the HIP base–line numbers you specify to VSGEN are the same as those specified in the MV CONSOLE ASSIGNMENT portion of the IOC generation (IOC stands for integrated office controller, the complex of computers and IOSS switch). The integrated office controller generation program, IOCGEN, produces an MV CONSOLE ASSIGNMENT report that shows the base–line numbers you should enter for each PIM on each host in the integrated office controller.

Type the line number and press NEW LINE, or accept the default value.

HIPs to support (0 1 2 3):

There are four HIPs, numbered 0, 1, 2, and 3. Each HIP supports 32 lines. You need specify only enough HIPs to support terminals on your system. To specify all four HIPs, type 0 1 2 3↵; to specify HIPs 0 and 1, type 0 1↵; and so on.

Specify the HIPs you want the new system to support, or accept the default value.

VT100 terminal support? (Y/N) *x*

If you want this controller to support VT100-compatible terminals (terminals compatible with a Digital Equipment Corporation VT100 display terminal), you should answer Yes. (For VT100 support to work properly when the new system runs, the MXLT characteristic must also be selected. This characteristic is explained later in this chapter, in the section "Specifying Terminal Lines." You can select it at VSGEN or later with a CHARACTERISTICS command.)

A Yes answer reserves memory space for code needed to handle VT100 control characters. This reduces the amount of controller memory available for I/O buffers and might affect processing speed on all lines. Also, enabling VT100 support via the MXLT characteristic incurs some processing overhead. Thus VT100 support is not without cost.

If you want this AOS/VS II system to support non-DG VT100 compatible terminals, we suggest you concentrate these terminals on specific controllers and select VT100 terminal support only for those controllers.

If you know you want VT100 terminal support on this controller, answer Y for Yes. If the default is what you want, take it.

Asian language support? (Y/N) *x*

This question pertains to use of Asian languages like Japanese or Chinese. It allows the system to translate phonetic characters typed on a Kanji keyboard into ideographs on the screen. This also includes support to handle Kanji characters, which require 2 bytes of storage instead of the standard 1 byte. Generally, you will want to select this option only if a Kanji terminal is attached to one or more lines on this controller.

A Yes answer will tell the operating system to load Asian-language handling code into the controller. This will reduce the amount of memory available for I/O buffers and may affect processing speed on all lines; thus it is not wihtout cost. If you want Asian language support, we suggest you concentrate the terminals on specific controllers and select Asian language support only for those controllers.

If you know that you want Asian language support, this answer should be Yes. (Later, when you identify terminal lines, for each terminal line that will use Asian language you should also select the 2-byte characteristic — M16B — explained later in "Specifying Terminal Lines.")

Execute? (Y/N)

Review the answers on the screen; if any seem wrong, back up and fix them. When you're satisfied with all values on the screen, confirm by typing

Y↵

VSGEN takes your changes, if any, and makes them part of the configuration.

You've specified an PIM terminal controller. Now while the controller name is still fresh in your mind, we suggest that you add, edit, or list the terminal lines on this controller. To do this, add (or edit) a line group. The default name of the first such group has the form PIMn_LINE_GROUP_0, where n is the number of the PIM you just specified, or null for the first IAC. The device type of a line group is TERMINAL. Specifying devices of type TERMINAL is described in "Specifying Terminal Lines," later in this chapter.

PIM-E Example

This example shows the editing of PIM-E information.

VSGEN Main Menu

...

Enter choice: EDIT⮐

Device name: PIM⮐

PIM Terminal Controller

PIM Controller name: *PIM*

Comments: PIM1 — LINES 32-48 FOR PCM. BY S. THOMPSON. 3/4/90.⮐

PIM requires 5 consecutive device code, specify the first
Device code (octal) [0-277]: *70*⮐

HIPs to support (0 1 2 3): *0,1,2,3* ⮐

Base line number: *0*⮐

VT100 terminal support? (Y/N) *Y* ⮐

Asian language support? (Y/N) N ⮐

Execute? (Y/N) Y⮐

The person typing might now list or edit line groups for this controller. A full example on PIM controllers, with terminal lines specified as well, is shown later in the chapter in Figure 4-16.

Configuring a PIM–T1

This section explains configuring a 192–line PIM–T1; PIM–Es are explained earlier.

Examine the listing of your configuration; if you're sure you want to edit PIM information (or if you want to add a PIM), continue. To add instead of editing, use the ADD keyword instead of EDIT.

Enter choice: EDIT↵ (or ADD)
Device name:

People don't use the controller name to access terminals (they use the terminal console filename, form @CONn), but you will need to remember the controller name to define terminal lines.

The default name for a PIM–T1 has the form PIMn, where n is null for the first PIM type of device; so the names are PIM, PIM1, PIM2, PIM3, and so on.

If you're editing or listing, specify the PIM you want. You can use the INDEX function key to list all devices. From the Index display, use CANCEL/EXIT to return to the menu. If you're adding, we suggest a name of the default form. Type the device name; for example,

PIM1↵

If you're adding, VSGEN asks the device type. A PIM–T1 is a device of type IAC, so respond with IAC:

Device type: IAC↵

VSGEN displays the IAC screen:

IAC Terminal Controller

Controller name: *PIM1*

Comments:

Device code (octal):

IAC type:

Base line number:

VT100 terminal support? (Y/N)

Asian language support? (Y/N)

Execute? (Y/N)

VSGEN fills in the controller name *xxx*; you can change this only via the RENAME keyword. We'll take the remaining questions one by one.

Comments:

This field can be blank or it can include information people might find useful, like the lines on this controller or your name and the date; for example,

PIM–T1 — SPECIFY AS AN IAC–192. BY ALISON VEBLEN. 3/4/90.↵

Device code (octal) [0–277]:

Type the device code of the PIM–T1, or accept the default value (on a CRT, press NEW LINE; on a hardcopy terminal, press CTRL–A and then NEW LINE). For example,

⤶

IAC type:

For a PIM–T1, you must answer 192:

192⤶

Base line number:

The base–line number determines the line numbers of all terminals attached to the PIM.

The number you specify must be larger than the last line number specified for any asynchronous controller. We suggest you specify the lowest number available (the total number of lines on all asynchronous controllers already specified). For the first such controller, this number is 0.

Type the base–line number and press NEW LINE. Or take the default, for example,

⤶

VT100 terminal support? (Y/N) x

If you want this controller to support VT100–compatible terminals (terminals compatible with a Digital Equipment Corporation VT100 display terminal), you should answer Yes. (For VT100 support to work properly when the new system runs, the MXLT characteristic must also be selected. This characteristic is explained later in this chapter, in the section "Specifying Terminal Lines." You can select it at VSGEN or later with a CHARACTERISTICS command.)

A Yes answer reserves memory space for code needed to handle VT100 control characters. This reduces the amount of controller memory available for I/O buffers and might affect processing speed on all lines. Also, enabling VT100 support via the MXLT characteristic incurs some processing overhead. Thus VT100 support is not without cost.

If you want this AOS/VS II system to support non–DG VT100 compatible terminals, we suggest you concentrate these terminals on specific controllers and select VT100 terminal support only for those controllers.

If you know you want VT100 terminal support on this controller, answer Y for Yes. If the default is what you want, take it.

Asian language support? (Y/N) x

This question pertains to use of Asian languages like Japanese or Chinese. It allows the system to translate phonetic characters typed on a Kanji keyboard into ideographs on the screen. This also includes support to handle Kanji characters, which require 2 bytes of storage instead of the standard 1 byte. Generally, you will want to select this option only if a Kanji terminal is attached to one or more lines on this controller.

A Yes answer will tell the operating system to load Asian-language handling code into the controller. This will reduce the amount of memory available for I/O buffers and might affect processing speed on all line; thus it is not without cost. If you want Asian language support, we suggest you concentrate the terminals on specific controllers and select Asian language support only for those controllers.

If you know that you want Asian language support, this answer should be Yes. (Later, when you identify terminal lines, for each terminal line that will use Asian language you should also select the 2-byte characteristic — M16B — explained later in "Specifying Terminal Lines.")

Execute? (Y/N)

Look at the answers on the screen; if any seem wrong, back up and fix them. When you're satisfied with all values on the screen, confirm by typing

Y ⮐

VSGEN takes your changes, if any, and makes them part of the configuration.

You've specified an PIM-T1 terminal controller. Now while the controller name is still fresh in your mind, we suggest that you add, edit, or list the terminal lines on this controller. To do this, add (or edit) a line group. The default name of the first such group has the form PIMn_LINE_GROUP_0, where n is the number of the PIM you just specified, or null for the first IAC. The device type of a line group is TERMINAL. Specifying devices of type TERMINAL is described in "Specifying Terminal Lines," later in this chapter.

PIM–T1 Example

This example shows editing of PIM–T1 information (which, as needed, was defined to VSGEN as an IAC type 192).

VSGEN Main Menu

...

Enter choice: EDIT↵

Device name: PIM1↵

IAC Terminal Controller

Controller name: *PIM1*

Comments: PIM–T1, GENNED AS IAC 192, LINES 0–191.↵

Device code (octal) [0–277]: *70*↵

IAC type: *192*↵

Base line number: *0*↵

VT100 terminal support? (Y/N) *Y*↵

Asian language support? (Y/N) N↵

Execute? (Y/N) Y↵

The person might now list or edit line groups for this controller. A full example on IAC controllers, with terminal lines specified as well, is shown later in the chapter in Figure 4–16.

Specifying a TELNET Controller

TELNET is a virtual terminal protocol similar to X.29; it is used in the popular TELNET application that runs under TCP/IP networking software. The TELNET application lets users log on other systems. It is widely used on UNIX systems and is analagous to DG's Virtual Terminal Agent (VTA). Using TELNET lets remote users on DG/UX™, another UNIX system, or AOS/VS II access the DG system's applications software (like the CEO electronic office, with mail and filing) while retaining the familiarity of UNIX for local processing).

To support remote TELNET terminals, your system needs a LAN controller (like an ILC) and TCP/IP network software. The hardware–software configuration looks like Figure 4–15.

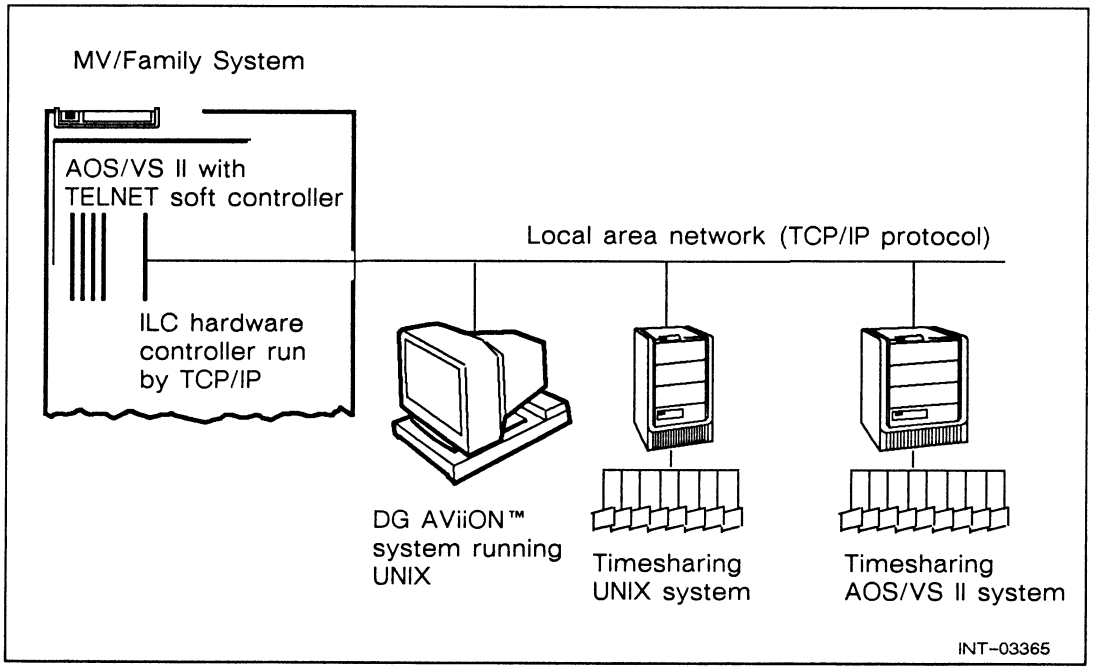


Figure 4–15 A TCP/IP TELNET Hardware/Software Configuration

Choosing a TELNET Terminal Handler

With AOS/VS II Release 2.00, you have a choice of TELNET terminal handlers: you can specify the TELNET soft controller in VSGEN or you can skip the server in VSGEN and use the separate TELNET application (as before Release 2.00). If you specify a TELNET soft controller and line group to VSGEN, the operating system and not the TELNETD process will manage virtual terminals. Performance on the TELNET terminals will be better if you do it via VSGEN.

For the operating system to support TELNET terminals, you must be running AOS/VS II TCP/IP Release 1.00 or later. This includes the appropriate revision of XTS II. TCP/IP itself requires DG/ONMS; check the TCP/IP Release Notice for details on TCP/IP requirements.

VSGEN must run using the correct version of the library QNET.LB, as loaded with the TCP/IP network software. (If you have not yet loaded TCP/IP, finish running VSGEN and create a configuration file, but don't build a system. Load TCP/IP and move the QNET.LB file as explained earlier, in the section "If You Have the XTS II, TCP/IP, or DG/OTS Network Transport System." Then run VSGEN using the form VSGEN/BATCH=configuration-pathname to build the tailored system.)

Before the connections will work, you must configure the LAN network using the network generation program NETGEN. Also, since AOS/VS II will treat each TELNET user as a standard terminal user, you'll need to create a user profile for each user. Configuring a TCP/IP network is further described in *Managing AOS/VS II TCP/IP*, 093-000704.

Regardless of the network hardware and generation steps, AOS/VS II can support TELNET terminals only if you specify a TELNET controller and line group to VSGEN.

Configuring a TELNET Controller

A TELNET controller is not a hardware entity, therefore the Disk Jockey sizer routine cannot generate an entry for it. If a TELNET controller has not been added to your system, you must add one. There can be only one TELNET controller and one line group per system. To add one, type

Enter choice: ADD⤶ (Or to edit an existing TELNET controller, use EDIT)

Device name:

People don't use the controller name to access terminals (they use the terminal console filename, form @TCONn), but you will need to remember the controller name to define a line group. We suggest the name TELNET1. For example,

TELNET1⤶

If you're adding a controller, VSGEN asks the device type. Respond with TELNET:

Device type: TELNET⤶

VSGEN displays the TELNET screen as follows.

TELNET Terminal Controller

Host: hhh

Controller name: *xxx*

Comments:

Execute? (Y/N)

VSGEN fills in the hostname *hhh* and the controller name *xxx*. You can change to a different host only via the HOST keyword and you can change the controller name only via the RENAME keyword. We'll take the remaining question.

Comments:

This field can be left blank or it can include information people might find useful, like the use of the controller, your name, and the date; for example,

CONNECTS TO REMOTE TERMINALS VIA TCP/IP. BY L. ELY. 3/4/90.⤶

Execute? (Y/N)

When you're satisfied with the comments, confirm them by typing

Y↵

Now VSGEN takes your changes and makes them part of the configuration. Control returns to the menu from which you specified ADD (or EDIT).

You have specified a TELNET terminal controller. Now while the controller name is still fresh in your mind, we suggest that you add or edit the terminal line group on this controller. To add a controller, we suggest that you name the TELNET line group TELNET_LINE_GROUP. The device type of a line group is TERMINAL. Specifying devices of type TERMINAL is described in "Specifying Terminal Lines," later in this chapter. The following example shows the line group specification.

TELNET Example

This example shows a session in which someone adds a TELNET controller and line group.

VSGEN Main Menu

...

Enter choice: ADD↵

Device name: TELNET1 ↵

Device type: TELNET ↵

Execute? (Y/N): Y↵

TELNET Terminal Controller

Host: MSIS_01

Controller name: *TELNET1*

Comments: CONNECTS TO REMOTE TERMINALS VIA TCP/IP. BY L. ELY. 3/4/90.↵

Execute? (Y/N) Y↵

VSGEN Main Menu

...

Enter choice: ADD↵

Device name: TELNET_LINE_GROUP↵

Device type: TERMINAL↵

Execute? (Y/N): Y↵

Terminal Line Group
Host: MSIS_01

Line group name:	*TELNET_LINE_GROUP*	
Comments:	LINES FOR TELNET TERMINALS.↵	
Controller name:	TELNET1 ↵	
Number of lines:	12 ↵	(Allows system to support a maximum of 12 remote terminals, named TCON0 through TCON11.)
Terminal definition:	*CRT3* ↵	
Terminal type:	*CRT3* ↵	
Input buffer length:	*128* ↵	
Output buffer length:	*128* ↵	
Lines per page:	*24* ↵	
Characters per line:	*80* ↵	
Break key function:	*MBBM* ↵	
Characteristics:	*MST MEOC MULC MWRP MCTD* ↵	(Delete MNAS)

Execute? (Y/N) Y ↵

Specifying a VTASERVER Controller and Line Group

The VTASERVER lets remote users on other Data General systems (running AOS/VS II, AOS/VS, or AOS) log on your system via XTS networking software.

To support the remote DG terminals, your system needs a network controller (ILC or NBA) and XTS II network software. Before the connections will work, you must configure the network using the XTS II network generation program. Also, since AOS/VS II will treat each remote user as a standard terminal user, you'll need to create a user profile for each user. Configuring an XTS network is further described in *Managing and Operating the XODIAC™ Network Management System* and *Managing Your XODIAC™ Network with DG/ONMS.*

Choosing a Virtual Terminal Handler

With AOS/VS II Release 2.00, you have a choice of virtual terminal handlers: you can specify the virtual terminal server in VSGEN or you can skip the server in VSGEN and let the network UP macro start the terminal handling process SVTA (as before Release 2.00). If you specify a VTA server and line group to VSGEN, the operating system and not the SVTA process will manage virtual terminals. Performance on the virtual terminals will be better if you do it via VSGEN; however, the network UP macro will report errors when it tries to create and direct the SVTA process. These are not serious errors, but they might be disconcerting.

For the operating system to support the virtual terminals, you must be running XTS II Release 2.00 or later. VSGEN must run using the XTS II library QNET.LB, loaded with the network software. (If you have not yet loaded XTS II, finish running VSGEN and create a configuration file, but do not build a system. Load XTS II and move the QNET file as explained earlier, in the section "If You Have the XTS II, TCP/IP, or DG/OTS Network Transport System." Then run VSGEN using the form VSGEN/BATCH=configuration-pathname to build the tailored system.)

Configuring a VTASERVER

A VTASERVER is not a hardware entity, therefore the Disk Jockey sizer routine cannot generate an entry for it. If a VTASERVER has not been added to your system, you must do this. There can be only one VTASERVER and one VTASERVER line group per system. To add one, type

Enter choice: ADD↵ (Or to edit an existing VTASERVER, use EDIT)

Device name:

People don't use the controller name to access terminals (they use the terminal console filename, form @VCONn), but you will need to remember the controller name to define a line group. We suggest the name VTASERVER1. For example,

VTASERVER1↵

If you're adding a controller, VSGEN asks the device type. Respond with VTASERVER:

Device type: VTASERVER↵

VSGEN displays the VTASERVER screen as follows.

VTASERVER Terminal Controller

Host: hhh

Controller name: *xxx*

Comments:

Execute? (Y/N)

VSGEN fills in the hostname *hhh* and the controller name *xxx*. You can change to a different host only via the HOST keyword and you can change the controller name only via the RENAME keyword. We'll take the remaining question.

Comments:

This field can be blank or it can include information people might find useful, like the use of the controller, your name, and the date; for example,

OS SUPPORT FOR VIRTUAL TERMINALS. BY S. THOMPSON. 3/4/90.⤶

Execute? (Y/N)

When you're satisfied with the comments, confirm them by typing

Y⤶

Now VSGEN takes your changes and makes them part of the configuration. Control returns to the menu from which you specified ADD (or EDIT).

You have specified a VTASERVER terminal controller. Now while the controller name is still fresh in your mind, we suggest that you add or edit the terminal line group on this controller. Proceed as folllows.

Enter choice: EDIT⤶ (or ADD)

Device name:

If you are editing, type the device name of the group you want. If you are adding, type the name of the group you want to create. The default name for the VTASERVER line group is VTASERVER_LINE_GROUP. So type

VTASERVER_LINE_GROUP⤶

If you are adding, VSGEN asks the device type. Respond with TERMINAL or LINES; for example

Device type: TERMINAL⤶

VSGEN displays the VTASERVER Line Group Screen (which differs from all other line group screens), as follows:

Terminal Line Group

Line group name:	*VTASERVER_LINE_GROUP*
Comments:	
Controller name:	*xxx*
Number of lines):	

Execute? (Y/N)

We'll take these prompts one by one.

Line group name: *VTASERVER_LINE_GROUP*

VSGEN fills in the line group name from the device name field on the previous screen. You can change this name only via the RENAME keyword.

Comments:

This field can be blank or it can include information people might find useful, like a description of the lines in this group or your name and the date; for example,

VTASERVER LINE GROUP -- VIRTUAL TERMINALS 1-12. BY S. THOMAS. 3/4/90.⤶

Controller name: *xxx*

Type VTASERVER:

VTASERVER⤶

Number of lines:

For a VTASERVER, there can be only one line group, including all the lines you specify here. The new system will support only as many terminals of this type (VCON) as you specify here. It is important to know about how many terminals of this type you will run, although you can always edit the configuration file later and enlarge the number. For example,

12⤶

Execute? (Y/N)

Look at the answers on the screen; if any seems wrong, back up and fix it. When you are satisfied with the values on the screen, confirm by typing

Y⤶

VSGEN takes your changes, if any, and makes them part of the configuration. You have specified a VTASERVER terminal controller and line group. Proceed to specify other devices, if you want.

VTASERVER Example

This example shows a session in which someone adds a VTASERVER controller and line group.

VSGEN Main Menu

...

Enter choice: ADD⤶

Device name: VTASERVER ⤶

Device type: VTASERVER ⤶

Execute? (Y/N): Y⤶

VTASERVER Terminal Controller

Host: MSIS_01

Controller name: *VTASERVER*

Comments: O.S SUPPORT FOR VIRTUAL TERMINALS. BY S. THOMPSON. 3/4/90.⤶

Execute? (Y/N) Y⤶

VSGEN Main Menu

...

Enter choice: ADD⤶

Device name: VTASERVER_LINE_GROUP⤶

Device type: TERMINAL⤶

Terminal Line Group
Host: MSIS_01

Line group name: *VTASERVER_LINE_GROUP*
Comments: VIRTUAL TERMINAL LINES -- VCONS.⤶
Controller name: VTASERVER ⤶
Number of lines: 12 ⤶ (Allows system to support up to 12 virtual terminals, named VCON0 through VCON11.)

Execute? (Y/N) Y ⤶

Specifying Terminal Lines

This section explains how to specify terminal lines: the lines that connect the asynchronous controller(s) you specified in previous sections with devices like terminals, modems, and laser or letter-quality printers.

If You Used a Spec or Configuration File as Input to VSGEN

If you used an accurate spec or configuration file as input to VSGEN (via VSGEN/DEFAULT=filename), you may not need to edit any information on terminal lines. For each asynchronous device and group of lines defined in your file, VSGEN will create default controller and line group names. Default asynchronous controller names have the form x, x1, x2, and so on, where x is the type; for example IAC, IAC1, IAC2. Default line groups have names of the form name_LINE_GROUP_n, where name is the controller name and n is the number of the group on the controller; for example, IAC_LINE_GROUP_0 or IAC3_LINE_GROUP_2.

Note that a soft controller group (like a PCVTSERVER or TELNET group) cannot be part of a pre-Release 2.00 configuration file, nor can the Disk Jockey sizer routine have VSGEN create it. You must manually create one group — and only one group — for each soft controller.

Please examine your configuration file to see how VSGEN thinks your lines are arranged (particularly, check the characteristics of line groups), and either edit line group information or skip it, as appropriate.

If You Used a Disk Jockey Sizer File as Input to VSGEN

If you used the Disk Jockey sizer file as input to VSGEN, you must edit terminal line groups that are connected to nonstandard devices like modems and specify the nonstandard settings. (You must do this because the sizer cannot tell what kind of device is connected to a terminal line; therefore it assumes that all lines are connected to the default device, a CRT3 terminal.) If any of your lines are connected to modems or hardcopy terminals, you will probably need to add new terminal line groups for them.

For example, assume you have an IAC 8 with lines 0 and 1 attached to modems and lines 2 through 7 attached to CRT3s (standard CRTs). You would define a new line group for this IAC, lines 0 and 1, and make sure the lines have the modem characteristics (or define them as MODEM_1200 lines, as explained next).

Terminal Line Groups

You add or edit information about terminal lines by *group*. A group includes one or more lines, up to the limit supported by the controller. Each group has a unique device name that identifies all lines in it.

Each group has its own definition of such things as terminal type, input and output buffer length, lines per page, characters per line, characteristics, data bits, parity, and baud rate. In most cases, you need not specify any of these things directly; you can use one of the predefined *terminal definitions*, and VSGEN will provide defaults for all other values. The predefined terminal definitions and their meanings are

CRT3 — This line group is attached to a standard DG or other CRT display terminal (but not a graphics display terminal). Generally, CRT3 is correct for all groups except those that include hardcopy terminals, graphics terminals, and modems.

CRT6 — This line group is attached to a DG graphics CRT display terminal (Model D470).

MODEM_1200 — This line group is attached to a 1200-baud modem.

TTY — This line group is attached to a hardcopy (printing) terminal.

If modems are configured in the spec files, VSGEN will define them as CRT3s with modem characteristics. You can leave these CRT3 definitions as they are; or, for greater clarity, you can change the terminal definition to MODEM_1200.

Line groups attached to laser or letter-quality printers should be defined as TTYs (explained in the next section). For example, suppose we have an IAC 8, controller name IAC5, with lines attached as follows:

- Lines 0 and 1 are attached to 1200-baud modems.
- Line 2 and lines 5, 6, and 7 are attached to a standard CRT.
- Line 3 is attached to a laser or letter-quality printer.
- Line 4 is attached to a hardcopy terminal.

In this example, the default group names have the form IAC5_LINE_GROUP_n. There are three groups:

Group Name	Controller Name	Terminal Definition	Lines
IAC5_LINE_GROUP_0	IAC5	MODEM_1200 (or CRT3)	0, 1
IAC5_LINE_GROUP_1	IAC5	CRT3	2, 5–7
IAC5_LINE_GROUP_2	IAC5	TTY	3, 4

A hyphen specifies a range of lines, as shown in second group, IAC5_LINE_GROUP1.

NOTE: If your terminals, printers and modems are not labeled, someone should label them — preferably with the terminal's console filename, form @CONn. You can use adhesive tape for this. If you don't know a terminal's console filename, you can figure it out from the controller base-line number and line number on the controller, as described earlier in the chapter in "Specifying Base-Line Numbers." Labeling the terminals will make things a lot easier later on.

Creating Customized Terminal Definitions

If you have terminals that do not conform to the predefined definitions (which are CRT3, CRT6, MODEM_1200, TTY), you can create your own terminal definitions. After creating a definition, you can specify its name when you add or edit a terminal line group; this eliminates the need to change values that are wrong for the terminal.

For example, assume you have lines attached to 2400-baud modems. You can create a terminal definition called MODEM_2400, of type CRT3, change characteristics from the CRT3 defaults to MMOD, MMRI, and change the baud rate from 9600 to 2400. Then, when you define the line group that includes the 2400-baud modems, just specify MODEM_2400 as the terminal definition and you're done with those lines.

To create a terminal definition, use the keyword DEFINE or from the VSGEN Main Menu, select "Customize VSGEN Defaults or Terminal Types" choice, and then select choice 2. Work though the menu, each of whose entries is described in the section "Configuring Terminal Lines," beginning with the line *Terminal definition*. Your customized type will be saved with this configuration so you can use it in later VSGEN sessions.

If you ever want to delete a customized definition, use the keyword REMOVE or from the VSGEN Main Menu, select the "Customize VSGEN Defaults or Terminal Types" choice and then take choice 3.

Laser and Letter-Quality Printers

AOS/VS II supports laser and letter-quality printers connected to asynchronous lines the same way it supports user terminals. You specify them to VSGEN the same way you do a terminal.

For each line connected to a laser or letter-quality printer, make sure the line is part of a group defined as type TTY. Specify a small input buffer and about 256-byte output buffer, default characteristics, 8 data bits, 1 stop bit, and a baud rate of 1200. These printers are good candidates for a custom terminal definition, perhaps under the name LASER.

Mouse

If your system has a mouse, do not identify it to VSGEN. Software support for the mouse is provided by the Graphical Kernel System (GKS) software; GKS defines and handles the mouse device.

Configuring Terminal Lines

If you want to edit information about terminal line groups (or add one or more groups), read this section. To add instead of editing, use the ADD keyword instead of EDIT. (But for a VTASERVER soft controller, add or edit lines as explained earlier in the section "Specifying a VTASERVER Controller and Line Group.")

Enter choice: EDIT↵ (or ADD)

Device name:

If you're editing, type the device name of the group you want. If you're adding, type the name of the group you want to create. The default name (which we highly recommend, since it helps you keep track of which lines are on each controller) has the form

name_LINE_GROUP_n

where

name is the controller name. Default controller names include the device type (CPI, DRT, IAC, ITC, LAC, LMC, PADCON, PCVTSERVER, PIM, or TELNET) and number, beginning with null. For example, default names of controllers of type IAC are IAC, IAC1, IAC2, and so on.

n is the number of the group for this controller. Numbers begin with 0 (0 for the first group defined, 1 for the second group, and so on). For the soft controllers (PAD, PCVTSERVER, TELNET, or VTASERVER), there is only one line group. (But for a VTASERVER soft controller, add or edit lines as explained earlier in the section "Specifying a VTASERVER Controller and Line Group.")

So IAC2_LINE_GROUP_2 would indicate the third IAC in the system, third line group. When you're ready, type the device name. For example,

IAC_LINE_GROUP_3↵

If you're adding, VSGEN asks the device type. Respond with TERMINAL or LINES; for example

Device type: TERMINAL↵

VSGEN displays the Terminal Line Group Screen, as follows:

Terminal Line Group

Line group name:	*xxx*	
Comments:		
Controller name:	*xxx*	
Line numbers:	*n*	(or *Number of lines*)
Terminal definition:	*xxx*	
Terminal type:	*xxx*	
Input buffer length:	*n*	
Output buffer length:	*n*	
Lines per page:	*n*	
Characters per line:	*n*	
Break key function:	*n*	
Characteristics:	*xxx xxx xxx*	
Data bits:	*n*	VSGEN omits these prompts for the soft controllers PAD, PCVTSERVER, and TELNET
Stop bits:	*n*	
Parity:	*x*	
Baud rate:	*n*	

Execute? (Y/N)

We will take these prompts one by one.

Line group name: *xxx*

VSGEN fills in the group name *xxx* from the device name field on the previous screen. You can change this name only via the RENAME keyword.

Comments:

This field can be blank or it can include information people might find useful, like a description of the lines in this group or your name and the date; for example,

IAC3 LINE GROUP 1. 1200 BAUD MODEM LINES. BY S. THOMAS. 3/4/90.↵

Controller name: *xxx*

This field specifies the name of the asynchronous controller that manages this group of lines. Common asynchronous controllers include IACs, LACs, and ITCs, explained earlier in this chapter. If you used the default naming form, the controller name is the first string of characters before _LINE_GROUP in this line group.

If you are adding, type the controller name (which you must already have specified to VSGEN); for example, IAC1↵. If you're editing and don't want to change the controller that manages this line group, take the default (with a CRT, press NEW LINE; with a hardcopy terminal, press CTRL–A and then NEW LINE).

Line numbers: *n* (or *Number of lines*)

For a hardware controller (IAC, ITC, PIM), VSGEN asks *Line numbers*. Specify the line numbers that make up the group here. All lines in this group will have identical settings.

For a soft controller, VSGEN asks *Number of lines*. For a soft controller, there can be only one line group, including all the lines you specify here; the new system will support only as many terminals of this type (PADCON, PCCON, or TCON) as you specify here. It is important to know about how many terminals of this type you will run, although you can always edit the configuration file later and enlarge the number. For example,

12↵

For a hardware controller, valid numbers for line ranges are 0 through n–1, where n is the number of lines the controller supports. You can specify ranges with a hyphen and separate individual line numbers with a space or comma. This field holds 40 characters, which lets you specify all lines, however they might be configured, on the controller. For example,

0 23	indicates lines 0 and 23 (it omits lines 1 through 22)
0–23	indicates lines 0 through 23 (all lines on an IAC 24)
0, 2, 3–5, 7–15	indicates lines 0, 2, 3 through 5, and 7 through 15 (it omits lines 1, 6, and those above 15, if there are any on this controller).

NOTE: If you are configuring a line group for a PIM controller, specify all the line numbers on all HIPs you specified here (if you specified 4 HIPs, the numbers are 0–127). Then in the next question make sure the terminal definition is CRT3, and take the defaults for all remaining questions on the terminal definition screen.

If you're adding or want to change this group, type the numbers that indicate the lines you want to be part of this group. If you're editing and don't want to change the default, take the default. For example, on an IAC 8, suppose you're adding a group of modem lines 0 and 1, type

0 1↵

Terminal definition: *xxx*

The terminal definition establishes other settings for this line group. It can be one of the DG-supplied definitions explained previously — CRT3, CRT6, TTY, or MODEM_1200 — or one of your own custom definitions created via the Customize VSGEN Defaults or Terminal Types screen. In either case, VSGEN sets the other values according to the terminal definition you type.

If a line is connected to a printer, make sure the line group terminal definition is TTY. This is particularly important for a line that connects an ITC/128 with a printer.

If you're adding or want to change this group, type the new name; if this is a valid name you'll see other settings change. If you're editing and don't want to change the default, take the default. For example, on an IAC 8, suppose you're changing the original definition for a group of lines to MODEM_1200:

MODEM_1200↲

Terminal type: *xxx*

VSGEN changes the terminal type based on the terminal definition you just specified. If you change the type, you will change the terminal definition. We suggest you take the default.

Input buffer length: *n*
Output buffer length: *n*

An input buffer holds data from a keyboard or communications line until the system is ready for it. An output buffer holds data to be displayed on a screen or sent to a printer.

For each line group, VSGEN asks questions about the input and output buffer length. Your answers set the asynchronous controller's memory buffer size in bytes for each line in the group. The default values work fine for most situations. Generally, accept the defaults on buffer length (but for printers you might want to specify other values, as mentioned earlier in "Laser and Letter–Quality Printers").

For some lines, you may have to specify nondefault sizes. For example, a line used for data communications (via DG/BLAST software or similar product) or for a block–oriented terminal may fill an input buffer faster than the system can empty the buffer. If the input buffer overfills, characters will be lost and users of the line will see *Data overrun error* messages. You can eliminate the data overrun by increasing the input buffer length and decreasing the output buffer length by an even number of bytes. (The output buffer size is not crucial in these cases.)

If you're specifying line groups on an ITC TermController (IAC 128 or 64), LAC–32 (IAC 32) or PIM–E, the numbers for input and output buffers are ignored; the controller dynamically uses its own parameters for I/O buffers.

If you take the defaults, skip to the next question. For an IAC–16, you may want to continue with the next paragraphs.

The memory on an IAC (particularly an IAC–16) is limited, so be careful not to allot more memory than it has. The system will not operate properly if you do. VSGEN does not check IAC memory allotment ar any verification level. If you allot more memory than an IAC has, when you start the new system it will display the error message

IAC DEVICE CODE n
IAC memory oversubscribed

and bypass the IAC.

Before changing input and output buffer lengths, read the latest AOS/VS II Release Notice or AOS/VS II update notice, which gives the total space available for input and output buffers (also called ring buffers) and the average space for each buffer. These numbers change from revision to revision and update to update.

After you know how much memory is available, you can divide the total space among the lines. For example, assume the total ring buffer space for an IAC–16 is 4146 bytes. Dividing 4146 by 32 buffers (2 buffers per line), and rounding to an even number, gives the default of 128 bytes per buffer. You can adjust the input buffer figures as needed to eliminate data overrun errors, as long as the sum of all buffer lengths does not exceed the IAC's memory total ring buffer space.

To answer the input and output buffer questions, either take the defaults or type the desired value, and press NEW LINE.

Lines per page: *n*

This value sets the maximum number of lines that can be printed on a screen (CRT) or form (hardcopy terminal). This value can be changed easily at runtime with the CHARACTERISTICS command. Generally, take the default. But if you want to change it, type the new value and press NEW LINE.

Characters per line: *n*

This value sets the maximum number of characters that can be printed on one line. As with lines per page, this value can be changed easily at runtime with the CHARACTERISTICS command. Generally, take the default. But if you want to change it, type the new value and press NEW LINE.

Break key function: *x*

This value determines what effect a break sequence has when typed on a terminal that belongs to this line group. (To generate a break sequence on a CRT, you press the CMD key, hold it down, and then press the BREAK/ESC key; on a hardcopy terminal, press BRK.)

By default, a break sequence breaks binary mode (value MBBM). Generally, take the default. If you are configuring a line for a printer on an ITC/128 TermController, this value *must be* MBBM; the device depends on this setting. If you take the default, skip to the next question. For details, continue with the next paragraphs.

On the system console, a break sequence gives control to the SCP CLI. On a *user terminal* line group, you can define a break sequence to do *one* of the following things:

- Break binary mode (used by certain programs when they write to the terminal) and restore normal CTRL character handling. In binary mode, the terminal ignores CTRL sequences like CTRL–C CTRL–A. The VSGEN mnemonic to break binary mode is MBBM; the CHARACTERISTICS command switch for it is /BREAK=BMOB. Break binary mode is the default effect of a break sequence.
- Terminate the user process on the terminal, log the user off, and cause a modem disconnect. You might use this break definition if you want users to be able to log off quickly and simply, regardless of the process running on their terminals. The VSGEN mnemonic for this is MBDS; the CHARACTERISTICS switch for it is /BREAK=DCOB.
- Generate a CTRL–C CTRL–A or CTRL–C CTRL–B sequence. You might use this if you want users to be able to use the break sequence to produce the pertinent kind of interrupt. For CTRL–C CTRL–A, the VSGEN mnemonic is MBCA; the CHARACTERISTICS switch is /BREAK=CAOB. For CTRL–C CTRL–B (which aborts the issuing process), the VSGEN mnemonic is MBCB and the CHARACTERISTICS switch is /BREAK=CBOB.
- Create a CTRL–C CTRL–F sequence. This sequence has no meaning to AOS/VS II, but your site can use it in application programs to redirect control or do anything you like. The program must issue a ?KWAIT system call (or higher level language equivalent) to receive notice that CTRL–C CTRL–F was entered. The VSGEN mnemonic is CFOB; the CHARACTERISTICS switch is /BREAK=CFOB.

To answer the *Break key function* question, either take the default, or type the desired value and press NEW LINE.

Characteristics: *xxx xxx xxx*

Characteristics are settings that determine how the operating system reads and writes information on this line group. You can set them for a line group during VSGEN. Or, more conveniently, you can set them for any terminal at runtime with the CLI command CHARACTERISTICS. To do this, some agent (perhaps the system UP macro) must use the CHARACTERISTICS command and /DEFAULT switch before the terminal is enabled for logon. For example, the command CHARACTERISTICS/DEFAULT/PM @CON3↲ sets page mode on the terminal whose console filename is CON3. Another way is to have user log–on macros (Chapter 5) set characteristics as users log on (this works only if the default characteristics *allow* a user to log on). Or users can set characteristics on their own terminals.

The default characteristics vary with the group's terminal definition, which you specified earlier. Generally, you should take the default; if you do so, skip to the next question.

If you want to specify different characteristics, you can do it as follows. Use the INDEX function key (on a CRT, SHIFT–F2; on a hardcopy terminal, ESC–I) for a complete list of characteristics and a way to turn them on or off for this line group. Use the appropriate mnemonics, separated by a space. If you specify any nondefault characteristic, you must specify *all* the ones you want for the line(s), including the defaults. VSGEN includes only those you actually indicate. The order in which you specify mnemonics doesn't matter.

Characteristics that apply to specific line group definitions are

CRT3 or CRT6:	MST MEOC MULC MWRP	(The baud rate, asked later, should be 9600.)
TTY (hardcopy):	MST MEOC MULC	(The baud rate, asked later, should be 1200 or 300.)
Modem:	MST MEOC MULC MWRP MMOD MMRI	(The baud rate, asked later, should be 1200, 2400, or 300, based on modem speed.)
TELNET group:	MST MEOC MULC MWRP MCTD MNAS	(If terminal is compatible with VT100, also select MXLT; for international VT100 character set support, also select M8BT.)

NOTE: If a terminal is uppercase only, be sure to specify lowercase–to–uppercase conversion (MUCO, shown in Table 4–5) for its line. If you don't, the terminal may not display lowercase letters sent to it.

If you want this line group to support VT100–compatible terminals, add the characteristic MXLT to the others needed for that line group. If you want *international* VT100 support, also specify 8–bit characters, M8BT.

Characteristics that relate to output flow control, modems, and 8–bit characters are explained in following sections. *All* characteristics are defined in Table 4–5, later on. For soft controllers, *Characteristics* is the last question in the line group screen; after answering it, review your answers and when ready answer Yes to the *Execute* prompt. Then skip to the section "Verifying the Line Group."

Data bits: *n*

This value sets the number of bits used to send each character over lines in this group. This value does not determine the number of bits used to *represent* each character. The 8–bit characteristic, explained later, determines that number (7 or 8). The default to send each character is 8 and, for DG standard character handling, you must retain it.

Generally, take the default and skip to the next question. But if you want to change it, type the new value and press NEW LINE.

Stop bits: *n*

This sets the number of stop bits transmitted after each character. Valid answers are 1, 1.5, and 2. This value can be changed easily at runtime with the

CHARACTERISTICS command. Generally, take the default and skip to the next question. But if you want to change it, type the new value and press NEW LINE.

If you are configuring a line group for an ITC/128 TermController, the value you specify here is irrelevant; the TermController chooses its own value at runtime.

Parity: *x*

This value sets the kind of software parity checking done. Normally, the value should be NONE, since the hardware automatically checks parity. Valid answers are NONE, ODD, and EVEN. This value can be changed easily via the UP macro with the CHARACTERISTICS command. Generally, take the default and skip to the next question. But if you want to change it, type the new value and press NEW LINE.

If you are configuring a line group for an ITC/128 or ITC/64 TermController, the value you specify here is irrelevant; the TermController chooses its own value at runtime.

Baud rate: n

This value determines the rate, in bits per second, at which the system will read data from and write it to lines in the group. By default, each character requires 10 bits (8 for the character, 1 start bit, and 1 stop bit). So at a data rate of 9600, the system will try to receive and send 960 characters per second. Generally, users like high baud rates, but too high a baud rate may cause I/O buffer overflow and, in worst case, prevent useful I/O over the line. If you enable flow control (MIFC, MOFC), the system and terminal can start and stop data flow as needed to prevent overflow, but generally you should use a value no higher than the following:

Line groups with CRTs (CRT3, CRT6)	9600
Line groups with hardcopy terminals	1200
Line groups with modems	1200, 2400, or 300, based on modem

This value can be changed easily at runtime with the CHARACTERISTICS command. Generally, take the default and skip to the next question. But if you want to change it, type the new value and press NEW LINE.

If you are configuring a line group for an ITC/128 or ITC/64 TermController, the value you specify here is irrelevant; the TermController chooses its own value at runtime.

Execute? (Y/N)

Look at the answers on the screen; if any seem wrong, back up and fix them. When you're satisfied with the values on the screen, confirm by typing

```
Y)
```

VSGEN takes your changes, if any, and makes them part of the configuration.

Verifying the Line Group

You've edited (or created) a line group. At this point, we suggest you verify the configuration so that if there's an error you'll know where to correct it. Type VERIFY↵; then take all the defaults on the VERIFY screen.

If the configuration passes level 1 verification, continue with the next step (edit/add another group, or if you're finished with this asynchronous controller, perhaps list or edit information about another asynchronous controller). If the configuration doesn't pass, correct the error using the explanatory message.

About Output Flow Control

Some programs (notably the CEO® system, and also programs your site may choose to write) use binary mode to handle data on most terminals — including DASHER D210, D211, D220, D400, D410, D450, D460, and G300 terminals. If a program that uses binary mode will write to any of these terminals, then output flow control must be selected on the line. You can do this during VSGEN by specifying the mnemonic MOFC (software output flow control). Or you can do it via the characteristics command switches /ON/OFC, in the UP macro or via a user log-on macro (Chapter 5).

Some asynchronous controllers (EIA RS-232-C standard) support output flow control through hardware, not software. Most DG controllers either always support hardware flow control or never support it. But some controllers *allow* you to choose hardware flow control for certain lines, and modems and some printers *require* that you select it. For example, MCP1 lines 0 and 1, LAC (IAC-12) lines 10 and 11, and DRT line 0 (on MV/2000 DC and DS/7500 computers) allow selecting hardware flow control. If you use an EIA RS-232-C cable and terminal on these lines, we recommend selecting hardware flow control. If you use an EIA RS-422 cable, do *not* select hardware flow control (or turn it off). You can select hardware flow control during VSGEN by selecting the characteristic mnemonic MHRDFL. Or you can use the CLI CHARACTERISTICS command switches /ON/HOFC or /OFF/HOFC to turn hardware flow control on or off, respectively, in the UP macro or via a user log-on macro (Chapter 5).

Modem Lines

You can specify characteristics for modem lines either at VSGEN or at runtime in the UP macro from PID 2, using CHARACTERISTICS/DEFAULT commands. Generally, for a modem line, you can define the line group as MODEM_1200 (which will set the default characteristics as follows) or you can define the line group as CRT3 and specify these characteristics

MMOD (Modem)
MMRI (Monitor Ring Indicator)

Later on the screen you must also specify a baud rate of 1200 (or whatever the modem allows).

The Monitor Ring Indicator characteristic generally does no harm on any modem line (except for ITC/128s); it is required on CCITT-standard modems used in Europe. Remember, when you specify any nondefault characteristic to VSGEN, specify *all* the characteristics you want.

The modem characteristic MMOD includes two main functions: (1) it tells EXEC to use modem access control on the line, which means that any user must have the Modem privilege to log onto that line; and (2) it tells EXEC that this is a contended line — during logon, EXEC will disconnect the terminal if too much time passes during the log-on procedure or when the user logs off. You can obtain the effect of function 1 with characteristic MACC (CHARACTERISTICS /ACC switch) or of function 2 with characteristic MCTD (CHARACTERISTICS /CTD switch).

These guidelines for MMRI and MMOD apply to standard modems — popular models that DG supports without special treatment. For nonstandard modems, you may need to set other, special, characteristics. These special characteristics, like half-duplex support, are available via VSGEN or the CHARACTERISTICS command. They are described in an appendix to *Managing AOS/VS II.*

Specifying and Using 8-Bit Characters

By default, even if you specify 8 data bits per character, only 7 bits are used to represent the character (the remaining bit is ignored). For most character sets, including U.S. ASCII and other national character sets, 7 bits is enough. But under some circumstances, you might want to specify 8 bits.

Most DG terminals, including DASHER D211, D220, D410, and D460 terminals, can handle 8-bit characters. The main advantage of 8-bit characters is the ability to read and display characters with values above 177 octal, which include many characters in the international character sets (like the UK currency symbol) and other special characters. In 7-bit mode, the high bit is ignored, which means the terminal can't see codes above 177 octal.

One disadvantage of 8-bit character handling is that on a terminal with a non-U.S. keyboard, some keys send different codes in 7-bit mode from 8-bit mode. For example, on a French keyboard, the C Cedilla key will produce C with a cedilla in 7-bit mode, but will produce ^\ (ASCII 34) in 8-bit mode. Note also that CLI macros that use the !ASCII pseudomacro may display garbled messages. People often add 200 (octal) to the ASCII value of a character to conceal it from the CLI. For example, to display a comma in a CLI macro, you must use the string [!ASCII 254]. (An [!ASCII 54] psuedomacro would produce a comma, which the CLI would display as a space.) But if 8-bit character handling is enabled on a terminal and someone runs a macro that contains pseudomacro [!ASCII 254], the system will see the value of code 254, which is *not* a comma.

If you want 8-bit characters, a versatile way to get them is to specify 7-bit characters at VSGEN (characteristic M8BT off, the default), and then use the CHARACTERISTICS command with /8BT switch to enable 8-bit handling. To *print* 8-bit characters on an 8-bit printer, start the printer with the /8BIT switch to the EXEC START command. To restore 7-bit handling (on U.S. keyboards), the person at the terminal can type the command CHARACTERISTICS/RESET↵, or log off and on again.

The character *mode* is controlled by small dual in-line package (DIP) switches on the back of the terminal, in the HOST group, as follows:

- For 8-bit mode, which you can enable or disable via software, set the bit mode DIP switch to 8-bit mode; and then set the parity DIP switches to no parity (parity none). For U.S. terminals, 7-bit handling works normally — when set via software — with the DIP switches in these positions.
- For 7-bit mode, which cannot provide 8-bit characters but *does* allow certain non-U.S. characters to display as desired, set the bit mode DIP switch to 7-bit mode and set the parity DIP switches to mark parity.

The master CLI (PID 2) can change the default characteristics (but not the mode) of a terminal, with the /DEFAULT switch and console filename, *before* the terminal is enabled by EXEC. For example, the command

```
) CHARACTERISTICS/DEFAULT/ON/8BT  @CON22↲
```

sets characteristics at the terminal whose console filename is @CON22. If need be, you can put such commands in the system UP macro.

To *print* 8-bit characters on an 8-bit printer, users can use the QPRINT command with the /8BIT switch.

Asynchronous Line Characteristics

Table 4-5 explains the characteristics you can specify at VSGEN. As mentioned earlier, you can specify these by mnemonic at the *Characteristics:* question in the Terminal Line Group definition screen or via the Characteristics screen, accessed when you use the INDEX function key at the *Characteristics:* question. On the Characteristics screen, you can change the setting of any characteristic by typing the new value.

If in answer to the *Characteristics:* question you specify any nondefault characteristic, you must specify *all* the ones you want for the line(s), including the defaults. VSGEN includes only those you actually specify.

In Table 4-5, the column headed "CHARACTERISTICS Command Switch" shows the CHARACTERISTICS command switch that produces the same effect as the mnemonic in the "Mnemonic" column.

For example, for CON3, typing

```
) CHARACTERISTICS/DEFAULT/ON/PM  @CON3↲
```

from the master CLI will produce the same effect as if, while generating a system, you had specified IAC line 1 characteristics as

MPM (followed by the other desired characteristics).

For details on the CHARACTERISTICS command, see the command description in *Using the CLI (AOS/VS and AOS/VS II)*, or type HELP/V CHARACTERISTICS. Some CHARACTERISTICS switches work in CLI32 only; these are noted.

Line characteristics are included alphabetically by mnemonic in Table 4-5.

Table 4-5 AOS/VS II Terminal Line Characteristics for VSGEN

Mnemonic	Default Value	CHARACTERISTICS Command Switch	Description
M8BT	OFF	/8BT	Uses 8 data bits to represent each character. Choose this for VT100 or VT220 terminals to use the international VT100 character set. For these terminals you must also use MXLT. More details appear earlier.
M16B	OFF	/16B	Allows processing of Asian (16-bit) characters. You must also have specified Asian language support for the asynchronous controller. Setting this characteristic (via VSGEN or the CHARACTERISTICS command) also enables recognition of the MKG0, MKHW, and MNLX characteristics settings.
MABD	OFF	/AUTOBAUD	Automatic baud rate selection. Tells the system automatically to determine the baud rate of the line when a user logs on. AOS/VS II can detect the following baud rates: 300 1200 2400 9600 600 1800 4800 19200 900 For automatic baud selection to work, a user must press NEW LINE or CR (carriage return) at least three times (as compared to once if automatic baud selection is not in force) to start the log-on sequence.
MACC	OFF	/ACC	Line requires modem access control. EXEC will check for Modem privilege before allowing logon. Details appear in "Modem Lines," earlier.
MCALLOU	OFF	/CALLOUT	PBX call-out line, for CPI/24 lines only. Specifies that the line is for calling out; calls will be initiated by the computer, not a user. Generally used for lines connected to printers.

(continued)

Table 4-5 AOS/VS II Terminal Line Characteristics for VSGEN

Mnemonic	Default Value	CHARACTERISTICS Command Switch	Description
MCTD	OFF (ON for ITC/128)	/CTD	Contended line. EXEC will disconnect if someone doesn't log on within a specified period.
MEOC, MEOS	ON OFF	/EB0 /OFF/EB1	Echoes control characters (MEOC) and escape characters (MEOS). If you specify MEOC and omit MEOS (the default), all characters will echo as typed, except CTRL will echo as ^ and ESC as $. If you specify both MEOC and MEOS, CTRL and ESC won't echo.
MEOL	OFF	/EOL	Enforces end of line. Truncates any line longer than the maximum specified in *Characters per line* in the terminal definition. The alternative isMWRP.
MESC	OFF	/ESC	ESC character has same interrupt effect as CTRL-C CTRL-A.
MFF	OFF	/FF	Form feed. Sends a form feed character to terminal when it is opened for I/O.
MFKT	OFF	/FKT	Function keys terminate text input.
MHRDFL	OFF	/HOFC	Enables hardware flow control (on certain LAC and MCP1 lines only). Stops data transmission from the host when the CTS (clear to send) signal is low. Choose for modems and some printers. Use for RS-232-C protocol; omit for RS-422 protocol.
MKG0	OFF	/G1G0 (CLI32 only)	Enables the G1G0 character set (for Taiwanese characters). For the G1G0 character set to work, you must have specified Asian language support for the asynchronous controller, the 16-bit characteristic (M16B or CHARACTERISTICS/16B) must be on, and the 8-bit characteristic (M8B or CHARACTERISTICS/8BT) must be on. If off, this disables the G1G0 character set.

(continued)

Table 4-5 AOS/VS II Terminal Line Characteristics for VSGEN

Mnemonic	Default Value	CHARACTERISTICS Command Switch	Description
MKHW	ON	/DKHW (CLI32 only)	If on, disables half-wide character support. Use this for Chinese, Korean, and Taiwanese character sets. If off, this enables half-wide character support. For the system to support any Asian language, you must have specified Asian language support for the asynchronous controller, the 16-bit characteristic (M16B or CHARACTERISTICS/16B) must be on, and the 8-bit characteristic (M8B or CHARACTERISTICS/8BT) must be on.
MIFC	OFF	/IFC	Input flow control (X-ON, X-OFF). CTRL-S from host computer tells terminal to stop sending data until the host issues CTRL-Q. Can prevent loss of characters during binary I/O when host computer input buffer is full.
MMOD	OFF	/MOD	Modem. Line is attached to a modem. Use this for modem lines only. Details are in "Modem Lines," earlier.
MMRI	OFF	/MRI	Monitor ring indicator (modem lines). Details are in "Modem Lines." earlier.
MNAS	OFF(CRT) ON (TTY or TELNET controller)	/NAS	Non-ANSI-standard terminal. Such terminals have a small LF key and large RETURN key. (ANSI-standard terminals have a large NEW LINE and small CR key.)
MNLX	OFF	/NLX (CLI32 only)	Natural language translation for Asian languages; applies primarily to PC connections where the PC provides natural language translation. If on, disables natural language translation. If off, enables natural language translation. For the system to support any Asian language, you must have specified Asian language support for the asynchronous controller, the 16-bit characteristic (M16B or CHARACTERISTICS/16B) must be on, and the 8-bit characteristic (M8B or CHARACTERISTICS/8BT) must be on.

(continued)

Table 4-5 AOS/VS II Terminal Line Characteristics for VSGEN

Mnemonic	Default Value	CHARACTERISTICS Command Switch	Description
MNRM	OFF	/NRM	Does not receive messages. Prevents terminal from receiving SEND messages. (Messages from PID 2 override this.)
MOFC	OFF	/OFC	Output flow control. CTRL–S interrupts host computer and instructs it to stop sending data until the terminal issues CTRL–Q. Can prevent loss of characters during binary I/O when terminal input buffer is full. Needed on DASHER D210, D211, D220, D400, D410, D450, D460, and G300 terminals.
MPM	OFF	/PM	Page mode. Terminal will display the number of lines specified as the *Lines per page* value; then it will wait for CTRL–Q before displaying the next sequence of lines.
MRAC	OFF	/RAC	Rubout after CR or NEW LINE. Sends two rubout characters after either delimiter. Use this to prevent loss of characters sent to a slow (hardcopy) terminal. *See also* MRAF and MRAT.
MRAF	OFF	/RAC	Rubout after form feed. Sends 17 rubout characters after each form feed unless the form feed is simulated (MSFF). For hardcopy terminals; see comment under MRAC.
MRAT	OFF	/RAC	Rubout after tab. Sends two rubout characters after each tab, unless the tab is simulated (MST). For hardcopy terminals; see comment under MRAC.

(continued)

Table 4-5 AOS/VS II Terminal Line Characteristics for VSGEN

Mnemonic	Default Value	CHARACTERISTICS Command Switch	Description
MSFF	OFF	/SFF	Simulates form feed. Sends a carriage return followed by the number of NEW LINE characters that make up a page.
MST	ON	/ST	Simulates tabs. Tab key moves cursor right 8 columns.
MTO	OFF	/TO	Time outs. Enables time-out on terminal line(s).
MUCO	OFF	/UCO	Uppercase only. Converts lowercase to uppercase. Use with uppercase-only terminals.
MULC	ON (CRT) OFF (TTY)	/ULC	Upper- and lowercase. Accepts both upper- and lowercase characters as input. If you don't specify MUCO, MULC is the default. But if you specify MUCO, and omit MULC, the system converts lowercase to uppercase.
MWRP	ON	/WRP	Wraps text onto next line if line is too long (done in hardware). If you set this off, the system truncates such lines.
MXLT	OFF	/XLT	VT100-compatible terminal support. Lets the line group support non-DG terminals that are compatible with Digital Equipment Corporation VT100 terminals. For VT100 or VT220 terminals to use the international VT100 character set, also use M8BT.

(concluded)

Asynchronous Controller and Terminal Line Configuration Example

The following illustration, Figure 4–16, shows the configuration of two popular asynchronous controllers (an IAC–24 and an IAC–8) and the terminal line groups on them. It also shows the addition of a TELNET soft controller and line group.

It assumes that the lines are arranged as follows:

- The first controller is named IAC and is on device code 65.
- The second controller is named IAC1 and is on device code 50.
- On IAC, lines 0–2, 4–16, and 18–23 are attached to standard CRTs (or aren't attached to anything).
- On IAC, line 3 is attached to a hardcopy terminal.
- On IAC, line 17 is attached to a laser printer.
- On IAC1, lines 0 and 1 are attached to modems.
- On IAC1, lines 2–7 are attached to CRTs.

Thus the following line groups will be needed:

- One for IAC, the standard CRTs.
- A second for IAC, the hardcopy terminal and laser quality printer.
- A third for IAC1, the modems.
- A fourth for IAC1, the standard CRTs.

The example shows editing of two existing controllers, but the dialog to add them would involve only a few additions (like the specification of device type as TERMINAL).

Edit information for the first IAC controller, IAC.

VSGEN Main Menu
...

Enter choice: EDIT↲

Device name: IAC↲

IAC Terminal Controller

Controller name: *IAC*

Comments: LINES 0–23, STD CRTS AND TWO HARDCOPIES. CONS 2–25.↲
Device code (octal): *65*↲

IAC type: *24*↲

Base line number: *0*↲

VT100 terminal support? (Y/N) *Y*↲

Asian language support? (Y/N) N↲

Execute? (Y/N) Y↲

Edit the first IAC's first line group, for its standard CRTs.

VSGEN Main Menu
...
Enter choice: EDIT↲

Device name: IAC_LINE_GROUP_0↲

Terminal Line Group

Line group name: *IAC_LINE_GROUP_0*
Comments: STANDARD CRTS ON FIRST IAC.↲
Controller name: *IAC*↲
Line numbers: *0–2, 4–16, 18–23*↲
Terminal definition: *CRT3*↲
Terminal type: *CRT3*↲
Input buffer length: *128*↲
Output buffer length: *128*↲
Lines per page: *24*↲
Characters per line: *80*↲
Break key function: *MBBM*↲
Characteristics: *MST MEOC MULC MWRP*↲
Data bits: *8*↲
Stop bits: *1*↲
Parity: *None*↲
Baud rate: *9600*↲
Execute? (Y/N) Y↲

INT–02536

Figure 4–16 Asynchronous Controllers and Terminal Lines Example (continued)

Now edit the IAC's second line group, for its hardcopy terminals (laser printer and terminal).

```
    VSGEN Main Menu
  ...

  Enter choice:      EDIT↲

  Device name:       IAC_LINE_GROUP_1 ↲

    Terminal Line Group

  Line group name:   IAC_LINE_GROUP_1
  Comments:          HARDCOPY TERMINAL AND LASER PRINTER ON FIRST IAC. ↲
  Controller name:   IAC↲
  Line numbers:      3, 17↲
  Terminal definition:      TTY↲
  Terminal type:            TTY↲
  Input buffer length:      128↲
  Output buffer length:     128↲
  Lines per page:           30↲
  Characters per line:      72↲
  Break key function:       MBBM ↲
  Characteristics:          MST  MEOC  MULC↲
  Data bits:                8 ↲
  Stop bits:                1 ↲
  Parity:                   None ↲
  Baud rate:                1200↲
  Execute? (Y/N)            Y↲
```

Now edit information for the second IAC controller, IAC1.

```
  VSGEN Main Menu
  ...

  Enter choice:      EDIT↲

  Device name:       IAC1↲

            IAC Terminal Controller

  Controller name:          IAC1

  Comments: LINES 24-31, MODEMS ON 24, 25, BASE NUMBER 24, CONS 26-33 ↲

  Device code (octal):      50 ↲

  IAC type:                 8 ↲

  Base-line number:         24 ↲

  VT100  terminal support? (Y/N)      Y ↲

  Asian language support?  (Y/N)      N ↲

  Split baud:               N↲

  Execute? (Y/N)            Y↲
```

Figure 4–16   Asynchronous Controllers and Terminal Lines Example (continued)

Now for the second IAC, IAC1, first line group.

VSGEN Main Menu

...

Enter choice: EDIT ⤶

Device name: IAC1_LINE_GROUP_0 ⤶

Terminal Line Group

Line group name: IAC1_LINE_GROUP_0
Comments: MODEM LINES ON SECOND IAC (IAC1) ⤶
Controller name: *IAC1* ⤶
Line numbers: *0, 1* ⤶
Terminal definition: MODEM_1200 ⤶
Terminal type: *MODEM_1200* ⤶
Input buffer length: *128* ⤶
Output buffer length: *128* ⤶
Lines per page: *24* ⤶
Characters per line: *80* ⤶
Break key function: *MBBM*
Characteristics: *MST MMRI MEOC MULC MMOD MWRP MOFC* ⤶
Data bits: *8* ⤶
Stop bits: *1* ⤶
Parity: *None* ⤶
Baud rate: *1200* ⤶
Execute? (Y/N) Y ⤶

Figure 4–16 Asynchronous Controllers and Terminal Lines Example (continued)

Now for IAC1, the second line group.

VSGEN Main Menu

...

Enter choice: EDIT ↵

Device name: IAC1_LINE_GROUP_1 ↵

Terminal Line Group

Line group name:	*IAC1_LINE_GROUP_1*
Comments:	IAC1, STANDARD CRT3 LINES. ↵
Controller name:	*IAC1* ↵
Line numbers:	*2 – 7* ↵
Terminal definition:	*CRT3* ↵
Terminal type:	*CRT3* ↵
Input buffer length:	*128* ↵
Output buffer length:	*128* ↵
Lines per page:	*24* ↵
Characters per line:	*80* ↵
Break key function:	*MBBM* ↵
Characteristics:	*MST MMRI MEOC MULC MMOD MWRP MOFC* ↵
Data bits:	*8* ↵
Stop bits:	*1* ↵
Parity:	*None* ↵
Baud rate:	*1200* ↵
Execute? (Y/N)	Y ↵

VSGEN Main Menu

...

Enter choice: VERIFY ↵

...

Verification complete

Figure 4–16 Asynchronous Controllers and Terminal Lines Example (continued)

Add a TELNET soft controller and line group.

VSGEN Main Menu
...

Enter choice: ADD

Device name: TELNET1

Device type: TELNET

Execute? (Y/N): Y

PAD Terminal Controller

Host: MSIS_01

Controller name: TELNET1

Comments: CONNECTS TO REMOTE TERMINALS VIA TCP/IP. S. THOMAS. 1/1/90.

Execute? (Y/N) Y

VSGEN Main Menu
...

Enter choice: ADD

Device name: TELNET_LINE_GROUP

Device type: TERMINAL

Execute? (Y/N): Y

Terminal Line Group
Host: MSIS_01

Line group name:	*TELNET_LINE_GROUP*	
Comments:	LINES FOR TELNET TERMINALS.	
Controller name:	TELNET1	
Number of lines:	12	(Lets system support 12 remote terminals)
Terminal definition:	*CRT3*	
Terminal type:	*CRT3*	
Input buffer length:	*128*	
Output buffer length:	*128*	
Lines per page:	*24*	
Characters per line:	*80*	
Break key function:	*MBBM*	
Characteristics:	*MST MEOC MULC MWRP MCTD*	(Delete MNAS)

Execute? (Y/N) Y

VSGEN Main Menu
...
Enter choice: VERIFY
...
Verification complete

Figure 4–16 Asynchronous Controllers and Terminal Lines Example (concluded)

In Figure 4–16, for IAC, we edited controller information, adding comments. Then we edited the two terminal line groups connected to the IAC. The first group includes standard CRTs; its name is IAC_LINE_GROUP_0, and it includes lines 0, 1, 4–16, and 18–23. The second group, IAC_LINE_GROUP_1, includes the hardcopy terminal (line 3) and laser printer (line 17). We changed the baud rate to 1200 for this group.

Then we did the next asynchronous controller, IAC1. Again, there are two terminal line groups. The first line group, named IAC1_LINE_GROUP_0, includes the modem lines. We changed its definition from CRT3 to MODEM_1200, but this was the only change we made. The second line group, IAC1_LINE_GROUP_1, has only standard CRTs.

Finally, we verified the configuration.

After editing lines on the two IACs, we added a TELNET software controller with 12 lines, and again verified the system. As many as 12 users on remote systems that run TELNET with TCP/IP networks under UNIX will be able to log on this system.

When the new system runs, the terminal console filenames on IAC lines 0–2 will be @CON2–@CON4; on line 3, the filename will be @CON5; on lines 4–16, the filenames will be @CON6–@CON18; on line 17, the laser printer will be @CON19; on lines 18–23, the filenames will be @CON20–@CON25. On IAC1 lines 0 and 1 (the modems) the terminal console filenames will be @CON26 and @CON27, and on other lines the filenames will be @CON28–@CON33.

The TELNET terminal entries will be @TCON0 through @TCON11.

Terminal Line Configurations and the System UP Macro

On some devices, for terminal lines to operate properly, the system UP macro must provide special treatment, as follows.

ITC/128 and LTC/64 TermController Lines

Terminal console filenames on a TermController work the same way as other asynchronous controller line names: the device name is @CON followed by the line number plus 2. For example, the device on line 0 is @CON2; the device on line 1 is @CON3; the device on line 31 is @CON33; and the device on line 127 is @CON129. For a TermServer network, the line–terminal assignments (line 0 to @CON2, for example) are fixed only at system startup. When a user logs on through a TermServer, he or she will be assigned the next available line. In other words, using the same terminal, a user might log on console filename @CON102 in the morning, and console filename @CON95 in the afternoon.

For a printer attached to a TermController line to operate properly, you'll need to do the following. At VSGEN, specify the printer line as a TTY, with break function of MBBM, as described earlier. In the system UP macro, you must insert CONTROL @EXEC commands to start the printer on this TTY line. Insert these EXEC commands before the EXEC ENABLE/ALL command. And, via TermServer software, you'll need to establish a permanent virtual circuit (PVC) between the TTY line and the TermServer port connected to the printer.

PIM–E (128–Line PIM) Lines

At runtime, the interoffice controller (IOC) will use some lines (those designated at IOCGEN as *MV console lines*) for terminal sessions. The IOC will use other lines (those designated at IOCGEN as *PCM Consoles)* for personal call management. To let this happen, EXEC must enable only the MV console lines in the system UP macro; it must not enable the personal call management lines. ISA and PCM processes will manage the call management lines. In the UP macro, you should start the PCM process to control the non-PCM lines, and then insert EXEC commands to start any printers on their lines, and later in the macro, have EXEC enable all terminals (ENABLE/ALL).

Note that for a PIM-E line user to log on, his or her user profile must allow use of a modem. The default setting for the value *Use Modem* is No; therefore someone will probably need to edit the profiles of all PIM-E line users. User profiles are explained in Chapter 5 and in *Managing AOS/VS and AOS/VS II.*

Soft Controller (PAD, PCVTSERVER, TELNET, VTASERVER) Lines

Normally, starting the XTS II network will enable PAD, PCVTSERVER, and VTASERVER terminals. Starting the TCP/IP will enable TELNET terminals. You need not and cannot enable devices of type PADCON, PCCON, TCON, or VCON via EXEC. The network process SVTA cannot (and need not) enable any of these terminals if you selected support for them during VSGEN. If the network UP macro tries to communicate with the SVTA process, it will fail with harmless error messages. In the network UP macro, you can delete or comment out command lines that mention SVTA if you have selected support for remote terminals via VSGEN.

NOTE: For any user of a terminal connected via a soft controller to log on, his or her user profile must grant the privilege Use Virtual Terminal. The default setting for the value Use Virtual Terminal is Yes; therefore editing of the user's profiles might not be necessary. User profiles are explained in Chapter 5 and in *Managing AOS/VS and AOS/VS II.*

Proceeding

When you have added or checked all asynchronous controllers and the terminal line groups on them, and verified your efforts, continue to the next section.

Specifying Line Printers

If a letter–quality printer is attached to an asynchronous line, the configuration must identify it to VSGEN as a terminal line, as described earlier in this chapter. If you have one or more line printers (data channel printers), the configuration must identify them as printers, as described in this section.

There are several types of data channel printers:

LPB An LPB is a commercial I/O printer, with a vertical forms unit. AOS/VS II supports as many as eight LPB printers, default device names LPB, LPB1, LPB2, ..., LPB7.

LPD An LPD is a DASHER Model 4325 through 4328 printer. AOS/VS II supports as many as two LPD printers, default device names LPD and LPD1.

LPE Type LPE includes laser document printers (Model 4225) and *any data channel printer that doesn't need system initialization* (LPB and LPD do need initialization). AOS/VS II can run as many as eight LPE printers, default device names LPE, LPE1, ..., LPE7.

LPJ0 LPJ0 is the default name of an LPJ printer, which runs on a DS/7500, MV/2500 DC, MV/2000 DC, MV/1400 DC, or MV/1000 DC system. VSGEN allows four LPJ controllers, but you can add only LPJ0, device code 21, when building a system to run on DS/7500, MV/2500 DC, MV/2000 DC, MV/1400 DC, or MV/1000 DC computers.

For MV/4000 DC or SC, or DS/4000 systems: If a printer is connected to the MIOC printer controller, identify it as LPE, with device code 17 (default).

If you used an accurate spec or configuration file as input to VSGEN (via VSGEN/DEFAULT=filename), you don't need to add or edit line printer information. For each printer defined in your file, VSGEN will create a default printer name. Default printer names have the form name, name1, name2, and so on, where name is the type; for example LPB, LPB1, LPB2.

Check the listing of your configuration for devices named in the form LPx; if you're sure you want to edit printer information (or if you want to add a printer), continue. To add instead of editing, use the ADD keyword instead of EDIT:

Enter choice: EDIT↵ (or ADD)

Device name:

If you're editing or listing, specify the printer you want. Default device names of printers are explained above. You can use the INDEX function key (SHIFT–F2 on a CRT, ESC–I on hardcopy) to list all devices. From the Index display, use CANCEL/EXIT (F11 or ESC–E) to return to the menu. If you're adding, the name you specify will become the printer device name needed to start and stop queues on the printer via EXEC. We suggest a name of the default form LPxn, where x is B, C, D, E, or J and n is null for the first printer, 1 for the second, and so on. Type the device name; for example,

LPB1↵

If you're adding, VSGEN asks the device type. Respond with LPB, LPD, LPE, or LPJ, as appropriate. For example,

Device type: LPB↵

VSGEN displays the printer screen:

Line Printer

Printer name:	*xxx*
Comments:	
Controller type:	*xxx*
Device code (octal) [0–277]:	*nn*
Execute? (Y/N)	

VSGEN fills in the controller name *xxx*; you can change this only via the RENAME keyword. We'll take the remaining questions one by one.

Comments:

This field can be blank or it can include information people might find useful, like the department this printer serves and/or your name and the date; for example,

LPB1. FIRST PRINTER, MIS GROUP 1. BY L. ELY. 3/4/90.↵

Controller type: *xxx*

VSGEN fills in the printer type name *xxx*. If you're adding a printer, you can't change this; but if you're editing one, you can. If you want to change the type, do so (specify one of the types explained earlier in this section).

Device code (octal) [0–277]: *nn*

The default device codes of the primary and secondary printers are as follows.

Controller Type	Default Device Code (octal) Primary	Secondary
LPB, LPD, LPE	17	57
LPJ	21	61

If a printer is connected to an MCP1 printer controller, its device code must be 57.

If the default device code is correct, take it. To change the code, type the correct new value and press NEW LINE.

Execute? (Y/N)

Review the answers on the screen; if any seem wrong, back up and fix them. When you're satisfied with all values on the screen, confirm by typing

Y↵

VSGEN takes your changes, if any, and makes them part of the configuration.

If you want any printer device to handle 8-bit characters, arrange this through EXEC (*Managing AOS/VS and AOS/VS II*, EXEC's START command). VSGEN does not configure AOS/VS II for 8-bit characters on printers.

You have specified a line printer controller. If you have any more printers to edit or add, return to the beginning of this section. Otherwise, proceed to other devices or parameters, or build a system, as appropriate.

Line Printer Example

This example shows the editing of a line printer specification.

VSGEN Main Menu

...

Enter choice: EDIT↵

Device name: LPB↵

Line Printer

Printer name:	*LPB* ↵
Comments:	FIRST PRINTER — STANDARD FORMS.↵
Device code (octal) [0–277]:	*17* ↵

Execute? (Y/N) Y↵

Specifying Network Controllers

A Local Area Network (LAN) connects a group of computer systems that are no more than a mile from one another. A LAN can include one vendor's computers (for example, DG computers) or the computers of different vendors. A LAN can be very useful for intersystem communication, distributed data processing, and transport of software from one system to another. Also, DG computers running AOS/VS II can support IBM-compatible personal computers (PCs) over a LAN. A LAN can also connect terminals to a central computer, as described under "Specifying ITC/128s and LTC/64s (Intelligent TermControllers)" earlier in this chapter, but from the operating system point of view, the connections with the LAN appear to be asynchronous lines.

DG supports two software protocols for LANs: X.25 and TCP/IP (Ethernet). These protocols are supported by DG's XTS and TCP/IP network software. XTS and TCP/IP can provide communications with other DG systems running AOS/VS II, AOS/VS, or DG/UX (DG's version of the UNIX operating system); they can also provide communications with IBM-compatible personal computers (PCs). In a PC network, a DG computer running AOS/VS II can support PCs just as if they were user terminals.

Regardless of the network you have, the only network controller you need to identify to VSGEN is a Multiprocessor Communications Adapter (MCA).

Specifying an MCA

An MCA controller is used in small LANs with DG systems that are no more than 150 feet apart. Each MCA can handle up to 15 asynchronous lines (nodes). AOS/VS II supports as many as six MCAs; the first two have default device names MCA and MCA1. Internally, an MCA is two devices: the transmitter, MCAT(1), and the receiver, MCAR(1). MCAT must be on a device code of the form n06, and MCAR on device code n07; MCAT1 must be on device code of the form n46, and MCAR1 on device code n47. As with other devices, the n indicates the channel; on the first channel, n is 0 (or null); on the second it is 1 (for example, 106 and 107); and on the third, n is 2.

As with other controllers, if you used an accurate spec or configuration file as input to VSGEN (via VSGEN/DEFAULT=filename), you don't need to add or edit MCA information. For each MCA defined in your file, VSGEN will create default controller names. Default names are MCA (for the first) and MCA1 (for the second). VSGEN sees the transmitter and receiver as one device, so the MCA dialog is the shortest of all.

Review the listing of your configuration for MCA devices; if you're sure you want to edit or add an MCA, continue. To add instead of editing, use the ADD keyword instead of EDIT.

Enter choice: EDIT↵ (or ADD)

Device name:

If you're editing or listing, specify the MCA you want. If you're adding, we suggest a name of the default form, MCA or MCA1. Type the device name; for example.

MCA↵

If you're adding, VSGEN asks the device type. Respond with MCA:

Device type: MCA↲

VSGEN displays the MCA Controller screen:

MCA Controller

Controller name: *xxx*

Comments:

MCAs require two consecutive device codes, specify the first
Device code (x06, x46): *n*

Execute? (Y/N)

VSGEN fills in the controller name *xxx*; you can change this only via the RENAME keyword. We'll take the remaining questions one by one.

Comments:

This field can be blank or it can include information people might find useful. For example,

MCA 1; CONNECTS XTS TO MSIS_08.↲

MCAs require two consecutive device codes, specify the first
Device code (x06, x46): *n*

Specify or take the default device code. The *x* represents the channel number. Omit *x* unless the MCA is on the second channel (IOC), in which case *x* is 1, or on the third IOC, in which case *x* is 2.

Execute? (Y/N)

Review the answers on the screen; if any seem wrong, back up and fix them. When you're satisfied with all values on the screen, confirm by typing

Y↲

VSGEN takes your changes, if any, and makes them part of the configuration.

You've specified an MCA. If you have another to edit or add, return to the beginning of this section. Otherwise, proceed to other devices or parameters, or build a system, as appropriate.

Other Network Controllers

A network controller that's similar to an MCA, but provides LAN communications with systems up to 1 mile apart, is the Network Bus Adapter (NBA), also called an NBS. NBAs are supported by the DG X.25–based XODIAC/XTS networking software. If you have one or more NBAs, you specify them to the XODIAC/XTS network generation program, not to VSGEN.

Alternatives to MCAs and NBAs are Intelligent LAN controllers (ILCs), for all DG systems except MV/7500, MV/4000–series, MV/2500 DC, MV/2000 DC, MV/1400 DC, and MV/1000 DC integrated systems), and Local–bus LAN controllers (LLCs) for the previously mentioned computer systems. Some deskside computers (MV/7800 DCX and DC, MV/4000 DC and SC) have LAN controllers built into their MIOC boards. If you have a network controller, identify it to the network generation program supplied with XODIAC/XTS or TCP/IP software. (But if you want an AOS/VS II system to support personal computers through any of these LAN controllers, you must specify the personal computers to VSGEN in a host parameter question, described later in this chapter.)

To communicate with an IBM SNA network, you need DG/SNA software and an intelligent synchronous controller (ISC), an MCP1 (synchronous controller portion), a local–bus synchronous controller (LSC), or a Data Control Unit (DCU) controller. Each of these is driven by SNA software, and you identify it to the SNA network generation program, not VSGEN.

For bisynchronous communications with IBM systems, using Data General RJE80, HASP II, or RCX70 communications software, you need one of the synchronous controllers described in the previous paragraph. You also need a bisynchronous spec file; you can create such files with the BSCGEN program. BSCGEN is described in "Supporting Synchronous Devices (DCUs, ISCs, MCP1s, LSCs)," near the end of this chapter.

Specifying a Battery Backup Unit (BBU)

Your ECLIPSE MV/Family computer may have a battery that provides backup power during failures. If you have one, it may provide full backup (saving memory and device state, which allows device restart without shutdown when power returns) or partial backup (saving memory state, which allows orderly shutdown when power returns).

If the new system is to use the backup battery, the VSGEN configuration must specify it. As with other controllers, if you used an accurate spec or configuration file as input to VSGEN (via VSGEN/DEFAULT=filename), you don't need to add or edit battery information. VSGEN will create an appropriate controller entry for the device.

Examine the listing of your configuration for a backup battery (default name is BBU); if you're sure you want to edit or add BBU information, continue. To add instead of editing, use the ADD keyword instead of EDIT.

Enter choice: EDIT↵ (or ADD)

Device name:

If you're editing or listing, specify the backup battery (default name BBU). If you're adding, we suggest the name BBU. Type the device name; for example,

BBU↵

If you're adding, VSGEN asks the device type. Respond with BBU:

Device type: BBU↵

VSGEN displays the Battery Backup Unit screen:

Battery Backup Unit

Unit name: xxx

Comments:

Full or partial backup: xxx

Enable auto-restart: xxx

Execute? (Y/N)

VSGEN fills in the name *xxx*; you can change this only via the RENAME keyword. We'll take the remaining questions one by one.

Comments:

This field can be blank or it can include information people might find useful. For example,

BACKUP BATTERY — SAVES EVERYTHING FOR 2+ MINUTES.↵

Full or partial backup: xxx

If your battery is Model 8746, it provides full backup; type FULL and press NEW LINE. If the battery provides partial backup, type PARTIAL and press NEW LINE; VSGEN then skips to the *Execute?* question.

If you specify full backup, VSGEN asks

Enable auto-restart: x

An answer of Yes allows AOS/VS II to continue normally when power returns after a power failure. We recommend that you answer Yes by typing Y and pressing NEW LINE.

(Autorestart tells the operating system to restart all devices when power returns within a given period. A setting with similar name but different functionality is automatic reboot. Automatic reboot tells AOS/VS II whether to restart itself after a fatal error. Automatic reboot is a host *parameter*, described in "Specifying Host Parameters," the next section of this chapter.)

Execute? (Y/N)

Review the answers on the screen; if any seem wrong, back up and fix them. When you're satisfied with the values on the screen, confirm by typing

Y↲

VSGEN takes your changes, if any, and makes them part of the configuration.

You've specified a backup battery. If you have another to edit or add, return to the beginning of this section. Otherwise, proceed to other devices or parameters; or build a system, as appropriate.

As always, you can display all current system specifications with the CURRENT command, list information with the LIST command, or change information with the EDIT command.

For full backup to work, all of the following must be true:

- The battery must provide full backup.
- Power must return before the battery is exhausted.
- Someone must have specified BBU with full backup and autorestart to VSGEN.
- The computer LOCK switch (if there is any) must have been in the ON or LOCK position when power went down.

Handling power failures is described near the end of Chapter 6.

Specifying Host Parameters

Host parameters include performance–related items (like the number of buffers in the cache), the default program to run at system startup, and automatic reboot specifications.

This section describes each of the many parameters you can specify, with background information as needed. Some background information, like that for the swap and page directories, is quite extensive. Just skip over the information you don't need.

As with hardware devices, the amount of work you need to do depends on whether you used an accurate configuration file or an accurate autosizer output file (:SIZER.CFG) as input to VSGEN (using the command form VSGEN/DEFAULT=filename). If you used an accurate file as input, all your parameters have been correctly identified to VSGEN; you need not do anything else in this major section (but if you want to specify any parameter that is new in Release 1.10, you must edit parameters to do so).

Please check your configuration file and decide whether you want to edit host parameters. If you do, make sure the hostname (displayed at the top of the screen) indicates the system you want to edit; if needed, change to the host you want with the HOST keyword.

Then type the PARAMETER keyword:

Enter choice: PARAMETER⤶

VSGEN displays the Specify Host Parameters screen, as follows.

```
            Specify Host Parameters                  [PARAMETER]

Index       Parameter                                Current Value
01   Swap directory size (blocks):                   2147483647
02   Page directory size (blocks):                   2147483647
03   Number of system buffers                        256
04   Minimum number system pageable pages:           10
05   Frequency (Hz):                                 10
06   Enable access:                                  YES
07   Initial program for PID 2:                      CLI.PR
08   Initial IPC message for PID 2:
09   Maximum load pages – no contention:             0

     Choose the parameter(s) you would like to modify

Parameter(s):
```

Not all parameters fit on one screen. As with other screens, if you have a CRT, you can scroll the display forward by pressing the NEXT SCREEN function key (F4) and scroll it backward by pressing the PREVIOUS SCREEN function key (F3). You can use the FIND function key (SHIFT–F6) or GOTO (SHIFT–F7) to locate a parameter.

You specify a parameter by its number. In the Parameters field you can separate individual parameter numbers with commas and specify ranges of parameters with hyphens. For example, to edit parameters 1, 2, 5 through 10, and 21, you would type

```
1, 2, 5-10, 21↵
```

All parameters are shown in Table 4-6.

Table 4-6 Host Parameters

Index	Parameter	Original Default Value (as supplied by DG, no configuration file)
01	*Swap directory size (blocks):*	*2147483647*
02	*Page directory size (blocks):*	*2147483647*
03	*Number of system buffers:*	*128*
04	*Minimum number system pageable pages:*	*10*
05	*Frequency (Hz):*	*10*
06	*Enable access:*	*YES*
07	*Initial program for PID 2:*	*CLI.PR*
08	*Initial IPC message for PID 2:*	*none*
09	*Maximum load pages – no contention:*	*0*
10	*Maximum load pages – contention:*	*0*
11	*Fault time prepaging maximum:*	*0*
12	*Enable variable swap files:*	*NO*
13	*Maximum swap file size:*	*126*
14	*Default swap file size:*	*126*
15	*Truncate swap files:*	*NO*
16	*Truncate page files:*	*YES*
17	*Page file size for truncation:*	*2048*
18	*Lowest group 1 priority:*	*255*
19	*Lowest group 2 priority:*	*258*
20	*Soft tape errors suppressed:*	*NO*
21	*Dump device:*	*MTB*
22	*Maximum number of PIDs:*	*255*
23	*Use the SMI:*	*NO*
24	*Default offset to GMT:*	*0:00*
25	*Automatic reboot:*	*NO*
26	*Operator intervention delay (seconds):*	*NO*
27	*Enable data caching:*	*NO*
28	*Enable simulated data caching:*	*NO*
29	*Data cache size in megabytes:*	*0.00*
30	*Cache entry size (4, 8, 16, 32, 64, 128):*	*16*
31	*Use cache on root LDU:*	*NO*

We will run through these questions one by one. Seek help (HELP function key) as you need it.

Swap directory size (blocks): *n*
Page directory size (blocks): *n*

The swap and page directories relate to AOS/VS II memory management. They are summarized in the next two paragraphs and detailed in the section that follows. If you're more interested in other parameters, skip to the sections that describe them.

Swap directory size specifies the maximum size or the disk unit for the swap directory. The default is 2,147,483,647 disk blocks (a block holds 512 bytes). This is more space than AOS/VS II can ever use. The default size is more than adequate, but instead of a size, you may want to specify a disk unit. The unit must contain an LDU whose filename (assigned with Disk Jockey) is SWAP or BOTH. To specify a unit, you must use the format ldu-unique-ID/disk-unitname (for example, BOTH/DPJ20).

Page directory size (as with swap) specifies the maximum size or the disk unit for the page directory. The default is the same as for the swap directory. As with swap, the default size is fine, but you can specify a disk unit. The unit must contain an LDU whose filename is PAGE or BOTH. To specify a unit, you must use the format ldu-unique-ID/disk-unitname (for example, BOTH/DPJ20).

Swapping and Paging in AOS/VS II

AOS/VS II is a *virtual memory, demand-paged* system. Virtual memory means that memory is a composite of main memory and disk memory. Demand-paged means that it adds a page of memory to each process's total memory allotment (called its *working set*) when the process demands another page. A page of memory contains 2,048 bytes.

The SWAP and PAGE directories are the disk component of AOS/VS II virtual memory. They are critical to its operation.

Processes and Working Sets

AOS/VS II runs each program as a *process*, with its own process ID (PID). A process starts with a certain number of pages of virtual memory — its initial working set. When it needs more pages (perhaps to execute a routine that isn't in memory), a *page fault* occurs; AOS/VS II then allots an additional page of memory to the process's working set. AOS/VS II then reads needed information from disk into the page. The theoretical limit on the number of pages in a process's working set exceeds 1,000,000 — providing a limit of 2 billion bytes for a process's logical total size.

There can be many processes — up to 4,096 — all running simultaneously.

Memory contention occurs when all currently active processes (including the AOS/VS II system and its peripheral manager) want a working set larger than the computer's main (physical) memory. Memory contention can occur much of the time.

In *light* memory contention, AOS/VS II resolves the situation by removing inactive pages from processes and keeping them on disk in directory PAGE. The processes' initial working sets remain in memory. Later, if demanded, the pages are restored to the processes' working sets. Because the number of pages involved varies, the files used to keep the pages vary in size. In directory PAGE, AOS/VS II creates a page file for each new process ID as the process is created. Later, it tries to reuse these files, matching the file's size to the number of pages it expects the process to use.

In *heavy* memory contention, AOS/VS II removes whole *processes* (selecting blocked processes first), and keeps them in directory SWAP. Later it restores them to main memory. The file in which it keeps each process is a contiguous file of 512 disk blocks (each disk block is 512 bytes). As with PAGE, AOS/VS II creates a swap file for each new process ID as the process is created. The file size is constant unless you enable variable swap files (described below).

AOS/VS II creates and manages the SWAP and PAGE directories automatically. They are really part of memory; AOS/VS II relies on them and uses them extensively. If AOS/VS II runs out of space in either one, it may fail (panic). The default maximum sizes are very large to prevent AOS/VS II from running out of space. However, the large sizes won't prevent problems if the LDU that *holds* SWAP and PAGE fills up.

Files in SWAP and PAGE can be deleted by superusers to save space; but the system will recreate them as needed. After anyone deletes files in these directories, AOS/VS II should be shut down and brought up again, so that it can reinitialize the directories.

Generally, you will not want to delete page files. But you might do so in a situation in which a very large process (like a batch job) runs at night — requiring a large page file — and where interactive user processes, which generally need smaller page files, run during the day. You might delete the large page files after the batch job runs to make more room for the smaller daytime page files.

Using an LDU for the SWAP, PAGE, or BOTH Directories

If you can afford the disk space, you may want to designate an LDU for both SWAP and PAGE directories, or designate an LDU for each one. Ideally, an LDU used for either (or both) of these directories will be on a disk whose controller differs from the system disk controller.

To create an LDU for both directories, use Disk Jockey to format a DPJ, DPF, or MRCDISK disk with the LDU filename and unique ID of BOTH. Then, during VSGEN, specify the unique ID and disk unit name, using the format BOTH/disk-unit-name, in answer to both the SWAP and PAGE questions. For example, if your LDU named BOTH will be unit DPJ10, you'd specify the following to VSGEN:

Swap directory size [default]: BOTH/DPJ10↵
Page directory size [default]: BOTH/DPJ10↵

For an LDU named BOTH to work properly, both the filename and unique ID must be SWAP or PAGE. VSGEN cannot check the LDU filename or unique ID on the disk you specify, so if you make a mistake, you won't discover it until you try to boot the new system.

When the new system comes up, it will automatically create and maintain control point directories with pathnames :SWAP and :PAGE on the LDU named BOTH. LDU BOTH is not restricted to the SWAP and PAGE directories; you can put other directories on it as well.

Under some circumstances, you may want to give the SWAP or PAGE directory, or each one, its *own* LDU. To do this, use Disk Jockey to create an LDU with the LDU filename *and* unique ID of SWAP or PAGE. Then, during VSGEN, specify the unique IDs and pertinent disk unit names in the format ldu-unique-ID/disk-unit-name, as before (for example, SWAP/DPJ20 and PAGE/DPJ21 (or, for MRC-bus disks, SWAP/MRCDISK000800 and PAGE/MRCDISK000800). Remember, as with BOTH, for an LDU named SWAP or PAGE to work properly, both the filename and unique ID must be SWAP or PAGE. VSGEN cannot check the LDU filename or unique ID, so if you make a mistake, you won't discover it until you try to boot the new system.

Unlike BOTH, an LDU you use for SWAP or PAGE cannot hold other directories.

You can override the VSGEN default specs for both SWAP and PAGE when you bring up any AOS/VS II system. The system will ask the questions for *Swap* and *Page*, and you will answer them in the same way (a size or a unit, form ldu-unique-ID/disk-unit-name).

Number of system buffers *n*

This parameter sets the number of 512-byte buffers allotted for the system to do its I/O. The original default is 256, a good general-purpose value.

The valid range is 96 through 4096. If your system will have a lot of free memory (as it might if it will run only a few processes), a large number of buffers can help cut down on disk requests. But if there will be a lot of processes and/or memory contention, swapping will occur anyway; and you might want to specify fewer buffers to free memory for active processes.

For your first system you will generally want to take the default. The ideal buffer figure will depend on your system load, the kind of things the system does, and your hardware; you can time typical application programs to determine it.

As with the swap and page specs, you can override the buffer spec when you bootstrap the system. This makes it easy to alter the number for testing; simply reboot the system, override default specs, and enter the new number.

Minimum number system pageable pages *n*

This parameter sets the number of 2,048-byte pages AOS/VS II will try to keep resident in main memory (its own working set). The valid range is 4 through 1000 pages; the default, a general-purpose value, is 60.

If memory contention will be light, you may want to specify a large number of pages here. This will keep less frequently used system code resident, which may allow processes to run faster.

If memory contention will be moderate or heavy, you may want to specify a lower figure and free the memory for active processes. Ideally, system load will be set up to be consistent, and programs that use similar types of calls will be run simultaneously. But this requires a lot of experience to implement, and generally you can take the default. This specification can't be overridden at system startup.

Frequency (Hz) *n*

This parameter sets the frequency, in cycles per second (Hz), of the CPU real-time clock (RTC) or architectural clock. This value defines the granularity for AOS/VS II timing services, used when programs make delay system calls (?DELAY), run histograms, and the like. (The real time and architectural clocks are different from the boot clock; the boot clock maintains the date and time when AOS/VS II isn't running.) The default frequency is 10 Hz. Other choices are 100 Hz, 1000 Hz, or the ac line frequency (which is either 50 or 60 Hz). Several high-level languages, like BASIC, expect the default frequency for their time-oriented statements.

If you want to synchronize with ac line frequency, ask your electric company what the frequency is before choosing (if you choose 50 and your ac runs at 60, the clock will run fast). If the new system *must* check something often — as in a some kind of process control situation — you might choose 1000, despite the overhead involved in 1000 interrupts per second.

Enable access *x*

This parameter enables (Y) or disables (N) the AOS/VS II file access control mechanism. All file security — very important in a multiuser system — depends on access control. If you disable access, the multiuser environment will work, but every user will be able to access, modify, and delete every file in the system. So you will probably want to take the default on this.

Initial program for PID 2 *x*

Normally, when AOS/VS II starts up, it runs a CLI process (called the master CLI process) as PID 2 on the system console. This question allows you to specify another program for PID 2. If this AOS/VS II system will support multiple users, the CLI is your best choice, since it can create the multiuser environment (EXEC) easily. But for a special application, you might want to specify one of your own programs, perhaps one that creates other processes. Or on a single-user system, where PID 2 needn't create any processes, you can choose any program you want (for example, CEO).

For any program other than the default, you must specify the full pathname, with the .PR suffix, from the root directory. The file you specify must exist when you try to start up this system; if it doesn't, the system won't run.

Whenever you shut down the PID 2 process, and confirm your intent to shut down, the whole system will shut down.

Initial IPC message for PID 2 *x*

This prompt allows you to specify a file of commands to be executed by the PID 2 (master) process when it comes up. The default is no IPC message. If the initial program for PID 2 will be CLI.PR (default), you might want to specify the system UP macro (:UP.CLI) to start EXEC automatically.

You may want to run the System Management Interface (SMI), a friendly, menu-driven program designed to help inexperienced people manage an AOS/VS II system. It's described briefly under the question *Use the SMI:*, a few pages later in this chapter, and more extensively in the manual *Using the AOS/VS II System Management Interface (SMI)*. If you want to run the SMI, type the pathname of the macro that starts it (:UTIL:UP_EXEC.CLI).

To change the default to none, type □⤶ (One or more spaces and ⤶).

Maximum load pages – no contention *n*
Maximum load pages – contention *n*

These two parameters can enable the system to load multiple pages into memory when a process is created. A nondefault answer doesn't *do* anything. It just enables multiple page loading for a program, if specified by the Selective Preamble Editor (SPRED) utility.

Normally, when a process is created, its working set has only a few pages (nominally 0). Your answers to the *Maximum load pages* questions set the *maximum* number of pages that can be loaded as the working set when a process is created. For this loading to occur, someone must run the SPRED utility and describe the page boundaries.

Even if you specify a nonzero answer (say 50), multiple pages won't be loaded before someone has run SPRED on the program file(s) that will use this feature. If you take the default (0), multiple page loads cannot occur even if SPRED specifies them. Regardless of your answer, and what is done with SPRED, existing programs will run. Using SPRED is described in *Managing AOS/VS and AOS/VS II*.

Loading multiple pages can be useful in situations in which programs use many unshared pages — it's faster to load most (or all) of the needed pages when the process is created than to load the pages in later.

The state of memory contention may influence your choice of maximums. For example, you might want to allow a fairly large maximum when memory is free (no contention), and allow only a small (or 0) maximum in contention situations.

Fault time prepaging maximum *n*

This parameter can let a process acquire multiple pages on a page fault. The original default, 0, lets a process read only one page (2,048 bytes) at a time. Normally, when a process needs information that isn't in memory, it takes a page fault; the system finds one page frame, adds it to the working set, and reads needed information into the page frame.

This *Fault time* question can let the system add multiple pages to a working set when a process takes a page fault. Having a process do this can be useful when you know the process will usually need more than one page when it takes a fault. Like the *Maximum program load pages* question, this question only *enables* a feature; someone must use the SPRED utility to specify the actual number of pages to be added.

Enable variable swap files x

This question enables variable swap files, which may shorten swapping time for large processes. If you answer Yes, it asks about maximum and default sizes.

During memory contention, sometimes a process must be swapped to disk. If the process's working set has grown while the process was running, the swap file might not be large enough to hold the working set. If this happens, the system must strip pages from the working set until it fits in the swap file. Later, when the process swaps back in, it may need the stripped pages back, and take many page faults to get them.

These operations take a lot of time. You can shorten this time by setting up a large swap file for each process that you expect will acquire a large working set and then get swapped out. Like the two previous parameters, this only sets a maximum. For a nondefault swap file size, someone must run SPRED on the program's .PR file.

Neither allowing variable swap files nor specifying a large swap file will prevent or inhibit a program from running. The only negative aspect is the loss of disk space.

The default maximum swap file size is 126 pages. The default swap file size for all processes not given a custom size (with SPRED) is also 126 pages.

Truncate swap files: x

Truncating swap files can (temporarily) save disk space by reducing each process's swap file size to 0 when the process terminates. However, the swap file will return to its original size when a process that's using it swaps. Generally, if you have more than 100 Mbytes of disk storage, the answer should be No. With less than 100 Mbytes of storage, the answer should be Yes (answer Y↵).

Truncate page files: x

Truncating page files can save disk space by reducing a process's page file size to 0 bytes when the process terminates — if the page file has grown larger than a specific size (next question). The space saved by truncating page files may last for hours or even days, since page files grow only as needed by the process using them. The answer should be No only if you have ample disk space and paging performance is critical. If you have less than 100 Mbytes of disk storage, the answer should always be Yes.

Page file size for truncation: n

VSGEN asks this question only if you wish to truncate page files (previous question). The answer sets the upper limit of page file size. If, when a process terminates, its page file exceeds *n* bytes, the system will truncate the file to 0 bytes. The original default (2,048 blocks) is a good general purpose choice.

If you have less than 100 Mbytes of disk storage, type 0↵.

With more than 100 Mbytes of disk storage, if disk space is not a critical issue, take the default (2,048 blocks).

If you want to fine-tune page file size, or if disk space *is* a critical issue, try the following. Run the system for a while; then check the page file size in :PAGE (F/AS :PAGE:+⤶). Take the average page file size, divide by 512 to convert bytes to disk blocks, and run VSGEN again to specify this average number.

(Although the default page file limit, 2048 blocks, appears very large, it's deceiving. The F/AS command shows byte length to the *end of file mark*, in the highest block number in the file. Many disk blocks before the end of file are not occupied. A page file that appears to use, say, a megabyte is actually using much less space.)

Lowest group 1 priority: n

Process groups are independent of process priority. There are three process groups: group 1, high priority; group 2, medium priority (includes user processes); and group 3, low priority. Your answers to this question and the next one determine the group into which a process of a given priority falls. The details of all this are fairly complex (process groups are described in *Managing AOS/VS II*). In most cases, you don't need to know the details. Things will be simpler if you take the default on this *Lowest priority* question and the next one. The original default for this question is 255.

Lowest group 2 priority: n

This question sets the range for group 2 processes (between the number in the previous question and this number). All processes with a lower priority than this one will run as group 3 processes. We suggest the default (the original default is 258).

Soft tape errors suppressed: x

A soft tape error is an I/O inconsistency that disappeared in fewer than 13 retries. (If it persisted for 13 retries, it would be a hard error.) Normally, soft errors are reported to the system console and AOS/VS II error log (:ERROR_LOG). Certain brands of magnetic tape can produce many soft error messages. On a hardcopy terminal, printing these messages can slow system response. And the messages can be quite annoying on any terminal you are trying to use.

To disable soft tape error reporting on the system console, type Y⤶; otherwise answer N⤶ (the original default). A Yes answer disables *only* reporting of intermittent soft tape errors on the system console. (More than 3 soft tape errors will be reported to the system console.) All disk errors will still be reported on the system console, and all soft and hard errors will be reported to the system error log file. You can control soft tape error logging at runtime with SYSLOG commands.

Dump device [xxx]

If serious system errors recur, you may want to ask for help from DG. To get help, you might need to submit a dump of computer memory. The default unit for this dump is a tape unit with the ECLIPSE default tape unit name MTB0, but if you don't have a tape unit named MTB, or if your tape controller is on an MRC subsystem, you must specify a different unit. (You can also identify the memory dump unit at runtime, should a serious error occur.) You can specify any tape unit you have (for example, MTD0 or MRCTAPE000A00).

Maximum number of PIDs: 255

On most systems, the default of 255 PIDs (processes) is enough. But on a large system you might want to specify more than 255.

Your answer to this question sets the maximum number of processes the new system can run. As a general rule, CLI users who may also use CEO need an average of three and a half processes. CEO-only users need an average of two and a half processes. So — assuming twenty or so system processes — the default of 255 processes is enough for about 65 CLI users or 90 CEO-only users simultaneously.

On most computers, 255 processes is enough. But on an MV/40000 or MV/20000, you may want to run more — or fewer — than 255 (the allowable range is 16 through 4,096). If so, type the number of processes you want. For example, you might type 500↵.

Specifying more than 255 processes doesn't mean you *must* run more than 255 — it just allows the system to do so. VSGEN lets you specify up to 4,096 processes.

To allow a process to run with a PID above 255, you will need to edit the pertinent program file(s) with the SPRED editor. Also, there are issues relating to PID size that you should understand. These issues are explained in *Managing AOS/VS II*, the performance chapter.

Use the SMI: x

The SMI (System Management Interface) is an easy-to-use, menu-driven program for managing AOS/VS II. You can select the SMI (instead of the default, the CLI) by typing Y↵. If you answer Y, you will also need to specify an initial IPC file for PID 2 (the pathname is :UTIL:UP_EXEC.CLI).

The SMI program lets you perform various EXEC and CLI system management functions. Some of SMI's system management functions, such as controlling printers and backing up or restoring personal files, are available to all users on the system. Other functions are restricted to users who have the System Manager privilege in their user profiles.

If you choose (or decide to try) the SMI, you must specify, as an initial IPC file for PID 2, the file :UTIL:UP_EXEC.CLI. (Otherwise, VSGEN will give you an error.) For more information about the SMI, see the manual *Using the AOS/VS II System Management Interface (SMI).*

Default offset to GMT? *00:00*

GMT is Greenwich Mean Time (Universal Time). Setting this is useful only if your system will communicate with another computer system in a different time zone. If you specify no offset, files (and documents) created on your system will be sent to other systems using your system's timestamp. This means, for example, that a document sent to Paris from your system at 10:00 a.m. will arrive with the postmark of 10:00 a.m., although it was sent at 2:00 p.m. Paris time.

You can specify this offset either at VSGEN for a tailored system, or for any AOS/VS II system at startup (via a bootstrap program or the Technical Maintenance Menu).

The offsets are independent; if you specify -4:00 to VSGEN and -4:00 at startup, the offset will remain -4:00 (not -8:00 or 0:00), regardless of the AOS/VS II system you run.

To specify no offset — skip the issue — press NEW LINE. Otherwise, find out the number of hours (and fractions of an hour, if this applies) your time zone is from Greenwich Mean Time. The offset decreases with distance West from Greenwich, England. The 014-series "Starting" manual supplied with your computer includes a table with GMT offsets from different places. Type the number of hours and minutes to add (+ or -) to Greenwich Mean Time to equal local time.

For example, if the new system will run in New York City during Eastern Daylight Time, you would specify

-5:00↵

Automatic reboot: x

This question determines whether the new AOS/VS II system will try to restart itself after shutdown (normal or abnormal) or wait for human action.

If you answer Yes, the system will try to restart after each shutdown. If abnormal shutdown (a fatal error) occurred, the system will display AOS/VS II fatal error status information and an appropriate prompt; then it will wait a given interval (determined by the next question) for an operator to intervene. After the interval, if no intervention occurs, the system will run the Emergency Shutdown (ESD) routine. Then, for either normal or abnormal shutdown, the system will wait the given interval and try to reboot from the default device. You can interrupt the automatic reboot by typing the break sequence.

If you answer No, AOS/VS II will not try to reboot after shutdown. After a fatal error, the system will display AOS/VS II fatal error status information, ask if the operator wants a memory dump, and wait for someone to answer Yes or No. After shutdown, someone must reboot AOS/VS II (via the SCP BOOT command) to restart it. The latter behavior (waiting at the prompt) was the standard behavior for earlier revisions of AOS/VS II and AOS/VS.

A Yes answer to the *Automatic reboot* question has major advantages. If the computer has a boot clock (time-of-day clock) to provide date/time information, AOS/VS II can restart itself and, if the *Initial IPC file for PID 2* parameter is set to UP.CLI, can even bring up the multiuser environment by itself. Automatic rebooting is ideal at sites that lack an experienced human operator — after a few moments for rebooting, users can continue work (although, depending on what they were doing at the failure, they may need to re-enter information). Even if the computer lacks a boot clock, AOS/VS II will proceed to the query *Date (MM/DD/YY)*, which allows someone to reboot AOS/VS II simply by answering date and time questions and taking defaults on others.

If the operator does not want AOS/VS II to restart itself, perhaps because hardware failed or because recurrent software failure warrants a memory dump, he or she can type the break sequence during the delay interval.

A No answer is preferable if you always want someone manually to start the system — perhaps because, after a fatal error, an operator is needed to run a recovery program (like INFOS II IRECOVER) or to tell users how to proceed in their sessions.

The answer given here can be overridden at system startup if you answer Yes to the *Override default specs?* question. Thus, if unusual circumstances like persistent failures occur, you can temporarily change the value without running VSGEN again.

Decide on whether you want the automatic reboot feature. If you want it, type Y and press NEW LINE. If you don't, type N and press NEW LINE. If you type N, VSGEN skips the next question.

Operator intervention delay (seconds): n

This value determines how long — after a fatal system error — AOS/VS II will wait for operator intervention before it runs the Emergency Shutdown (ESD) routine in preparation for rebooting. If the operator wants to take a memory dump (perhaps to submit an STR), he or she must do it during this delay, since running ESD overwrites essential information in memory.

Generally, this value should be the shortest time the system operator will need, after learning of the failure, to reach the system console. (The system will use the same value as the time-out default for the question *Override default specs*; thus, on systems with boot clocks, users will experience this delay at least twice before the system restarts — once before it runs ESD, and again after reboot as it waits at the *Override* question.)

Enable data caching   *N*

AOS/VS II can reserve a portion of main memory to store disk information, based on the premise that it can find this information in memory and thus avoid disk I/O. The portion of memory reserved for this is called a *data cache* or *cache*. Access time to information in memory is thousands of times shorter than access time to information on disk; therefore proper use of the caching mechanism can enhance system performance significantly. As implemented on AOS/VS II, data caching affects only read operations — but reads involve about 70 percent of I/O. The data cache is independent of swapping and paging; however, memory you allot for the cache will not be available for general storage, thus allotting a cache might cause memory contention.

Data caching is transparent to application programs. It may let them run faster or slower (in worst case, by reducing memory and causing memory contention), but it will not prevent existing applications from running or change their sequence of operations.

There can be just one data cache per system. You specify whether you want a real or simulated cache, the cache size, the size of its entries, and whether you want the root LDU cached, here at VSGEN. You can also specify caching information at startup, by answering Yes to the question *Override default specs?* Answering Yes to *Enable data caching* simply enables LDU data caching (but in a later question you can implement caching for the root LDU). For LDUs other than the root, the cache questions just reserve memory for the cache. For any LDU other than the root, caching will not occur unless the LDU is initialized with the INITIALIZE switch /CACHE.

The main cost of caching is the memory reserved for the cache. Caching may offer significant benefits for your system if you have some free memory and caching will not cause memory contention.

It's difficult to measure free memory unless you have the optional AOS/VS and AOS/VS II Performance Package or equivalent. If you have the Performance Package, the monitor can tell you this figure.

An important gauge of cache efficiency is the cache hit ratio. You can determine this by running the LDUINFO utility supplied with AOS/VS II or the Performance Monitor. Either LDUINFO or the Monitor can tell you the cache hit rate for the cache you specify (or simulate). Broadly speaking, if caching doesn't cause memory contention, a cache hit ratio of 50 percent or more means that the cache is aiding performance.

However, even if you don't have the Performance Package, you can experiment with data caching and, by timing your applications, arrive at an efficient size for the cache (or decide to skip a cache because it produces no improvement). Several studies made with DG computers with multiple disks have shown improved performance with caches of 1 to 8 megabytes.

Caching can also help if the disk load in your system is unbalanced (for example, if of 10 LDUs, two LDUs bear 80 percent of the load). You can cache those LDUs that are heavily used to help balance the I/O load.

DG database management products, like DG/SQL and INFOS II, have their own disk caching mechanisms; however, these products may benefit from an AOS/VS II system cache.

If you don't want to enable data caching through VSGEN, answer No to both *Enable data caching* and *Enable simulated data caching* questions. Then skip to the section named "Proceeding."

If you want to try caching, there are several ways to approach it. You can enable caching, boot the new system, and try it (using INITIALIZE/CACHE for the pertinent LDUs); or you can enable simulated caching, which simulates the effect of a cache and is most useful if you plan to add memory but don't know how much to add. Simulated caching has no effect on system performance; it simply lets you discover the cache hit ratio via LDUINFO or the Performance Monitor. To try simulated caching, answer No to the *Enable data caching* question and Yes to the *Enable simulated data caching* question.

If you decide to try caching (as opposed to simulated caching), you will need to determine an effective cache size. If you have the Performance Monitor, you can tell how much free memory you have; try some percentage of this. If not, try 1 or 2 megabytes or 10 percent of your total memory, whichever is lower. To select caching, answer Yes to the *Enable data caching* question and No to the *Enable simulated data caching* question.

Any cache information you specify at VSGEN can be overridden at system startup (if you answer Yes to the question *Override default specs?*). So you can try different cache sizes as you start up AOS/VS II; then, when you've determined a good size, run VSGEN again and specify that size in the tailored system.

After you answer the *Enable data caching* question, VSGEN asks

Enable simulated data caching: *N*

Answer No unless you want simulated data caching (which is most useful when you contemplate acquiring more main memory, as explained above). If you answered Yes to the *Enable data caching* question above, you must answer No.

Data cache size in megabytes: *n*

This value determines the size, in megabytes, of the data cache. The main memory you specify here will be allocated exclusively to the cache; it will not be available for general I/O. You can specify any number from 000.1 through 999.9 (use decimal format as shown). If necessary, this value will be rounded down to an even number of disk blocks (512 bytes), and then down to an integer number of cache entries (asked next).

The best cache size depends on the amount of free main memory in your computer, as mentioned above. Generally, don't specify more than 10 percent of the total amount of main memory in the computer for which you're generating this system. If you specify more memory than is available, at startup the system will display an *Insufficient memory* message and disable data caching.

For example, if you have 32 megabytes of main memory, you might type

2↵

Cache entry size (2, 4, 8, 16, 32, 64, 128): *n*

Cache entries are subdivisions within the cache used to store information read from LDUs that were initialized for caching.

This value determines the size, in 512-byte disk blocks, of each cach entry. The number of entries in the cache will be the cache size divided by the entry size you specify here. You can specify any power of 2 between 2 and 128 blocks (2, 4, 8, 16, 32, 64, 128).

The system will fill each entry with information from the number of disk blocks you specify, including the block(s) requested by the read operation. For example, if the entry size is 16 and a program wants to read one block, the system will read the requested block and 15 others into the cache entry. The position of the requested block(s) within the cache entry depends on the physical disk address of the block(s). If on the next read from this LDU the system finds other sought blocks within the cache entry, it need not access the disk for these other blocks; the cache will have eliminated the disk access(es) needed to read these blocks.

A good general-purpose cache entry size is 16 blocks (8,192 bytes), so you might type

16↵

Use cache on root LDU: *N*

This question lets you specify caching on the root LDU (which you could not otherwise do, since you select caching with the INITIALIZE /CACHE switch, and the root LDU is already initialized when the system comes up).

This question allows sites that have only one LDU to use data caching. If you answer Yes, the new system will use the settings for cache and entry size you specified above.

Proceeding

When you have specified the parameters you want, you may want to review the whole system again with the CURRENT command. If any device or parameter is wrong, fix it with the EDIT command, or in worst case, delete a device with the DELETE command and add it again.

Then continue with the next section.

Saving and Building the New System

You have specified your system devices and parameters to VSGEN. Only a few steps remain.

Saving the Configuration in a File (SAVE Keyword)

Until you type a SAVE (or BUILD) keyword, the work you've done with VSGEN remains only in computer memory. To save it on disk, use the SAVE keyword. (The BUILD keyword, described next, also writes the system configuration to disk, so you need not use SAVE if you're going to build immediately.)

Before you save the configuration, if you haven't already done so, please verify the configuration. Type VERIFY, specify the level you want, and don't specify a file for the listing. If the system doesn't pass verification, fix the problems described; then try again.

When ready, use SAVE. An example of using the SAVE keyword is

SAVE↵

Save Current Configuration

Configuration file pathname: *xxx.CONFIG*

Execute? (Y/N)

The default name, *xxx.CONFIG*, is the current hostname or the name defined by the configuration file you specified to VSGEN — with the .CONFIG suffix. If the filename displayed is based on the hostname and the configuration contains information for more than one host, you might want to specify a different filename. For example, if the configuration contains information for hosts MSIS_01 and PURCHASING and the pathname displayed is MSIS_01, you might want to specify MSIS_01_AND_PURCHASING. The configuration file will be placed in the working directory (by default, :SYSGEN) unless you specify another directory.

To confirm and have VSGEN create the file, type Y and press NEW LINE.

If a file with the same name already exists in the destination directory, VSGEN will warn you that it already exists. To have VSGEN delete the existing configuration file and replace it with the current one, confirm with Y↵. To retain the old file, type N↵; then change the pathname or rename the host and use SAVE again.

At this point, all your efforts are saved on disk. If you want to stop, you can leave VSGEN via the BYE command, and then later build a system using the form VSGEN/BATCH=configuration-filename/HOST=hostname. Or you can continue and build your tailored system immediately.

Building the System (BUILD Keyword)

To build the current configuration into a tailored AOS/VS II system, use the BUILD keyword. BUILD always saves the current configuration on disk (in a file named in the form hostname.CONFIG) and saves device name information (in a file named in the form hostname.NAMES), so you need not have used the SAVE keyword before building.

After you use BUILD, VSGEN displays the Build a System screen:

Build a System

Hostname(s): +

Build in maintenance mode (Y/N): N

Execute (Y/N):

We will answer these one by one.

The answer to *Hostname(s):* determines for which hosts VSGEN will build a system. If you specify +, the default, VSGEN will build a system for all hosts defined in the configuration file (there may be only one host defined). VSGEN will build a system and names file for each host, in the working directory. It will use the forms hostname.PR and hostname.NAMES). To display all hostnames defined, use the INDEX key.

The AOS/VS II system filename, without .PR suffix, is limited to 13 characters, so we suggest that you limit your hostnames to 13 characters. If a hostname is too long, VSGEN will display only the first 13 characters. You can change a hostname with the RENAME keyword.

Maintenance mode determines whether VSGEN will save temporary files it creates while building the system. Generally, answer No to this. But if you suspect that VSGEN may not be building systems correctly, answer Yes to have it save the temporary files (.TMP files, explained in Table 4–1) for later analysis by a DG support person or organization.

To the *Execute* question, answer Yes to have VSGEN build a system; answer No otherwise. After you answer Yes, VSGEN will verify the configuration (using level 1 verification) and notify you if the configuration isn't valid. If it is valid, VSGEN will create a new configuration file and then build a system. (VSGEN creates a new configuration file whether or not you've changed the configuration.)

For XTS network operations, if you want to use XTS II, VSGEN will copy code from the QNET.LB library in :SYSGEN. So if you have XTS II, and haven't loaded it and moved QNET.LB from :NET to :SYSGEN, you won't be able to use the network. If you haven't loaded XTS and moved QNET.LB, then save the configuration (SAVE keyword), leave VSGEN, load XTS II, and move QNET as described early in this chapter; then build a system with the command form VSGEN/BATCH=configuration–filename. (Omit the .CONFIG suffix from the configuration filename).

NOTE: If you see the error message *Operation incomplete*, this probably means VSGEN can't find a file it needs. VSGEN must be able to find files in directories :SYSGEN and :UTIL. If you receive this error message, save the configuration (use SAVE) and leave VSGEN. Verify that your working directory is :SYSGEN and your search list includes :UTIL (use the commands DIRECTORY and SEARCHLIST). If the working directory and search list are not what they should be, set them (use the commands SEARCHLIST :UTIL,:⤶ and DIRECTORY :SYSGEN⤶). Then rerun VSGEN, select the desired host (if needed), and run through the BUILD sequence again. If the working directory or search list is not the problem, type the file named in the form hostname.KS_OUT.pid.TMP or ?.n.hostname.+TMP (described in Table 4-1) to check for other errors.

To build a system, VSGEN invokes first the macroassembler (MASM), and then the Link utility. This may take up to 10 minutes on a moderately busy MV/20000 system; it can take somewhat longer on a smaller machine like an MV/2000. You'll see the messages

Building host xxx
xxx successfully linked

where *xxx* is your hostname. The tailored system has been built. Go to the next section.

Leaving VSGEN (BYE Keyword)

The new system has been built, but has not been updated or run. You need to leave VSGEN, update the new system, shut down the current system, and start the new system. To leave VSGEN, type

BYE⤶
Su) (With CLI16, the Superuser prompt is *)

You're back in the CLI.

If you try to leave VSGEN without saving the configuration or building a system, VSGEN warns you, as follows:

You are about to leave VSGEN but you haven't saved the configuration file which you modified.

Configuration file pathname:	*xxx.CONFIG*
Save this configuration? (Y/N)	*Y*
Exit from VSGEN? (Y/N)	*N*

To exit from VSGEN without saving the configuration file and names file, answer the *Configuration file pathname* question by taking the default (ignore any *File already exists* warning); answer the *Save this configuration* question by typing N and pressing NEW LINE; and answer the *Exit from VSGEN* question by typing Y and pressing NEW LINE.

To save the configuration and exit, accept the default name or type a different name. Then answer the *Save this configuration* question by typing Y and pressing NEW LINE. (VSGEN will warn you if the file already exists; to overwrite the old configuration and names files, type Y and press NEW LINE.)

Updating the New System

With your tailored AOS/VS II system built, it's time to apply the update (DG–supplied corrections called patches) to it. The update supplied with AOS/VS II must have been installed via Disk Jockey as described in Chapter 2 (for your first AOS/VS II system) or Chapter 8 (if you have installed an update or new release of AOS/VS II).

Updating your tailored system is easy. With Superuser on, make :UPDATE the working directory; and then run the Update tool. Use the form UPDATE/REV=update–rev system–pathname. For example, if update–rev is 2.01 and the system pathname is :SYSGEN:MSIS_01.PR, type

Su) DIR :UPDATE↵
Su) UPDATE/REV=2.01 :SYSGEN:MSIS_01.PR ↵

If the system filename differs from the configuration filename (as it might if the configuration file contains information for more than one host), you must use the /CONFIG= switch when you run the Update tool. For example, assume configuration file GENERAL.CONFIG defines HOSTA and MSIS_01, the system pathname you want to update is HOSTA.PR, and the update is 2.01. You would type

Su) UPDATE/REV=2.01/CONFIG=:SYSGEN:GENERAL.CONFIG :SYSGEN:HOSTA.PR↵

The Update tool now updates the system file (it runs VSGEN and patches the system file). If you receive an error message, see the section "Update Errors" in Chapter 8.

If you don't know which is the latest update, you can list update revisions by typing FILES/ASSORT/S :UPDATE:*.** ↵. The number that appears last (for example, 2.01) is the latest update revision.

You're done. However, the update changes will not take effect until you shut the system down and bring it up again, which is described in the major section "Testing the New System."

NOTE: If you will want this system to be the default system, you must make it the default system, as described later, in the section "Making the New System and Names Files the Defaults." This is essential even if you gave it the same name as the current default system.

VSGEN Example

Figure 4–17 summarizes a VSGEN editing session. This session shows dialogs to edit host, MRC chassis, asynchronous controller, and terminal line information. The host is shown as an MV/40000 and the configuration includes an MRC chassis, channel, disk controller, and disk unit. If your system does not have an MRC, skip over the MRC devices. The asynchronous controllers and terminal lines are arranged as follows:

- The first controller is named IAC and is on device code 65.
- The second controller is named IAC1 and is on device code 50.
- On IAC, lines 0–2, 4–16, and 18–23 are attached to standard CRTs.
- On IAC, line 3 is attached to a hardcopy terminal.
- On IAC, line 17 is attached to a laser printer.
- On IAC1, lines 0 and 1 are attached to modems.
- On IAC1, lines 2–7 are attached to CRTs.

Thus the sytem has four line groups: one for IAC, the standard CRTs; a second for IAC, the hardcopy terminal and laser printer; a third for IAC1, the modems; and a fourth for IAC1, the standard CRTs.

Run Disk Jockey and install AOS/VS II software (as in Chapter 2, section "Installing AOS/VS II Software on the System LDU").

Run Disk Jockey sizer routine (in Chapter 2, section "Sizing Your System Hardware").

Start the starter system, :SYSGEN:SYS.PR (Chapter 2, section "Bringing Up the AOS/VS II Starter System").

Load XTS II and move QNET.LB into :SYSGEN (this chapter).

) SEARCHLIST :UTIL, : ⤶
) DIR :SYSGEN⤶
) SUPERUSER ON⤶
Su) VSGEN/DEFAULT=MSIS_01⤶ (Instead of MSIS_01, use your configuration filename (without suffix), or if there is no such file, use the pathname of the Disk Jockey sizer file, :SIZER.CFG)

VSGEN Main Menu

1. Change the current configuration
2. List the current configuration
...
Enter choice: 2⤶

Print the current configuration (file @LPT or a disk file that you print from the CLI). Examine the listing carefully to see what devices you need to edit or add.

Press CANCEL/EXIT (or, on a hardcopy terminal, ESC–C) to return to Main Menu.

Try HELP, SHIFT–F1 (or, on a hardcopy terminal, ESC–H).

Edit the Host device specification:

VSGEN Main Menu
Host: MSIS_01

1. Change the current configuration
...
Enter choice: EDIT⤶

Device name: MSIS_01⤶

Host

Hostname: *MSIS_01*

Comments: HOST MSIS_01 INFORMATION — BY ALISON ARMSTRONG 4/18/90⤶

CPU model: *MV/40000*⤶

Number of IOC channels: 2⤶

Edit host parameters (Y/N): *N*⤶

Execute? (Y/N) Y⤶

Figure 4–17 Sample VSGEN Session (continued)

The Main Menu returns. Edit an MRC chassis (then channel, disk controller, and disk unit).

Enter choice: EDIT ⤶
Device name: MRC_CHASSIS ⤶

MRC Chassis
Host: MSIS_01

Chassis name: *MRC_CHASSIS*

Comments: MRC CHASSIS GENERATED FROM SIZER FILE (SIZER.CFG). ⤶

Unique chassis ID (hex): *1F* ⤶

Number of slots: *23* ⤶

Managing host: *MSIS_01* ⤶

MRC Controller slot (hex): *B* ⤶

Execute? (Y/N) Y ⤶

The Main Menu returns. Edit an MRC channel (to add, the device type is MRCCHANNEL).

Enter choice: EDIT ⤶
Device name: MRC_CHANNEL00⤶

MRC Channel
Host: MSIS_01

Channel name: *MRC_CHANNEL00*

Comments: MRC CHANNEL 1 -- GENERATED FROM SIZER FILE (:SIZER.CFG). ⤶

Device code (octal): *116* ⤶

Chassis name: *MRC_CHASSIS* ⤶

SI slot number (hex): *0D* ⤶

Execute? (Y/N) Y ⤶

The Main Menu returns. Edit an MRC disk controller (to add, the device type is MRCDISK).

Enter choice: EDIT ⤶
Device name: MRCDISK_CONTROLLER_000F ⤶

MRC Disk or Tape Controller
Host: MSIS_01

Controller name: *MRCDISK_CONTROLLER_000F*

Comments: SECOND MRC DISK CONTROLLER. GENERATED FROM SIZER FILE. ⤶

Chassis name: *MRC_CHASSIS* ⤶

MRC slot number (hex): *0F* ⤶

Execute? (Y/N) Y ⤶

Figure 4–17 Sample VSGEN Session (continued)

The Main Menu returns. Edit an MRC disk unit (to add, the device type is DISK).

Enter choice: EDIT ↵
Device name: MRCDISK000F03 ↵

MRC Disk Unit
Host: MSIS_01

Unit name: *MRCDISK000F03*

Comments: THIRD MRC DISK ON CONTROLLER 0F. GENERATED FROM SIZER FILE. ↵

Controller name: *MRCDISK_CONTROLLER_000F* ↵

Unit number: *3* ↵

Hostname(s): + ↵

Treat this unit as multiported? (Y/N) *N* ↵

Execute? (Y/N) Y ↵

The Main Menu returns. Edit IAC controller information.

VSGEN Main Menu
Host: MSIS_01

...

Enter choice: EDIT ↵

Device name: IAC ↵

IAC Terminal Controller

Controller name: *IAC*

Comments: CONTROLS LINES 0–23. BASE NUMBER 0. CONS 2–25 ↵

Device code (octal): *65* ↵

IAC type: *24* ↵

Base line number: *0* ↵

Execute? (Y/N) Y ↵

The Main Menu returns. Edit the terminal lines on the first IAC. Start with the first group.

VSGEN Main Menu

...

Enter choice: EDIT ↵

Device name: IAC_LINE_GROUP_0 ↵

Figure 4–17 Sample VSGEN Session (continued)

Terminal Line Group

Line group name:	*IAC_LINE_GROUP_0*
Comments:	STANDARD CRT LINES ON IAC.
Controller name:	*IAC*
Line numbers:	*0–2, 4–16, 18–24*
Terminal definition:	*CRT3*
Terminal type:	*CRT3*
Input buffer length:	*128*
Output buffer length:	*128*
Lines per page:	*24*
Characters per line:	*80*
Break key function:	*MBBM*
Characteristics:	*MST MEOC MULC MWRP*
Data bits:	*8*
Stop bits:	*1*
Parity:	*None*
Baud rate:	*9600*
Execute? (Y/N)	Y

The Main Menu returns. Edit the IAC's second line group for its hardcopy terminal lines (comprising the laser printer and hardcopy terminal).

VSGEN Main Menu

...

Enter choice: EDIT

Device name: IAC_LINE_GROUP_1

Terminal Line Group

Line group name:	*IAC_LINE_GROUP_1*
Comments:	HARDCOPY TERMINAL LINES ON IAC.
Controller name:	*IAC*
Line numbers:	*3, 17*
Terminal definition:	*TTY*
Terminal type:	*TTY*
Input buffer length:	*128*
Output buffer length:	*128*
Lines per page:	*30*
Characters per line:	*72*
Break key function:	*MBBM*
Characteristics:	*MST MEOC MULC*
Data bits:	*8*
Stop bits:	*1*
Parity:	*None*
Baud rate:	1200
Execute? (Y/N)	Y

Figure 4–17 Sample VSGEN Session (continued)

The Main Menu returns. Check the second IAC, IAC1.

VSGEN Main Menu

...

Enter choice: EDIT↲

Device name: IAC1↲

IAC Terminal Controller

Controller name: *IAC1*

Comments: LINES 24–31. MODEMS ON 24 & 25. BASE NUMBER 24. CONS 26–33↲

Device code (octal): *50*↲

IAC type: *8*↲

VT100 terminal support ? (Y/N): Y↲

Asian lanaguage support? (Y/N): N↲

Base line number: *24*↲

Split baud: *N*↲

Execute? (Y/N) Y↲

The Main Menu returns. Change a host parameter.

VSGEN Main Menu

...

Enter choice: EDIT↲

Device name: PARAMETER↲

Specify Host Parameters

Index	*Parameter*	*Current Value*
01	*Swap directory size (blocks):*	*2147483647*
02	*Page directory size (blocks):*	*2147483647*
03	*Number of system buffers:*	*256*
04	*Minimum number system pageable pages:*	*10*
05	*Frequency (Hz):*	*10*
06	*Access*	*YES*
07	*Initial program for PID 2:*	*CLI.PR*
08	*Initial IPC message for PID 2:*	
09	*Maximum load pages – no contention:*	*0*

Choose the parameter(s) you would like to modify

Parameter(s): 3↲

3 Number of system buffers: 512↲

Figure 4–17 Sample VSGEN Session (continued)

```
    Parameter(s):  27-31 ↲

    Enable data caching:                     Y↲
    Enable simulated data caching:           N↲
    Data cache size in megabytes:            8↲
    Cache entry size (2, 4, 8, 16, 32, 64):  16↲
    Use cache on root LDU:                   N↲

       Parameter(s):                         (Press CANCEL/EXIT, F11, or ESC-E)
```

The Main Menu returns. Save the configuration.

```
       VSGEN Main Menu
    ...

    Enter choice:     SAVE↲

                 Save Current Configuration

    Configuration file pathname:             MSIS_01.CONFIG ↲

    Execute? (Y/N)           Y↲
```

The Main Menu returns. Build a system.

```
       VSGEN Main Menu
    ...

    Enter choice:     BUILD↲

                 Build a System

    Hostname(s):                             +↲

    Build in maintenance mode (Y/N):         N↲

    Execute (Y/N):     Y↲

    Building host xxx
    xxx successfully linked

       VSGEN Main Menu
    ...

    Enter choice:     BYE↲
    *)
```

Run the Update tool on the tailored system file (here :SYSGEN:MSIS_01.PR):

```
    Su) DIR :UPDATE ↲
    Su) UPDATE/REV=2.01  :SYSGEN:MSIS_01↲
```

Figure 4–17   Sample VSGEN Session (concluded)

Testing the New System

To test the new system, first shut down the current system. (If the multiuser environment is up, make sure all users are logged off first). Then type

Su) BYE ↵ (The CLI16 Superuser prompt is *)
Do you really want to shut the system down? Y↵
Starting system shutdown date time

System shutdown ...
SCP-CLI>

Boot from disk:

SCP-CLI> RESET↵
SCP-CLI> BOOT 24↵ (or BOOT 116) (Use BOOT with the primary disk unit device code. For an ECLIPSE-bus disk, the code is 24 for DPJ-type disks or 27 for DPF-type disks. For an MRC-bus disk, it is 116; after typing BOOT 116↵), when the system console asks about node and unit, type 0E,0↵.)

The bootstrap program displays the Operating System Load Menu:

Operating System Load Menu

1. Continue immediately with operating system load
2. Enter the Technical Maintenance Menu
. . .
Enter choice [1]:

From the Operating System Load Menu, select choice 2 by typing 2↵. Depending on your computer, the bootstrap program may display the Technical Maintenance Menu, or it may ask the date, time, and offset from GMT.

If it asks *Date (MM/DD/YY)?*, type today's date. For example, for August 23, 1990, type 8 23 90↵. To answer *Time (HH:MM:SS)?*, type the time, using a 24-hour clock. For example, for 4:30 p.m., type 16 30↵. To answer the *Offset* question, type 0↵.

The bootstrap program displays the Technical Maintenance Menu:

Technical Maintenance Menu

. . .

6. Run a specified program

. . .

Enter choice [1]:

From the Technical Maintenance Menu, select choice 6 by typing

6↲

The program asks

Pathname?

Type the full pathname of your new system (from the root directory) next to the *Pathname?* prompt. For example, if your system is named MSIS_01.PR, type

:SYSGEN:MSIS_01.PR↲

Again, depending on your computer, the bootstrap program may ask the date, time, and offset from GMT. If it does, answer them as explained above.

The bootstrap program then displays a *Loading file* message, then an AOS/VS II banner, and

Override default specs [N] ?

CAUTION: If you see the message *WARNING: System patch area contains no patches*, continue bringing up AOS/VS II — but *immediately* update the AOS/VS II system as described in an earlier section; then reboot. Installing patches, which is one of the things the update does, is extremely important. Unless you update the system file, your system may crash repeatedly.

The system is asking about specs you gave to VSGEN for the new system. You don't want to override, so press NEW LINE:

↲

A pause occurs here; then

AOS/VS II CLI Release n date time
)

The new, tailored system is running. Proceed to the section "A Fast Check for the Tailored System."

If the New System Doesn't Come Up or Work Properly

If the new system doesn't come up, there will usually be an error message that describes the problem. The solution may be simply a matter of editing incorrect device information in the configuration file. If the message is *AOS/VS FATAL ERROR*, note the figures displayed and avoid a memory dump by typing N⤶.

After ESD runs, boot from disk (format BOOT n) and bring up the starter system, :SYSGEN:SYS.PR. To bring up the starter system, select choice 2 (not 1) from the Operating System Load Menu. Don't wait for the time-out delay. The system console will display the Technical Maintenance Menu. From this menu, select choice 6, "Run a specified program"; when asked for a pathname, specify :SYSGEN:SYS.PR.)

Then, if you think the problem is in the VSGEN configuration, execute VSGEN with the /DEFAULT= switch; fix the offending device spec(s); save the updated configuration (SAVE keyword); and overwrite the old file. Then use the BUILD keyword again; leave VSGEN; update the system; and repeat the "Testing the New System" section, earlier in this chapter.

If the new system fails again, or if the problem isn't the VSGEN configuration, perhaps you haven't updated your AOS/VS II system. Updating the system is described in an earlier section. If you haven't done this, do it and test again. If the new system fails again, consult your DG support organization.

A Fast Check for the Tailored System

If you know that your VSGEN configuration file is okay, perhaps because it was based on a current Disk Jockey autosizer file (:SIZER.CFG) or because you've used it to build a system that works, go to the next section, "Making a Tailored System Tape Set."

If your VSGEN spec file is new, you may want to check a few basics. (You won't really know that the system works until you've brought up the multiuser environment, as described in the next chapter.) As a preliminary test, try a few CLI commands:

) SEARCHLIST :UTIL⤶
) FILES/AS/S :PAGE:+ ⤶
Warning: Read or write access is required, file :PAGE:+
) SUPERUSER ON⤶
Su) FILES/AS/S :PAGE:+ ⤶ (With CLI16, the Superuser prompt is *)
... (Displays sorted list of files in directory :PAGE) ...

This sequence of commands sets the search list to :UTIL, and then checks file access controls and shows you the FILESTATUS /S (Sort) and /AS (Assortment) switches.

Now, if you have any other LDUs (formatted with Disk Jockey), try to initialize and release them. For example, assume you have an LDU with disk unit name DPJ10 or MRCDISK000F00 that you named UDD1. With this disk unit ready, type

Su) INITIALIZE @DPJ10⤶	(or MRCDISK000F00⤶)	(Initialize using disk unit name)
UDD1		(System displays LDU name)
Su) RELEASE UDD1⤶		(Release using LDU name)

Try this with all your LDUs. If the commands work, your disk controllers were correctly identified to VSGEN. If a command doesn't work, you forgot a controller or entered an incorrect controller specification; the VSGEN configuration file may need editing.

Turn on your line printer (making sure the paper in it is aligned); put it on line; and type

Su) COPY @LPB :UTIL:AOSVS.PANICS.SR↵ (Or @LPE or @LPJ instead of @LPB)

The @ is shorthand for the peripherals directory. This command shows that the line printer works; it also provides a copy of the panics file — useful for describing fatal errors.

Type

Su) CHAR↵
... (Displays terminal characteristics VSGEN set up for the system console.) ...
Su)

Type

Su) PROCESS/BLOCK/DEFAULT/IOC=@CON2 :CLI↵
Su)

This creates a CLI process to run on the terminal whose console filename is CON2. Go to the console connected as CON2 (line 0 of the first asynchronous controller) and verify the baud rate and parity settings on the back (if it is a CRT). Make sure it is on line.

Wait a few moments; then press NEW LINE a few times. If the CLI prompt appears, this means that you have at least one line connected and identified to VSGEN correctly. It's very good news. But if nothing happens on CON2, the hardware may be wrong, or you may have made a mistake in VSGEN.

To terminate the process on CON2, type BYE↵ on the CON2 keyboard.

Next try some magnetic tape I/O with the tailored system. Get a blank tape, make sure it is write enabled, and mount it on unit 0. Put the tape unit on line. Type

Su) DIR :↵
Su) DUMP_II/V/R @MTB0:0 (or @MRCTAPE000A00:0↵) (Use the name of your tape unit, and specify file 0 (:0). For an ECLIPSE-bus unit, the name is @MTB0:0, @MTC0:0, @MTD0:0, or @MTJ0:0, depending on unit type; for an MRC-bus unit, the default name is @MRCTAPE000A00:0.)

... (Program verifies files dumped) ...

CTRL-C CTRL-A (Press CTRL-C, then CTRL-A)

Error: Console interrupt

Su) REWIND @MTB0↵ (or @MRCTAPE000A00) (Specify the unit name)

This shows that the tape driver software for unit 0 is was correctly specified at VSGEN; it also shows how to interrupt CLI commands with CTRL–C CTRL–A. Dismount the tape.

You have done nearly all the testing it is practical to do without bringing up the multiuser environment.

Making a Tailored System Tape Set

After testing the system, you should make a system tape set of your tailored system. (A tape set can include one or two tapes, depending on the capacity of your tape.) This can save many steps if you ever need to rebuild your system LDU. To make a tailored system tape set, follow these steps.

- Get two blank tapes, write enabled. (You may need only one, but have two ready.) Mount a tape on tape unit 0, the one you used for the initial AOS/VS II load. Make sure power is ON; then put the unit on line.

- Type

) SUPERUSER ON↵
  Su) DIR :SYSGEN↵
  Su) SYSTAPE @MTB0 (or @MRCTAPE000A00↵) (Use the name of your tape unit. For an ECLIPSE–bus unit, this is is @MTB0, @MTC0, @MTD0, or @MTJ0, depending on unit type; for an MRC–bus unit, the default name is @MRCTAPE000A00.

  ... (System verifies files dumped) ...

  Optional SYSTAPE switches are

/16K	Uses 16K buffers. Use this switch for ECLIPSE MTJ–type tape units only.
/MINIMUM	Copies only those files required to run the AOS/VS II starter system (SYS.PR) on a blank disk and to load other software. You can then use LOAD_II to load remaining AOS/VS II files from the original system tapes (tape file 2). (Note that you must use tape-based Disk Jockey to load file DJ from this tape; if you lose LOAD_II, you may not be able to start AOS/VS II from disk.)
/TWO_VOLUMES	Creates a two-volume tape set, with the format of the original system tapes, shown in Table 2–4. Use this switch when all AOS/VS II files won't fit on one tape (as with a 15–Mbyte cartridge tape) and you want to include them all. (You did not use the /MINIMUM switch.) The macro will prompt for the second tape when needed; therefore you cannot use batch mode when you invoke SYSTAPE with this switch.

  Using commands in the SYSTAPE.CLI macro, the system makes you a tailored system tape set. If you used the /TWO_VOLUMES switch, it will prompt you for a second tape.

- When the CLI Superuser prompt returns, remove the tape from the unit. Then write-protect the tape(s), clip the cover on them, and make a paper label that says "AOS/VS II System Tape" for the tape(s).

  NOTE: If the system encounters a flawed section of the tape, it will display the message *HARD error* or *Physical unit failure*, and then offer to continue or quit. Do not continue; a hard error on the system tape could make it unusable in the future. Instead, quit (Q). Then dismount the tape, find another tape, mount it, and reissue the SYSTAPE command.

The tape set you make using the SYSTAPE.CLI macro has a format similar to the AOS/VS II system tape set supplied by Data General. However, the tape set has your tailored AOS/VS II system as well as the starter system. And it has all files and programs currently in your root (:), :UTIL, :HELP, and :SYSGEN directories and their subordinate directories, including the ones your site created, *and* a copy of the microcode/SCP file (form MVn.MCF).

On each tape, file 0 contains the tape bootstrap; file 1 contains stand-alone Disk Jockey; and file 2 is a dump file that contains directories : (root), :SYSGEN, :HELP, and :UTIL. (But if you used /TWO_VOLUMES, file 2 of the first tape contains everything except :UTIL and :HELP, and file 2 of the second tape contains :UTIL and :HELP.) Since each SYSTAPE includes the tape bootstrap and Disk Jockey, you can boot and install software from either one.

If you ever need to rebuild a blank LDU using this tape set, you can abbreviate the procedures given in Chapter 2. You won't need to load microcode from a separate tape, or run VSGEN again. In fact, after you have used Disk Jockey to format the disk and create the LDU, you can substitute this tailored tape set for the AOS/VS II system tape(s); then tell Disk Jockey to Install System Software from it. After having Disk Jockey install bootstraps and microcode, you can boot AOS/VS II and come up with the root, :UTIL, :HELP, and :SYSGEN directories restored as of the time the system tape set was made.

Making the New System and Names Files the Defaults

Now that you've tested your tailored system, you should make it the default system. Also, to help identify devices to Disk Jockey and diagnostic programs, you must make the tailored system names file (form hostname.NAMES) the default device names file. To make the tailored system and the names files the defaults, follow these steps.

NOTE: If you want a newly generated system and names files to become the defaults, you *must* make them the defaults as described here. You must do so even if the system you just generated has the same name as the previous default system.

1. Shut down the current AOS/VS II system if one is running. (If the multiuser environment is running, make sure all users are logged off first.) To shut down, type BYE↵; then type Y↵.

2. Boot from disk:

   SCP-CLI> RESET↵
   SCP-CLI> BOOT 24↵ (or BOOT 116) (Use BOOT with the primary disk unit device code. For an ECLIPSE-bus disk, it is 24 for a DPJ-type disk, or 27 for a DPF-type disk. For an MRC-bus disk, it's 116; after typing BOOT 116↵, when the system console asks about node and unit, type 0E,0↵.)

   The system console displays

   Operating System Load Menu

   1. Continue immediately with operating system load
   2. Enter the Technical Maintenance Menu
   ...
   Enter choice [1]:

3. To enter the Technical Maintenance Menu, select choice 2:

   2↵

   At this point, the bootstrap program may need more information. If it can find the needed information, it continues with startup; go to step 8. If it cannot find the needed information, it asks

   Disk unit name:
   LDU filename:
   LDU unique ID:

4. Specify the disk unit name of your system disk. For ECLIPSE-bus disks, this is usually DPJ0 or DPF0. For MRC-bus disks, it's MRCDISK000E00. If the system disk is mirrored, you must type both unit names, separated by an exclamation point (!).

The program displays the Device Specification menu:

Device Specification

Device name:	*xxx*
Bus type (ECL/MRC):	*xxx*
Device type:	*xxx*
Unit number:	*n*
Device code (octal):	*n*
MRC slot number (hex):	*x*
Execute (Y or N):	

Correct defaults to these questions may be provided by the system device names file. If you have doubts, the following table gives general answers.

	ECLIPSE–Bus Disk	**MRC–Bus Disk**
Device name:	DPJ0, DPF0, or DPI0	MRCDISK000E00
Bus type (ECL/MRC):	ECL	MRC
Device type:	DPJ, DPF, or DPI	MRCDISK
Unit number:	0	0 or other unit
Device code (octal):	24 (DPJ), 27 (DPF), 33 (DPI)	116
MRC slot number (hex):	Does not apply	0E

5. Correct the menu values as needed, or if all the default answers are correct, take all the defaults. Then Disk Jockey returns to the previous screen:

   LDU filename:

6. Specify the filename of your system disk; for example, ROOT↵.

   LDU unique ID:

7. Specify the unique ID of your system disk; for example, ROOT.IMAGE1↵. But if the LDU is mirrored, type the unique IDs of both images separated by an exclamation point (!).

8. Depending on your computer, it may display the Technical Maintenance Menu (skip to the next step); or it may ask the date and time questions.

   If it asks *Date (MM/DD/YY)?*, type today's date. For example, for August 23, 1990, type 8 23 90↵. To answer *Time (HH:MM:SS)?*, type the time, using a 24-hour clock. For example, for 4:35 p.m., type 16 35↵. To answer the *Offset from GMT?* question, type 0↵.

9. Disk Jockey displays the Technical Maintenance Menu:

Technical Maintenance Menu

. . .

4. View or change startup parameters . . .

. . .

Enter choice [1]:

10. From the Technical Maintenance Menu, select choice 4 :

4↲

The bootstrap program displays another screen:

View or Change Startup Parameters

Disk unit name(s):	*xxx*
LDU filename:	*xxx*
LDU unique ID:	*xxx*
Operating system pathname:	*xxx*
Device names file pathname:	*xxx*
Disk Jockey pathname:	*:DJ*
Microcode system area ID:	*xxx*

Execute (Y or N):

11. For the first three parameters, take the default values (on a CRT, press NEW LINE; on a hardcopy terminal, press CTRL–A and then NEW LINE). Then the program displays

Operating system pathname: xxx

12. If the system named as the default *xxx* is the one you want, press NEW LINE. If not, type the pathname of your tailored system, starting from the root directory. For example, to make the system you named MSIS_01 — generated in :SYSGEN — the default system, type

:SYSGEN:MSIS_01.PR↲

Device names file pathname:

13. The device names file will tell Disk Jockey the addresses of devices, so it can find a device using only its name. Without this file, Disk Jockey must ask four or five device specification questions before it can access any device. The names filename — like the operating system pathname — is based on the hostname, but has the suffix .NAMES instread of .PR.

If the file shown as default is the one you want, press NEW LINE. If not, type the pathname of the names file, starting from the root directory. For example, if the hostname is MSIS_01 — generated in :SYSGEN — type

:SYSGEN:MSIS_01.NAMES↵

14. For all remaining questions on this screen, take the defaults (on a CRT, press NEW LINE; on a hardcopy terminal, press CTRL–A and then NEW LINE).

The Technical Maintenance Menu returns:

Technical Maintenance Menu

1. Load and start the default operating system.

. . .

Enter choice [1]:

NOTE: If you added or deleted a device (controller or chassis) during the previous VSGEN session, you should now run Disk Jockey's sizer (choice *Size system configuration*) to create an updated :SIZER.CFG file. This will provide an accurate device list for any future you diagnostics may run. Running the Disk Jockey sizer is explained in Chapter 2.

15. From the Technical Maintenance Menu, select choice 1 to start the tailored system:

1↵

————

Loading file
xxx (*xxx* is the default AOS/VS II system file you specified)

AOS/VS II Release n

16. If it asks *Date (MM/DD/YY)?*, type today's date. For example, for August 23, 1990, type 8 23 90↵. To answer *Time (HH:MM:SS)?*, type the time, using a 24–hour clock. For example, for 4:40 p.m., type 16 40↵. To answer the *GMT Offset* question, type 0↵.

17. *Override default specs [N]?* ↵

... (pause) ...

AOS/VS II CLI Release n date time

Your tailored system is running and it is the default system. Until you change the system or the default, this system will be the default system. And the names file will remain the default names file.

Generating Other AOS/VS II Systems

After you generate an AOS/VS II system that you like, you can use configuration file (form hostname.CONFIG) as a base for all future systems.

There are two main reasons for generating a new AOS/VS II system. The first is to change a configuration (as when you acquire a new device) or change a host parameter. The second reason is to create a new system after installing a new AOS/VS II release or update.

You can generate a new system for either case using the /DEFAULT= switch. For interactive work, if you want to check (and possibly change) settings, use only the /DEFAULT= switch. For example,

Su) VSGEN/DEFAULT=MSIS_01↲

For noninteractive work, if you know you don't want to change VSGEN settings, you can run a noninteractive session by inserting the VSGEN /BATCH switch. If the configuration contains information for more than one host, you must include the /HOST switch to tell VSGEN which host to build a system for. Otherwise, VSGEN will build a system for each host. For example,

Su) VSGEN/BATCH=CENTRAL_CONFIG/HOST=MSIS_01↲

If EXEC is running, you can run VSGEN in a batch stream by inserting the CLI command QBATCH before the VSGEN command above. The QBATCH command lets you retain use of your terminal while VSGEN is running.

In either case, VSGEN will warn you if any interrevision changes may cause problems.

The hostname of an AOS/VS II system determines the new system's filename. If you retain the same hostname (as you will generally do), the old system will be deleted (after VSGEN warns you that a file with the same name already exists). If you want to keep the old system, you must change the hostname.

After VSGEN has run, don't forget to update the system file. Make :UPDATE the working directory; and then run the Update tool. Use the form UPDATE/REV=update-rev system-pathname. For example, if update-rev is 2.03 and the system pathname is :SYSGEN:MSIS_01.PR, type UPDATE/REV=2.03 :SYSGEN:MSIS_01.PR↲. Then shut down and test the tailored system.

NOTE: If you want a newly generated system to become the default system, you *must* make its system and names files the default as described earlier. This is true even if the system you just generated has the same name as the default system.

Whenever you add or delete a controller, you should run Disk Jockey's sizer to create an updated :SIZER file. This will provide an accurate device list for any future diagnostics you may run. Running DJ's autosizer is explained in Chapter 2 and 3. (Generally, don't use the sizer output file for future VSGEN sessions; use the VSGEN configuration file instead.)

Supporting Synchronous Devices (DCUs, ISCs, MCP1s, LSCs)

AOS/VS II supports synchronous devices *only* for bisynchronous communications via RJE80, HASP II, or RCX70 emulator software — or if you want to write applications that make system calls to synchronous lines. For other applications (using DG/SNA, XODIAC/XTS, or TCP/IP network software), the network software — not AOS/VS II — will run the synchronous controller, and you must run the network generation program, not an AOS/VS II program. Therefore, if your system has one or more synchronous controllers that you will use exclusively for DG/SNA, XODIAC/XTS, or TCP/IP applications, you can skip this section and go the section "What Next?".

Synchronous devices supported directly by AOS/VS II include Data Control Units (DCUs), Intelligent Synchronous Controllers (ISCs), Multicommunications Processors (MCP1s), and (on DS/7500, MV/2500 DC, MV/2000 DC, MV/1400 DC, and MV/1000 DC systems) Local-bus Synchronous Controllers (LSCs).

A DCU is a processor with one or more synchronous communications multiplexors (SLMs); it can handle as many as eight synchronous (sync) lines.

An ISC has a processor and sync multiplexors on one circuit board; it can handle up to two sync lines. An MCP1 sync controller or an LSC controller is like an ISC; you identify it the same way as an ISC.

A DCU, ISC, MCP1, or LSC is required if your system is to use sync lines. Sync lines are needed for communication with IBM systems or IBM software emulators (RJE80, HASP II, RCX70).

To have AOS/VS II support the sync lines, you must run the DG-supplied program BSCGEN; and later, you must run a process called GSMGR that will use the spec file created by BSCGEN. (As mentioned above, you need to have AOS/VS II support sync lines only if your system will use IBM software emulators — RJE80, HASP II, RCX70 — or if your own applications will make system calls to the sync lines.)

You need not run BSCGEN *every time* you run VSGEN. However, you must run it when your sync line configuration changes or when the AOS/VS II Release Notice recommends running it.

The BSCGEN Program

BSCGEN creates a spec file with information about sync lines. A program called GSMGR (global sync manager) uses this information to manage the line hardware, allowing another program (like RJE80) to use the lines. Starting GSMGR is described in Chapter 5.

To create the sync spec file that GSMGR needs, you must run BSCGEN.

BSCGEN Dialog

BSCGEN — like VSGEN — is in directory :SYSGEN. To execute it, type

```
) SUPERUSER ON ⤶
Su) DIR :SYSGEN ⤶
Su) XEQ BSCGEN ⤶
```

BSCGEN executes and asks the following questions. Legal answers are displayed in parentheses. Default answers (that BSCGEN will use if you answer with NEW LINE) are in brackets.

Do you wish to:

A Create a spec file.

B Edit a spec file.

C Update a pre rev 2.00 spec file.

Enter your selection:

Before AOS/VS revision 2.00, sync spec files were created by VSGEN, with a name of the form sys.SYNC, where sys was the name given to the new AOS/VS system. If there is an old spec file that you want to update, type C↵ . If there is a BSCGEN-created spec file that you want to check or edit, type B↵. To create a new spec file, type A↵.

Enter name of spec file:

Type the name of the spec file you want to create or edit. For a new file, we suggest a name of the form sys.BSC. For example, use MSIS_01.BSC for an AOS/VS II system named MSIS_01. If you want to edit or update a file, and the name you type is not a valid filename, BSCGEN repeats this question.

What type of CPU (MV20000, MV10000, MV8000, MV6000)
(MV4000, MV2000DC, DS7700, DS7500) [MV8000]

Answer with the model of CPU that will run the synchronous device. For MV/15000, use MV20000. For MV/7800, use MV4000. For MV/1400, use MV2000DC. For example,

MV20000↵

Do you want to set/change bisync buffer area size (4)? [N]

The default buffer size is 4 pages (8 Kbytes). This size suits RJE80, HASP II, and RCX70. For the default size, press NEW LINE and skip the next question.

To specify a nondefault size, type Y↵. BSCGEN then asks the size:

Bisync buffer area size in 2 kbyte pages [4]

The valid range of buffer sizes is 1 to 26 (pages). The program that owns this buffer will run resident, so the buffer will always occupy memory while the program runs. Decide on the buffer area size you want, and type it. For example, for RCX70 on two terminals, type 4↵.

What type is bisync controller n (DCU200, ISC/2, LSC) ? [DCU200]

BSCGEN asks this question for each controller you have. If this device is a DCU, press NEW LINE for the default. Otherwise, type ISC/2↵ or LSC↵.

Enter device code for controller n [m]:

The default device code (*m*) for the first ISC or MCP1 sync controller is 25. The default code for the first LSC is 30. The default code for the first DCU is 40. For your first DCU, ISC/MCP1, or LSC, unless you know it is connected to a nonstandard device code, press NEW LINE for the default. If you know the device is connected to a nonstandard code, or if no default code is displayed, type the correct device code and press NEW LINE.

Enter lines to be genned on controller n: [0,1]

With an ISC/MCP1 or LSC, press NEW LINE for the default. On a DCU, each SLM usually manages two lines; there can be as many as four SLMs — hence eight lines, usually numbered 0 through 7. For a DCU, type the range of lines handled (for example, 0,3↵); or with two lines, press NEW LINE for the default.

Enter logical line number for physical line m: [n]

Generally, for the first ISC, MCP1, LSC, or DCU, the logical line number should be the same as the physical line number, so press NEW LINE for the default.

For the second and subsequent ISC or MCP1, the logical line number should be (2 * number-of-previous-devices), and then (2 * number-of-previous-devices)+1. For example, for the second ISC, the first line would be 2 and the second line 3.

For the second DCU (if any), you may want the logical line numbers to follow those of the first (not required). BSCGEN displays as default the lowest available line number. If you want the default, press NEW LINE; otherwise, type the desired line number and press NEW LINE.

For either device, the name of the sync line will have the form @SLNn, where n is the number you specify or take as the default, when this spec file is being used.

Is this line switched or dedicated (SWT or DED)? [SWT]

If this sync line will use a dedicated (leased) phone line, type DED↵. If it uses a switched (standard) phone line, press NEW LINE for the default.

Is this line half- or full-duplex (H or F)? [H]
(Full duplex lines will have RTS high always.)

Half-duplex sync lines are more common than full-duplex sync lines. The bisync protocol is a half-duplex protocol. So generally, you should take the half-duplex default by pressing NEW LINE. This will work with either a half- or full-duplex modem. However, if you *know* that this line will be on a full-duplex modem, *and* that the modem takes a while to switch from transmit to receive, you should answer F↵. The *RTS* message tells you that the GSMGR process will keep RTS (the ready-to-send signal) high always on full-duplex lines.

For a DCU, BSCGEN skips the next two questions.

Is the clock for this line external? [Y]

Each ISC, MCP1, and LSC has an internal clock, with a frequency that you can select (next). But most modems have and depend on their own clocks. So generally, if this is a modem line, or if you want the line on an external clock, press NEW LINE for the default. If you specify an external clock, BSCGEN skips the next question.

To use the ISC or MCP1 clock, type N↵. BSCGEN then asks

Specify internal clock frequency in baud
(300, 600, 1200, 2400, 4800, 9600, 19200, 38400) [2400]

Type the desired baud (data) rate. The device on the other end of the sync line must match this baud rate. The default, 2400, is the highest rate that works reliably over an ordinary modem and switched phone line. For the default, press NEW LINE; for a different baud rate, type the desired number and press NEW LINE.

Now, for every line on this device, BSCGEN returns to the *Enter logical line number* question. When you have described all the lines, it asks

Do you have additional bisync controllers? [N]

If you have another ISC, MCP1, LSC, or DCU to describe, type Y↵; BSCGEN then returns to the *What type is bisync controller...* question.

If this was the last ISC, MCP1, LSC, or DCU, press NEW LINE. BSCGEN then asks

Do you wish to display current configuration? [Y]

BSCGEN gives you this chance to review the specs entered. To review the specs, press NEW LINE; BSCGEN then displays them. To skip the specs, type N↵; BSCGEN then terminates.

If you pressed NEW LINE to see the current configuration, BSCGEN asks

Do you wish to save this spec file? [Y]

If you think the spec file has many errors, you may want to answer N↵ and rerun BSCGEN from scratch. But you can always rerun BSCGEN to edit the file and correct errors. So generally, you should press NEW LINE. BSCGEN now terminates.

The sync spec file is done (along with a display file, named spec.DSP, that you can print). Both files are in directory :SYSGEN. Later, the spec filename will be passed to the GSMGR process when GSMGR is started up (described in Chapter 5).

BSCGEN Example

A sample BSCGEN dialog for an ISC might look like the following.

```
Su) XEQ BSCGEN↵

 Do you wish to:
            A  Create a spec file.
            B  Edit a spec file.
            C  Update a pre rev 2.00 spec file.
 Enter your selection:  A↵

 Enter name of spec file:  MSIS_01.BSC↵
 What type of CPU (MV20000,MV10000,MV8000,MV6000)
            (MV4000,MV2000DC,DS7700,DS7500) [MV8000]   MV20000↵
 Do you want to set/change bisync buffer size [N]?   ↵
 What type is bisync controller n (DCU200, ISC/2, LSC) ? [DCU200]   ISC/2↵
 Enter device code for controller 1: [def]   ↵
 Enter lines to be genned on controller 1: [0,1]   ↵
 Enter logical line number for physical line 0: [0]   ↵
 Is this line switched or dedicated (SWT or DED)? [SWT]   ↵
 Is this line half- or full-duplex (H or F)? [H]   ↵
 Is the clock for this line external? [Y]   ↵
 Enter logical line number for physical line 1: [1]   ↵
 Is this line switched or dedicated (SWT or DED)? [SWT]   ↵
 Is this line half- or full-duplex (H or F)? [H]   ↵
 Is the clock for this line external? [Y]   ↵
 Do you have additional bisync controllers? [N]   ↵
 Do you wish to display current configuration? [Y]   ↵

            ... (Display) ...

 Do you wish to save this spec file? [Y]   ↵
            . . .
 Su)
```

What Next?

If this was your first system, you will want to create the multiuser environment, which will be easier than what you've done thus far.

If this was not your first system, you might want to bring up EXEC and user processes, and perhaps run a few applications to see how they do.

End of Chapter

Chapter 5
Creating the Multiuser Environment

Read this chapter

- When you have generated and tested your first tailored AOS/VS II operating system and want to create an environment where many people can use it.
- Whenever you want to create a brand-new multiuser environment, or some useful macros to help manage this environment.

This chapter leads you through the steps needed to create a multiuser environment. It assumes that a tailored AOS/VS II operating system has been generated and tested, and is running — as described in Chapter 4.

The AOS/VS II multiuser environment is based on two utility programs:

PREDITOR, the user profile editor, which creates individual profiles (account definitions) for each user.

EXEC, the executive program that supervises user logon and logoff according to PREDITOR profiles, and manages printing and batch queues. Even if your system has no user terminals, you need EXEC to manage printer and batch queues, and perhaps for labeled tape backup.

Using PREDITOR, you create a profile for each person who will use the system. Next you initialize EXEC. Then, you edit some macros with a text editor so that you can bring the multiuser environment up or down with one command.

Next you consider other DG software, like compilers, that you acquired with AOS/VS II, and you create a tailored error message file for these. Finally — to make life easier for users — you create log-on messages and perhaps Help messages.

This chapter explains how to do all these things. The major sections are

- Creating the Initial Profiles
- Initializing EXEC and Its Queues
- Using the SED Editor to Create Useful Macros
- Editing the UP and DOWN Macros
- Other DG Software
- Making Life Easier for Users
- Overview of Your System File Structure

Creating the Initial Profiles

This section leads you through a session in which you create two classes of profiles:

- The *operator profile*, which provides all privileges and special powers needed to control the system.
- *User profiles*, which provide only those privileges that users actually need.

Later, as your system evolves, you may want to edit individual profiles according to user needs.

Usernames, Passwords, and Network Access

The username is the identifier for every person who will use your system. The username is the only trace to the person who's responsible for the account. Usernames persist over long periods of time; they are not often changed (although PREDITOR does have a command to rename a profile).

Generally, your system should have a unique username for every person; more than one user should not use a single account. If, for any reason, you want to place a set of users in a group, think up a special identifier (like a suffix) for the usernames and make the identifier part of each username. Username groups are further explained in *Managing AOS/VS and AOS/VS II* in the chapter on security.

The rest of this section explains how usernames and passwords relate to access over networks. If you won't be using networking, skip to the section on the operator profile.)

DG network software you can run under AOS/VS II includes XTS II and TCP/IP (based on Ethernet IEEE 802.3 protocol). With any network, a user must know a valid username/password pair on a host system to access that system. (*Host* means the same thing as node or member.) Eventually you will need to coordinate names and passwords with other host systems — to have profiles created for your users on these systems and/or learn which remote users to create profiles for.

For access via XODIAC/XTS, your choice of username, password, and password encryption are significant. There's some functional benefit to having each person's username, password, and encryption status be the same on each system.

For access via TCP/IP, your choice of username, password, and password encryption have no functional effect. There's no functional benefit to having the same username and password on all hosts (although most people find it easier to remember a single username/password pair than several different ones). If you'll be running TCP/IP with AOS/VS II, skip to the section "The Operator Profile."

XODIAC/XTS software includes applications (called agents) that provide different services. The agents are applications; they rely on use XTS to access network hardware. The agents are Resource Management Agent (RMA), Virtual Terminal Agent (VTA), and File Transfer Agent (FTA). Details on these agents follow.

RMA The Resource Management Agent allows users on one host to access devices and files on another host. RMA allows network pathnames and remote access without a log-on requirement; for example, the command TYPE :NET:REMOTE_SYSTEM:UDD:SANDY:MYFILE↵.

For access to occur via RMA,

- The user must have a valid profile on both systems, *with the same user name and the same password* on both systems.
- The user must have the privilege *Access local devices from remote machines* on the remote host.
- The user must have access to the file or device. By default, each user has all (Owner) access to files in his/her own user directory. Access to devices like tape units is governed by the unit's access control list (ACL) in the peripherals directory. Access to printers is generally governed by EXEC; users access print *queues* (not printers). You can control user access to queues and devices with the EXEC command ACCESS.

VTA The Virtual Terminal Agent lets users call remote hosts, log on, and use the remote host as if it were a local host. VTA is the only agent involved in PC networks, where a DG system supports personal computers as if they were user terminals.

FTA The File Transfer Agent can transfer files from one host to another.

Agents VTA and FTA both require users to pass a log-on procedure. For access to occur via VTA and FTA,

- The user must have a valid profile (but not necessarily the same username and password) on both systems.
- The user must have the privilege *Use virtual console* (for VTA) or *Access local resources from remote machines* (for FTA) on the remote system.
- The user must have appropriate access to the file or device. See comments under RMA.

For any agent, if the first two conditions do not exist, the user will receive an *Invalid username-password pair* message on attempted access.

If you will use the DG CEO system over a network, be aware that CEO Mail allows different usernames and passwords; CEO Mail doesn't use RMA or FTA. However, if a user wants to use a remote printer from CEO, the operator (OP) passwords must be the same on both systems; for remote printing, CEO depends on RMA.

Password Encryption

Password encryption is the process of converting a password into what appears to be a string of random characters. The system recognizes the random characters as the password, but a human reading the random characters cannot determine the password from them. PREDITOR can encrypt a password before storing it. From a security standpoint, encryption is very desirable.

But if the user will rely on XODIAC/XTS agent RMA, encrypting the password may prevent RMA access to remote hosts (because, unless both passwords are encrypted, the two password strings won't be identical). If any remote host runs a revision of XODIAC that doesn't support encryption, encrypting the password locally will prevent RMA access to that host. (Unless your XODIAC Release Notice says that your revision supports encryption, assume it is not supported.) Also, if any remote host runs AOS/VS Revision 6.00 or earlier or runs AOS, encrypting the password locally will prevent RMA access to that host. (These restrictions exist because both the operating system and the XODIAC agent must handle encryption so they can compare encrypted and unencrypted passwords.)

For a CEO user on a network, encrypting the password won't prevent the user from accessing other hosts via CEO Mail. It may prevent a user from using remote printers, since CEO relies on the RMA agent to control access to remote printers.

Once encrypted, a password can't be decoded. If a password is encrypted and you later decide to have it stored unencrypted, you must edit the profile, think up a new password and type it, and say No to the *Encrypt* question. Then tell the user the new password. (He or she can change it if desired.)

For a network user, you may decide against encryption, or you may decide to encrypt in the user's profile on all systems (for the latter, all systems must be running AOS/VS Revision 7.50 or later or AOS/VS II). Or you might maintain two accounts for the user: one secure local account, with password encrypted, and one general-purpose account, with password unencrypted, to serve for network access. For users who store highly sensitive material, the two-account approach is a good idea, although it involves extra work.

The Operator Profile

You — and the person who routinely operates the system — need a profile that gives you the special powers needed to control the AOS/VS II system.

The master CLI (PID 2) that runs on the system console already has all these powers. But having a profile and user directory will

- Let you issue Q-series commands (QPRINT, QBATCH and the like) to the CLI.
- Allow you to log on as the operator from any terminal (instead of restricting you to the system console).
- Provide a directory for your own files.

So you should create an operator profile first. Type

```
) DIR :UTIL↲
) XEQ PREDITOR↲
```

AOS/VS User Profile Editor Rev n date time
Command:

PREDITOR has commands to create a profile (C), list a profile's specifications (L), and edit an existing profile (E), among others. Each command has its own dialog. If you make a mistake when you answer a PREDITOR question, you can "back up" by pressing ^ (the SHIFT and the 6 key), or the uparrow key on a CRT keyboard, until you reach the wrong entry, and then type the desired answer and proceed.

You want to create a profile. So type

```
C↲
```

Username:

The operator profile must have a username of OP, so type

```
OP↲
```

Password change? (Y or NL)

The values displayed in parentheses are valid answers to the question. For a new profile, you must type

```
Y↲
```

New (6–15 chars):

On the system console, the master CLI is always available and a username and password aren't required to use it. But on any other terminal, you will need to enter the username and password to log on to the system. A password can be any combination of 6 through 15 of the following characters: upper- or lowercase letters (treated as uppercase), numbers 0 through 9, and all printing characters except for ^ (caret). You will be able to change the password when you log on — so, for simplicity, choose something simple like

```
OPERAND↲
```

Encrypt password [No]?

PREDITOR can encrypt a password before storing it. From a security standpoint, this is desirable because no one — not even a superuser — can find out an encrypted password.

Generally, it's a good idea to have the operator's password encrypted, since the operator account is privileged. But if the operator using this profile will rely on XODIAC/XTS networking (if your site runs XODIAC/XTS), encrypting the password may prevent access via RMA (described earlier under username, password, and network issues). Encryption will *not* affect access via CEO Mail to remote hosts, nor will it affect access via TCP/IP network software.

Having considered network issues, decide whether to choose password encryption. If you want the password encrypted, type Y↲. Otherwise, press NEW LINE.

↲

Initial IPC file [] change? (Y or NL)

The IPC file holds commands that the system will execute when this user logs on. It usually contains a sequence of CLI commands that set the default ACL, search list, prompt, and so on. The file is not required, but it can be very useful in terms of user friendliness and system control. The empty brackets mean that the default is null (no initial IPC file). You want one, so type

Y↲

New (0–63 chars):

PREDITOR wants the IPC file pathname.

The most flexible way to handle the log–on issue is to use one macro file (perhaps in directory :UTIL) for all users. This central macro can impose certain system–wide defaults for default ACL, search list, and so on. The last line of the central macro can execute a log–on macro in each user's directory. The user can then edit his/her own log–on macro with a text editor to change the defaults imposed by the central macro, if desired, or add other commands. The central macro can be changed easily if you want to change the defaults; for example, if you want to tighten security on the system.

You (or a user) can create the central and user log–on macros with a text editor, described later in this chapter.

The central macro pathname might be something like :UTIL:LOGON_CENTRAL.CLI. (Each user logon macro might be something like LOGON.CLI.) But the central macro pathname is the one to specify here, for example,

:UTIL:LOGON_CENTRAL.CLI↲

Program [:CLI.PR] change? (Y or NL)

Take the default for this question by pressing NEW LINE. Then answer the following questions as follows.

Create without block [No]? (Y, N, or NL) Y↲
Use IPC [No]? (Y, N, or NL) Y↲
Use console [Yes]? (Y, N, or NL) ↲
Use batch [Yes]? (Y, N, or NL) ↲
Use virtual console [Yes]? (Y, N, or NL) ↲
Access local resources from remote machines [Yes]? (Y, N, or NL) ↲
Change password [Yes]? (Y, N, or NL) ↲
Unlimited sons [No]? (Y, N, or NL) Y↲
Change priority [No]? (Y, N, or NL) Y↲
Change type [No]? (Y, N, or NL) Y↲
Change username [No]? (Y, N, or NL) Y↲
Access devices [No]? (Y, N, or NL) ↲

Superuser [No]? (Y, N, or NL) Y↵
Superprocess [No]? (Y, N, or NL) Y↵
System Manager privilege [No]?

System Manager privilege allows a user process to change the system date, time, ID (SYSID), and bias factor. Also, the user can start or stop the system log (SYSLOG). This privilege also allows the user to initialize and release job processors (relevant only with a computer that has more than one job processor), to create and delete process classes and logical processors, and to change the locality of another user's process. These privileges have significant impact on security; use of classes can also affect performance. (For definitions of terms used here, see the *AOS/VS II Glossary*.)

Generally, the master CLI (which has all privileges anyway) issues all the commands that require the System Manager privilege. However, the operator may need System Manager privilege to initialize job processors *outside* the UP macro. Also, if your system will run classes using the optional Class Assignment and Scheduling Package (CLASP), the operator will need this privilege. If you want the operator to have System Manager privilege, type Y↵. To say No, press NEW LINE.

↵

Modem [No]? (Y, N, or NL)

You may not want to give the operator profile the privilege to use a modem. If you do give this privilege, and an unauthorized user somehow learns the operator password, he or she can access and use the system at will from outside the installation.

If you will want to use a modem yourself, you can create another profile later, with modem privileges. For now, say No by pressing NEW LINE.

↵

Change address space type [No]? (Y, N, or NL)

Answer Y to this; then take defaults for the following questions:

Y↵

Change working set limit [No]? (Y, N, or NL) ↵
Priority [2] change? (Y or NL) ↵
Max qpriority [0] change? (Y or NL) ↵
Disk quota [500] change (Y or NL)

The default of 500 512-byte blocks is not much disk space. For now, change the quota to something like 15000. You can always change it again later with the PREDITOR Edit command. Type

Y↵
New (0-2147483647): 15000↵

Logical address space – batch [–1 system default] change? (Y or NL)

Accept the default answers for this *Logical address space* and the next questions as follows.

↲

Logical address space – non–batch [–1 system default] change? (Y or NL) ↲
Minimum working set size – batch [–1 system default] change? (Y or NL) ↲
Maximum working set size – batch [–1 system default] change? (Y or NL) ↲
Minimum working set size – non–batch [–1 system default] change? (Y or NL) ↲
Maximum working set size – non–batch [–1 system default] change? (Y or NL) ↲
Default user locality – non–batch [0] change? (Y or NL)

This last question and the following questions about locality are important only if you plan to use class scheduling on your system. You can create and implement classes with CLASP, described in the manual *Using CLASP (Class Assignment and Scheduling Package)*; or you can write a program to do it via AOS/VS II system calls.

For the operator profile, we recommend the default, 0. For the default, press NEW LINE. (There's more information on this question and the next in *Managing AOS/VS and AOS/VS II*, the PREDITOR chapter.)

↲

Use other localities – non–batch [No]? (Y, N, or NL)

The locality issue is meaningful only after you've built an application and created classes. For initial profiles, we recommend the default; press NEW LINE and skip the next question.

If you answer Y, PREDITOR asks

User locality – non–batch [ ] change? (Y or NL)

The operator will be able to change locality of nonbatch processes to any locality you specify here. Respond with the numbers of *all* localities you want the operator to have, or press NEW LINE to prevent the operator from changing locality. Separate numbers with spaces. For example, 0 1 3 5↲.

Default user locality – batch [0] change? (Y or NL)

This question applies to batch processes only, letting you distinguish between users' interactive processes and batch jobs. For the operator profile, we recommend the default, 0. For the default, press NEW LINE.

↲

Use other localities – batch [No]? (Y, N, or NL)

The locality issue is meaningful only after you've built an application and created classes. For initial profiles, we recommend the default; press NEW LINE, and skip the next question.

If you answer Y, PREDITOR asks

User locality - batch [ ] change? (Y or NL)

The operator will be able to change locality of batch processes to any locality you specify here. Respond with the numbers of *all* localities you want the user to have, or press NEW LINE to prevent the operator from changing locality. Separate numbers with spaces. For example, 0 1 3 5↵.

User comment [] change? (Y or NL)?

User comments are simply text strings placed in the profile file; they are purely informational. They are handy for users' full names, dates, and/or phone extensions. To enter one for the OP profile, answer Yes and enter a useful comment; for example,

Y↵

New (0–79 chars): OP PROFILE, 30 MARCH 90↵

Command:

You've finished the Operator profile. As with any existing profile, you can list its specs by typing L↵, and then the username and ↵. You can edit its specs one by one by typing E↵, and then the username.

Whenever you run it, PREDITOR checks for the existence of directory :UDD. If no file with the pathname :UDD exists, PREDITOR creates directory :UDD. For every profile you create, PREDITOR creates a user directory (with disk space limit specified) in :UDD, and the system creates a profile in :UPD (the user profile directory). Each user directory and profile is named the username; for example, :UDD:OP for username OP.

Standard User Profiles

Users' needs vary. Some may need large working set sizes and large amounts of disk space. After all, you bought your computer system to run programs — perhaps very large programs — and the process that will run these programs will need a user profile (unless you plan to run all large programs interactively from the master CLI, which has the Superuser privilege and can do anything it wants).

Given these variables, we suggest general–purpose default values for all users. You can then tailor these values for individual users. To set up the default profile, edit PREDITOR's internal default profile (!DEFAULT!) as in the following dialog. But, for CEO user profiles, see *Managing the CEO® System* or *Managing AOS/VS II,* the PREDITOR chapter.

Answer the PREDITOR questions as follows.

```
Command: E↲
Username: !DEFAULT!↲
Password change? (Y or NL) Y↲
New (6-15 chars): GENERAL↲
Encrypt password [No]? ↲
Initial IPC file [] change? (Y or NL) Y↲
New (0-63 chars): :UTIL:LOGON_CENTRAL.CLI↲
Program [:CLI.PR] change? (Y or NL) ↲
Create without block [No]? (Y, N, or NL) ↲
Use IPC [No]? (Y, N, or NL) ↲
Use console [Yes]? (Y, N, or NL) ↲
Use batch [Yes]? (Y, N, or NL) ↲
Use virtual console [Yes]? (Y, N, or NL) ↲
Access local resources from remote machines [Yes]? (Y, N, or NL) ↲
Change password [Yes]? (Y, N, or NL) ↲
Unlimited sons [No]? (Y, N, or NL) ↲
Sons [1] change? (Y or NL) Y↲
New (0-1023): 3↲
Change priority [No]? (Y, N, or NL) ↲
Change type [No]? (Y, N, or NL) ↲
Change username [No]? (Y, N, or NL) ↲
Access devices [No]? (Y, N, or NL)↲
Superuser [No]? (Y, N, or NL) ↲
Superprocess [No]? (Y, N, or NL) ↲
System manager privilege [No]? (Y, N, or NL) ↲
Modem [No]? (Y, N, or NL) ↲
Change address space type [No]? (Y, N, or NL) Y↲
Change working set limit [No]? (Y, N, or NL) ↲
Priority [2] change? (Y or NL) ↲
Max qpriority [0] change? (Y or NL) ↲
Disk quota [500] change? (Y or NL) Y↲
New (0-2147483647): 15000↲
Logical address space - batch [-1 ... default] change? (Y or NL) ↲
Logical address space - non-batch [-1 ... default] change? (Y or NL) ↲
Minimum working set size - batch [-1 ... default] change? (Y or NL) ↲
Maximum working set size - batch [-1 ... default] change? (Y or NL) ↲
Minimum working set size - non-batch [-1 ... default] change? (Y or NL) ↲
Maximum working set size - non-batch [-1 ... default] change? (Y or NL) ↲
Default user locality - non-batch [0] change? (Y or NL) ↲
Use other localities - non-batch [No]? (Y, N, or NL) ↲
Default user locality - batch [0] change? (Y or NL) ↲
Use other localities - batch [No]? (Y, N, or NL) ↲
User comment [] change? (Y or NL)? Y↲
New (0-79 chars): GENERAL USER↲
Command:
```

This tailors PREDITOR's !DEFAULT! profile for general use. Now, when you create each profile, the new defaults you gave will appear; this allows you to take the default for more questions and saves time. The original default values will return when PREDITOR terminates, so you should do all the profiles you need during this session.

Creating the Profiles

For each profile you create based on !DEFAULT!, the only values you *must* specify (and cannot take a default for) are username and password.

Each username must be unique among usernames. As a username, you might use a person's first name and initial (if needed). For the password, you can specify the username, and tell the user to change it when he or she logs on (described later). The username is an AOS/VS II filename. It can be 1 through 15 characters long and include the lettters A–Z (lowercase are converted interally to uppercase), numbers 0–9, ?, $,
. (period), and _ (underscore).

If anyone on your system uses other DG systems (or vice versa) over a network, and his/her password is changed, it may also need to be changed on other systems. If he/she changes the password, have him/her log on to remote system(s) and change it there also. Username, password, and network issues are explained near the beginning of this chapter.

The following dialog shows how you might set up a profile for someone named Jack. It also explains some of the issues involved.

Command: C⤶
Username: JACK⤶ (Type username)
Password change? (Y or NL) Y⤶
New (6–15 chars): JACKJACK⤶ (JACK alone is not enough characters for a password.)
Encrypt password [No]?

PREDITOR can encrypt a user's password before storing it. From a security standpoint, this is desirable because no one — not even a superuser — can figure out an encrypted password.

But if the user will rely on XODIAC/XTS network agent RMA, encrypting the password may prevent certain kinds of access to remote hosts. (RMA issues are explained earlier under "Username, Password, and Network Access.") Encryption will *not* affect remote access via CEO Mail or TCP/IP network software.

Having considered network issues, decide whether to choose password encryption. If you want the password encrypted, type Y⤶. Otherwise, press NEW LINE.

⤶

Initial IPC file [:UTIL:LOGON_CENTRAL.CLI] change? (Y or NL)

For IPC, accept the default central macro name you specified earlier:

⤶

Program [:CLI.PR] change? (Y or NL)

The CLI is the most versatile choice; via CLI commands, a user can run other programs and do practically anything allowed on the system. However, with AOS/VS II Release 2.00, you have a choice of CLIs. Data General ships both CLI16 (a 16-bit CLI, which people have used for years) and CLI32 (a 32-bit CLI, which has more processing power but uses more memory).

For most operations, the CLIs appear identical. But for some tasks, CLI32 has major advantages. CLI32 has far larger stack space, which lets users run macros that call themselves recursively with little fear of exhausting CLI memory. And CLI32 has a command history feature, similar to the UNIX history feature. The history feature offers convenient access to previous commands typed; it can save time and help ease the transition to the CLI if your programmers have UNIX experience. CLI32 lets you turn on system manager mode (via the PRIVILEGE command); this is handy for the system operator when he or she wants to change the system time or perform some privileged operation and doesn't want to return to the system console and the master CLI. And finally, CLI32 includes the GROUPLIST command to let users join a user group.

On the other hand, CLI32 consumes more memory than CLI16. If your system has only 4 megabytes of memory or is near its memory capacity, or if it has reached capacity and encountered memory contention, you should use CLI16 for all users except, perhaps, the operator. Also, CLI16 offers labeled diskette support with its OPERATOR and DUMP commands, while CLI32 has no such support; so if a user wants to use labeled diskettes, he/she will need CLI16.

You *can* specify CLI32 for some users and CLI16 for others. There is some overhead in having different CLIs running, but not as much as having everyone run CLI32.

The program pathname of the CLI32 is :CLI32.PR; the pathname of CLI16 is :CLI16.PR. With AOS/VS II, the PREDITOR default program name, :CLI.PR, is a link to CLI32, so if you take the default, this user will get CLI32.

If you want the user to use CLI16, type :CLI16.PR and press NEW LINE. If you know you want *all* users (except the operator) to use CLI16, abandon this profile (use the ^ key) and edit the !DEFAULT! profile again to specify :CLI16.PR for program. Then begin the user profiles again; this will save a lot of typing effort. To select CLI32, take the default or type :CLI32.PR and press NEW LINE.

Possibly you may not want the initial program to be the CLI at all. If you want this user to come up in BASIC or some other program — in which case, type Y↵ and the full pathname, with .PR suffix, of the program you want. For BASIC, there is often a BASIC directory off the root directory or in directory :UTIL. If this is true (or will be true because you plan to install such a directory), answer Y↵, and then type :BASIC.PR↵ or :UTIL:BASIC.PR↵ to start the user in BASIC..

There is another, more versatile, way to start a user in a program other than the CLI. For program, choose CLI.PR or :CLI16.PR (explained above); later on, edit the user's personal logon macro to execute the program. Thus, when the user logs on, the central log-on macro will call the :UDD:username:LOGON.CLI macro; and :UDD:username:LOGON.CLI will execute the desired program. This approach has the advantage of allowing the user to log on even if the desired program isn't available: the user will log on the CLI and receive a *File does not exist* message. The disadvantages are

- The user can change his/her logon macro and start in a program you don't want him/her to use.
- Possible exposure to the CLI (which might confuse naive users).
- The need for the user to exit from two programs when he/she logs off (the non–CLI program and the CLI).

You can minimize these drawbacks by having the log–on macro use the CHAIN command, instead of XEQ, to run the desired program; for example, CHAIN CEO.

Generally, the CLI is a good general-purpose choice because it allows users to access text editors and write programs in *all* DG languages; it also allows users to execute other programs like BASIC. Unless you know that you want this user to come up in a program other than the CLI, select the default by pressing NEW LINE:

⤶

Create without block [No]? (Y, N, or NL)

Create without block means that the user can have at least two processes running concurrently. By default, the creating (father) process is blocked when it executes the son; this means that the father is eligible to be swapped, which may speed up the system. But if the user wants to run DG's SWAT® debugger (for C, COBOL, FORTRAN 77, Pascal, or PL/I programs), he or she must have the *Create without block* privilege. So, for such users, you must answer Y⤶. Otherwise, take the default, which is No:

⤶

Use IPC [No]? (Y, N, or NL)

IPC means InterProcess Communications calls, available in assembly language and some higher–level languages. IPC privileges are needed wherever two or more active processes must communicate. IPCs are needed to communicate with DG server processes (like network processes or EXEC). If two processes created by a user are to comunicate, that user also needs *Create without block,* because at least two of his/her processes must remain active if they are to use IPC. For most users, take the default.

⤶

Use console [Yes]? (Y, N, or NL)

A Yes answer lets the user log on a local user terminal. In practically all cases, answer Yes. If you want the user to access your system only remotely (virtual console or access local resources questions, later), you can answer No to this question and Yes to one or both of those questions. Generally, press NEW LINE.

⤶

Use batch [Yes]? (Y, N, or NL)

A Yes answer lets the user submit batch jobs via the CLI commands QBATCH and QSUBMIT. Generally, batch offers an efficient way to handle noninteractive operations like compilations and sorts. Unless you know that you don't want this person to use batch, we suggest you press NEW LINE for the default:

↲

Use virtual console [Yes]? (Y, N, or NL)

This question is meaningful if your system will run networking software (Data General XODIAC/XTS or TCP/IP) or if you will have users on terminals attached via any of the soft controllers (PAD, PCTVASERVER, TELNET, or VTASERVER). The default answer (Yes) allows this user to log on your system from a remote host system (using XODIAC's VTA agent or TCP/IP's telnet program), or on a terminal connected via a soft controller. It also allows the user to use the XTS loopback feature. A Yes answer is required if your system supports personal computers or telnet terminals as user terminals and the user will access your system from one of these. A value of N (no) prevents the user from logging on your system via a virtual terminal.

Generally, for security reasons, a user should not have both virtual console privilege and Superuser privilege (asked later on). Superuser with virtual console privilege allows a user to explore your entire system from a terminal on a remote system.

If you don't plan to give Superuser, and do want the user to be able to log on your system from a remote system, the answer should be Yes. Press NEW LINE.

↲

Access local resources from remote machines [Yes]? (Y, N, or NL)

This question is meaningful if your system will run networking software (like Data General XTS or TCP/IP). The default answer allows a remote user to access files and devices like tapes and printers on your system. It allows remote users to access your system via the XTS XODIAC RMA and FTA agents. Also, it allows remote users to access files on your system via the TCP/IP file transfer program, ftp.

Using local resources is different from being able to log on, as covered in the previous question. If you want the user to be able to do this, press NEW LINE.

↲

Change password [Yes]? (Y, N, or NL)

In general, users should be able to change their own passwords. But if you are setting up a public (guest) profile, to allow guests to use your system, the password must be public; and you should answer N↲ to prevent a guest from changing the password and barring other guests from the system. Generally, press NEW LINE:

↲

Unlimited sons [No]? (Y, N, or NL)

A user who can create unlimited son processes has the potential for hobbling the system. Each process requires some CPU time and disk I/O to the SWAP and/or PAGE directories. As far as possible, it's a good idea to minimize the number of processes. In most cases, press NEW LINE.

↲

Sons [3] change? (Y or NL)

BASIC and clerical data entry users can get along with fewer sons: 1 or 2. CLI users who want to execute a non–CLI son process from within a son (instead of going back to the CLI to do it) need more sons — at least 5. For these people, you might want to say Y↲. PREDITOR will prompt *New (0–1023)*, and you will type the new number and press NEW LINE.

For other users, 3 sons is a good general–purpose number. This will allow a user to develop programs and use the SWAT debugger; it's a minimum for serious application programmers who will use C, COBOL, FORTRAN 77, Pascal, or PL/I. So, for this group, take the default by pressing NEW LINE.

↲

Change priority [No]? (Y, N, or NL)

Processes compete for CPU time, and processes of the same type with higher priority (closer to 0) get preference. But a user process that can change priority can monopolize the system. Also, changing priority may change group status, which can change the way the process is scheduled (process groups are explained in *Managing AOS/VS II*). So, unless you know a process *must* be able to change its priority, press NEW LINE.

↲

Change type [No]? (Y, N, or NL)

Processes can run as one of three types: resident (always in main memory), pre–emptible (generally in main memory, but swappable if blocked), and swappable. Swappable is the most common type and is the default type for user and other processes. Resident is quite rare — used primarily for the peripheral manager program and the system itself. If a process can change type, it can become resident, and perhaps hobble the system. So, unless you know that a process must be able to change its type, say No by pressing NEW LINE.

↲

Change username [No]? (Y, N, or NL)

A process that can change its username can assume the name of OP — giving it access to many system files — or to another username, giving it access to that user's files. Again, unless you know that the process must be able to change its username, say No by pressing NEW LINE.

↲

Access devices [No]? (Y, N, or NL)

The Access devices privilege lets a process bypass operating system safeguards and access devices directly in machine language. Never give it unless the user is a systems programmer who needs it to write device drivers. Network and DG/SNA processes need it, but they can get it from the master CLI. So, generally, press NEW LINE.

↲

Superuser [No]? (Y, N, or NL)

This privilege allows a user process to bypass all file access controls and execute, read, modify, or delete any file on the system. Superusers can run PREDITOR to change their own (or other) profiles; and, unless you choose to encrypt passwords, they can find other users' usernames and passwords in their profile files. The master CLI needs Superuser to control the system, but most other users do not need it, and they shouldn't have it. Say No by pressing NEW LINE.

↲

Superprocess [No]? (Y, N, or NL)

This privilege allows a user process to terminate any process, including the master CLI, which would bring down the entire system. Superprocess also allows a process to change the type and priority of any process, or block any process, including itself. Unless you know a user needs Superprocess for his or her processes, say No by pressing NEW LINE.

↲

System Manager privilege [No]?

This privilege allows the user — via a program that he or she writes — to

- Issue commands to EXEC.
- Change the system date and time.
- Start or stop the system log (SYSLOG).
- Change default device characteristics from other than PID 2.
- Clear a device (via call ?CLRDV) it doesn't own.
- Send messages to users who have requested no receipt of messages. (via CHAR/NRM) on their terminals).
- Change the system bias factor.

System manager privilege also lets a user initialize and release job processors (relevant only with a computer that has more than one job processor), to create and delete process classes and logical processors, and to change the locality of other users' processes. Use of classes and privileged system calls can affect the performance and security of your system.

Generally, the master CLI issues all the commands that require the System Manager privilege. Possibly, a system operator may need this privilege. Users, as a rule, *don't* need it. So, generally, say No by pressing NEW LINE.

↲

Modem [No]? (Y, N, or NL)

If you want this user to be able to log on via a modem, type Y↵. Generally, superusers should not be able to use a modem, because the two privileges allow the user to explore the entire system from his or her own home or wherever a remote terminal is placed. Generally, unless a user requires modem privilege, say no by pressing NEW LINE:

↵

Change address space type [Yes]? (Y, N, or NL)

The privilege allows the user to execute 16-bit programs. There may be 16-bit programs shipped with AOS/VS II. So, generally, press NEW LINE.

↵

Change working set limit [No]? (Y, N, or NL)

This privilege allows the user to run programs that change the system default working set limit. The system default works best for nearly all programs. For the exceptions, this question is further described in *Managing AOS/VS and AOS/VS II*, PREDITOR chapter. Generally, press NEW LINE.

↵

Priority [2] change? (Y or NL)

Generally, user processes should be equal. For equality and simplicity, we suggest the default. (Details on priority appear in *Managing AOS/VS and AOS/VS II*.)

↵

Max qpriority [0] change? (Y or NL)

When the multiuser environment is up and running, users will use Q-series commands (QPRINT, QBATCH) to print files and submit batch jobs. The qpriority determines the highest priority a user can specify for his/her jobs in queues (via the /QPRIORITY= switch).

Queue priority 0 is the highest priority; the default queue priority is halfway between 0 and 255. If you give the default to all users, they can receive equal treatment on their Q-series jobs. Generally — unless you want to discourage a user's print or batch jobs — press NEW LINE.

↵

Disk quota [15000] change? (Y or NL)

This sets the limit on the size of the user directory that PREDITOR will create and the system maintain for this user process.

The default you put in !DEFAULT! is 15,000 blocks — a good general-purpose amount of disk space. If this user process is for guests or other casual users, then you might want to specify less space (perhaps the original default, 500). If this user process will be used by many people (perhaps data entry clerks or students), you might want to specify a larger figure (like 100,000). If this user process will deal with a large database and its directory will contain the database(s), you might want to allot an entire single– or multiple–disk LDU to it.

A Model 6236 disk contains about 690,000 blocks; a Model 6239 disk contains about 1,110,000 blocks; and a Model 6297 disk contains about 1,600,000 blocks. A Model 6061 disk contains about 370,000 blocks anda Model 6122 disk contains about 540,000 blocks. A Model 6446 disk (in a Combined Storage Subsystem, CSS) holds about 450,000 blocks.

If you want to change the space quota, type Y↵. PREDITOR will then say *New (0–2147483647):* and you will type the new quota.

To accept the default, press NEW LINE.

↵

Logical address space – batch [–1 system default] change? (Y or NL)

This series of questions gets more detail in *Managing AOS/VS II*, the PREDITOR chapter. For now, take the defaults on these questions, as follows:

↵

Logical address space – non–batch [–1 system default] change? (Y or NL) ↵
Minimum working set size – batch [–1 system default] change? (Y or NL) ↵
Maximum working set size – batch [–1 system default] change? (Y or NL) ↵
Minimum working set size – non–batch [–1 system default] change? (Y or NL) ↵
Maximum working set size – non–batch [–1 system default] change? (Y or NL) ↵
Default user locality – non–batch [0] change? (Y or NL)

This question has meaning only if you plan to use class scheduling on your system. For initial user profiles, we recommend the default, 0. For the default, press NEW LINE.

Use other localities – non–batch [No]? (Y, N, or NL)

Localities are meaningful only after you've built your application and created classes. For initial profiles, use the default; press NEW LINE on this and the following questions:

↵

Default user locality – batch [0] change? (Y or NL) ↵
Use other localities – batch [No]? (Y, N, or NL) ↵
User comment [GENERAL USER] change? (Y or NL)?

As described earlier, you can use this prompt for comment about the user: full name, date, phone extension, and so on. Type Y↵, and then the desired text. For example,

Y↵

New (0–79 CHARS): JACK ARMSTRONG 30 APRIL 90↵
Command:

You have finished this profile. PREDITOR has written it into its profile directory, :UPD, as a file with the filename of the username; for example, JACK for a username of Jack. The profile is ready for use.

To do another profile, type C↵ and run through this section again. (Remember that a user must have a profile to log on. Many people can have a common profile, usable through a common username and password; but, aside from using the system console, a person who doesn't know a valid username and password cannot use the system.)

When you have finished all the profiles you want, PREDITOR will be asking for a command. Leave PREDITOR and return to the CLI by typing

```
BYE↵
)
```

Continue to the next section.

Initializing EXEC and Its Queues

With the user profiles done, you can initialize the EXEC process. This involves using EXEC to create and open EXEC queues; generally, you need to do it only once.

Via the master CLI, set your search list and turn on Superuser as follows.

```
) SEARCHLIST  :UTIL↵
) SUPERUSER  ON↵
Su)                            (With CLI16, the Superuser prompt is *)
```

Now run the QCMP utility (which compacts any existing queues and converts them if needed for the new release of AOS/VS II); then start EXEC. Use the following commands.

```
Su) XEQ  QCMP/Y ↵              (Run QCMP to update any existing queues)
...                            (QCMP messages)
Su) PROCESS/DIR=@/DEFAULT/NAME=EXEC  EXEC↵     (Start EXEC)
PID 3                                          (EXEC messages)
From Pid 3 : (EXEC) Revision n Ready
↵
Su)
```

The XEQ command creates a new process to run QCMP. The PROCESS command creates a new process — just as XEQ does — but it is more versatile. The switches make the home directory of the EXEC process :PER (@ means :PER, the peripherals directory), give it all privileges of its creator (/DEFAULT), and make its process name EXEC. The *Pid* messages indicate that EXEC is running as a process with Process ID 3 (PID 3), and give its revision.

NOTE: If you are updating from an earlier release to Release 2.00, you must run QCMP before running EXEC to convert your queues to the new format. If you do not do this, you will not be able to use your existing queues and must recreate them.

Now create the printer queue, and then open the batch, printer, and mount queues via the following commands to EXEC.

```
Su) CONTROL @EXEC  CREATE  PRINT  LPT↵
From EXEC ...
Su) CONTROL @EXEC  OPEN  BATCH_INPUT↵
From EXEC ...
Su) CONTROL @EXEC  OPEN  BATCH_OUTPUT↵
From EXEC ...
Su) CONTROL @EXEC  OPEN  BATCH_LIST↵
From EXEC ...
Su) CONTROL @EXEC  OPEN  LPT↵
From EXEC ...
Su) CONTROL @EXEC  OPEN  MOUNTQ↵
From EXEC ...
```

The CONTROL @EXEC directs the command through the CLI to EXEC. The commands created EXEC permanent spool queues. These are stored in a file named

:QUEUE:QUEUES. As long as this file exists, you will never need to repeat these commands.

NOTE: DG supplies a macro named CX.CLI that contains the CONTROL @EXEC command. So instead of typing CONTROL @EXEC and the command, you can type CX and the command. For example, instead of typing CONTROL @EXEC OPEN MOUNTQ, you can type CX OPEN MOUNTQ↵.

Now go to the line printer and make sure power is on, paper is aligned, and the printer is on line. The printer must be on line for EXEC to start it.

Open batch stream number 1 for processing by typing

Su) CONTROL @EXEC CONTINUE 1↵
From EXEC: time

Now start the batch queues on the printer. The device name of the printer is LPB, LPD, LPE, or LPJ, depending on the printer, as explained in Chapter 4. Type

Su) CONTROL @EXEC START BATCH_OUTPUT @LPB↵ (or LPE, LPJ, or LPD, depending on printer type)
From Pid 3 : (EXEC) @LPx Cooperative initiated
From Pid 3 : (EXEC) @LPx Paused
Su) CONTROL @EXEC START BATCH_LIST @LPB↵ (Or LPE, LPJ, LPD, as before)
From EXEC ...

Now start the printer manager process on the printer and queue. The command for an LPB printer follows. If your printer is uppercase only, include the argument UPPER in the EXEC START command as shown as an alternative command; this tells EXEC to change lowercase characters to uppercase for printing.

Su) CONTROL @EXEC START LPT @LPB↵ (or START LPT @LPB UPPER↵)
From EXEC ...
Su) CONTROL @EXEC CONTINUE @LPB↵
From EXEC...

For a type LPD printer, use device name LPD instead of LPB.

For a type LPE laser printer, use device name LPE instead of LPB. And for a laser printer, use the /NL switch in the EXEC START command, as follows:

Su) CONTROL @EXEC START/NL LPT @LPE↵

This tells EXEC to preprocess NEW LINE characters as needed for the laser printer.

You have continued the batch streams, and started the batch queues and printer queue on the printer. Users can now issue Q-series commands. There are four default batch streams in the BATCH_INPUT queue, and we have activated (with CONTINUE) only number 1, but this is enough to start. These commands are part of a CLI macro named UP.CLI, which will run on subsequent startups after you edit it, so you will not need to type them individually.

Laser and Letter-Quality Printer Queues

If your system has one or more laser or letter-quality or laser printers (connected to asynchronous controller lines), create and open a printer queue for each.

For example, if you have a laser and letter-quality printer, you might type

Su) CONTROL @EXEC CREATE PRINT LASER↵
Su) CONTROL @EXEC OPEN LASER↵
Su) CONTROL @EXEC CREATE PRINT LQP↵
Su) CONTROL @EXEC OPEN LQP↵

Now start the printer-managing process for the laser and/or letter-quality printer. The command to do this resembles the printer command, but the device name has the form @CONn, where n is the asynchronous line number plus 2. So, for a laser or letter-quality printer attached to line 13, you could type

Su) CONTROL @EXEC START/NL LASER @CON15↵ (or LQP instead of LASER; for LQP, omit the /NL switch from the START command)
From EXEC ...
Su) CONTROL @EXEC CONTINUE @CON15↵
From EXEC ...

Users can now queue jobs to the laser printer with the /QUEUE=LASER switch, or to the letter-quality printer via the QPRINT command and the /QUEUE=LQP switch.

Second Line Printer Queue

If you have a second line printer, initialize a queue for it:

Su) CONTROL @EXEC CREATE PRINT LPT1↵
From EXEC ...
Su) CONTROL @EXEC OPEN LPT1↵
From EXEC ...

Enabling a User Terminal

Now to enable a user terminal. The terminal names are the console filenames set at VSGEN. If the terminals have not been labeled, now is a good time to label them. Using white tape or tape labels, label each with its name, based on the console filename: @CON2, @CON3, and so on.

Choose a CRT (for example, @CON2), turn it on, and place it on line. Then enable it via EXEC:

Su) CONTROL @EXEC ENABLE @CON2↵
Console enabled, @CON2
From EXEC ...

@CON2 is ready for user logon. If you want to try enabling *all* terminals, type

Su) CONTROL @EXEC ENABLE/ALL↵

The ENABLE/ALL command tells EXEC to try to enable all terminals (all console files — files of type CON in directory :PER). ENABLE/ALL will return an error (*Device already in use, @CONn*) for any terminal line on which you have started a printer process, as above. You can ignore this error message for any line on which a printer process has been started.

If EXEC reports only this *Device already in use* error, or does not report an error, skip past the next section.

If EXEC Fails to Enable a Terminal

If you get a *Could not enable* or *File does not exist* error message from the EXEC ENABLE command, issue it again. If the error persists, type DIR @⤶, then F/S⤶ to list the entries in directory @ (@ is a shorthand symbol for :PER). All the device and console filenames you specified during VSGEN should be in this directory. The console filenames here should match the names pasted on the terminals. If not, you may have made a mistake during VSGEN, or the console line connections may be wrong. You may want to check the message in the manual *AOS/VS and AOS/VS II Error and Status Messages*.

Try enabling another terminal whose console filename appears in directory @ (:PER); and issue the CONTROL @EXEC ENABLE command with that terminal's console filename.

Logging on As a User

Having enabled a terminal, walk over to it. The screen (or paper, on a hardcopy terminal) should display

**** *AOS/VS II Release n / Press NEW-LINE to begin logging on* ****

If only part of this message shows, the terminal may be uppercase only. After you log on, you can view all text by typing CHAR/ON/UCO⤶ — but eventually you should specify lower- to uppercase conversion to VSGEN or by a CHARACTERISTICS/DEFAULT command in the UP.CLI macro, as described later on.

Log on with the OP username and password you created for the operator with PREDITOR. Do it as follows:

```
          ⤶
AOS/VS II Release n / EXEC REV n  date time @CONn
Username:   OP⤶
Password:              (Type the password you specified when you created the profile
                       earlier; for example, OPERAND⤶. The password does not echo.)

AOS/VS II CLI  REV n  date time
)
```

You have now logged on as a user (user OP), and your user process is running a CLI process for you. This is your own CLI, independent of the CLI on the system console.

Now you know that EXEC's log-on function works, and that the hardware and software configuration of your system are probably correct.

Try some QPRINT commands:

```
) QPRINT  :UTIL:UP.CLI⤶
 Queued, Seq = 1, Qpriority = 127

) QPRINT  :UTIL:AOSVS.PANICS.SR⤶
 Queued, Seq = 2, Qpriority = 127
)
```

The line printer should now print the text of these files, each preceded by a header sheet that gives your username, file pathname, and date, among other things. You needn't read these files now — they served only to test the printer queue. Take the printed copy to the system console for later use.

If you have a laser-quality printer and created a queue for it earlier, try it using a QPRINT/QUEUE=queuename command:

) QPRINT/QUEUE=LASER :UTIL:UP.CLI↵
Queued, Seq = 3, Qpriority = 127
)

For a letter-quality printer, use the command QPRINT/QUEUE=LQP :UTIL:UP.CLI↵ instead of QPRINT/QUE=LASER :UTIL:UP.CLI↵.

The laser or letter-quality printer should print the text of UP.CLI, a prototype for your tailored UP macro. If nothing happens, or you get an error message, check the section "Letter-Quality and Laser Printer Queues," earlier in this chapter.

Try a batch command:

) QBATCH Write Hello↵
Queued, Seq = 4
)

The batch output file is sent to the line printer, so the text string "Hello" should appear there, preceded by a printed header and log-on information. If so, EXEC's batch function is okay.

To get a sense of the CLI's Help facility, type

) HELP↵

... (CLI displays HELP topics) ...
)

The entire Help facility is available to any user from any CLI process. Use it whenever you have doubts or questions on a topic or command.

Things look good for the multiuser environment. You can terminate the user process by typing

) BYE↵

AOS/VS II CLI Terminating date time

Process n terminated
Connect time: nn:nn:nn
User 'OP' logged off

***** AOS/VS II Release n / Press NEW-LINE to begin logging on *****

Then return to the system console.

Changing a Password

By default, any user can change his or her password at logon. The user types his or her username and presses NEW LINE as usual, and then types the password, but presses the ERASE PAGE key (or CTRL–L) instead of NEW LINE.

EXEC will then ask for the new password, which must be 6 through 15 printable characters. The user types the new password and presses NEW LINE. EXEC will then ask again for the password, to make sure the user typed correctly. The user then retypes the password and, if the two new passwords match, EXEC announces *New password in effect* and EXEC logs the user on. From that point on, the new password will be in effect. If the passwords don't match, EXEC logs the user on and retains the old password. Note that usernames are public information, but passwords — including the OP password — should be private.

Bringing Down EXEC

Back at the system console, bring down EXEC.

Su) CONTROL @EXEC HALT)
From EXEC ...
From Pid 3 : (EXEC) Terminating on HALT Command.
Su)

The EXEC command HALT brings down the EXEC process and all its sons.

Using the SED Editor to Create Useful Macros

As you saw, there are a lot of commands involved in bringing EXEC up and down. To make this easier, Data General supplied CLI macros named UP.CLI and DOWN.CLI in directory :UTIL. Because systems vary, these macros are not directly executable; you must edit them for *your* system before you can use them. We describe the changes you must make in the next major section. After you make the changes, you'll need only to type UP) to bring up EXEC and the multiuser environment, and DOWN) to bring them down.

To edit the macros, you'll need to know how to use a text editor — specifically, the text editor named SED. This section will help you get started with SED and create some useful macros.

Using the SED Text Editor

SED is a text editor with informative error messages and its own Help facility. It has many commands and features. But to do the editing you need now, you'll require only a few commands, as follows.

Command	Comments
HELP	Gives Help on SED commands or features.
APPEND	Adds text to the end of the file.
BREAK/ESC or ESC key	Terminates an Append, Insert, or Modify command.
INSERT	Inserts lines of text before the current line.
MODIFY	Edits lines of text one by one.
→, ←, ↑, ↓	Moves the cursor. These cursor control keys are on the keypad to the right of the main keypad. They move the cursor right, left, a line up, or a line down.
CTRL–E	While you're modifying a line, begins or ends a text insert.
DEL key	Deletes the previous character.
LIST	Displays a range of lines.
FIND	Locates a text string.
DELETE	Removes one or more lines of text.
BYE	Leaves SED and returns to the CLI.

The SED prompt is an asterisk (*). As with CLI commands, you can abbreviate SED commands to their shortest unique parts. For example, you can type MOD↲ instead of MODIFY↲.

SED is a line–oriented editor, dealing with text a line at a time. It is also screen–oriented, depending heavily on cursor control keys. Thus you should use it on a CRT if you can. If the system console is a hardcopy terminal, follow these steps to work from a CRT:

1. Bring up EXEC again, as follows, from the system console:

   Su) PROCESS/DIR=@/DEF/NAME=EXEC EXEC↲

2. Enable the same user terminal you did before using the form CONTROL @EXEC CONn, where n completes the console filename; for example

   Su) CONTROL @EXEC ENABLE @CON3↲

3. Log on the enabled terminal as the operator (user OP, as before).

4. Get into directory :UTIL, where the macros are, and turn Superuser on:

) DIR :UTIL↲
) SUPERUSER ON↲
   Su)

5. Create or edit the macros (particularly UP.CLI and DOWN.CLI, which are the most important) using the SED editor. Leave the SED editor with BYE↲.

The following sections tell you to create a number of macros before you edit UP.CLI. If any of these macros already exist, don't recreate them; simply try them to see if they work. You can see if a macro exists by using the form FILES/AS filename, where filename is the macro filename. If the CLI displays the name, the macro exists.

Editing Macro SED.CLI

A useful macro that may not exist on your system is SED.CLI. It allows you to skip the XEQ command when you want to use SED. To create it, type

Su) XEQ SED SED.CLI↵	
SED Rev n Input File – :UTIL:SED.CLI	
Do you want SED.CLI to be created? Yes↵	
* APPEND↵	(Append text.)
1 XRQSED%/% %-%↵	(Append XRQSED%/% %-%.)
2 ESC	(Press BREAK/ESC or ESC key.)
* MODIFY 1↵	(Modify line 1.)
1 *XRQSED%/% %-%*	(SED displays line 1.)
Press →; type E over the R in XRQSED; press →; press CTRL–E to insert; press the space bar; then press NEW LINE.	(Use control characters and space bar to correct the bad line — changing the bad line to XEQ SED%/% %-%.)

* BYE↵
Output File – :UTIL:SED.CLI
Su)

Now you can run SED by simply typing the command SED followed by the filename you want to edit. (The line numbers — 1 and 2 above — are displayed by SED for your editing convenience. They are not part of the file.)

Make this macro accessible to users by typing

Su) ACL SED.CLI OP,OWARE +,R↵

This command gives use OP all access, and all users Read access, to the macro. Read access is all a user needs to run a macro.

Macros ON.CLI and OFF.CLI

You, and perhaps other people who run the system, will often need to turn Superuser on and off. It's a nuisance to have to type the whole command line to do so. Here is the text of macros ON.CLI and OFF.CLI, which turn Superuser or Superprocess on and off.

Text of ON.CLI:

```
COMMENT If user appended the /P switch, turn Superprocess on.
[!equal,%0/%,/P]
   superprocess  on
[!else]
COMMENT Without the /P switch, turn Superuser on.
   superuser  on
[!end]
```

Text of OFF.CLI:

```
COMMENT If user appended the /P switch, turn Superprocess off.
[!equal,%0/%,/P]
   superprocess  off
 [!else]
 COMMENT Without the /P switch, turn Superuser off.
   superuser off
 [!end]
```

Here's another primer session — this one to create ON.CLI.

```
Su) X  SED  ON.CLI↵       (or SED ON.CLI↵ if you created the SED.CLI macro)
Input file — :UTIL:ON.CLI
Do you want ON.CLI to be created?   Y↵

 * APPEND↵
1          COMMENT If user appended the /P switch, turn Superprocess on.↵
2            [!equal,%0/%,/P]↵
3             superprocess  on↵
4          [!else]↵
5          COMMENT Without the /P switch, turn Superuser on.↵
6            superuser on↵
7          [!end]↵
8          ESC          (Press BREAK/ESC or ESC key.)

* BYE↵
 Output file - :UTIL:ON.CLI
Su)
```

This session created macro ON.CLI. With macros ON.CLI and OFF.CLI in :UTIL, you can turn Superuser on by typing ON↵; and you can turn Superprocess on by typing ON/P↵. To turn them off, type OFF↵ or OFF/P↵.

Make the macros accessible to users by typing

```
Su) ACL  ON.CLI  OP,OWARE  +,R↵
Su) ACL  OFF.CLI  OP,OWARE  +,R↵
```

Macro ?.CLI

It's very useful to know which processes are running on your system. DG supplies a macro that displays process information. The macro name is WHOS.CLI, in :UTIL. You can, if you want, use only WHOS.CLI to display processes on the system. Or you can copy WHOS.CLI to ?.CLI, which lets you use either macro to display processes.

(At DG, we tend to use ?.CLI, but the supplied macro is named WHOS.CLI to avoid confusion with the ? character — because ? is a request for help on some non-DG operating systems.)

To copy WHOS.CLI to ?.CLI, type

```
Su) COPY/V  ?.CLI  WHOS.CLI↵
 WHOS.CLI
Su)
```

Make this macro accessible to users by typing

Su) ACL ?.CLI OP,OWARE +,R↵

Now you — and users — can display the names of all processes on the system by typing

) ?↵ (or WHOS↵)

For the following few macros, we show only the text. Try the SED commands for yourself.

Macros BATCH.CLI and CHEK.CLI

By default, when users submit batch jobs (usually with the QBATCH command), the output and list files are send to the first line printer device, LPB. To check the results of the batch jobs, users must walk to the line printer. This may discourage them from using batch. The following macros allow any user to do a whole batch job without leaving his or her terminal.

Macro BATCH.CLI queues a batch job with output and list files in a user's initial directory; macro CHEK.CLI types and deletes these files. (It's named CHEK.CLI to distinguish it from the CLI command CHECKTERMS.)

Macro BATCH.CLI is self-documenting. It explains itself if someone types its name without an argument (that is, BATCH↵). This is a good idea for your own user-oriented macros; if they explain themselves, then you don't have to explain them.

The text of BATCH.CLI is

```
[!equal,%1%,]
   write CLI macro %0% queues a batch job, with multiple
   write arguments. It writes the batch output file and batch
   write list file to your initial working directory - instead
   write of the line printer queue - so that you needn't go to
   write the printer each time you use batch. Do not use it to
   write stack multiple batch jobs - wait for one job to complete
   write before using it to queue the next job.  The format for
   write using this macro is
   write ,, BATCH , normal-command-line , NEW-LINE ,,, For example,
   write ,, BATCH , XEQ , MASM , PROG1 , PROG2  NEW-LINE
 [!else]
   delete/2=ignore    :UDD:[!username]:(LAST_BATCH.<OUT,LIST>)
   create             :UDD:[!username]:(LAST_BATCH.<OUT,LIST>)
   qbatch/notify/qoutput=:UDD:[!username]:LAST_BATCH.OUT&
 /qlist=:UDD:[!username]:LAST_BATCH.LIST    %-%
   write When this batch job is done your terminal will show
   write 'From PID n (EXEC): BATCH_INPUT n COMPLETED' then beep.
   write Type CHEK NEW-LINE. Macro CHEK types the batch output file -
   write allowing you to check for errors. Then it allows you to
   write delete or save the batch output and list files.
 [!end]
```

The text of CHEK.CLI is

```
[!equal, comment,] This macro prints the batch output file after a
 batch job created by macro BATCH.CLI completes.[!end]
 type    :UDD:[!username]:LAST_BATCH.OUT
 write   To delete batch output and empty batch list files
 write   press NEW LINE.
 string  [!READ To save them type S and press NEW LINE.  ]
  [!equal,[!string],S]
     write Saving output and list files
     write  :UDD:[!username]:LAST_BATCH.<OUT LIST>
 [!else]
     delete/v   :UDD:[!username]:LAST_BATCH.OUT
     [!equal [!size  :UDD:[!username]:LAST_BATCH.LIST] ,0]
         delete/v   :UDD:[!username]:LAST_BATCH.LIST
     [!else]
        write List file - :UDD:[!username]:LAST_BATCH.LIST
        write is NOT empty. Saving.
     [!end]
  [!end]
```

Make the macros accessible to users by typing

Su) ACL BATCH.CLI OP,OWARE +,R↲
Su) ACL CHEK.CLI OP,OWARE +,R↲

Now, to post a batch job, all a user needs to do is type BATCH followed by the command line he or she wants to run in batch. For example,

) BATCH X MASM MYPROG↲

The BATCH macro will tell the user what to do next; and the prompt will return to the terminal. When the job is done, the user types

) CHEK↲

which displays the batch output file — showing all errors — with an option to delete both files. These macros offer a fast, simple, and effective way for users to post batch jobs.

Macro REMEMBER.CLI

As people work on your system, they may want to post reminders to themselves — for example, about meetings or deadlines. You can make it easy for anyone to post one or more such personal reminders by creating macro REMEMBER.CLI (naturally, you can give it any name you want).

The text of REMEMBER.CLI is

```
[!eq, %2%, ]
  write This macro - %0% - reminds you of a future engagement.
   write It enqueues a batch job to run at the time you specify.
   write The batch job sends the specified message to your terminal.
   write
   write To execute the macro use the form
   write ,,, %0% ,,,, date:time ,,,, message ,,,, NEW-LINE
   write
   write "date:time" can be a specific date and/or time - for example
   write "23-AUG-88:20" means "August 23 88 8pm". Or "date/time" can be
   write relative - for example "+1" means "an hour from now." Try the
   write HELP *AFTER ,,, topic for more information on "date/time."
 [!else]
   string @[!console]
   qbatch%/%/after=%1%/qlist=@NULL/qoutput=@NULL &
  send [!STRING][!asc 215][!asc 207][!asc 216] REMEMBER: [!asc 217] %2-%
 [!end]
```

Make the REMEMBER macro available to users by typing

Su) ACL REMEMBER.CLI OP,OWARE +,R↵

Now, for example, if user Sally wanted to be reminded of a meeting on August 22, 1989, at 4:00 p.m. (16:00 on a 24-hour clock), she would type

) REMEMBER 22-AUG-89:16 Meeting↵

Then, when the system calendar and clock showed the specified time, Sally's REMEMBER batch job would run; her terminal would beep and display *REMEMBER: Meeting* with the message text blinking. REMEMBER works only if you are logged on the same terminal from which you typed the REMEMBER command. (If all batch streams are busy thoughout the delay interval, the REMEMBER batch job will be delayed until a job finishes. So if you plan to run many batch jobs, you might not want to use the macro.)

Editing the UP and DOWN Macros

The UP and DOWN macros are critical parts of your multiuser system. The UP macro initializes LDUs, starts EXEC, creates batch– and printer–managing processes, enables terminals for logon, and, at many sites, starts data management and network software, and applications like CEO. The DOWN macro brings down the multiuser environment, reducing AOS/VS II to single–user system status.

This section explains editing these macros. Examples are shown later in Figure 5–1 and Figure 5–2.

Editing Macro UP.CLI

After writing some macros with SED (previous section), you're ready to tackle UP.CLI. The UP.CLI shipped with AOS/VS II is a nonexecutable sample. To make it executable, you must edit it. But first, you should print both UP and DOWN macros. To do this, type

Su) DIR :UTIL↵
Su) COPY @LPB UP.CLI DOWN.CLI↵ (or LPE or LPJ or LPD, depending on the printer type specified to VSGEN)

... (pause while printing occurs) ...
Su)

(If EXEC is running, you'll see a *File is exclusively opened* error message. Use the command QPRINT instead of COPY.)

After printing the macros, read the printouts. The comments to the system manager give you most, if not all, the information you need. These comments, the CLI manual, and CLI Help explain all the commands and their meanings. Notice that each macro creates a log file, named UP.LOG and DOWN.LOG respectively. If a macro stops with an error at runtime, you can type this log file to discover the last command executed; this is particularly useful if your system console is a CRT.

The amount of editing to do with UP.CLI depends on the hardware and software in your system. At minimum, you need to make the macro executable. You may also want to insert other commands, depending on whether

- You want to set your system ID and/or start the system log.
- You want to set nondefault characteristics for asychronous lines (like modem lines).
- You have LDUs to initialize.
- Your computer has more than one job processor.
- You have printers other than one type LPB printer.
- You have programs (like XTS networking, INFOS II, CEO, or your own applications) to start.
- You want to run a secure CLI (locked CLI) on the system console.
- Other actions are necessary, as explained in the macro text or in documentation for other software products.

The following sections explain how to make the macro executable, and which commands to use for the system ID and/or log, characteristics, LDU, job processor, and printer issues. The only *required* sections you must read are "Making UP.CLI Executable" and "Starting Printers" (the latter is required only if your printer is not type LPB).

Making UP.CLI Executable

To start, type

Su) SED UP.CLI↵ (or XEQ SED UP.CLI↵ if you don't have a SED.CLI macro.)
SED Rev n – Input file :UTIL:UP.CLI
*

Type LIST ALL↵ to display all lines in the macro.

The first line to edit is the line with the first !equal. This line makes the macro nonexecutable; it says [!equal,1,2], which means "if 1 equals 2, execute all lines up to the next !else or !end." You need to change the 2 to 1. Type FIND "!equ"↵.

After SED finds the line, type MOD↵. Then, using cursor controls, position on the line and make the two numbers equal. For example, change the second number to 1:

[!equal,1,1]

Then press NEW LINE and press the BREAK/ESC (or ESC) key to enter the changed line.

Setting the System ID and/or Starting the System Log File

The system ID is a text string (limit 31 characters) that identifies your system. It is printed on header sheets on print jobs. Also, on a network, the ID, available to users via the SYSID command, helps remind users what system they're using. (The system ID is not necessarily the same as the network hostname, accessible via the HOST command, or the log-on banner displayed on user terminals — the latter is simply the contents of file :UTIL:LOGON.BANNER.SCREEN.)

Good choices for the system ID include the network hostname (if you plan to use networking and know the hostname), or simply the system name. You need not change the default system ID, which is null (no name). If you do want to set the system ID, use the SYSID command from PID 2, after the comment to the system manager about SYSID. A sample command is SYSID MSIS_01.

The system log file, which you can start with the SYSLOG command, can record all user activity on the system. (The system log is not the same as CLI logging, started with the LOG command.) If you choose to use logging, you should start the log early — after the comment to the system manager about the log file. The syntax of the SYSLOG command, suggestions for using it, and details on the companion REPORT program appear in *Managing AOS/VS II.* You may choose to start SYSLOG via the macro SYSLOG_UP.CLI, shown in *Managing AOS/VS II.*

If your computer has more than one job processor, you might want to proceed to the next section. Otherwise, you might want to leave the SED editor and return to the CLI, since the next commands you insert may be complicated enough to try first in the CLI. To leave the SED editor, type BYE⤶; then answer the *...backup file...* question by typing Y⤶. To edit again, you'll simply type SED UP.CLI⤶, as before.

Initializing Another Job Processor in a Multiprocessor System

If you have a multiprocessor computer (like an MV/20000 Model 2), it's a good idea to initialize additional job processors in your system's UP.CLI macro. While you're editing UP.CLI with SED, find the comment to the system manager about job processors (type FIND "job processor"; then INSERT +1). After the job processor line, insert a JPINITIALIZE command in the form

JPINITIALIZE/2=WARNING n	(For a two-processor system, n is 1. For a three- or four-processor system, insert a command line for the second processor, n = 1, for the third processor, n = 2, and for the fourth processor, n = 3.)

Press NEW LINE.

The /2=WARNING switch lets the macro continue running if this job processor is not functioning. This lets the macro bring up the multiuser environment even though not all job processors are functioning.

At this point, you can stop editing and update your UP.CLI macro. The next commands are complicated enough to test from the CLI before you use SED to add them to UP.CLI. To close, press the BREAK/ESC key (just to make sure you've left insert mode). Then type

* BYE⤶
Do you want to save the original file as a backup file? Y⤶
Output file - :UTIL:UP.CLI
Backup file - :UTIL:UP.CLI.BU
Su)

Saving the original as a backup (here, in file UP.CLI.BU) lets you keep track of what you did — in case the edited macro doesn't work the way you want it to. (SED keeps only one version of a backup file, form original-filename.BU. If a previous backup already exists, SED deletes this and replaces it with a newer version.)

Initializing Other LDUs

Before users can log on, the UP macro must initialize all disks they may need (if there are LDUs other than the system LDU). When UP.CLI issues these commands, the working directory should be the root (:) and Superuser must be on. Initializing LDUs may involve elaborate INITIALIZE commands; before trying it, read this section and the next. The INITIALIZE command has two formats, as follows:

1. INITIALIZE disk-unit-name*[!disk-unit-name]* *[disk-unit-name[!disk-unit-name]]*

2. INITIALIZE/LDUNAME=ldu-filename &
   ldu-unique-id/disk-unit-name*[!ldu-unique-id/disk-unit-name]*

where

disk-unit-name	is the name of the unit that holds the disk; for example, @DPJ2 or @MRCDISK000E02.
!	separates images of a mirror. ECLIPSE-bus and MRC-bus examples in format 1 are @DPJ2!@DPJ3 or @MRCDISK000E02!@MRCDISK000E03; examples in format 2 are UDD1.IMAGE1/@DPJ2!UDD1.IMAGE2/@DPJ3 or UDD.IMAGE1@MRCDISK000E02!UDD.IMAGE2@MRCDISK000E03.
/LDUNAME=	identifies the LDU. You must use this switch if there is more than one LDU on a physical disk. (You must also include the ldu-unique-id/disk-unit-name.)
ldu-filename	is the filename given to the LDU with Disk Jockey; for example, UDD.
ldu-unique-id	is the unique ID given to the LDU image with Disk Jockey; for example, UDD.IMAGE1.
/	separates the unique ID from the disk unit name.

You can use form 1 only if an LDU occupies one or more entire physical disk. Form 2 works for any LDU.

For example, if there were one LDU on disk unit DPJ1 (or MRCDISK000E01), you could initialize it as follows:

INITIALIZE @DPJ1 (or @MRCDISK000E01)

And if there were a mirror image of DPJ1 on DPJ2, or a mirror image of RCDISK000E01 on MRCDISK000E02, you could initialize both images with

INITIALIZE @DPJ1!@DPJ2 (or @MRCDISK000E01!@MRCDISK000E02)

If there were an LDU that spanned the physical disks DPJ10 and DPJ11 or MRCDISK000E01 and MRCDISK000E02:

INITIALIZE @DPJ10 @DPJ11 (or @MRCDISK000E01 @MRCDISK000E02)

But if there were two LDUs, named UDD1 and UDD2, with unique IDs UDD1.IMAGE1 and UDD2.IMAGE1, on disk unit DPJ1, you would need to specify the LDU filename and unique ID in addition to the unit name:

INITIALIZE/LDUNAME=UDD1 UDD1.IMAGE1/@DPJ1 (or UDD1.IMAGE1/@MRCDISK000E01)
INITIALIZE/LDUNAME=UDD2 UDD2.IMAGE1/@DPJ1 (or UDD2.IMAGE1/@MRCDISK000E01)

And if there were the same two LDUs UDD1 and UDD2 on DPJ1, mirrored on unit DPJ2, the commands would be

INITIALIZE/LDUNAME=UDD1 UDD1.IMAGE1/@DPJ1!UDD1.IMAGE2/@DPJ2
INITIALIZE/LDUNAME=UDD2 UDD2.IMAGE1/@DPJ1!UDD2.IMAGE2/@DPJ2

Disk Jockey's View LDU Information screen (keyword LDINFO) can tell you the filename and unique ID of all LDUs on a physical disk.

If there are no LDUs you want to mirror, test the INITIALIZE commands now. For each LDU, type the command until the system accepts it without an error or warning message. Then type RELEASE ldu-filename to release the LDU. For example

Su) INITIALIZE @DPJ1↵
Error: Disk contains more than one LDU piece, respecify command (Error message.)

Su) INITIALIZE/LDUNAME=MY_LDU MY_LDU.IMAGE1/@DPJ1↵ (Add information.)
MY_LDU (No error; system echoes the LDU filename.)

Su) RELEASE MY_LDU↵ (Release LDU.)
Su)

For each LDU, after the INITIALIZE command runs without errors, note the command for later inclusion in UP.CLI. Don't forget to release each LDU after initializing it; and note the RELEASE command for inclusion in DOWN.CLI (in the section "Releasing LDUs," later).

Initializing Mirrored LDUs

When you want to mirror LDU images, you can specify all images in the INITIALIZE command, or you can specify the primary image in the INITIALIZE/NOMIRROR command and later tell the system to synchronize the other image(s) with the MIRROR command.

Specifying all images in the INITIALIZE command is simpler, but will produce a synchronization error if the images are not synchronized (this would happen if the mirrored LDU had not been released normally). After this error, you must use the proper INITIALIZE/NOMIRROR command to initialize a *more current* image, and then decide whether you want to synchronize the other image(s), using the MIRROR command. The decision depends on the reason for desynchronization; if one or more units isn't operational, you can't synchronize. In other words, your course after the synchronization error requires thought; it's difficult to have the UP macro make the correct decision.

The following macro shows one approach you might use. It tries to initialize a mirrored LDU; then, if an error occurs, it displays an appropriate message and stops. You can then type the proper INITIALIZE/NOMIRROR command and, depending on the state of the other images, MIRROR command(s). You can insert this macro's commands in your UP.CLI macro, in the section where comments tell the system manager to initialize LDUs, or you can create the macro as a separate file and call it from UP.CLI. Whichever you do, the macro will not terminate on an initialization error condition; on either a normal return or initialization error, it will continue and pass control back to the remaining part of the UP macro.

The example macro uses ECLIPSE-bus disk unit names. For MRC-bus disks, use the appropriate MRC disk unit names, form MRCDISKccdduu, where cc indicates the MRC chassis number, ss indicates the disk controller slot number in the MRC chassis, and uu indicates the unit number, all in hex. For example, the name MRCDISK000E03 indicates a disk in the first MRC chassis, on the controller in slot 0E, of unit number 03; it corresponds to the ECLIPSE-bus disk named DPJ3.

```
COMMENT Macro START_MIRRORED_DISKS.CLI
COMMENT Try to initialize as a mirror. On error, drop through.
initialize/s/1=warning/2=warning/lduname=UDD   &
   UDD.IMAGE1/@DPJ2!UDD.IMAGE2/@DPJ3
[!equal,[!string],]
   write Initialize command that specified mirroring failed. Try
   write INITIALIZE/NOMIRROR commands on each image until a
   write  command succeeds.
   write You may then want to try MIRROR commands for other images.
   [!else]
   COMMENT The command succeeded.
[!end]
```

Now, as with unmirrored LDUs, use the CLI to initialize the mirrored LDUs. For each disk and LDU, type the RELEASE command until the system accepts it without an error or warning message. Then use that RELEASE command to release the LDU. For example,

Su) INITIALIZE @DPJ1↵
Error: Incomplete mirrrored LDU specified (Error message.)

Su) INITIALIZE/LDUNAME=MY_LDU MY_LDU.IMAGE1/@DPJ1↵ (Add information.)
MY_LDU (No error; system echoes the LDU filename.)

Su) RELEASE MY_LDU↵ (Release LDU.)
Su)

For each LDU, after the INITIALIZE command works without errors, note the command for later use. Don't forget to release each LDU after initializing it; and note the RELEASE command for inclusion in DOWN.CLI.

At this point, you might want to create a START_MIRRORED_DISKS macro of your own, with the INITIALIZE commands you've just tested. After doing so, edit UP.CLI again (SED UP.CLI). Then find the section whose comment tells the system manager to initialize LDUs. After this section, call your START_MIRRORED DISKS macro (just insert the name of your macro).

Changing Default Characteristics for Terminal Lines

If you need to change the default characteristics of one or more terminal lines (perhaps because the desired characteristics weren't chosen at VSGEN), you must do so from PID 2 before EXEC enables the line(s). UP.CLI is an ideal place to do it.

Before you use SED to insert a CHARACTERISTICS command in UP.CLI, test the command from the PID 2 CLI before EXEC comes up. Use the CHARACTERISTICS command with the /DEFAULT switch, using the console filename of the pertinent terminal. For example, to change lines 3 and 4 to support modems instead of local terminals, you would insert these lines:

```
characteristics/default/crt3/mod/mri/ebo/st/ulc/off/eb1   @CON3
characteristics/default/crt3/mod/mri/ebo/st/ulc/off/eb1   @CON4
```

Then start EXEC (PROCESS/NAME=EXEC/DEFAULT/DIR=@ EXEC↵) and enable all terminals (CX ENABLE/ALL↵ — the CX macro contains the command CONTROL @EXEC).

Make sure the line works the way you want it to. When it does, stop EXEC (type CX HALT↵).

Having tested the CHARACTERISTICS command(s), use SED to insert the command(s) in UP.CLI, after the lines whose comments advise the system manager to set characteristics. After the last comment line, insert your CHARACTERISTICS commands.

If You Have Graphics Terminals

AOS/VS II supports screen windowing on graphics (pixel-mapped) terminals on DS/7500 computers. On such systems, a user can create windows on a graphics terminal, but in order to do so, the user must first assign (get ownership of) the PMAP, an entry in :PER, for the device. On a multiuser DS/7500 system, unauthorized access to PMAP entries represents a potential security risk.

To prevent unauthorized creation of windows on a multiuser DS/7500 system, add the following line to your system's UP macro *before* the line that enables terminals:

```
assign ([!filenames @PMAP+])
```

This assigns (gives ownership of) the PMAP device entries (specified by @PMAP+) to PID 2.

Likewise, if you have a program that creates additional windows, deletes default windows, or repositions or resizes windows, you can run that program from your UP macro — but run it *before* assigning the PMAPs. For more information on security risks involved with windows, see *Managing AOS/VS and AOS/VS II.*

Starting Printers

The UP macro already contains commands to start and to continue a line printer of type LPB. If your printer is an upper- and lowercase type LPB printer, you can leave the printer specification as is. But if your primary printer is an uppercase-only LPB, use SED to add the argument UPPER to the control @EXEC start LPT command, producing the command

```
control @EXEC start LPT [!string] UPPER
```

Next, if your primary line printer is not type LPB, use SED to change the string (in the command string @LPB) to the type you have. For a type LPD printer, change the name @LPB to @LPD. For an LPE laser printer, change @LPB to @LPE; and change
control @EXEC start to control @EXEC start/NL. And for a type LPJ printer, change the name @LPB to @LPJ.

If you have a *second* line printer and/or plotter, start and continue its queue after the comment to the system manager about "start any other printers." Depending on the printer type (LPB, LPD, or LPE, uppercase-only or laser document), insert CONTROL @EXEC commands in the following forms:

control @EXEC start *[/NL]* LPT1 @LPx *[UPPER]*
control @EXEC continue @LPx

Insert the /NL for a laser printer, of type LPE. Insert UPPER for an uppercase only printer. The x is B1 for the second LPB printer, D for the first LPD printer, D1 for the second LPD printer, E for the first laser printer, E1 for the second laser printer, and so on.

Starting the second printer allows users to post printing requests to it via QPRINT/QUEUE=LPT1 commands.

With two or more line printers, label each printer (perhaps using a sticky-backed magnetic tape label) with its queue and device name; for example "Device LPB, queue LPT" for the first printer. Having the names clearly visible will make operations easier later on.

Starting Printers Attached to Asynchronous Lines

If you have one or more printers attached to asynchronous lines, start them *before* EXEC enables terminals for logon; that is, start them after the comment to the system manager about starting other printers. (While a line is enabled for logon, you can't start the line for printing.) Printers attached to asynchronous lines include letter-quality and laser printers.

If you created one or more laser or letter-quality printer queues earlier in this chapter, insert commands to start and continue them. For example, assume you have a laser and a letter-quality printer, connected to asynchronous lines 13 and 14. Also assume you created queues named LQP and LASER for them, as shown earlier in this chapter. You'd insert the following commands:

```
control @EXEC start LASER @CON15
control @EXEC continue @CON15
control @EXEC start LQP @CON16
control @EXEC continue @CON16
```

(Each terminal console filename is the line number plus 2.)

This will allow CLI users to post printing requests to the laser printer using QPRINT/QUEUE=LASER commands or to the letter-quality printer using QPRINT/QUEUE=LQP commands.

As with line printers, you may want to label your letter-quality printers — with queue name and device name. (If you have the CEO system, you will want to label printers with the CEO printer name also, after configuring the printers via CEO.)

Starting Networks, Database, and CEO Software, and User Applications

The first time you create the multiuser environment, you will probably want simply to start EXEC and the multiuser environment. If you have other software, like network, data management, CEO, and or/user applications software, it must be installed and configured before you can use it.

But *after* this software has been installed and configured, and you know what command line(s) start it, you can insert these command lines in the UP macro. Most software available from DG includes its own startup macros (described in the product documentation or Release Notice); for example, XODIAC/XTS network software has a startup macro named UP.NETWORK.CLI, and CEO has one called CEO.SYSTEM.CLI. For such a product, you need only insert the macro name in the UP.CLI macro. For DG products shipped without a startup macro, you'll need to use CLI PROCESS commands.

For any DG network or data management product, or the CEO system or user applications, use a text editor to insert the appropriate startup commands in the UP macro after the pertinent comment to the system manager. Figure 5-1, later in the chapter, shows a sample UP macro that includes some of these commands.

Enabling User Terminals

The UP macro contains an EXEC ENABLE/ALL command that enables all terminals, so you do not need to insert ENABLE commands for specific terminals.

But after EXEC enables a terminal, it "owns" that terminal. Some other DG programs need to own terminals to run on them. Among these are terminal manager programs (like TPMS) and IBM emulator programs (RCX70, DG/SNA). If you plan to run one or more of these other programs, decide which terminals you want them to use.

Then, in the UP macro, start the control process for any of these programs and have them take charge of the consoles they need *before* the control @EXEC enable/all command. (A good place to start the process is immediately after the comment to the system manager about starting data management programs.) The other program(s) will get use of the terminals before EXEC does; EXEC will display a harmless *Device already in use* message when it tries to enable them. Also, if you want to change any terminal characteristics (CHARACTERISTICS/DEFAULT command), do this before the terminal is enabled, as covered earlier.

After making sure the terminals you want will be enabled, proceed.

Running a Locked CLI

Unless you specify otherwise in the UP macro, a standard CLI, son of the master CLI (PID 2), will remain running on the system console. As son of the master CLI, this CLI has all privileges, which means that any person passing by can turn Superuser on and discover privileged users' passwords or maliciously shut the system down. Before the UP macro ends, we recommend that you have it run a locked CLI.

To run a locked CLI, you have a choice. You can execute the 16-bit program LOCK_CLI, or you can let CLI32 (the 32-bit CLI) program run and have it issue the LOCK command. The main benefit of LOCK_CLI is familiarity; if you have used it before, you may well want to keep using it. The main benefits of CLI32 are easier password changes and fewer processes (since a subordinate CLI process is not needed). Decide on the CLI you want; then try it as follows:

To run LOCK_CLI (a 16-bit CLI), use	To lock CLI32, use
execute :LOCK_CLI	LOCK/FILE=:PASSWORD

Now try unlocking the CLI you choose. (You will need to do this before running the DOWN macro.) Type the command UNLOCK; then type the password. The default password, shipped with both CLIs, is PASSWORD. You can test to see if the CLI is unlocked by typing XEQ SED. A locked CLI will not execute a program; an unlocked CLI will.

After locking and unlocking the CLI, insert the locking command in UP.CLI after the comment that describes the locked CLI. Eventually you may want to change the CLI password. Changing the CLI32 password is described in *Using the CLI (AOS/VS and AOS/VS II*; changing the CLI316 password is described in *Managing AOS/VS and AOS/VS II.*

Finishing Up with UP.CLI

Having made the UP macro executable, and (perhaps) initialized LDUs and done the other tasks above, you have finished the UP macro.

If you are running the SED text editor, leave the editor and save both old and new files. At the SED prompt, type BYE↵; then, when it asks *Do you want to save the original file as a backup file?*, type

Y↵
Output file - :UTIL:UP.CLI
Backup file - :UTIL:UP.CLI.BU
Su)

Saving the original as a backup (here, in file UP.CLI.BU) lets you keep track of what you did — in case the changed macro doesn't work the way you want it to. (SED keeps only one version of a backup file, form original-filename.BU. If a previous backup already exists, SED deletes this and replaces it with a newer version.)

Copy the macro to the root directory with the MOVE command:

Su) MOVE/V/R : UP.CLI↵
UP.CLI
Su)

Sample working UP and DOWN macros appear later in this chapter, in Figure 5-1 and Figure 5-2.

Editing DOWN.CLI

Bringing the multiuser environment down is largely a matter of halting EXEC. This will bring down all user processes created under EXEC, so whoever uses the DOWN macro will need to make sure that all users are alerted to the impending shutdown so they won't lose work. You will also want to shut down network, CEO, and other non–EXEC processes in an orderly way and release any nonmaster LDUs.

Review the text of the DOWN.CLI macro you printed earlier. Then type

Su) SED DOWN.CLI⤶ (The Superuser prompt for CLI16 is *)
...

As with UP.CLI, to make the macro executable, you must make the two numbers in the "[!equal 2,1]" line the same. For example, you could edit this line to be

[!equal,1,1]

Adding Warning Notes

Near the beginning of the macro, before the macro sets the search list, you might want to add text that gives the operator a chance to reconsider before shutting down. To do so, find the "COMMENT Set search list" command, and insert the following lines, as in

```
* FIND "Set search list"⤶
```

n COMMENT Set search list...

Insert the following lines here, before the comment line.

```
write This macro terminates active batch/print jobs and user processes.⤶
write If large batch/print jobs are active or if you have not warned users⤶
write then you may not want to continue. To stop here:  type CTRL-C CTRL-A⤶
write⤶
write Then wait for batch/print jobs to finish and/or warn users of shutdown.⤶
write⤶
write [!read To proceed with shutdown: press NEW LINE.]⤶
```

This gives information and allows the person to stop the macro if needed. For completeness, you might add some other information near the end of the macro.

```
* FIND "pop"⤶
```
n pop

* INSERT +1⤶ (Insert before the next line. Type the following lines.)

```
write The multiuser environment is shut down. To check for other⤶
write processes: use the WHOS macro. To shut down the AOS/VS II system: type⤶
write BYE and press NEW LINE — then confirm with Y and NEW LINE.⤶
```

Press NEW LINE; then press BREAK/ESC. Leave SED:

```
* BYE⤶
```
Do you want to save the original file as a backup file? Y⤶

Output file - :UTIL:DOWN.CLI
Backup file is - :UTIL:DOWN.CLI.BU
*)

As with UP.CLI, copy DOWN.CLI to the root directory:

Su) MOVE/V/R : DOWN.CLI
DOWN.CLI
Su)

Stopping User Applications and CEO, Database Management, and Network Software

If the UP macro started any database management, CEO, or network processes, the DOWN macro must shut them down in an orderly way — in reverse order from the UP macro. (Critical databases can be corrupted if some of these processes are simply terminated.)

Most software available from DG includes its own shutdown macros (described in the product documentation or Release Notice); for example, XODIAC/XTS network software has a shutdown macro named DOWN.NETWORK.CLI, and CEO has one called CEO.SYSTEM.CLI. For such a product, you need only insert the macro name in the UP.CLI macro. For DG products shipped without a shutdown macro or instructions for shutdown, you'll need to use CLI TERMINATE commands. For your own applications, only you know how best to shut them down. TERMINATE commands always work.

For any DG network or data management product, or CEO or user applications, use a text editor to insert the appropriate shutdown commands in the DOWN macro after the pertinent comment to the system manager. Figure 5-2, later in the chapter, shows a sample DOWN macro that includes some of these commands.

Releasing LDUs

It's important to add commands that release all the nonsystem LDUs that the UP macro initialized. (System shutdown releases all initialized LDUs, but still you should release them specificially in the DOWN macro; this will let you run the UP macro if you want without shutting down AOS/VS II.) If you have only one disk in your system, skip the rest of this section.

The RELEASE command is less elaborate than the INITIALIZE command. Its form is

RELEASE ldu-filename

To release an LDU, you need to be in the directory in which the LDU was initialized, or you need to specify a full pathname to the LDU filename. Also, you need Write access to this directory or have Superuser on.

In the DOWN.CLI macro, find the comments that advise the system manager to release LDUs. After those comments, insert RELEASE commands for every LDU that the UP macro initialized. For example,

RELEASE UDD
RELEASE UDD1

Finishing Up with DOWN.CLI

Having made the DOWN macro executable, and (perhaps) added warning notes, stopped applications, and released LDUs, you have finished the DOWN macro. If you are running the SED text editor, leave the editor and save both old and new files. Type BYE⤶; then, when it asks *Do you want to save the original file as a backup file?*, type

Y⤶
Output file - :UTIL:UP.CLI
Backup file - :UTIL:UP.CLI.BU

Copy the macro to the root directory with the MOVE command:

Su) MOVE/V/R : DOWN.CLI⤶
DOWN.CLI
Su)

Testing UP and DOWN

Having edited the macros, try them in sequence. First, make sure all terminals you want to enable are turned on and are on line. Make sure the line printer(s) are on line.

Then try UP:

Su) UP⤶

Starting log file UP.LOG ...

Running QCMP now...
...(QCMP messages)...

Starting EXEC.

Pid 3 : (EXEC) Revision n Ready
...

Starting batch output queues.

Starting default printer queue and continuing...

Continuing batch stream.
From Pid 3 : (EXEC) BATCH_INPUT_1 [Idle]
From Pid 3 : (EXEC) @LPB Cooperative initiated
From Pid 3 : (EXEC) @LPB [Idle]
From Pid 3 : (EXEC) Enabling all consoles
. . .
Enable all complete, n consoles enabled

AOS/VS II CLI rev n.nn date time
)

If you started any printers on your asychronous lines, or if any other program enabled consoles before EXEC did, you'll see the message *Could not enable console, Device already in use*. This does not represent an error condition, just status.

If you saw any other error messages, you may need to edit UP.CLI to fix them. If you ran a locked CLI in the UP macro, or even if you just left the command execute CLI as is, type the appropriate following command sequence from Table 5-1 to return to an unlocked, master CLI.

Table 5-1 Returning to an Unlocked Master CLI

If the last nonCOMMENT command line in UP.CLI is		
execute :CLI, type	**execute :LOCK_CLI, type**	**LOCK/FILE=:PASSWORD, type**
BYE	UNLOCK↵ xxx↵ (LOCK_CLI password) BYE↵	UNLOCK ↵ *Password:* xxx↵ (CLI password)

From an unlocked master CLI, type the log file (TYPE UP.LOG) to help track the error. The log file shows all CLI dialog; error messages begin with "Warning" or "Error:". If you identify an error, test the corrected command(s) from the CLI.

For some errors, like initializing LDUs, you must restore the environment to its status before the UP macro ran, or UP will return an error from trying the same operation twice. If you don't know how to restore the environment to its state before UP ran, a last resort is to shut down AOS/VS II — type BYE and respond Y to all questions until you see the SCP prompt; then restart with the BOOT command. After AOS/VS II comes up, test the revised command to see if it works.

When you've learned how to correct an erroneous command, run SED on the UP.CLI in directory :UTIL; correct the error, update the macro by terminating SED with the command BYE; and confirm with Y. Then move the revised macro to the root directory (MOVE/V/R : UP.CLI).

Through trial and error, work with UP until you've eliminated all but the *Could not enable console, Device already in use* messages shown above. When UP runs without other errors, go and check the terminals. Each one enabled for user logon will have a *Press NEW-LINE to begin logging on* message on it. If any terminals you expected to be enabled do not show this message, note their numbers; perhaps they were not identified to VSGEN or are not working properly. Check the peripheral directory by typing F/AS @+CON+ to see if all terminal lines were identified to VSGEN. If not, you'll need to run VSGEN again and specify the missing ones.

When the UP macro runs without errors, and all the terminals you want are enabled, try bringing the multiuser environment down with DOWN.CLI.

The down sequence generally goes as follows.

1. Warn users that EXEC is coming down, so they can get out of text editors or take other appropriate action. The CLI BROADCAST macro (supplied by DG) is useful for this. You can use WHOS.CLI or ?.CLI to check all user processes.

2. Check for large or critically important batch or print jobs (QDISPLAY command). If a job you want complete is still running, wait for it to finish. You can tell queues and printers to pause (at the end of the current job) with EXEC's PAUSE command.

3. When all users have logged off or have only CLI.PR running on their terminals, and when no important batch/print job is running, return to an unlocked master CLI as shown in Table 5-1. (To safeguard users' work, the DOWN macro works only when run from PID 2, the master CLI. You must return to PID 2 to run it.)

4. Run DOWN↵ to bring the multiuser environment down.

The following dialog shows these steps.

Su) BROADCAST System coming down now!↵
From Pid n : (OP) System coming down now!

Su) ?↵ (or WHOS↵)
Elapsed: ...

PID:	*1*	*PMGR*	*PMGR*	*:PMGR.PR*
PID:	*2*	*OP*	*OP*	*:CLI.PR*
PID:	*3*	*OP*	*EXEC*	*:UTIL:EXEC.PR*
PID:	*4*	*OP*	*00004*	*:UTIL:XLPT.PR*
PID:	*5*	*EXEC*	*@CONn*	*:CLI.PR*

CLI commands in the ?.CLI and WHOS.CLI macros return four pieces of information for each process: the process ID, username, process name, and the program pathname. There are no other processes now because no users are logged on.

The next step is to check the batch and printer queues. To do this, use the QDISPLAY command. QDISPLAY displays queue status. The queues you care about are BATCH_INPUT and LPT. Type

Su) QDISPLAY↵

BATCH_INPUT		*BATCH*	*Open*
xxx	*xxx*	*xxx*	(Batch jobs appear in this BATCH_INPUT list.
xxx	*xxx*	*xxx*	Active jobs have a leading asterisk; for example,
			**34 D JACK :UDD:JACK:?34.CLI.00002.JOB)*
BATCH_OUTPUT	*BATCH Closed*		

LPT		*PRINT*	*Open*
xxx	*xxx*	*xxx*	(Print jobs appear in this LPT list. Active jobs
xxx	*xxx*		have a leading asterisk; for example,
			**35 JACK :UDD:JACK:MYFILE)*

Su)

The QDISPLAY command shows no active batch or print jobs, so you can proceed. To bring down the system, you need to get back to the master CLI, PID 2. You can always do this with the BYE command. To check your PID, use the WHO command. For example,

Su) WHO↵

PID: 5	*OP*	*00005*	*:CLI.PR*	(Your PID is 5.)

Su) BYE↵ (Or UNLOCK and BYE, or UNLOCK and password, shown in Table 5–1)

Su) WHO↵
PID: 2 OP OP :CLI.PR (Your PID is 2.)

As PID 2, with no users logged on and no essential batch/print jobs running, you can run the DOWN macro:

Su) DOWN↵

This macro terminates active batch/print jobs and user processes.
If large batch/print jobs are active or if you have not warned users
then you may not want to continue. To stop here: type CTRL–C CTRL–A

Then wait for batch/print jobs to finish and/or warn users of shutdown.

To proceed with shutdown: press NEW LINE.

↵

Starting log file DOWN.CLI...

Pausing printers and batch streams.

Disabling all consoles.

Bringing down EXEC.
From Pid 3 : (EXEC) Terminating ...
...

The multiuser environment is shut down. To check for other
processes: use the WHOS macro. To shut down the AOS/VS II system: type
BYE and press NEW LINE — then confirm with Y and NEW LINE.

Type WHOS↵ to check on the processes. There should be only two: the peripheral manager and master CLI. If you received error messages, type the log file, DOWN.LOG, to pinpoint their location. Since DOWN is simpler than UP, there should be few, if any, errors. Use SED to fix any errors.

Now test both macros. Type UP↵. After UP has run, return to an unlocked master CLI and type DOWN↵.

Within your tailored DOWN macro, you might consider inserting the QDISPLAY command somewhere in the operator warning note (beginning with "This macro"). Knowledge of queue status could be useful to the system operator as he/she prepares to shut down.

When the UP and DOWN macros run without error messages (aside from *Could not enable console, Device already in use*), you're done. UP and DOWN will serve your installation well, executing many relatively complex tasks and requiring only that someone type the macro name.

Figure 5–1 shows a sample working UP.CLI macro, and Figure 5–2 shows a sample working DOWN.CLI macro.

```
COMMENT  UP.CLI

COMMENT Check if the two arguments are equal.  If so, the macro is executable.
[!equal,1,1]

  COMMENT  Check to see if the process is PID 2.
  [!ueq,2,[!pid]]

    COMMENT  Start log with SYSLOG_UP - renames old log file based on date.
    :SYSLOG_UP.CLI
    COMMENT  System ID is MSIS_01.
    SYSID  MSIS_01

    COMMENT  Set search list, dir to the root directory, push an
    COMMENT  environment level, and turn Superuser on.
    searchlist  :util  :
    directory   :
    push
    prompt      pop
    superuser   on

    COMMENT Set up and start a CLI log file to help track UP errors.
    write
    write   Starting log file UP.LOG. Type this file to track any error.
    delete/2=ignore       :UP.LOG
    create/elementsize=8  :UP.LOG
    logfile               :UP.LOG

    COMMENT  Set tape unit ACLs.
    acl      @MT-   +,ware

    COMMENT  Set default characteristics of console lines.
    COMMENT  Set lines CON42 - CON44 for modem support.
    characteristics/default/crt3/mod/mri/ebo/st/ulc/off/ebl  @CON42
    characteristics/default/crt3/mod/mri/ebo/st/ulc/off/ebl  @CON43
    characteristics/default/crt3/mod/mri/ebo/st/ulc/off/ebl  @CON44

    write    Initializing LDUs UDD1 and UDD2.
    initialize/lduname=UDD1  UDD1.IMAGE1/@DPJ1
    initialize/lduname=UDD2  UDD2.IMAGE2/@DPJ2

   COMMENT  to system manager: Set ACLs on newly-initialized LDUs, if desired.

   COMMENT  to system manager:  Initialize other job processors, here.
   jpinitialize/2=warning 1

   COMMENT  Run QCMP to compress the print queues.
   xeq/1=warning/2=warning      QCMP/yes
```

Figure 5-1 Sample Working UP.CLI Macro (continued)

```
COMMENT  Create EXEC process.
    write
    write    Starting EXEC.
    process/default/directory=@/name=EXEC  EXEC
    WAIT_FOR_PORT  @EXEC

    COMMENT  Tell EXEC to start batch output queues.

    string   @LPB

    write
    write    Starting batch output queues.
    control  @EXEC  start  BATCH_OUTPUT  [!string]
    control  @EXEC  start  BATCH_LIST    [!string]

    write    Starting default print queue and continuing printer.
    control  @EXEC  start  LPT           [!string]
    control  @EXEC  continue             [!string]

    COMMENT  Start laser printer.
    control  @EXEC  start/nl  LASER      @CON37
    control  @EXEC  continue             @CON37

    COMMENT  Start XTS network software.
    :UP.NETWORK.CLI

    COMMENT  Start INFOS II data management software.
    :INFOS:INFOS.UP.CLI

    COMMENT  Start CEO.
    push
    prompt   pop
    searchlist :INFOS,[!searchlist]
    dir      :UTIL:CEO_DIR
    CEO.SYSTEM  start  checkpoint
    pop
    COMMENT  to system manager:  Start your own applications, if any, here.

    COMMENT  Tell EXEC to open the mount queue.
    control  @EXEC  open  mountq

    COMMENT  Tell EXEC to continue batch streams 1 and 2. Set qpriority.
    write    Setting qpriority for stream 2 to 255 only; jobs must be
    write    submitted with /QPRIORITY=255 to be processed in stream 2.
    write
    control  @EXEC  continue  1
    control  @EXEC  continue  2
    control  @EXEC  qpriority 2  255 255
```

Figure 5–1 Sample Working UP.CLI Macro (continued)

```
  COMMENT  Tell EXEC to enable all consoles.
   write
   control  @EXEC  enable/all
   COMMENT  Return to original environment.  Set up informative prompt.
   checkterms
   pop
   prompt time
   COMMENT  Secure the system console by executing :LOCK_CLI.

   execute  :LOCK_CLI

  [!else]
   write  *Error*
   write  %0\% runs only from the master CLI - PID 2.,,Your PID is [!PID].
   write  Required arguments:,,None
   write  Optional switches:,,,None
  [!end]

[!else]
  write    This macro is executable only if - in its first !EQUAL command -
  write    the numbers are the same.  To make the macro executable
  write    use a text editor to make the numbers equal. For example
  write    make them both 1.
  write
  write    We suggest that you keep the executable macro in the root
  write    directory. This will provide easy access on startup.
  write    You can move it there via the command ,, MOVE/V/R : UP.CLI
[!end]
```

Figure 5-1 Sample Working UP.CLI Macro (concluded)

```
COMMENT  DOWN.CLI

COMMENT  Check if the two arguments are equal. If so, the macro is executable.
[!equal,1,1]

  COMMENT  Check to see if the process is PID 2.
  [!ueq,2,[!pid]]

    COMMENT  Set search list, dir to the root directory, push an
    COMMENT  environment level, and turn Superuser on.
    searchlist  :UTIL  :
    directory   :
    push
    prompt      pop
    superuser   on

    write    Starting log file DOWN.LOG. Type this file to track any error.
    delete/2=ignore         :DOWN.LOG
    create/elementsize=8    :DOWN.LOG
    logfile                 :DOWN.LOG

    COMMENT  Pause printer and batch streams.
    write
    write    Pausing printer and batch streams.
    control  @EXEC  pause  @LPB
    control  @EXEC  pause  @CON37
    control  @EXEC  pause

    COMMENT  Disable all consoles.
    write
    write    Disabling all consoles.
    control  @EXEC  disable/all
    pause    20

   COMMENT  to system manager: Stop your own applications, if running, here.

    COMMENT  Stop CEO.
    :UTIL:CEO_DIR:CEO.SYSTEM  stop

    write    Bringing down INFOS II.
    terminate/2=warning    OP:INFOS_II
    pause    3

    write    Bringing down the network.
    :DOWN.NETWORK.CLI
```

Figure 5–2   Sample Working DOWN.CLI Macro (continued)

```
    write    Bringing down EXEC.
     control  @EXEC  halt
     WAIT_FOR_NO_PORT  @EXEC

     COMMENT  Stop SYSLOG.
     syslog/stop

     COMMENT  Release LDUs - in reverse order of initialization.
     release  :udd2
     release  :udd1

     checkterms
     pop
   [!else]
     write  *Error*
     write  %0\% runs only from the master CLI - PID 2.,,Your PID is [!pid].
     write  Required arguments:,,None
     write  Optional switches:,,,None
   [!end]

[!else]
  write    This macro is executable only if - in its first !EQUAL command -
  write    the numbers are the same.  To make the macro executable
  write    use a text editor to make the numbers equal. For example
  write    make them both 1.
  write
  write    We suggest that you keep the executable macro in the root
  write    directory. This will provide easy access on shutdown.
  write    You can move it there via the command ,, MOVE/V/R : DOWN.CLI
[!end]
```

Figure 5–2   Sample Working DOWN.CLI Macro (concluded)

If You Have Bisynchronous Communication Lines

If you have bisynchronous communications (bisync) lines, needed for DG communications programs like RJE80, HASP II, or RCX70, a process called GSMGR must be running before any of these programs can use the lines. GSMGR runs in the synchronous controller(s) defined in a spec file created by the BSCGEN program (Chapter 4). (GSMGR has exclusive use of the controller, which means that other communications software, like DG/SNA or XTS, cannot use the controller at the same time. However, XTS or DG/SNA *can* use any synchronous controllers that GSMGR doesn't use.)

In most cases, it's best to create GSMGR in its own bisync up macro, which you can call from the UP macro — generally, after EXEC is started. You might name the bisync macro UP_BSC.CLI or equivalent, in directory :UTIL.

The bisync up macro should create the GSMGR process a command like the the following one. MSIS_01.BSC is a sample name; for MSIS_01.BSC, substitute the name of the sync line spec file created by the BSCGEN program (Chapter 4).

```
process/resident/superuser/access/ipcusage/name=GSMGR&
/dir=@/username=op/data=:SYSGEN:MSIS_01.BSC   :GSMGR
```

The ampersand (&) is the CLI line-continuation character; it tells the CLI to ignore the following NEW LINE character — allowing you to write multiple-line commands.

After creating GSMGR, the bisync up macro can also start the bisync emulator software (for example, RJE80) and pertinent EXEC queue (if any). The bisync macro can start the EXEC queue only if it is executed *after the EXEC process is created.*

To terminate the GSMGR process, the master CLI (or any Superprocess) can issue the command

```
terminate  OP:GSMGR
```

This command can be made part of a bisync down macro (for example, DOWN_BSC.CLI) or DOWN.CLI.

The GSMGR process must be resident (PROCESS command with /RESIDENT switch) — and, like any resident process, involves a certain amount of system overhead. If you will be using bisync lines a lot, and the overhead doesn't bother you, you can call the bisync up macro from the UP.CLI macro. Otherwise, to minimize overhead, run the bisync up macro only when you want to use the bisync lines.

Communications products that use sync lines are further described in manuals supplied with the communications software. Creating and opening queues needed by the DG/SNA and HASP II products (and by the XODIAC/XTS agent FTA) are described in *Managing AOS/VS II*, the EXEC chapter.

PREDITOR and EXEC Summary

With user profiles, EXEC, and the macros done, the multiuser environment is practically complete.

If you wish to bring the system down, type BYE↵, then Y↵ — later, you'll need to bootstrap to bring it up. Assuming power stays on to your CPU and disks, the sequence from startup to normal shutdown is

1. Bring up AOS/VS II.
2. Type UP↵ to the CLI.
3. The multiuser environment runs; users log on and off, and submit batch and print jobs.
4. Before shutdown, warn users (BROADCAST) and check queues (QDISPLAY).
5. Return to master CLI (PID 2) via BYE↵. (If you run a locked CLI, you must unlock this CLI before BYE will work.)
6. Type DOWN↵.
7. Type BYE↵; then confirm with Y↵.

Actually, you can type BYE↵ at any time, with other processes running, from the PID 2 CLI. If you confirm, everything will be shut down. But this risks terminating processes prematurely, causing users to lose work.

Startup and normal (and abnormal) shutdown are detailed in the next chapter.

There are a number of issues and tools to learn about (described next). And there are other processes and commands you will eventually want to make part of your UP macro. But with user profiles, EXEC, and the UP and DOWN macros, the backbone of the multiuser environment stands. Congratulations.

Other DG Software

Along with AOS/VS, you may have acquired other DG products, like communications and networking software; the CEO system; programming languages like C, COBOL, FORTRAN 77, Pascal, and PL/I; the SWAT debugger, database management systems like DG/SQL; and others.

Each of these products comes on its own magnetic tape (or diskettes), with its own documentation. Instructions for loading and using it appear in the documentation and/or in the product Release Notice.

Some products, like XODIAC/XTS and CEO, have a specific home directory. Other products, like languages, can be placed where you wish — in their own directories, perhaps under :UTIL, or in :UTIL itself. Putting a product in its own directory keeps it in one place and may allow faster access. But putting a product in :UTIL makes it easier for users to access because their search lists need include only :UTIL.

Some products have programs that must be executed with the PROCESS command; some have commands that the master CLI process or users can issue. Many products, like XODIAC/XTS and CEO, have UP macros of their own to ease operation. CEO may require a one-line edit of your UP.CLI macro (to include the CEO directory in the search list, as described in *Managing the CEO System).*

For products other than XODIAC/XTS and CEO, after some experience, you may decide to place the pertinent PROCESS and other commands in the UP.CLI macro. This macro is a tool that summarizes the components of your entire system; you will find it, and perhaps different variations of it, very useful.

Error Handling — The ERMES File

DG strives to have a unique error code for every kind of error that can occur in every process running under AOS/VS II. Each code is a number. The system translates each code to a text error message via a file called ERMES.

The CLI uses ERMES to describe its own errors. And when any program executed from the CLI (with a PROCESS or XEQ command) has a fatal error, the program process terminates and returns control to its parent CLI. The process may describe the error before it terminates, or it may simply return a numeric error code to the CLI.

When the CLI receives an error code, it looks for the text definition in file ERMES, in the root directory. If ERMES defines the code, the CLI will find and display the text error message. But if the code is not defined in ERMES, the CLI will report *UNKNOWN MESSAGE CODE n,* where *n* is the code.

The ERMES file built by default for AOS/VS II contains error message text needed by AOS/VS II and the programming languages it is written in, as follows:

Program	Error Message Filename(s), in :UTIL
AOS/VS II itself	SYSERMES.OB, XYZZYERMES.OB FS_ERMES.OB, IO_ERMES.OB
CLI (CLI16)	ZERMES.OB
CLI (CLI32)	CLI32ERMES.OB
CLRE (common language runtime routines)	CLREERMES.OB
EXEC	XERMES.OB
FORTRAN 77 runtime routines (F77)	F77ERMES.OB
Language runtime routines	LANG_RTERMES.OB
Link program	LINKERMES.OB
Macroassembler (MASM)	MASMERMES.OB
PL/I language runtime routines	PLIERMES.OB, PLIERMES16.OB
SED test editor	SEDERMES.OB
SPEED test editor	SPEEDERMES.OB

However, the supplied ERMES does not define error codes for other DG software, like high-level languages (for example, COBOL, Pascal, or BASIC), data management software (for example, Sort/Merge), or communications/networking software.

After you have loaded DG-supplied software not included in the list above, someone must create an ERMES file with text definitions for all its errors. If this is not done, users will often get only the numeric error codes, which won't help productivity.) The easiest and best way to generate a tailored ERMES file is to create a macro to do it.

With a text editor (like SED), create a macro to execute the standard AOS/VS II file builder, LINK_ERMES.CLI. Have this macro run LINK_ERMES and specify all the error message files you want. This way, you can build a new version of ERMES easily, whenever you install a new revision of software, by typing just one command. And since you (not Data General) create the tailored macro, new releases of AOS/VS II won't delete your macro when you load them.

We suggest you call the macro TAILORED_ERMES.CLI. You can call it anything you want, but a standard name will help you remember. Turn Superuser on and make the working directory :UTIL. With SED, create the macro and insert the LINK_ERMES command, followed by the full pathname of all non-AOS/VS II error messages you want to add.

The network software that relies on AOS/VS II (XTS II, AOS/VS II TCP/IP, and DG/OTS) has its own error message files. If you have any of these products, be sure to include the pertinent error message files, as follows. All network error text files are installed in directory :NET:UTIL.

XTSII	AOS/VS II TCP/IP	DG/OTS
NETERMES.OB	NETERMES.OB	NETERMES.OB
XTS_ERMES.OB	XTS_ERMES.OB	XTS_ERMES.OB
MHSERMES.OB	MD_ERMES_ENGLISH.OB	MHSERMES.OB
	NMI_ERMES_ENGLISH.OB	OAPI_ERMES.OB

For example, assume you have acquired AOS/VS BASIC, C, COBOL, FORTRAN 77, Sort/Merge, TCP/IP, and XTS II networking software. (You also have INFOS® II, but this has its own error text handler.) Also assume that you installed COBOL in a directory whose pathname is :COBOL; you installed AOS/VS BASIC in a directory called :BASIC; and you put Sort/Merge in a directory called :UTIL:SORT_3.30. The network software, XTS II, is installed in directory :NET and :NET:UTIL (XTS II is always installed in these directories; you have no choice).

After loading these onto the system, you could write your TAILORED_ERMES.CLI macro to look like this:

```
comment  Run standard macro :UTIL:LINK_ERMES and add other ERMES pathnames.
:UTIL:LINK_ERMES.CLI  &
:BASIC:BASERMES.OB  &
:UTIL:CERMES.OB  &
:COBOL:COBERMES.OB  &
:UTIL:SORT_3.30:SORTERMES.OB  &
:NET:UTIL:NETERMES.OB &
:NET:UTIL:XTS_ERMES.OB &
:NET:UTIL:MHSERMES.OB &:NET:UTIL:MD_ERMES_ENGLISH.OB
&:NET:UTIL:NMI_ERMES_ENGLISH.OB &
```

You can ignore the F77 language because its error message filename is included in the default LINK_ERMES.CLI. The ampersand character (&) continues the line — letting you arrange the text for easy readability.

When you are satisfied, press NEW LINE, then BREAK/ESC. Leave the SED editor as usual with BYE↵. Then run your tailored macro:

```
Su) TAILORED_ERMES↵
  ...pause...
Su)
```

If you get *File does not exist...* messages, check the locations of the product directories and make sure the pathnames you write into the macro are correct. Fix any errors with the text editor.

When your tailored macro runs without error messages, you know you have a new ERMES file with your specified error codes added. Copy the new ERMES file from directory :UTIL (where it was created) to the root directory. Use the MOVE command with the /R (recent) switch, as follows:

```
Su) MOVE/V/R  :  ERMES↵
 Deleted :ERMES
 ERMES
Su)
```

(The /R switch copies the file only if it is more recent than a file with the existing name in the root directory.)

Next, return to PID 2 at the system console, type CHAIN:CLI and press NEW LINE. (You must do this because the CLI opens ERMES when it starts. The CLI cannot open the new ERMES until you chain to it (creating a new PID 2 CLI process) or shut down AOS/VS II and restart. Chaining is much easier.

Now users will get text messages in response to BASIC, C, COBOL, INFOS_II, SORT, TCP/IP, and XTS II network runtime errors.

ERMES instructions usually appear on the Release Notices of each relevant software product. Also, file :UTIL:ERMES.SR describes the format of the ERMES file.

Making Life Easier for Users

This section tells you how to tailor the log-on screen, create log-on messages, and give and get Help.

Tailoring the Log-On Screen

Every terminal enabled under EXEC displays the log-on banner, which looks like this:

*** *AOS/VS II Release n.nn / Press NEW-LINE to begin logging on* ***

For user terminals, you can tailor a log-on screen by editing the file :UTIL:LOGON.BANNER.SCREEN. For hardcopy terminals, create the file :UTIL:LOGON.BANNER.HARDCOPY. If these files exist, EXEC will display the text in them instead of the one-line log-on banner.

You can edit either of these screen files using a text editor like SED. Each file can have as many as 2,048 characters (an 80- by 24-character screen holds 1920 characters).

You don't have to create either of the log-on screen files, but it's a nice way to personalize your system. If the pertinent file (for CRT or hardcopy) doesn't exist, EXEC will display the default one-line banner on the terminal.

User Log-On Macro Files

When you specified the initial IPC file to PREDITOR, you gave a central macro filename (for example, :UTIL:LOGON_CENTRAL.CLI) that would be executed for users when they logged on. You planned for this macro to execute a log-on macro in each user's directory. There will be no error message if these files don't exist, but they serve as a useful information and control tool for users, so you might as well create them.

Use a text editor (SED) to create the files. First, create the central macro — shown by example as file :UTIL:LOGON_CENTRAL.CLI. Go to directory :UTIL; turn Superuser on; execute the SED text editor on the filename you want. Append the text you want and leave the text editor. The text might look something like this:

```
COMMENT This is a central macro that executes user log-on macros.
searchlist  :UTIL
defacl  [!username],OWARE
:UDD:[!username]:LOGON.CLI
```

Now create the LOGON.CLI macro to be moved into user directories. Sample text for the user log-on macro file follows.

```
write Welcome to the AOS/VS II Operating System. The file you are
reading
write is a CLI macro in your own directory. You can edit it as
write desired to set characteristics and/or search list and/or
write default access control list - DEFACL - for your files.
searchlist  [!searchlist]
write Your search list is [!SEARCHLIST]
write Type HELP and press NEW LINE for Help.
```

After writing both macros, test them by typing

Su) MOVE/V/R :UDD:[!USERNAME]:LOGON.CLI↲ (Put user macro in your directory.)
LOGON.CLI
Su) LOGON_CENTRAL↲ (Try central macro.)

You should see the text you typed after each WRITE command, and the current search list set by the SEARCHLIST command. If there are error messages, they probably result from syntax errors. EXEC processes only the first 512 characters in the central macro file, so you shouldn't make it more than 512 characters long.

When the log-on macro runs without error messages, give everyone read and write access to the macro and move a copy of it to everyone's directory by typing the following commands (from directory :UTIL with Superuser on).

Su) ACL LOGON_CENTRAL.CLI +,R↲ (Set ACL of central macro.)
Su) ACL LOGON.CLI +,WR↲ (Set ACL of user long macro.)
Su) MOVE/V/R :UDD LOGON.CLI↲ (Needed to allow move into user directories.)
LOGON.CLI (System confirms move.)

Su) DELETE LOGON.CLI↲ (Delete original user macro from :UTIL.)
Su) DIR :UDD↲ (Set to move copy into all user directories.)

Su) SPACE + 50↲ (Needed for the next MOVE command.)
Su) MOVE/V ([!FILENAMES +]) LOGON.CLI↲
... (CLI verifies each file moved) ...

This sequence initializes each user directory and moves a copy of LOGON.CLI into each.

Note that the macro text applies only to CLI users (users whose *initial program,* specified to PREDITOR, is CLI.PR.) If a user's program is BASIC.PR, LOGON.CLI must be rewritten in BASIC to type the log-on message if you want one (use the BASIC PRINT statement). A BASIC program cannot use CLI commands. If a user's initial program is CEO, however, you need not change the IPC file (CEO does not try to execute commands in the IPC file).

For a CEO user, you may want to execute CEO automatically at logon. You can do this by inserting the command line :UTIL:CEO_DIR:CEO at the end of the macro. Wait until CEO is installed before inserting this command line.

Message of the Day — the LOGON.MESSAGE File

If you create a file called LOGON.MESSAGE in :UTIL, EXEC will display the contents of this file to every user who logs on — in any program.

LOGON.MESSAGE is useful for general system information, like planned shutdowns, new features, and so on. The system manager or operator can add information to this file as needed. If you want, you can give the file an access control list that allows any CLI user to edit it, adding messages of general interest. As with the user log-on file, only the first 512 characters of LOGON.MESSAGE are displayed (but people can use the command TYPE LOGON.MESSAGE to see the whole thing, if it exceeds 512 characters).

Create and/or edit the file LOGON.MESSAGE as you would any file. It must be in directory :UTIL. Sample text is

This is the wonderful world of AOS/VS II.
If you have questions, please see the system operator.

After creating both the user log–on and LOGON.MESSAGE files, bring everything up (UP↵), then log on as OP on a user terminal. You will see the messages just as any user will see them.

Giving and Getting Help

AOS/VS II has a Help mechanism that can help inexperienced people. You may have used Help with VSGEN, PREDITOR, and SED; you can also use it with the CLI, EXEC, and other DG products. For example, type the following commands.

) HELP↵

... (CLI displays the list of HELP topics) ...

) HELP *COMMANDS↵

... (CLI displays a list of its commands) ...

) HELPV ACL↵

... (CLI describes the ACL command) ...

) XHELP↵

... (CLI displays the EXEC commands) ...

) XHELP ENABLE↵

... (CLI describes the EXEC ENABLE command) ...

You can see that HELP provides quick, pertinent information, when people need it. All Help messages, for all programs, are in directory :HELP. This directory was created, and its files loaded, when you first brought up the starter system.

Each Help file begins with a character string that identifies it to the system. The format of the Help file depends on the CLI you are using, as shown in Table 5–2.

Table 5–2 Format of Help Files

Format of Filename in :HELP		Format of CLI Command that Displays Message
CLI16	CLI32	
CLI.TPC.TOPICS	CLI.TPC.TOPICS	HELP
CLI.TPC.string	CLI.TPC.string	HELP *string
CLI.CMD.string[1]	CLI32.CMD.string[2]	HELP string
CLI.PSM.string[1]	CLI32.PSM.string[2]	HELP !string
EXEC.string	EXEC.string	XHELP string

1 – The string must be a real CLI command.
2 – CLI32 looks for CLI32.xxx.xxx; if it cannot find this, it looks for CLI.xxx.xxx.

Additional help files in :HELP, accessible from programs other than the CLI, are

Filename Format	Accessible from
DEBUG4.string	Assembly language debugger.
FED.string	Assembly language disk file editor.
SED.string	SED text editor.
SPEED.string	SPEED text editor.
VSGEN_HELP	VSGEN program.

By default, every user can read these files (via appropriate HELP or TYPE commands), and the system will automatically find and display them.

Generally, if you want to create one or more Help files and have the system type its contents, use the filename form

CLI.TPC.string

The system will then display the string in proper alphabetical order when a user types HELP↵. It will display the file's contents when a user types HELP followed by an asterisk and the string; for example

HELP *OUR_SITE↵

If a Help message can tell the whole story by itself, you can simply leave it as a Help topic. But if the explanation is quite long, you can use the topic file to tell the user what files to type for more Help.

All Help files you create should have an Access Control List (ACL) of at least +,R so the users can read them. You can set ACLs as shown in the example below.

Even if you decide not to create your own Help messages now, all files shipped with non-AOS/VS II products that begin with CLI.TPC. should be in directory :HELP. This will allow users to see the topic when they type HELP↵.

Most (if not all) Data General products ship their Help files to install in directory :HELP. If, after you install a product, the HELP command doesn't display a topic for it, perhaps the Help topic is in the product home directory instead of :HELP.

In the product's home directory (wherever it is installed), check for filenames of the form CLI.TPC.+ using a + *template* (wildcard character that matches all or parts of filenames). The character + (plus sign) matches all characters. So in any directory (say F77), you can see which filename begin with CLI.TPC. and sort the filenames, by typing

```
) DIR F77↵
) FILES/S CLI.TPC.+↵

  ... (System alphabetically lists all filenames that begin with CLI.TPC.) ...
)
```

Help File Example

In directory HELP, with Superuser on, use a text editor to create a file named

CLI.TPC.ABOUTSYSTEM

The contents of this Help file can be any message you want. For example:

ABOUTSYSTEM — This is a Data General MV/Family computer running the AOS/VS II operating system. Type any of the following files for more information:

:HELP:COMPILERS	Describes compilers and how to use them.
:HELP:BATCH	Describes using batch.
:HELP:DAY_RUN	Describes schedule of application programs.
:HELP:DAY_DUMP	Describes daily schedule of Dump/Backup runs.

After leaving the text editor, give everyone read access to the Help file:

Su) ACL/V CLI.TPC.ABOUTSYSTEM +,R)
CLI.TPC.ABOUTSYSTEM
Su)

This shows the simplest approach to Help messages. When any user types HELP) from the CLI, the system will display ABOUTSYSTEM as a topic. When the user types HELP *ABOUTSYSTEM), the text will be displayed; the user can then type any of the pathnames described for more information. You'll be able to think up more sophisticated ways to use Help messages later on. But the main point is to know about it: it can be a great boost to productivity.

Overview of Your System File Structure

Your multiuser environment is ready for users. During the whole process, there were a number of directories and files created — some via the system tape, some by the tailored system, some by PREDITOR and EXEC, and some by you.

Figure 5-3 shows the directory structure, with some pertinent files, and describes how and when the files were created. An oval indicates a directory file; a rectangle indicates one or more nondirectory files.

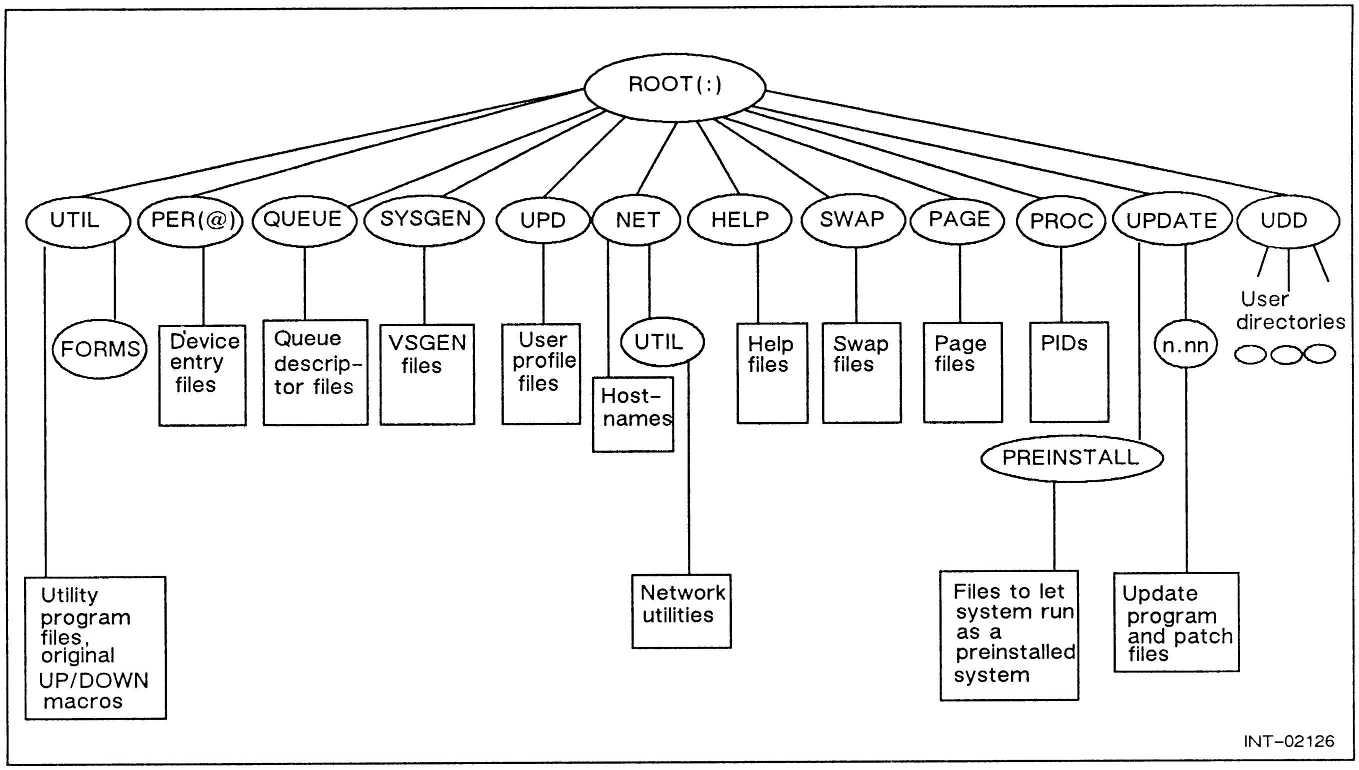


Figure 5-3   Directory Structure in the Finished AOS/VS II System

From the top, left to right, the directories shown in Figure 5-3 are as follows.

Directory Name (Pathname)	Description
Root (:)	The root directory contains all other directories. It was created by Disk Jockey when the system LDU was created. Its nondirectory files include the system Agent, the peripheral manager (PMGR), Disk Jockey, CLI files, the edited UP.CLI and DOWN.CLI macros (which you moved there), and the error message file (ERMES).
UTIL (:UTIL)	The utilities directory contains AOS/VS II utility program files: SED text editor, macroassembler, Link, and so on. UTIL also has system programs like PREDITOR, EXEC, and PED. It was created by Disk Jockey when AOS/VS II software was installed.
FORMS (:UTIL:FORMS)	The FORMS directory contains forms files to control printer positioning for printing special forms. It also contains mapper files created by DG to create special printer characters. If you require special forms printing, store the forms files you create (perhaps with the FCU utility) here. Directory :UTIL:FORMS was created by Disk Jockey when AOS/VS II software was installed.
PER or @ (:PER or @)	The peripherals directory is created by a tailored AOS/VS II system each time it comes up. PER contains a device entry file for each device (not controller) generated to be part of the operating system (for example, MTB0, @MRCTAPE000A00, DPJ0,

Directory Name (Pathname)	Description
PER or @ (cont.)	MRCDISK000E00, CON103, VCON22, LPB.) The @ is convenient shorthand for :PER; for example @MTB0 is easier to type than :PER:MTB0. PER is also the home directory of EXEC (although the EXEC program file is in :UTIL). When AOS/VS II starts up, it creates device entries in PER. When EXEC starts up, it creates batch and device queues in PER. Other software products, like networking or communications products, also create entries in PER when they are started up. When a system is shut down normally, it deletes PER, so do not place user files there.
QUEUE (:QUEUE)	Directory QUEUE is created by EXEC the first time EXEC starts up. QUEUE contains two files, QUEUES and JOBS, which have queue and job information for EXEC. The QCMP utility program may delete all user files in QUEUE, so do not place user files here.
SYSGEN (:SYSGEN)	The system–generation directory was created by Disk Jockey when AOS/VS II software was installed. It contains needed VSGEN and library files for system generation.
UPD (:UPD)	The user profile directory was created by PREDITOR the first time PREDITOR ran. The user profile for each user — created PREDITOR — is there. EXEC checks this directory for a matching profile file before logging a user on. After a user logs on, the system itself enforces the limits set within the profile file.
NET (:NET)	The network directory is created the first time someone loads network software. by the starter system the first time it comes up. XODIAC/XTS network hostnames are put here automatically by network software. Do not put user files here.
HELP (:HELP)	The HELP directory is created by Disk Jockey when AOS/VS II software was installed. It contains topic Help files, command and pseudomacro Help files, and VSGEN and EXEC Help files. You can also place your own Help files here.
SWAP (:SWAP)	The SWAP directory is part of AOS/VS II memory structure. The starter system creates it at startup. Its size is specified at VSGEN, but you can override this if you override default specs at startup. Do not place user files here.
PAGE (:PAGE)	Like SWAP, PAGE is part of the AOS/VS II memory structure; the starter system creates it at startup. You can override the size specified at VSGEN at startup. Do not place user files here.
PROC (:PROC)	AOS/VS II uses the PROC directory to keep track of running processes. The starter system creates it at startup. Do not place user files here.

Directory Name (Pathname)	Description
UPDATE (:UPDATE)	The update directory is created with program files, patch files, and an update script file by the first AOS/VS II update loaded. Each update creates a directory named n.nn (the release number; for example, 2.03) within :UPDATE. Generally, restrict this directory to update files; users should not store files here.
PREINSTALL (:UPDATE:PREINSTALL)	This directory contains files that let AOS/VS II run as a preinstalled system. It includes UP_EXEC.CLI, and other files AOS/VS II needs if you create a system to run as a preinstalled system (as explained in the manual *Using Preinstalled AOS/VS II*).
UDD (:UDD)	The user directory directory is created by PREDITOR the first time PREDITOR is run on this LDU. In this directory, PREDITOR creates a user directory for each user given a profile. This directory has the name given as a username to PREDITOR; for example, ROBIN, SAM, or F77. The user directory becomes the user's working directory when the user logs on; within it, the user can create files and subordinate directories.

What Next?

This chapter has given you the essentials for creating the multiuser environment.

It showed how to create general–purpose user profiles with the PREDITOR profile editor and how to initialize EXEC, the multiuser environment manager, gave some pointers on other DG software and the ERMES error file, shown how to make life easier for users with initial user IPC files and the log–on message file, and offered a picture of your finished system's directory structure.

This chapter ends the "cookbook," blank–disk to finished–system portion of the book. This portion has introduced you to the DG hardware and software in Chapter 1; told you how to format LDUs, install, and bring up the starter system in Chapter 2; explained how to generate, patch, and test a tailored system in Chapter 4; and showed how to create the multiuser environment in this chapter.

Whatever your role — DG engineer, system manager, DP manager, MIS manager, or nonadministrative person — you have done a tremendous job. Not only have you had to execute many steps, but you've had to learn a lot. Your tailored, multiuser system is up and running. You may have to execute parts of preceding chapters again — but you will rarely, if ever, need to do it all again for your installation.

The next chapter details startup and shutdown, both normal and abnormal. Read it if you want to learn about startup, and/or handling abnormal shutdown.

Chapter 7 tells how to run Disk Jockey with nonsystem LDUs. Chapter 8 explains how to install AOS/VS II updates shipped periodically from DG.

For reference on various programs — for example, EXEC, backup, or security — you might want to check *Managing AOS/VS and AOS/VS II.* Table 1–1 (in Chapter 1 of the manual you're reading) serves as a general directory to system management task topics.

Depending on your interest, go to the appropriate chapter, different manual, or check the index for a specific topic or product.

End of Chapter

Chapter 6
Startup and Shutdown

Read this chapter

- When you want to start a program like an AOS/VS II system or Disk Jockey.
- When you want to shut an AOS/VS II system down.
- If AOS/VS II hangs or stops with a fatal error or hard error message.
- When power returns after a power failure.

This chapter gives the details on system startup, normal shutdown, and abnormal shutdown. The major sections are

- The SCP and SCP CLI Commands
- Computer Front Panel
- Cold Start, Computer Power Off
- Warm Start, Computer Running — All Computers
- Using the Technical Maintenance Menu
- Microcode File Issues
- Normal Shutdown
- Processor, Controller, or Unit Failures
- Repair Under Power
- The Disk Jockey Disk Polisher
- Power Failures

Some computers let you change hardware startup parameters, like printer port and time-out delay, via an Automatic Program Load Menu. These computers include ECLIPSE MV/40000, MV/20000, MV/18000, MV/15000, MV/7800, MV/2500, MV/1400, MV/1000, and the DG DS/7500. For information on changing automatic program load preset values, see the 014-series "Starting" manuals supplied with your computer.

The SCP and SCP CLI Commands

With AOS/VS II, ECLIPSE MV/Family computers also run a second operating system, called the System Control Program (SCP or SCPOS). On MV/40000, MV/20000, MV/18000, MV/15000, MV/10000, MV/8000, and MV/6000 computers, AOS/VS II and the SCP run concurrently because each runs in a separate processor. When you bring up AOS/VS II, AOS/VS II gets and keeps control of the system console until it is shut down. Then the SCP CLI gets control of the system console.

On the MV/9500, MV/7800, DS/7500, and all MV/4000 and smaller computers, there is only one processor. Either the SCP or AOS/VS II can use it. On a cold start (with computer power off), the SCP uses the processor; you then use the SCP to start AOS/VS II. AOS/VS II gets and keeps control of the processor and system console while it runs. When the CPU is halted (as when AOS/VS II is shut down), the SCP CLI regains control of the processor and system console.

So on all computers but MV/9500s, MV/7800s, DS/7500s, MV/4000s, and smaller ones, you can use the SCP CLI while AOS/VS II is running. On the other systems, you can use the SCP CLI only when AOS/VS II is not running (when it is shut down or frozen).

When the SCP CLI has control, it displays the following prompt on the system console:

SCP-CLI>   (or *SCP-CLI/Jp0>* on some systems)

Next to the prompt, you can type SCP commands to boot an AOS/VS II system or other stand-alone program. The SCP will then load a program that loads your specified program into the main processor's memory. The new program takes control of the processor and system console and starts its own dialog. But the SCP will regain control when the new program terminates.

SCP CLI commands (also called the *soft console*) extend the functions of hardware switches on the computer front panel. Generally, you should use SCP CLI commands only when AOS/VS II is shut down. Most SCP CLI commands change main processor state — so if you use them when AOS/VS II is trying to run the processor, AOS/VS II may fail when it regains control of the processor.

The most common SCP CLI commands appear in Table 6-1. You can abbreviate all SCP commands except RESET to the shortest identifiable string of characters.

Table 6-1 Commonly Used SCP CLI Commands

Command Format	What Command Does	Example
ATTACH *[n]*	For multiprocessor computers only. Tells the SCP to apply future commands to processor *n*; by default SCP commands apply to processor 0. Omit *n* to display the number of the attached processor.	*SCP-CLI/Jp0>* ATT 1 ↵ *SCP-CLI/Jp1>* BOOT 24 ↵
BOOT *[n]*	Program loads from the first device on device code *n*. The program on this device takes control of the system console. Reset the processor before using BOOT.	*SCP-CLI>* RESET ↵ *SCP-CLI>* BOOT 24 ↵
CONFIG *[arg]*	On MV/40000s, displays or modifies the system configuration. Argument DDL sets the default device list (autoboot device).	*SCP-CLI>* CONFIG ↵
CONTINUE *[n]*	Tells the processor to continue running a halted program. Argument *n* specifies processor *n* (on multiprocessor systems). Useful after someone has accidentally typed the break sequence on MV/7800, DS/7500, MV/4000, and smaller systems.	*SCP-CLI>* CONT ↵

(continued)

Table 6-1 Commonly Used SCP CLI Commands

Command Format	What Command Does	Example
FLAGS *[fl]* {*YES*} {*NO* }	Sets or clears an SCP flag. Typed without arguments (*fl*), reports flag status. Some flags are AUTOBOOT and SCOPE. Set AUTOBOOT to Y the first time a system is powered up, to provide automatic load on future powerups. SCOPE tells the SCP to erase characters when you press the DEL key (instead of echoing ^\\). SCOPE is useful on CRT terminals. (AUTOBOOT and SCOPE are not available on all systems.)	*SCP-CLI>* FL AUTO Y⤶
HALT *[n]*	Halts the current processor after it completes the current instruction. With argument *n*, halts processor *n* (multiprocessors only).	*SCP-CLI>* HALT⤶
HELP *[item]*	Gives a general Help message (without *item*) or, depending on computer model, gives help on *item*.	*SCP-CLI>* HE ⤶
RADIX *[x]*	On MV/40000s, displays or changes the default radix used for BOOT and other commands. As argument *x*, you can use O for octal or H for hexadecimal.	*SCP-CLI>* RADIX O⤶
RESET *[n]*	Halts and resets the whole system. With argument *n*, halts and resets processor *n* without resetting I/O. Use RESET before booting or running ESD. You cannot abbreviate this command.	*SCP-CLI>* RESET⤶
START addr	Starts the current processor at address addr. The processor must be halted. This command is useful under unusual circumstances for emergency AOS/VS II shutdown.	*SCP-CLI>* RESET⤶ *SCP-CLI>* START 50⤶
TTY	Gives the main (not SCP) processor control of the system console. (TTY is not available on MV/7800, MV/7500, MV/4000, and smaller systems; use CONTINUE instead.)	*SCP-CLI>* TTY⤶

(concluded)

SCP features are further described in the SCP manual supplied with your computer.

Computer Front Panel

The controls on your computer's front panel affect how — and if — the SCP gets control while AOS/VS II is running.

MV/40000 Front Panel

The MV/40000 front panel is explained in the manual *Starting ECLIPSE MV/40000™-Series Systems.*

MV/20000, MV/18000, and MV/15000 Front Panels

Figure 6–1 shows the front panel on ECLIPSE MV/20000, MV/18000, and MV/15000 computers. From left to right, the panel has sliding power switch, four backlit switches, an unlit switch, three lights, and two digital displays.

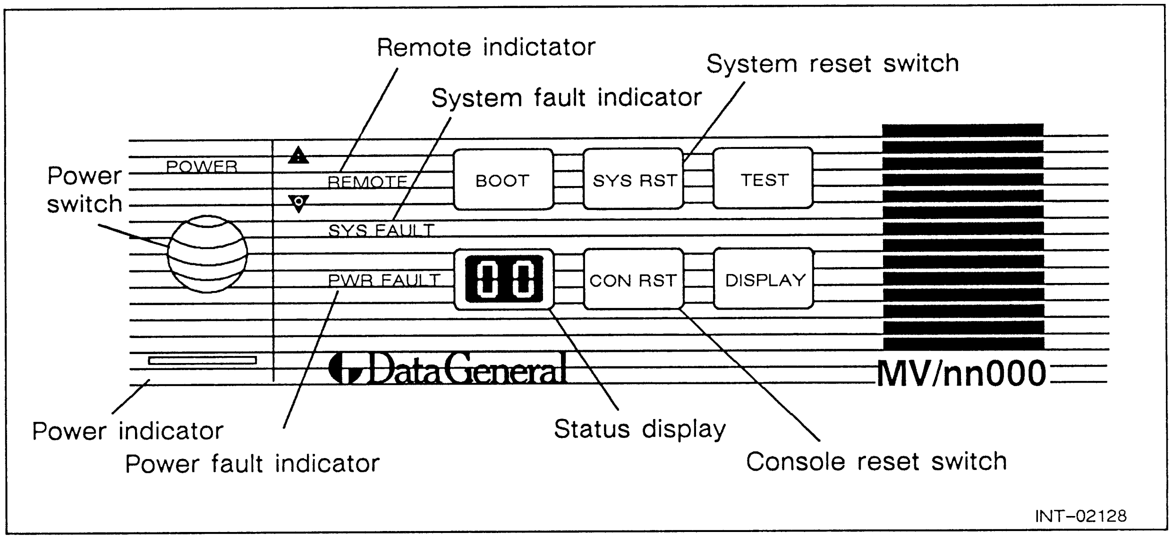


Figure 6–1 MV/20000, MV/18000, or MV/15000 Computer Front Panel

After powerup, it's easy to communicate with the computer via the SCP CLI or a startup menu. The switches and lights work as follows:

- POWER switch — Sliding the switch up (toward I) turns computer power on. Sliding the switch down (toward O) turns power off. *Don't turn power off when AOS/VS II is running.*
- POWER light — This glows when you turn the power switch on.
- REMOTE light — This flashes when there's a remote connection to the computer's diagnostics remote processor (DRP). The DRP, in conjunction with a special communications switch, lets DG engineers call your system via the telephone and run diagnostics.
- BOOT switch — If the processor(s) are halted and this switch is lit, pressing it tells the SCP to program load from the default device code (usually disk). If the processor is running, nothing happens.

- SYS RST switch — If this switch is lit, pressing it resets the computer. When you release the switch, the processor(s) are halted and fault codes are cleared.

  CAUTION: *Don't press this when AOS/VS II is running.*

- TEST switch — If this switch is lit, pressing it tests the switches and digital displays. These will light and show each digit for one second; then the panel will return to normal.

- SYS FAULT light — This flashes after a system (hardware) fault has caused the processor(s) to halt. The digital display shows a fault code.

- PWR FAULT light — This lights if a power fault occurs. The digital display shows a fault code.

- CON RST switch — If this switch is lit, pressing it resets the system console. If the console is locked by the SCP command LOCK, CON RST unlocks it.

  Use CON RST when the system console seems frozen and CTRL–Q doesn't help. AOS/VS II, if running, will continue. Don't use this switch unless you must.

- DISPLAY switch — DISPLAY is really a lock switch: pushing DISPLAY backlights the other touch–sensitive switches and enables them. When you touch an enabled switch, the switch stays lit and other switches go dark. When you release the switch, the other switches light again.

  When AOS/VS II is running, if the other switches are lit, press DISPLAY to disable them.

- Digital display — This lights up and shows a fault code when a processor or power fault occurs. Fault codes are explained in the 014–series "Starting" manual supplied with your computer.

MV/10000 SX, MV/10000, and MV/8000 II Front Panels

MV/10000-series and MV/8000 II computers have five front panel switches — PWR, LOCK, CONSOLE, SYSTEM, and STATUS — and a row of lights. (For MV/9500 systems, see the next section.) The switches work as follows:

- PWR switch — This switch should be at the ON-1 position, unless you want to cut CPU power.

- LOCK switch — In the on position, the LOCK switch disables the SYSTEM RESET switch, the CONSOLE switch, and the break sequence. On early models, LOCK on also disables the PWR off switch. LOCK on enables transfer to the backup battery (if any) if outside power goes down. LOCK on also tells the hardware to program load from the jumper-selected device code (usually the device code of your primary disk) when power is turned on.

  You must turn LOCK OFF to enable the break sequence or bootstrap from a device other than the one selected with jumpers. On early models, you must turn LOCK OFF to turn power off. *Keep LOCK in the on position unless you want to do one of these things.* Pressing LOCK to its current position (for example, pressing it on when it is on) has no effect; so whenever you don't know what position it is in, it does no harm to press it to the desired position.

  If LOCK is off when you turn power on, a microcoded console loader program (*BOOT WHAT DEVICE?* prompt) gets control. Then you can press NEW LINE to bootstrap from the jumper-selected device code as above, or you can type the device code to bootstrap from any device, for example, tape.

- CONSOLE switch — Pressing this switch to RESET on an unlocked computer gives control of the system console to the SCP operating system. AOS/VS II, if running, continues. To return control of the system console to AOS/VS II, type

  TTY)

- SYSTEM switch — If the console loader program (*BOOT WHAT DEVICE?* prompt) has control, pressing SYSTEM BOOT tells the hardware to load from the jumper-selected device code as mentioned above. If the SCP CLI has control, SYSTEM BOOT tells it to display *BOOT WHAT DEVICE?* on the system console; you can then type the desired device code and press NEW LINE. SYSTEM BOOT has no effect if the CPU is running (as when AOS/VS II is running). Pressing SYSTEM RESET (MV/10000-series only) resets the computer, if unlocked.

  CAUTION: *Do not press SYSTEM RESET when AOS/VS II is running.*

- STATUS switch — Pressing the STATUS switch to LAMP TEST tests the condition of the data lights; they should all glow. On an MV/10000-series machine, STATUS at the MONITOR position continuously displays the control store (microcode) memory address.

STATUS in the POWER SYSTEM position gives the power supply status in the rightmost seven lights (9–15 on MV/10000-series, 0–6 on MV/8000 II). *There has been a power supply fault if any of the rightmost seven lights stay on with the STATUS switch at POWER SYSTEM.* This position gives the most useful information. MV/10000-series and MV/8000 II power supply fault codes are described in the SCP manual for the computer.

The lights on the front panel work as follows:

- ON light — This is lit when power is flowing to the computer.
- RUN light — This is lit when the main CPU is executing instructions (running AOS/VS II or diagnostics).
- BATT light — This is lit when the CPU has transferred from normal power to backup battery.
- Data lights — The meaning of these depends on the STATUS switch, as described under the STATUS switch above.

When the computer is running AOS/VS II on normal power, the ON and RUN lights are lit. When the POWER switch is off, all lamps are off. When the system is running normally, you don't need the panel switches. To cut CPU power, press POWER OFF. To power up, press LOCK ON and POWER ON. For a continuous power status display, leave STATUS in the POWER SUPPLY position. Generally, avoid touching the panel switches unless you must force a shutdown.

MV/8000 C Panel Switches and Lights

MV/8000 C computers have three front panel rocker switches: LOCK, PR LOAD/RESET, and POWER. The *cabinet* power switch, above these, must be set ON to provide cabinet power; we suggest that you leave the cabinet switch ON and use the computer switches to control power. The front panel has three lights that indicate faults by blinking; fault codes are described in the *ECLIPSE MV/8000® II and ECLIPSE MV/8000® C System Control Processor Operator's Reference.*

The *panel* switches work as follows.

- LOCK switch — In the on position, the LOCK switch disables the PR LOAD/RESET switch and the break sequence. LOCK in the on position enables transfer to the backup battery (if any) if outside power goes down. LOCK on also tells the hardware to program load from the jumper-selected device code (24, 27, or 33) when power is turned on. You must turn LOCK off to enable the break sequence, or to bootstrap from a device other than the one selected with jumpers. *Keep LOCK in the on position unless you want to do one of these things.* (LOCK does not disable either the local or cabinet power switches on MV/8000 C machines.)

If LOCK is off when you turn power on, a microcoded console loader program (*BOOT DEVICE?* prompt) gets control. Then you can press NEW LINE to bootstrap from the jumper-selected device code, or you can type the device code to bootstrap from any device, for example, tape.

- PR LOAD/RESET switch — If the console loader program *(BOOT DEVICE)* has control, pressing PR LOAD tells the hardware to load from the jumper-selected device code. If the SCP CLI has control, PR LOAD tells it to display *BOOT DEVICE?* on the system console, you can then type the desired device code and press NEW LINE. PR LOAD has no effect if the CPU is running (as when AOS/VS II is running). Pressing RESET resets the computer, if unlocked.

  CAUTION: *Do not press RESET when AOS/VS II is running.*

- POWER switch — This switch should be at the ON–1 position, unless you want to cut CPU power.

The lights on the MV/8000 C panel work as follows:

- PWR light — This is lit when dc power is normal; it is off when power is off or the computer is under partial battery backup.
- BATT light — This is lit when computer has transferred from normal power to backup battery (full or partial backup).
- RUN light — This is lit when the computer is executing instructions (AOS/VS II or diagnostics); it is off when the computer is halted.

When the computer is running AOS/VS II on normal line power, the PWR and RUN lamps are lit. When the POWER switch is off, all lamps are off. When one or more lights *blink,* this indicates a power supply fault. MV/8000 C power supply fault codes are described in the SCP manual.

In the normal course of system operations, you don't need any panel switches. To cut CPU power, press the local CPU rocker switch POWER off. To power up, press rocker switch POWER on. Otherwise, avoid touching the switches unless you must force a shutdown.

MV/8000 Panel Switches

MV/8000 computers have one light (on when power is on) and two front panel switches: RESET and POWER. The switches work as follows:

- RESET switch — Pressing the RESET switch to SYSTEM resets the CPU. *Don't do it if AOS/VS II is running.* Pressing this to CONSOLE has the same effect as a break sequence. Avoid pressing it to CONSOLE unless you must (as for an AOS/VS II deadlock).
- POWER switch — This switch should be on, unless you want to cut CPU power.

In the normal course of system operations, you don't need any panel switches. To cut CPU power, press LOCK OFF and POWER off. To power up, press POWER on. Otherwise, avoid touching the switches unless you must force a shutdown.

MV/9500, MV/7800, MV/7800 C, and MV/7800 XP Front Panels

MV/9500, MV/7800, MV7800 C, and MV/7800 XP computers have four front panel rocker switches: LOCK, CONSOLE, SYSTEM, and POWER. Some systems also have a cabinet power switch above these. The cabinet power switch, if there is one, must be set on to provide cabinet power. We suggest that you leave this switch on and use the computer switches to control power.

The panel switches work as follows:

- LOCK switch — In the on position, the LOCK switch disables the CONSOLE and SYSTEM switches. It doesn't disable the POWER switch. Generally, keep LOCK in the on position.

- CONSOLE switch — Pressing this switch to RST (possible only if LOCK is off) on an unlocked computer halts the CPU and gives control to the SCP operating system. AOS/VS II, if running, freezes. To have AOS/VS II continue, type CONTINUE↵. Avoid using this switch unless you really need the SCP CLI.

- SYSTEM switch — This switch is disabled if LOCK is on. Pressing SYSTEM BOOT, if the computer is halted, displays the Automatic Program Load menu. If the computer is running (AOS/VS II or diagnostics), pressing SYSTEM to BOOT does nothing.

  Pressing SYSTEM to RST resets the computer, if unlocked.

  CAUTION: *Do not press SYSTEM RST when AOS/VS II is running.*

- POWER switch — This switch should be at the on (I) position, unless you want to cut CPU power. *Don't turn power off is AOS/VS II is running.*

The lights on the front panel work as follows:

- PWR light — This is lit when dc power is normal; it is off when power is off or the computer is under partial battery backup.

- BATT light — This is lit when the computer has transferred from normal power to backup battery (full or partial backup).

- RUN light — This is lit when the computer is executing instructions (AOS/VS II or diagnostics); it is off when the computer is halted.

When the computer is running AOS/VS II on normal power, the PWR and RUN lamps are lit. When the POWER switch is OFF, all lamps are off. When one or more lights *blink,* this indicates a power supply fault. Power supply fault codes are described in the pertinent 014-series "Starting" manual for your computer.

In the normal course of system operations, you don't need any panel switches. Leave LOCK ON. To cut CPU power, press POWER to OFF. To power up, press POWER to ON. Otherwise, avoid touching the switches unless you must force a shutdown.

DS/7500, MV/2500 DC, MV/2000 DC, and MV/1400 DC Front Panels

This section applies to DS/7500, MV/2500 DC, MV/2000 DC and MV/1400 DC systems.

These systems have an on/off button switch for power. A light within the button glows when power is on. The power switch controls power to the computer and all devices in the cabinet, including disk, diskette, and/or tape units.

Note that all peripheral devices with separate switches (like tape units and printers) must be turned on before computer power is turned on. Unless you do this, you won't be able to use the device.

On powerup, diagnostics test every controller in the system; the test messages, followed by *PASSED* messages, appear on the system console. If a fault occurs on powerup, the system console will indicate an error condition (fault code or partial powerup test message). To interpret the error indicator, consult the 014–series "Starting" or "Installing" manual supplied with the computer.

In the normal course of system operations, you don't need the power switch. To cut CPU power after shutdown, press the power switch to the O (off) position. To power up, press the switch to the I (on) position. *Otherwise, avoid touching the power switch.*

MV/6000 Front Panel

MV/6000 computers have three front panel switches: LOCK, PR LOAD/RESET, and POWER. The switches work as follows:

- LOCK switch — In the LOCK position, the LOCK switch disables the PR LOAD/RESET switch and POWER off switch. LOCK also tells the hardware to program load from the jumper–selected device code (often 27) when power is turned on. You must unlock LOCK to turn power off or to bootstrap from a device code other than the one selected with jumpers; *but we recommend that you keep the computer locked otherwise.*

- PR LOAD/RESET switch — Pressing this switch to RESET resets the computer if it is unlocked; *do not do this if AOS/VS II is running.*

- POWER switch — This switch should be on, unless you want to cut CPU power.

When the computer is running AOS/VS II on normal power, the PWR and RUN lamps are lit. When the POWER switch is off, all lamps are off.

In the normal course of system operations, you don't need any panel switches. To cut CPU power, press LOCK off and POWER off. To power up, press LOCK and POWER on. Otherwise, avoid touching the switches unless you must force a shutdown.

MV/4000 Front Panel

MV/4000 computers have four front panel rocker switches: LOCK, CONSOLE, SYSTEM, and POWER. The *cabinet* power switch, above these, must be on to provide cabinet power; we suggest that you leave this switch on and use device switches to control power. The *panel* switches work as follows.

- LOCK switch — In the on position, the LOCK switch disables the SYSTEM RST switch, the CONSOLE switch, the POWER off switch, and the break sequence. LOCK on enables transfer to the backup battery (if any) if outside power goes down. LOCK in the on also tells the hardware to program load from the jumper–selected device code (27 or 33) when power is turned on. You must turn LOCK off to turn power off with the rocker switch, enable the break sequence, or bootstrap from a device other than the one selected with jumpers. *Keep LOCK in the on position unless you want to do one of these things.* (LOCK does not disable the cabinet power switch.)

  If LOCK is off when you turn power on, a microcoded console loader program (@ prompt) gets control. You must type L to bootstrap from the jumper–selected device code (or type the device code followed by L (form nnL) — to bootstrap from any device, for example, tape.

- CONSOLE switch — Pressing this switch to RST on an unlocked computer halts the CPU and gives control to the SCP operating system. AOS/VS II, if running, freezes. To have AOS/VS II continue, type CONTINUE⤶. Avoid using this switch unless you really need the SCP CLI.

- SYSTEM switch — If the console loader program (@ prompt) has control, pressing SYSTEM BOOT tells the hardware to load from the jumper–selected device code. If the SCP CLI has control, SYSTEM BOOT tells the hardware to display *BOOT DEVICE?* on the system console; you can then type the desired device code and press NEW LINE. SYSTEM BOOT has no effect if the CPU is running (as when AOS/VS II is running). Pressing SYSTEM to RST resets the computer, if unlocked — *don't do this if AOS/VS II is running.*

- POWER switch — This switch should be at the on (I) position, unless you want to cut CPU power.

When the computer is running AOS/VS II on normal power, the PWR and RUN lamps are lit. When the POWER switch is off, all lamps are off. When one or more lights *blink,* there is a power supply fault. MV/4000 power supply fault codes are described in the manual *Data General 4000–Class System Control Programs Operator's Reference.*

In the normal course of system operations, you don't need any panel switches. To cut CPU power, press LOCK off and rocker switch POWER off. To power up, press LOCK on and rocker switch POWER on. Otherwise, avoid touching the switches unless you must force a shutdown.

MV/4000 DC, MV/4000 SC and Data General DS/4000-Series Front Panels

MV/4000 DC, MV/4000 SC, and Data General DS/4000-series front panels have two switches: PWR and RESET.

The panel switches work as follows:

- PWR switch — The power switch controls power to the computer and all devices in the cabinet, including disk and diskette units. When you turn power on, the action depends on the setting of a DIP switch on the multifunction I/O controller (MIOC) PC board. This DIP switch can be set to a device code (usually done by a DG engineer when the system is installed). If the DIP switch is set to a device code, the computer tries to program load from this device on powerup. The device code is usually that of the disk, 24. If the DIP switch is *not* set to a device code, the computer runs the console loader program, which displays an @ prompt. You must then type the desired device code and L; for example, 24L to load from disk, or 22L to load from tape.

- RESET switch — Pressing this switch resets the computer. *Do not do it if AOS/VS II is running.*

In the normal course of system operations, you don't need any panel switches. To cut CPU power *after shutdown,* press PWR off. To power up, press PWR on. Otherwise, avoid touching the switches.

MV/2500 DC, MV/2000 DC, MV/1400 DC, and MV/1000 DC Front Panels

The MV/2500, DC, MV/2000 DC, and MV/1400 DC front panels are described earlier, in "DS/7500, MV/2500 DC, MV/2000 DC, and MV/1400 DC Front Panels." The MV/1000 front panel — along with the other front panels — is explained in the manual *Starting Your ECLIPSE MV/1400™ DC, MV/2000™ DC, or ECLIPSE MV/2500™ Computer System.*

Cold Start, Computer Power Off

A cold start includes turning power on (if off), starting an AOS/VS II operating system or other stand-alone program, and bringing up the multiuser environment. It assumes that AOS/VS II was shut down normally (not by a fatal error or power failure). If abnormal shutdown occurred, see "Abnormal Shutdown," later in this chapter.

From a cold start (computer power turned off), startup differs for different computer models. Startup is easier from a warm start, in which computer power has remained on — because the SCP OS and microcode need not be loaded. (These are in volatile memory and vanish when power is cut.)

This section explains cold start steps; see the portion that applies to your computer. Warm start for all computers follows this section.

Cold Start, Computer Power Off, MV/40000-Series Computers

Cold start on a MV/40000 or MV/40000 HA whose system disk is on an ECLIPSE bus is similar to cold start on MV/20000 systems, described next. If the system disk is on an MRC bus, the Automatic Program Load Menu displays node and unit information, but automatic startup proceeds as for the MV/20000. For any MV/40000 computer, you can view or change default boot devices via the Automatic Program Load Menu, as described in *Starting ECLIPSE MV/40000™ Series Systems.*

Cold Start, Computer Power Off, MV/20000, MV/18000, and MV/15000 Computers

1. Make sure the system console is on and on line. Make sure that the disk(s) you want to use are on, started (for removable disks), and write enabled. Each unit's READY light must be lit.

2. Turn the computer POWER switch ON. The POWER light should glow.

3. Now EPROM code in the SCP does some powerup tests. When these succeed, the system console displays

   ** *POWER UP TESTING COMPLETED* **

   If this entire message doesn't appear, try again. Slide the POWER switch to off, and then to on. If you get the message ** *POWER UP TESTING – FAILED – xx–yy–zz,* check the fault code(s) *xx–yy–zz* in the 014–series "Starting" manual for your computer.

   Next, only if your system configuration has changed since the last time you brought it up, you may see the message *Configuration changed from previous power–up*, followed by a list of the current configuration.

   Then the code in EPROM displays the Automatic Program Load Menu:

   Automatic Program Load Menu   *date time*

   1 Continue immediately with automatic load
   2 Change preset values
   ...
   The default device is n
   ...
   Enter choice [1]:

4. The default choice (1) has the hardware continue with AOS/VS II startup, using preset values for the startup device. You can change a preset value by typing 2 and pressing NEW LINE, and then working from another menu (described in the 014-series "Starting" manual for your computer. To start from a device other than the one specified by code *n*, you must select choice 3 or 2. For example, to start from tape you must type 3 and press NEW LINE, and then specify the tape information (default device code for an ECLIPSE tape is 22 or 62, or for an MRC tape, it is 116, and then 0,0A).

   Generally, you'll want to start from the default device, *n*. To do so, press NEW LINE or wait out the time-out delay (original default is 45 seconds). The bootstrap program displays

Operating System Load Menu

1. Continue immediately with operating system load
2. Enter the Technical Maintenance Menu
3. Load and verify microcode
4. Run diagnostics (appears only if a diagnostics area is reserved on the disk)
. . .
Enter choice [1]:

5. From the Operating System Load Menu, you'll generally want the default, 1, "Continue immediately with operating system load." If so, take the default. On a CRT, press NEW LINE; on a hardcopy terminal, press CTRL–A and then NEW LINE. Or you can outwait the time–out delay (original default is 45 seconds).

   To enter the Technical Maintenance Menu, perhaps to change the default operating system, type 2↵. Details on the Technical Maintenance Menu appear later in "Using the Technical Maintenance Menu." To load microcode from a nondefault system area, select choice 3; the program will display a menu from which you can choose an area. To run ADEX diagnostics, select choice 4 (if displayed).

   After you press NEW LINE (or outwait the delay), an AOS/VS II bootstrap program loads microcode from the default microcode system area. This may take up to a minute. Then the bootstrap program loads AOS/VS II. You'll see messages about microcode and microcode loading, followed by a pause, and then

   Loading file
   xxx (*xxx* is the default operating system pathname.)

   AOS/VS II Release n

   Override default specs ? [N]

   Skip to the section "Warm Start, Computer Running — All Computers," step 9.

Cold Start, CPU Power Off, MV/10000-Series, MV/8000 II, and MV/8000 C Computers

1. Make sure the system console is on and on line. Make sure that the disk(s) you want to use are on, started (for removable disks), and write enabled. Each unit's READY light must be lit.

2. Press the CPU LOCK switch to on unless you want to cold start from magnetic tape or any other nondefault device.

3. Turn the CPU POWER switch to on. The POWER lamp should light.

4. Now EPROM code in the SCP does some power-up tests. When these succeed, the system console displays

   POWER UP TESTING COMPLETED

   If this entire message doesn't appear, try again: Push the LOCK switch to off, turn the power off, push the LOCK switch to on, and turn power on. If the message appears, skip to step 5.

   On MV/10000s only: If nothing happens, the computer hasn't been able to load from disk. You must load microcode from the SCP system tape.

   Turn power off and and press the LOCK switch on. Then turn power on again. The computer displays *BOOT WHAT DEVICE? (CHANNEL AND DEVICE CODE)*. Find the tape labeled SCP SYSTEM MEDIA; mount it on unit 0 of the first tape controller. Then type the following sequence of commands:

22 ↵	(Type the device code of the tape unit — 22 or 62 — followed by NEW LINE.)
NOVA INSTR OK	
...	
**** ADEX MENU ****	
1. Load and start the default system	
2. Load and verify microcode	
...	
Enter Choice: 2 ↵	(Select choice 2.)
Specify microcode to load [MVn]: ↵	(Take default.)
...	(It displays load messages.)
MV/n MICROCODE REV n INSTALLED	
**** ADEX MENU ****	
1. Load and start the default system	
2. Load and verify microcode	
3. Return to SCP-CLI.	
...	
Enter Choice: 3	(Select choice 3 to display the SCP prompt.)
SCP-CLI> BOOT 27↵	(Type BOOT, followed by the device code of your system disk unit — usually 27 or 24 — and press NEW LINE.)

   Continue to step 5.

5. The SCP reads the startup device and loads an AOS/VS II bootstrap program. The bootstrap program displays

Operating System Load Menu

1. Continue immediately with operating system load
2. Enter the Technical Maintenance Menu
3. Load and verify microcode
4. Run diagnostics (appears only if a diagnostics area is reserved on the disk)
. . .
Enter choice [1]:

If you turn power on when the LOCK switch is unlocked, it does not display a menu. Instead, an MV/10000-series computer displays *BOOT WHAT DEVICE? (CHANNEL AND DEVICE CODE)*. An MV/8000 II or MV/8000 C displays *BOOT DEVICE?* On either machine, type the device code of the device you want to boot from; for example, 22⮐ for tape or 27⮐ for a DPF-type disk. The first blocks on the device must contain the appropriate bootstrap — tape or disk. The device must contain the SCP OS and needed microcode; and it must include a program to load SCP OS and microcode. All these conditions are true for the SCP SYSTEM MEDIA tape you received from DG and for your master LDU. However, some MV/10000 computers can load microcode only from tape — not disk — on a cold start. If there is no response after you specify the disk device code, follow the instructions given under step 4.

6. From the Operating System Load Menu, you'll generally want the default, 1, "Continue immediately with operating system load." If so, take the default. On a CRT, press NEW LINE; on a hardcopy terminal, press CTRL-A and then NEW LINE. Or you can outwait the time-out delay (original default is 45 seconds).

To enter the Technical Maintenance Menu, perhaps to change the default operating system, type 2⮐. The system will then ask date and time questions and display the Technical Maintenance Menu. Details on using this menu appear later in "Using the Technical Maintenance Menu." To load microcode from a nondefault system area, select choice 3; the program will display a menu from which you can choose an area. To run ADEX diagnostics, select choice 4 (if displayed).

After you press NEW LINE (or outwait the delay), an AOS/VS II bootstrap program loads microcode from the default microcode system area. This may take up to a minute. Then the bootstrap program loads AOS/VS II. You'll see messages about microcode and microcode loading, followed by a pause, and then

Loading file
xxx (*xxx* is the default operating system pathname.)

AOS/VS II Release n

Override default specs ? [N]

Skip to the section "Warm Start, Computer Running — All Computers," step 6.

Cold Start, Computer Power Off, MV/9500 and MV/7800-Series Computers

This section describes startup for MV/9500, MV/7800, MV/7800 C, and MV/7800 XP computers.

1. Make sure the system console is on and on line.

Make sure that the disk(s) you want to use are on, started (for removable disks), and write enabled. Each unit's READY light must be lit.

2. Turn the computer power switch to the on position (push POWER to on, or push PWR to the position marked O). The POWER light should glow.

3. Now EPROM code in the SCP does some powerup tests. When these succeed, the system console displays

*** POWER UP TESTING COMPLETED ***

(If this entire message doesn't appear, try again. Slide the POWER switch to off, and then to on. If you get the message

*** POWER UP TESTING - FAILED - xx-yy-zz*

Check the fault code(s) *xx-yy-zz* in the 014-series "Starting" manual for your computer.

After the hardware passes the power-up tests, code in EPROM displays the Automatic Program Load Menu:

date time

Automatic Program Load Menu

1. Continue immediately with preset values
2. Change preset values
. . .
The default device is n
. . .
Enter choice [1]:

4. The default choice (1) has the hardware continue with AOS/VS II startup, using preset values for startup device, date, time, and time-out delay. You can change a preset value by typing 2↵, and then working from another menu (described in the 014-series "Starting" manual for your computer). If you want to start from a device other than the one specified by code *n* — for example, to start from tape (default device code 22 or 62) — you must type 2↵ and select choice 3 "Start from a different device."

Generally, you'll want to start from the default device, *dd*. To do so, press NEW LINE or wait out the time-out delay (original default is 45 seconds). The hardware reads the default startup device and loads the disk bootstrap, which in turns loads an AOS/VS II bootstrap program. This bootstrap program displays the Operating System Load Menu:

Operating System Load Menu

1. Continue immediately with operating system load
2. Enter the Technical Maintenance Menu
3. Load and verify microcode
4. Run diagnostics (appears only if a diagnostics area is reserved on the disk)
. . .
Enter choice [1]:

8. From the Operating System Load Menu, you'll generally want the default choice, 1, which is "Continue immediately with operating system load." If so, press NEW LINE or outwait the time-out delay (default is 45 seconds).

To enter the Technical Maintenance Menu, perhaps to change the default operating system, type 2) .The system will then ask date and time questions and display the Technical Maintenance Menu. Details on using this menu appear later in "Using the Technical Maintenance Menu." To load microcode from a nondefault system area, select choice 3; the program will display a menu from which you can choose an area. To run ADEX diagnostics, select choice 4 (if displayed).

After you press NEW LINE (or outwait the delay), an AOS/VS II bootstrap program loads microcode from the default microcode system area. This may take up to a minute. Then the bootstrap program loads AOS/VS II. You'll see messages about microcode and microcode loading, followed by a pause, and then

Loading file
xxx (*xxx* is the default operating system pathname.)

AOS/VS II Release n

Override default specs ? [N]

Skip to the section "Warm Start, Computer Running — All Computers," step 6.

Cold Start, Computer Power Off, MV/8000 Computers

1. Make sure the system console is on and on line. Make sure that the disk(s) you want to use are on, started (for removable disks), and write enabled. Each unit's READY light must be lit.

2. Make sure that the SCP/microcode diskette is correctly inserted in its unit slot and that the diskette door is latched.

3. Turn the CPU POWER switch on. The POWER lamp should light.

4. Now EPROM code does some power-up tests. When these succeed, the system console displays

   CONSOLE READY

   MV/8000 SYSTEM CONTROL PROGRAM

   . . .

   ENTER DATE (MO DAY YEAR)

   (If one or more power-up tests fail, the system console will show a partial or no ***CONSOLE READY*** message and the SCP octal debugger prompt (!) will appear. Turn power off and on again. If the problem recurs, see the SCP manual for your computer.)

   Type the date in numeric form; for example, for August 30, 1988, type 8 30 88↵.

   TIME (HR MIN SEC)

5. Type the time per a 24-hour clock. For example, for 2:52 p.m., type 14 52↵.

   MICROCODE(1= STD, 2= C350/MMPU[1])?

6. Accept the default microcode by pressing NEW LINE. You'll see loading and microcode messages, and then

   SCP-CLI>

   The SCP and microcode load take a little more than a minute. If you see an error message, make sure the diskette is inserted properly; turn the power off and on again and type the date and time again. If the error recurs, try another SCP/microcode diskette.

7. Reset; then boot from the device code of your master LDU, as follows:

   SCP-CLI> RESET↵
   SCP-CLI> BOOT 27↵

   The SCP reads the startup device and loads the disk bootstrap, which in turn loads an AOS/VS II bootstrap program. The bootstrap program displays the Operating System Load Menu:

Operating System Load Menu

1. Continue immediately with operating system load
2. Enter the Technical Maintenance Menu
3. Load and verify microcode
4. Run diagnostics (appears only if a diagnostics area is reserved on the disk)
. . .
Enter choice [1]:

5. From the Operating System Load Menu, you'll generally want the default choice, 1, which is "Continue immediately with operating system load." If so, press NEW LINE or outwait the time-out delay (default is 45 seconds).

   To enter the Technical Maintenance Menu, perhaps to change the default operating system, type 2↵. Details on the Technical Maintenance Menu appear later in "Using the Technical Maintenance Menu." To load microcode from a nondefault system area, select choice 3; the program will display a menu from which you can choose an area. To run ADEX diagnostics, select choice 4 (if displayed).

   After you press NEW LINE (or outwait the delay), an AOS/VS II bootstrap program loads microcode from the default microcode system area. This may take up to a minute. Then the bootstrap program loads AOS/VS II. You'll see messages about microcode and microcode loading, followed by a pause, and then

   Loading file
   xxx (*xxx* is the default operating system pathname.)

   AOS/VS II Release n

   Override default specs ? [N]

   Skip to the section "Warm Start, Computer Running — All Computers," step 9.

Cold Start, Computer Power Off, DS/7500, MV/2500 DC, MV/2000 DC, MV/1400 DC, and MV/1000 DC Computers

To cold start your DS/7500, MV/2500, MV/2000 DC, MV/1400 DC, or MV/1000 DC computer, do the following:

1. Make sure the system console is on and on line.

2. If you have a tape unit, turn it on now. (With some models, to use the tape unit, you must turn it on before turning computer power on.)

3. Turn computer power on via the switch on the cabinet.

   Now the computer runs power-up tests on each PC board in the computer. On the system console, you'll see *TESTING* messages.

   The power-up tests take a minute or so. (If the system fails to complete a message after 15 seconds or so, turn computer power off and on. If the problem recurs, there is a hardware fault condition. Consult your 014-series "Starting" or "Installing" manual for an explanation of the fault code. Cold starting the MV/1000 is explained in the manual *Starting Your ECLIPSE MV/1400™ DC, MV/2000™ DC, or ECLIPSE MV/2500™ Computer System.*

   After the computer hardware passes the power-up tests, EPROM code in the SCP does some power-up tests. Then it displays the Automatic Program Load Menu:

```
                                          date   time

                  Automatic Program Load Menu

  1  Continue immediately with preset values
  2  Change preset values
     . . .
  The default device is dd
     . . .
  Enter choice [1]:
```

4. The default choice (1) has the hardware continue with AOS/VS II startup, using preset values for startup device, date, time, and time-out delay. You can change a preset value by typing 2↵, and then working from another menu (described in the 014-series "Starting" manual for your computer). If you want to start from a device other than the one specified by code *n* — for example, to start from tape (default device code 23 or 22) — you must type 2↵ and select choice 3, "Start from a different device."

   Generally, you'll want to start from the default device, *dd*. To do so, press NEW LINE or wait out the time-out delay (original default 45 seconds). The hardware reads the default startup device and loads the disk bootstrap, which in turns loads an AOS/VS II bootstrap program. This bootstrap program displays the Operating System Load Menu:

Operating System Load Menu

1. Continue immediately with operating system load
2. Enter the Technical Maintenance Menu
3. Load and verify microcode
4. Run diagnostics (appears only if a diagnostics area is reserved on the disk)
. . .
Enter choice [1]:

5. From the Operating System Load Menu, you'll generally want the default choice, 1, which is "Continue immediately with operating system load." If so, press NEW LINE or outwait the time-out delay (default is 45 seconds).

   To enter the Technical Maintenance Menu, perhaps to change the default operating system, type 2↵. Details on the Technical Maintenance Menu appear later in "Using the Technical Maintenance Menu." To load microcode from a nondefault system area, select choice 3; the program will display a menu from which you can choose an area. To run ADEX diagnostics, select choice 4 (if displayed).

   After you press NEW LINE (or outwait the delay), an AOS/VS II bootstrap program loads microcode from the default microcode system area. This may take up to a minute. Then the bootstrap program loads AOS/VS II. You'll see messages about microcode and microcode loading, followed by a pause, and then

   Loading file
   xxx (*xxx* is the default operating system pathname.)

   AOS/VS II Release n

   Override default specs ? [N]

   Skip to the section "Warm Start, Computer Running — All Computers," step 9.

Cold Start, Computer Power Off, MV/6000 Computers

1. Make sure the system console is on and on line. Make sure that the disk(s) you want to use are on, started (for removable disks), and write enabled. Each unit's READY light must be lit.

2. Press the CPU LOCK switch to LOCK unless you want to cold start from magnetic tape. LOCK is a two-position rocker switch; you can see whether it's in the lock or unlock position.

3. Turn the CPU POWER switch to on. The POWER lamp should light.

4. Now EPROM code in the SCP does some power-up tests. When these succeed, the system console displays

   POWER UP TESTING COMPLETED

   (If this entire message doesn't appear, try again: LOCK switch to unlock position, power switch to off, LOCK switch to LOCK, power to on.)

   The SCP reads from the startup device and loads the disk bootstrap, which in turns loads an AOS/VS II bootstrap program. This bootstrap program displays the Operating System Load Menu:

   Operating System Load Menu

   1. Continue immediately with operating system load
   2. Enter the Technical Maintenance Menu
   3. Load and verify microcode
   4. Run diagnostics (appears only if a diagnostics area is reserved on the disk)
   . . .
   Enter choice [1]:

5. From the Operating System Load Menu, you'll generally want the default choice, 1, which is "Continue immediately with operating system load." If so, press NEW LINE or outwait the time-out delay (default is 45 seconds).

   To enter the Technical Maintenance Menu, perhaps to change the default operating system, type 2↓. The program will then ask date and time questions and display the Technical Maintenance menu. Details on using this menu appear later in "Using the Technical Maintenance Menu." To load microcode from a nondefault system area, select choice 3; the program will display a menu from which you can choose an area. To run ADEX diagnostics, select choice 4 (if displayed).

After you press NEW LINE (or outwait the delay), an AOS/VS II bootstrap program loads microcode from the default microcode system area. This may take up to a minute. Then the bootstrap program loads AOS/VS II. You'll see microcode loading messages, followed by a pause, and then

Loading file
xxx (*xxx* is the default operating system pathname.)

AOS/VS II Release n

Override default specs [N]?

Skip to the section "Warm Start, Computer Running — All Computers," step 6.

Cold Start, Computer Power Off, MV/4000 Computers

1. Make sure the system console is on and on line. Make sure that the disk(s) you want to use are on, started (for removable disks), and write enabled. Each unit's READY light must be lit.

2. If the CPU cabinet power switch is off, press it to on. Then press the LOCK switch to ON (unless you want to cold start from magnetic tape). LOCK is a two-position rocker switch; you can see whether it's at off or on.

3. Press the POWER rocker switch to ON. The POWER lamp should light.

4. Now the computer does some power-up tests. When these succeed, the system console displays

   MV4000 READY

   (If this entire message doesn't appear, try again: LOCK switch to off, power off, LOCK switch to on, power on. If this doesn't help, consult the *Data General 4000-Class System Control Programs Operator's Reference* manual, fault conditions self test table.)

   The SCP reads from the startup device and loads an AOS/VS II bootstrap program. This bootstrap program displays the Operating System Load Menu:

   Operating System Load Menu

   1. Continue immediately with operating system load
   2. Enter the Technical Maintenance Menu
   3. Load and verify microcode
   4. Run diagnostics (appears only if a diagnostics area is reserved on the disk)
   . . .
   Enter choice [1]:

   (If you turn power on when the LOCK switch is off, no menu is displayed. Instead, the loader program prints a commercial "at" sign, @. You must manually load by typing the desired two-digit device code, followed by L; for example 22L for tape. The first blocks on the device must contain the appropriate bootstrap — tape or disk. The device must contain the SCP OS and needed microcode, and it must include a program to load SCP OS and microcode. All these conditions apply to the MV/4000 system tape you received from DG and for your master LDU.)

5. From the Operating System Load Menu, you'll generally want the default choice, 1, which is "Continue immediately with operating system load." If so, press NEW LINE or outwait the time-out delay (default is 45 seconds).

To enter the Technical Maintenance Menu, perhaps to change the default operating system, type 2⮐ . The system will then ask date and time questions and display the Technical Maintenance Menu. Details on using this menu appear later in "Using the Technical Maintenance Menu." To load microcode from a nondefault system area, select choice 3; the program will display a menu from which you can choose an area. To run ADEX diagnostics, select choice 4 (if displayed).

After you press NEW LINE (or outwait the delay), an AOS/VS II bootstrap program loads microcode from the default microcode system area. This may take up to a minute. Then the bootstrap program loads AOS/VS II. You'll see microcode loading messages, followed by a pause, and then

Loading file
xxx (*xxx* is the default operating system pathname.)

AOS/VS Rev n

Override default specs [N]?

Skip to the section "Warm Start, Computer Running — All Computers," step 9.

Cold Start, Computer Power Off, MV/4000 DC, MV/4000 SC and Data General DS/4000-Series Computers

To cold start your MV/4000 DC, MV/4000 SC, or Data General DS/4000-series computer, do the following:

1. Make sure the system console is on and on line.

2. If you have a cartridge tape unit, turn it on now, by moving its switch to ON-1. (To use the tape unit, you must turn it on before turning computer power on.)

3. Turn computer power on via the switch on the cabinet.

4. Now the computer does some power-up tests. When these succeed, the system console displays

   MV4000 READY
   ... (test message about IOC board) ...

   (If these messages don't appear, try again: turn power off and on. If this doesn't help, consult the *Data General 4000-Class System Control Programs Operator's Reference* manual, fault conditions self test tables.)

   The message that follows these depends on the setting of a switch in the computer (specifically, a DIP switch on the MIOC PC board).

5. If the DIP switch is set to the disk device code, a loader program reads an AOS/VS II bootstrap program from the disk. This bootstrap program displays the Operating System Load Menu:

   Operating System Load Menu

   1. Continue immediately with operating system load
   2. Enter the Technical Maintenance Menu
   3. Load and verify microcode
   4. Run diagnostics (appears only if a diagnostics area is reserved on the disk)
   . . .
   Enter choice [1]:

   If this menu appears, you can proceed to bring up any disk-based software. To do so, skip to step 7.

6. To start from tape or diskette (perhaps to install a new system), type the break sequence (press CMD, hold it down, and press the BREAK/ESC key) to get the @ prompt. Then continue to the next paragraph.

If the DIP switch isn't set to the disk device code, or if you typed the break sequence, the system console displays a commercial "at" sign, @. You must manually load by typing the desired two-digit device code, followed by L. The device code of the disk is 24, the diskette is 64, and the tape unit (if you have one) is 22. For example, to load from diskette, you'd type 64L. The device you specify must contain the appropriate bootstrap (tape or disk). The device must also contain needed microcode and the SCP OS, and it must include a program to load SCP OS and microcode. All these conditions apply to the MV/4000 system tape or first system diskette you received from DG, and for your master LDU.

7. From the Operating System Load Menu, you'll generally want the default choice, 1, which is "Continue immediately with operating system load." If so, press NEW LINE or outwait the time-out delay (default is 45 seconds).

   To enter the Technical Maintenance Menu, perhaps to change the default operating system, type 2↵. The system will then ask date and time questions and display the Technical Maintenance Menu. Details on using this menu appear later in "Using the Technical Maintenance Menu." To load microcode from a system area, select choice 3; the program will display a menu from which you can choose an area. To run ADEX diagnostics, select choice 4 (if displayed).

   After you press NEW LINE (or outwait the delay), an AOS/VS II bootstrap program loads microcode from the default microcode system area. This may take up to a minute. Then the bootstrap program loads AOS/VS II. You'll see microcode loading messages, followed by a pause, and then

   Loading file
   xxx (*xxx* is the default operating system pathname.)

   AOS/VS II Release n

   Override default specs [N]?

   Skip to the section "Warm Start, Computer Running — All Computers," step 6.

Cold Start, Computer Power Off, MV/2500 DC, MV/2000 DC, MV/1400 DC, and MV/1000 DC Computers

See the cold start section on DS/7500, MV/2500 DC, MV/2000 DC, MV/1400 DC, and MV/1000 DC computers.

Warm Start, Computer Running — All Computers

You can *warm start* your system if AOS/VS II was shut down normally and power remained on. After normal shutdown, the SCP gets control and displays the SCP CLI prompt on the system console. These steps assume that the SCP CLI is active on the system console.

1. Make sure all disks are on, write enabled, and ready, with READY lights lit.

2. Make sure that your line printer(s) are on and on line, with paper aligned.

3. Reset the processor:

   SCP-CLI> RESET↵

4. Boot from disk, using the format BOOT n, where n is the correct device code from the following table.

Disk Type	Device Code	MRC Node (Slot) Number
DPJ	24 (octal)	Does not apply
DPF	27 (octal)	Does not apply
DPI	33 (octal)	Does not apply
MRCDISK	116 (octal)	0E (hex)

   For example,

   SCP-CLI> BOOT 24↵ (or, for a disk on an MRC bus, BOOT 116↵)

   If the system disk is on a standard ECLIPSE controller, the system console displays the Operating System Load menu (shown next). If the disk is on an MRC subsystem (you typed BOOT 116), the hardware needs to know what MRC slot the disk controller is in and what the disk unit number is. You see the question

   Enter NODE,UNIT of MRC boot device in hex. [x,y]

   The value of the default, *x,y*, depends on the last default set. Generally, for a 23-slot MRC, the primary disk controller is in node 0E (slot number 0E in hex), and the unit is number 0. So type 0E,0↵. For a 10-slot MRC, the primary disk controller slot depends on the other controllers in the chassis. Type the slot number and unit number (usually 0); for example 5,0 and press NEW LINE.

   After you answer, the system console will ask if you want the new value to be the default. If you're sure your answer was correct, you can respond Yes by typing Y and pressing NEW LINE (since you want the default to be the disk from which you generally boot AOS/VS II).

   The hardware tries to read from the specified device. If you see a *Timeout* message, this means that the system disk is not in the unit you specified. Type the break sequence. Then make sure the disk is on and on line

NOTE: All device codes in this book (including 24, 116, and 27) are shown in octal. The default radix on some MV/40000s is hexadecimal. If, on an MV/40000, you receive no response from the BOOT command with an octal radix, type the break sequence and check the radix with the command RADIX↵. If the radix is H (hexadecimal), type RADIX O↵ and try BOOT again.

The hardware reads an AOS/VS II bootstrap from disk. The bootstrap displays

Operating System Load Menu

1. Continue immediately with operating system load
2. Enter the Technical Maintenance Menu
3. Load and verify microcode
4. Run diagnostics (appears only if a diagnostics area is reserved on the disk)
. . .
Enter choice [1]:

5. From the Operating System Load Menu, you'll generally want the default, which is 1, "Continue immediately with operating system load." If so, take the default. On a CRT, press NEW LINE; on a hardcopy terminal, press CTRL–A and then NEW LINE. Or you can outwait the time–out delay (original default is 45 seconds).

   To enter the Technical Maintenance Menu, perhaps to change the default operating system, type 2↵. Details on the Technical Maintenance Menu appear later in "Using the Technical Maintenance Menu." To load microcode from a system area, select choice 3; the program will display a menu from which you can choose an area. To run ADEX diagnostics, select choice 4 (if displayed).

   After you press NEW LINE or outwait the delay, an AOS/VS II bootstrap program loads the AOS/VS II operating system from disk. There's a pause, and then

   Loading file
   xxx (*xxx* is the default operating system pathname.)

   AOS/VS II Release n

   At this point, AOS/VS II needs to know the date, time, and offset from universal time. If your computer has a battery–powered time–of–day clock (boot clock) and the clock is working, AOS/VS II can get the date and time values from the boot clock; it doesn't ask about the date or time, but does ask *Override default specs?* If it asks *Override default specs*?, skip to step 9.

6. If your computer doesn't have a boot clock, or the clock isn't working (perhaps because the battery is exhausted), AOS/VS II asks

   Date (MM/DD/YY)?

   Specify today's date. Type the date as numbers for month, day, and year. Spaces or slashes can separate numbers. For example, for August 30, 1990, type

   8 30 90↵

Time (HH:MM:SS) ?

7. Type the time, based on a 24-hour clock, in hours, minutes, and seconds. (Minutes and seconds are optional. If you omit them, the system sets each to 00.) Use spaces or colons to separate each number pair. For example, for 2:35 p.m., type

   14 35↵

   Offset from Universal Time [+00:00] ?

8. *Universal Time* is Greenwich Mean Time (GMT). Setting this is useful only if your system will communicate with another computer system in a different time zone. If you specify no offset, files (and documents) created on your system will be sent to other systems using your system's time stamp. This means, for example, that a document sent to Paris from your system at 10:00 a.m. will arrive with the postmark of 10:00 a.m., although it was sent at perhaps 2:00 p.m. Paris time.

   To specify no offset — skip the issue — press NEW LINE. Otherwise, find out the number of hours (and fractions of an hour, if this applies) your time zone is from Greenwich Mean Time. The offset decreases with distance West from Greenwich, England. The pocket-sized "Starting" manual supplied with your computer includes a table with GMT offsets from different places. Then type the number of hours and minutes to add (+ or –) to Greenwich Mean Time.

   For example, in New York City during Eastern Daylight Time, specify

   -4:00↵

   (If you see the message *WARNING: System patch area contains no patches,* continue bringing up AOS/VS II — but *immediately* install the latest AOS/VS II update as described in Chapter 4. Installing patches — which is one of the things the update does — is extremely important. Unless you install the update, your system may crash repeatedly.)

9. *Override default specs? [N]*

   Specs means certain startup specifications set in the AOS/VS II system during VSGEN. These are described in detail in Chapter 4, section "Specifying Host Parameters." Any change you make here will persist only while the AOS/VS II system runs; at shutdown the value will revert to the one specified at VSGEN. The startup parameters you can change here are

   Enable data caching
   Enable simulated data caching:
   Data cache size in megabytes:
   Cache entry size (2,4,8,16,32,64):
   Use cache on root LDU:

   Automatic reboot
   Operator intervention delay (seconds)
   Number of system buffers: [n]
   Swap directory definition [x]
   Page directory definition [x]
   Initial load [n]

These are explained in detail below. If you want to override any default spec, or simply examine the current settings, answer Y⤶; the system will then ask about each one and you can take the default or specify a new value. In most cases, though, you will not want to override the default specs, so you will press NEW LINE:

⤶

Or, instead of pressing NEW LINE, you can outwait the time-out delay for the *Override default specs?* question. If you press NEW LINE or outwait the time-out delay, skip to step 21.

The parameters and their meanings are as follows.

10. *Enable data caching* *x*

The data caching questions were covered in detail in Chapter 4. For your convenience, we will review that material here. There is a little more detail in Chapter 4.

AOS/VS II can reserve a portion of main memory to store disk information, based on the premise that it can find this information in memory and thus avoid disk I/O. The portion of memory reserved for this is called a *data cache* or *cache*. The data cache is independent of swapping and paging operations; however, memory you allot for the cache will not be available for general storage, thus allotting a cache may cause memory contention.

There can be just one data cache per system. You can specify the whether you want a real or simulated cache, the cache size, the size of its entries, and whether you want the root LDU cached, here at startup or at VSGEN. Answering Yes to *Enable data caching* simply enables LDU data caching (but in a later question you can implement caching for the root LDU). For LDUs other than the root, the cache questions just reserve memory for the cache. For LDUs other than the root, caching does not occur unless the LDU(s) involved are initialized with the INITIALIZE switch /CACHE.

The main cost of caching is the memory reserved for the cache. Caching can enhance system performance significantly if you have some free memory and caching will not cause memory contention.

It is difficult to measure the amount of free memory unless you have the optional AOS/VS and AOS/VS II Performance Package. If you have the Performance Package, the Performance Monitor can tell you this figure. An important gauge of cache efficiency is the cache hit ratio. You can determine this by running the LDUINFO utility supplied with AOS/VS II or the Performance Monitor. (LDUINFO is described in *Managing AOS/VS and AOS/VS II*.) Either LDUINFO or the Monitor can tell you the cache hit rate for the cache you specify (or simulate). Broadly speaking, if caching doesn't cause memory contention, a cache hit ratio of 50 percent or more means that the cache is aiding performance.

Whether or not you have the Performance Package, you can experiment with data caching and, by timing your applications, arrive at an efficient size for the cache (or decide to skip a cache because it produces no improvement). Several studies made with DG computers with multiple disks have shown improved performance with caches of 1 through 8 megabytes. Caching can also help if the disk load in your system is unbalanced (say of 10 LDUs, two LDUs bear 80 percent of the load). You can cache those LDUs that are heavily used to help balance the I/O load.

Data caching is transparent to application programs. It may let them run faster or (in worst case, by reducing memory and causing memory contention) slower, but it will not prevent existing applications from running or change their sequence of operations.

If you don't want to enable data caching, make sure the answer is No to this question (*Enable data caching*) and the next question (*Enable simulated data caching*). Then skip to the question *Automatic reboot*.

If you want to try caching, there are several ways to approach it. You can enable caching, boot the new system, and try it (using INITIALIZE/CACHE for the pertinent LDUs), or you can enable simulated caching, which simulates the effect of a cache and is most useful if you plan to add memory but don't know how much to add. Simulated caching has no effect on system performance; it simply lets you check the cache hit ratio via the LDUINFO utility or Performance Monitor. To try simulated caching, answer No to the *Enable data caching* question and Yes to the *Enable simulated data caching* question.

If you decide to try caching (as opposed to simulated caching), you will need to to determine an effective cache size. If you have the Performance Monitor, you can tell how much free memory you have; try some percentage of this. If not, try 1 or 2 megabytes or 10 percent of your total memory, whichever is lower. To select caching, answer Yes to the *Enable data caching* question and No to the *Enable simulated data caching* question.

After you answer *Enable data caching:*, VSGEN asks

11. *Enable simulated data caching:* *x*

Answer No unless you want simulated data caching (which is most useful when you contemplate acquiring more main memory, as explained above). If you answered Yes to *Enable data caching* above, you must answer No. If your answer to the previous question and this one are both No, skip to the *Automatic reboot* question.

12. *Data cache size in megabytes:* *n*

This value determines the size, in megabytes, of the data cache. The main memory you specify here will be allocated exclusively to the cache; it will not be available for general I/O. You can specify any number from 0.0 through 999.9 (use decimal format as shown). If necessary, the value you specify will be rounded down to an integer number of disk blocks (512 bytes), and then down to an integer number of cache entries (next question).

The best cache size depends on the amount of free main memory in your computer, as mentioned above. Generally, don't specify more than 10 percent of the total amount of main memory in the computer. If you specify more memory than is available, at startup the system will display an *Insufficient memory* message and disable data caching.

For example, you might type

4↵

13. *Cache entry size (2, 4, 8, 16, 32, 64, 128):* *n*

Cache entries are subdivisions within the cache used to store information read from LDUs that were initialized for caching.

This value determines the size, in 512–byte disk blocks, of each cach entry. The number of entries in the cache will be the cache size divided by the entry size you specify here. You can specify any power of 2 between 2 and 128 blocks (2, 4, 8, 16, 32, 64, 128).

The system's use of cache entries is further explained in Chapter 4. A good general purpose answer is 16 blocks (8,192 bytes).

For example, you might type

16↵

14. *Use cache on root LDU:* *x*

This question lets you specify caching on the root LDU (which you could not otherwise do, since you select caching with the INITIALIZE /CACHE switch, and the root LDU is already initialized when the system comes up).

If you answer Yes, the system will use the settings for cache and entry size you specified above.

15. *Automatic reboot [x]*

This specifies whether the AOS/VS II system will try to reboot itself after any shutdown (normal or abnormal). The default, *x*, is the value set at VSGEN (Y or N).

If the value is Y (Yes), after a fatal error AOS/VS II will wait a given number of seconds (specified in the next question), and then run the Emergency Shutdown routine. After any shutdown (normal or abnormal), the system will then wait out the interval and and try to reboot, using the default startup parameters. If the computer has a boot clock to supply date/time information, the AOS/VS II system can restart itself and, if the VSGEN parameter *Initial IPC file for PID 2* is set to UP.CLI, can even bring up the multiuser environment by itself.

Automatic rebooting is useful since it can provide AOS/VS II restart without operator intervention. It is ideal at sites that lack an experienced human operator. After a fatal error, given a few minutes for rebooting, users can continue work (although, depending on what they were doing at the time of failure, they may need to re-enter information). Even if the computer lacks a boot clock, AOS/VS II will proceed to the query *Date (MM/DD/YY)*, which allows someone to reboot AOS/VS II simply by answering date and time questions and taking default values on others.

You might not want automatic rebooting, perhaps because you want to submit a Software Trouble Report to DG and need to do a memory dump — which is useless after the Emergency shutdown routine has run. If you don't want automatic rebooting, make sure the answer is N (No). If the answer to this question is N, the system will skip the next question.

16. *Operator intervention delay (seconds) [30]*

This value determines how long — after a fatal system error — AOS/VS II will wait for operator intervention before it runs the Emergency Shutdown (ESD) routine in preparation for rebooting. If the operator wants to take a memory dump (perhaps to submit an STR), he or she must do so during this delay, since running ESD overwrites essential information in memory. AOS/VS II will also wait this time-delay interval after a normal shutdown before trying to reboot.

Generally, this value should be the shortest time the system operator will need, after learning of a system failure, to reach the system console. (The system will use the same value as the time-out default for the question *Override default specs*. Thus, on systems with boot clocks, users will experience this delay several times before the system restarts — once before it runs ESD, and again after rebooting as it waits at the *Override question*. Note that the default value for this question is always 30, regardless of the value given at VSGEN; if you want a period other than 30 seconds, you must manually type it.

17. *Number of system buffers [n]*

This value specifies the number of 512-byte system buffers for AOS/VS II to use for system I/O. The valid range is 96 through 4096. The original default, set for the AOS/VS II starter system, is 256. Either accept the default value (*n*) set at VSGEN, or type the new value and press NEW LINE.

18. *Swap directory definition [x]*

This value specifies the swap directory — either a size in disk blocks or an LDU name in the form SWAP/disk-unitname, as in SWAP/DPJ10, or BOTH/disk-unitname, as in BOTH/DPJ10.)

If you want to specify and LDU for SWAP or PAGE (or both directories), the LDU must have been created with the LDU filename and LDU unique ID of SWAP, PAGE, or BOTH (for both directories). For an LDU named SWAP or PAGE to work properly, both the filename and unique ID must be SWAP or PAGE.

19. *Page directory definition [x]*

This value specifies the page directory — either a size in disk blocks; or an LDU name, in the form PAGE/disk-unitname or BOTH/disk-unitname, as for Swap.

20. *Initial load [n]*

This prompt lets you load files of a new release of AOS/VS II without using Disk Jockey. If you specify Yes, the system will let you load files from tape.

NOTE: Do not use this question to load an AOS/VS II release or update. You must use Disk Jockey to install an AOS/VS II release or update, as explained in Chapter 8. If you load a release or update via this question, you may not be able to boot the AOS/VS II operating system from disk.

21. A pause occurs here. Depending on your hardware, you may see *Loading...* messages. The time needed varies from 30 seconds or so to — in worst case — ten minutes. In the latter case, you'll see *Loading...* messages. Ultimately, you'll see

AOS/VS II CLI Release n date time
)

The master CLI, process ID (PID) 2, is running.

NOTE: If the date or time is wrong, fix it now, with the DATE or TIME command, before bringing up the multiuser environment. (On computers with boot clocks, the CLI commands DATE and TIME also set the boot clock date and time.) Changing date or time while EXEC is running can confuse EXEC as it tries to keep track of user log-on time. Also, if you run the system log (SYSLOG), changing the time after you start logging may produce wrong account information. For these reasons, you should never change the date or time while the multiuser environment is running. Bring the multiuser environment down first.

It is possible, via VSGEN, to have the master CLI execute a command file automatically when it starts up. A likely candidate for automatic execution is your UP.CLI macro. If the UP macro is executed automatically, then

- You must ensure that the time and date are correct (if asked *Date* and *Time*, take extra care to specify them correctly);
- You can skip the next step (step 22).

22. Bring the multiuser environment up by running your tailored UP macro:

) UP↵

...*(Messages from UP.CLI)*...

AOS/VS II CLI rev n date time

)

23. If the computer front panel has a LOCK switch, make sure it is in the locked position.

EXEC and the multiuser environment are up; users can log on; and you can bring up other processes and/or issue EXEC and CLI commands (described in *Managing AOS/VS and AOS/VS II*).

If you have LDUs other than the system LDU, the UP macro should have initialized them. And if you have a multiple-processor system like an MV/20000 Model 2, your UP macro should have initialized the second processor. Chapter 5 exaplains editing UP.CLI for your system.

Later in the chapter, Figure 6-2 shows the steps taken by all parties to bring the whole system up. Figure 6-3 summarizes cold startup and normal shutdown for computers with boot clocks, and Figure 6-4 does the same for computers without boot clocks.

Using the Technical Maintenance Menu

The Technical Maintenance Menu, where you can perform nonstandard tasks, is accessible from the Operating System Load Menu. The Technical Maintenance Menu lets you

- Load and verify microcode.
- View or change startup parameters (like the default AOS/VS II system pathname).
- Run a stand-alone program other than the default operating system.
- Enter the Disk Jockey Main Menu (to run Disk Polisher or create or change LDUs).

After doing what you want with the Technical Maintenance Menu, you can start AOS/VS II via choice 1 on this menu.

The Operating System Load and Technical Maintenance menus set values in software (unlike the Automatic Program Load and Change Preset Values menus, which set values in hardware).

You can access the Technical Maintenance Menu from the Operating System Load Menu (which is displayed at cold and warm startups). The Operating System Load Menu looks like this:

Operating System Load Menu

1. Continue immediately with operating system load
2. Enter the Technical Maintenance Menu
3. Load and verify microcode
4. Run diagnostics (appears only if a diagnostics area is reserved on the disk)
. . .
Enter choice [1]:

To enter the Technical Maintenance Menu, type 2↵ before the default time-out delay expires. (The default system gets control automatically after the delay expires.)

Depending on your computer, the bootstrap program may display the Technical Maintenance Menu (skip past the next paragraph); or it may ask the date, time, and offset from GMT.

If it asks *Date (MM/DD/YY)?*, type today's date. For example, for August 23, 1990, type 8 23 90↵. To answer *Time (HH:MM:SS)?*, type the time, using a 24-hour clock. For example, for 4:35 p.m., type 16 35↵. To answer the *Offset* question, type 0↵.

The bootstrap program then displays the Technical Maintenance Menu. Depending on your machine and options, the menu may show seven or more choices. All possible choices follow.

Technical Maintenance Menu

1. Load and start the default operating system
2. Load and verify microcode
3. Enter the SCP CLI
4. View or change startup parameters
5. Run diagnostics (appears if the ADEX diagnostic system is installed on disk)
6. Run a specified program
7. Enter the Disk Jockey Main Menu
8. Boot from a different disk unit
9. Size system configuration

Enter choice:

Generally, you'll want choice 4 or 7. Details on each choice follow.

1. Load and start the default operating system.

If you select this choice, the bootstrap program will load the default operating system. This is the default choice.

2. Load and verify microcode.

If you select this choice, the bootstrap program will load and verify microcode from the default microcode system area. On every powerup, the bootstrap automatically loads microcode from the default system area and verifies it. Therefore you don't need to do this as a matter of course. You might want to do it if you suspect that the microcode image has been corrupted — which you might suspect if you get mysterious error messages, like *CPU RUNNING* or *Insufficient memory for xxx program.*

3. Enter the SCP CLI.

If you select this choice, the computer will run the SCP CLI. Use this when you need to issue an SCP command. For example, on a multiprocessor computer, you might want to use the SCP command ATTACH to change the default (initial) processor.

4. View or change startup parameters

If you select this choice, the bootstrap program will display another menu, allowing you to change defaults like the operating system pathname and time-out delay. The menu is

View or Change Startup Parameters

Disk unit name(s):
LDU filename:
LDU unique ID:
Operating system pathname:
Device names file pathname:
Disk Jockey pathname:
Microcode system area ID:

Execute? (Y or N)

Explanations of these menu selections follow.

To change any value on the View or Change Startup Parameters menu, type the new value and press NEW LINE. To take the default with a CRT terminal, press NEW LINE; to take the default with with a hardcopy terminal, press CTRL–A and then NEW LINE. The program can't check all answers for validity until you confirm at the *Execute?* prompt by answering Y and pressing NEW LINE. If it detects an error, it will describe the problem. You can return to a faulty answer on a CRT via the cursor control downarrow or uparrow, or on a hardcopy terminal by pressing CTRL–A and NEW LINE or CTRL–W. Then fix the faulty answer.

Disk unit name(s):

This choice and the next two let you change the system LDU — for example, if something goes wrong with the original system LDU and you have another LDU configured as a system LDU. If the unit you specify is an ECLIPSE-bus disk (like DPJ0), it must be the first disk on its controller; it must have been formatted as a system disk with Disk Jockey; and it must have AOS/VS II bootstraps and software installed. For easy cold starts (without the SCP SYSTEM MEDIA tape mounted), the LDU should also have microcode installed. To change the startup disk unit name, type the new name (for example, DPJ10↵ or MRCDISK000E00↵).

If the system disk is mirrored, you must identify all the units involved. The LDU images must have been created with the same filename, size, and bitmap size via Disk Jockey. Separate the unit names with an exclamation point (!). For example, if you specified the image DPJ0 and mirror image DPJ10, type DPJ0!DPJ10↵.

If the disk unit you specify has not been defined in the default device names file, Disk Jockey needs to know the address of the disk. If it doesn't need address information, Disk Jockey will continue to the *LDU filename?* question. It would need device names information, for example, if you just generated a new AOS/VS II system and renamed the system disk to XXX. Therefore XXX is defined in the new systems's device names file, but this file hasn't been made the default file yet and Disk Jockey has no idea of the address of disk XXX. If Disk Jockey needs device address information, it will display the Device Specification Menu:

Device Specification

Device name:	*xxx*
Bus type (ECL or MRC):	*xxx*
Device type:	*xxx*
Unit number:	*n*
Device code (octal):	*n*
MRC slot number (hex):	
Execute (Y/N):	

Here are some general-purpose answers to the device specification questions.

	ECLIPSE-Bus Disk	**MRC-Bus Disk**
Device name	DPJ0 or DPF0	MRCDISK000E00
Bus type	ECL	MRC
Device type	DPJ or DPF	MRCDISK
Unit number	0	0 or other unit
Device code (octal)	24 (DPJ) or 27 (DPF)	116
MRC slot (hex)	Does not apply	0E

When you're satisfied with all answers in this menu, answer the *Execute?* prompt with Y⤶. Unless you specified a mirrored disk, Disk Jockey then asks about the LDU filename of the startup LDU.

If your system disk is mirrored, Disk Jockey will repeat device specification questions for the units(s) that hold the second and third images. To specify the address of the second (or third) image, you must change at least one displayed default answer: unit number (for a mirror image on a different unit), device code (for a mirror image on a different controller), and/or MRC slot number (for a mirror image on a different MRC controller). Correct the answers you want to; take the default for each correct answer; and when you reach the *Execute?* prompt, type Y⤶.

To take the default with a CRT terminal, press NEW LINE; with a hardcopy terminal, press CTRL–A and then NEW LINE.

LDU filename: xxx

If you didn't change the default startup unit, take the default.

If you *did* change the default disk unit name, specify the filename, assigned when the LDU was created, of the LDU in the new unit.

LDU unique ID: xxx

If you didn't change the default startup unit, take the default.

If you did change the default disk unit name and LDU filename, specify the unique ID, assigned when the LDU was created, of the LDU in the new unit.

If the LDU you want to specify is mirrored, you must type the unique IDs of all LDUs involved. As with unit names, separate the IDs with an exclamation point. For example, if the unique IDs are ROOT.IMAGE1 and ROOT.IMAGE2, type ROOT.IMAGE1!ROOT.IMAGE2⤶.

If the LDU is not mirrored, type its unique ID and press NEW LINE.

Operating system pathname: xxx

This choice lets you change the default AOS/VS II operating system. It's useful after you've generated (and updated and tested) any new AOS/VS II system (even if the new system has the same name as the old one). Originally, when your system LDU was built, the default operating system was the starter system, pathname :SYSGEN:SYS.PR. Chapter 4 explains how to make your tailored system the default system.

To retain the default system, *xxx*, take the default. (But if the tailored system has been created since you last performed this step, you must type the name even if it is the same as the default name.) To change the default, type the pathname, from the root, of the tailored AOS/VS II system you want to use routinely; for example,

:SYSGEN:MSIS_01.PR⤶

The system you specify becomes the default immediately; it will run if you now select the default operating system. Disk Jockey checks the pathname when you confirm your choices by answering Yes to the *Execute?* question.

Device names file pathname:

This choice lets you change the device names file, which you should do whenever you change the default operating system pathname. The device names file tells Disk Jockey the addresses of devices, so it can find a device using only its name. If it cannot find this file, stand-alone Disk Jockey must ask device specification questions before it can access any disk unit, tape unit, or printer. VSGEN creates the device names file when it creates the operating system file. The default device names filename has the form hostname.NAMES; the file bears a name of this form unless you specified a nondefault configuration filename. Originally, when your system LDU was built, the default names file was :SYSGEN:SYS.NAMES.

If the file shown as default is the one you want, press NEW LINE. (But as with the system file, if the tailored system has been created since you last performed this step, you must type the name even if it's the same as the default name.) To specify the name, type the pathname of the names file, starting from the root directory. For example, if the hostname is MSIS_01, generated in :SYSGEN, type

:SYSGEN:MSIS_01.NAMES)

Disk Jockey pathname:

This choice lets you specify a nonstandard Disk Jockey pathname. There are two versions of Disk Jockey: a stand-alone version (pathname :DJ) that runs without an operating system; and a stand-among version (pathname :UTIL:DJ.PR) that runs under AOS/VS II. The two are similar, except that the stand-alone version can't run on an LDU that AOS/VS II is using (like the system LDU). This question relates only to the stand-alone Disk Jockey.

Generally, the standard Disk Jockey programs in the standard directories will fulfill your needs; you should not make a nonstandard program the default. This choice exists to let you use a Disk Jockey of a different revision (perhaps because you're running different releases of AOS/VS II on one LDU, and need a specific Disk Jockey to boot an operating system of the same release). If you specify a nondefault Disk Jockey, type the full pathname from the root directory.

Microcode system area ID:

This choice lets you specify different microcode as the default on powerup. When your system LDU was built, a microcode file was installed in a reserved area called the default microcode system area.

On powerup, an AOS/VS II bootstrap automatically loads microcode from this area into the computer. The system area isn't visible from AOS/VS II, but you can examine it, and other system areas, via stand–alone Disk Jockey, the View System Areas screen (keyword SAINFO).

There's only one system–defined microcode system area. If you specify a nondefault area: (1) you must have created it as a user–defined system area; and (2) you must have installed a working microcode file in this area using Disk Jockey.

In practically all cases, you won't want to change the default microcode system area ID. You might want to do it, for example, if you have a system LDU that's a removable disk pack that you use on different computers (which require different microcode files). On this LDU, you'd use Disk Jockey to create several user–defined system areas, and you'd install a different microcode file in each one. Then, as you brought the disk from one computer to another, you'd run Disk Jockey, verify that the system areas have the IDs of the correct microcode files, then go to the Disk Jockey View or Change Startup Parameters screen (which sets the same defaults as this one does) and adjust the default microcode system area ID for the machine.

To change the default microcode system area ID, select this choice. The program will then ask for the new (4–digit) ID. Specify the new ID. You could then return to the Technical Maintenance Menu choice *Load and verify microcode* to make sure the area you specified contains microcode loads without errors. Microcode issues are described in the next section.

5. Run diagnostics

This choice lets you run ADEX diagnostics (if these are installed on your disk). These diagnostics are explained in the manual for the Advanced Diagnostic EXecutive, *ADEX Operator's Manual.* If you type 5↵, it asks

Are you sure you want to run diagnostics? [N]:

To continue with the diagnostics run, type Y↵; to skip them, press NEW LINE.

6. Run a specified program

This choice lets you specify the pathname of any program to run. After you type 6↵, the program asks

Pathname of the file to boot?

Type the pathname of the program to run, starting at the root directory. For example, :SYSGEN:SYS.PR↵ runs the AOS/VS II starter system — which you might want if your tailored operating system didn't work and you wanted to run VSGEN again to fix it.

7. Enter the Disk Jockey Main Menu

This choice lets you enter the Disk Jockey Main Menu. You might want to do this to use Disk Polisher to recover disk space after abnormal shutdown, load a new AOS/VS II release, format a new disk, or check on system areas (as explained in the next section "Microcode File Issues").

8. Boot from a different disk unit

This choice lets you start AOS/VS II from a different disk unit than the default. (It doesn't change the default unit, as does the *View or change startup parameters* choice.) You might want to use this to run a stand–alone program (perhaps an AOS/VS II system) that's on a different disk unit. The disk must have been formatted as a system disk and have AOS/VS II bootstraps installed on it. It must also contain all files the program needs to run. For AOS/VS II, the essential files are the CLI, PMGR, Agent, IACRS (or other asynchronous controller operating system), and the operating system itself.

After you select this choice, the program asks for the disk unit name. Specify the disk unit name from which tyou want to boot; for example, DPJ1 or MRCDISK000E01. If the program needs device specification information, it will ask. Then it will try to run the bootstrap program that's on the destination disk. Via that program, you will specify the pathname to run.

9. Size system configuration

This choice lets you run the Disk Jockey sizer routine. This routine checks the hardware (like disks, tapes, printers, and asynchronous controllers) that is turned on and notes it in an equipment list in file :SIZER.CFG. This file is needed by on–line diagnostic programs (if you have them); therefore you should run the routine whenever your hardware changes. The sizer file can also serve as input to VSGEN, but since the sizer can't detect certain nonstandard terminal types (like modems), you should use a VSGEN configuration file, not a sizer file, as input to VSGEN if you can. Running the Disk Jockey sizer routine is explained in Chapter 2.

After you answer the last question, the program prompts with *Execute? (Y or N)*. Review your answers. If you want to change any, use cursor uparrow/downarrow control keys or, for hardcopy, CTRL–W and CTRL–A and NEW LINE to position the cursor at each wrong answer so you can fix it. When you're satisfied, type Y and press NEW LINE.

If your answers are valid, Disk Jockey writes your settings to disk and redisplays the Technical Maintenance Menu. To proceed with operating system load, type 12.

If you receive an error message, you may have wrongly specified an entry like a unique ID; retry or make sure the entry is correct, perhaps by using the View LDU Information screen (keyword LDINFO).

Microcode File Issues

Microcode is the heart of your ECLIPSE MV/Family computer. Correct microcode for your system was supplied on the SCP SYSTEM MEDIA tape (in tape file 1, dump format) or on a diskette shipped with the system. You'll receive periodic updates if you belong to the Microcode Subscription Service.

With AOS/VS II, microcode is loaded from a system area (not, as with AOS/VS, from a disk file in the root directory). When the system LDU was built, Disk Jockey installed the microcode file — from the SCP SYSTEM MEDIA tape or diskette — in the default microcode system area, from which it is loaded by default on a cold start.

You can get system area information from the LDUINFO utility supplied with AOS/VS II or from Disk Jockey. Use LDUINFO as explained in *Managing AOS/VS and AOS/VS II*, or bring up stand-alone Disk Jockey (using choice 7 on the Technical Maintenance Men11. From the Disk Jockey Main Menu, access the View System Areas screen by typing SAINFO and pressing NEW LINE.

In the system area display, the *name* is just an aid to human understanding; the ID is the real identifier by which the bootstrap programs access these areas. However, the name displayed for the microcode system area corresponds to the filename of the microcode file (as shipped on the SCP SYSTEM MEDIA). If you're curious about microcode, or if you're having trouble with microcode loads, you might want to examine Table 6–2, next. This table gives the filenames of microcode files for all DG 32–bit computers. The filename for your machine should match the *name* displayed by Disk Jockey for the microcode system area.

Table 6–2 Microcode Filenames for ECLIPSE MV/Family Systems

Computer Name	Standard	Hardware Floating-Point Option	Graphics Instruction Set Option
MV/40000	MV40000.MCF	Does not apply	Does not apply
MV/20000 (all)	MV20000.MCF	Does not apply	Does not apply
MV/18000 (all)	MV18000.MCF	Does not apply	Does not apply
MV/15000 Model 20 MV/15000 Model 10 MV/15000 Model 8	MV15000_20.MCF MV15000_10.MCF MV15000_8.MCF	Does not apply Does not apply Does not apply	Does not apply Does not apply Does not apply
MV/10000 Model SX MV/10000	MV10000SX.MCF MV10000.MCF	Does not apply Does not apply	Does not apply Does not apply
MV/9500	MV9500.MCF	Not available	Does not apply
MV/8000 (file on diskette)	MV8000.MCF	MV8000FP.MCF	Does not apply
MV/8000 II	MV8000_II.MCF	MV8000_IIFP.MCF	Does not apply
MV/8000 C	MV8000_C.MCF	MV8000_CFP.MCF	Does not apply
MV/7800 (all)	MV7800.MCF	MV7800_FP.MCF	Does not apply
DS/7500	MV7500.MCF	Does not apply	Graphics Instruction only: DS7500GIS.MCF
MV/6000	MV6000.MCF	Not available	Does not apply
DS/4000–series	MV4000.MCF	MV4000FP.MCF (with Graphics Instruction Set: MV4000GFP.MCF)	Graphics Instruction only: MV4000G.MCF
MV/2500 DC	MV2500.MCF	Does not apply	Does not apply
MV/2000 DC	MV2000.MCF	Does not apply	Does not apply
MV/1400 DC	MV1400.MCF	Does not apply	Does not apply
MV/1000 DC	MV1000.MCF	Does not apply	Does not apply

If there appear to be microcode problems, and/or the filename shown by Disk Jockey doesn't match the one shown for your machine in Table 6–2, you should get the SCP SYSTEM MEDIA and reinstall microcode, as shown under "Installing Microcode on the System LDU" in Chapter 2.

Normal Shutdown

Normal shutdown means orderly shutdown from an active multiuser system to the SCP CLI and, optionally, to turning off power to devices.

These shutdown steps assume that EXEC is running and that multiple users are logged on to the system. If no users are logged on, skip to step 5.

1. Send a message to all users indicating that the multiuser environment will be coming down. You can use the BROADCAST macro for this. For example,

   ```
   ) BROADCAST  System coming down in 5 minutes. Please log off.)
   ```

2. Look at printer and batch queues, via the QDISPLAY command, to ensure that no large jobs will be aborted.

   (If a batch job was active at shutdown, all work done in it is lost. If a print job is active at shutdown, printing stops, but you can save the pages already printed. At startup, the system will try to restart any batch or print jobs that were active at shutdown. After a print job restarts, to print it from a specific page — avoiding reprinting the pages printed before shutdown — use EXEC's RESTART command with page number and printer name.)

   The QDISPLAY command tells you the status of all queues, including BATCH_INPUT, LPT, and other queues you created. Type

   ```
   ) QDISPLAY)
   ```

   ```
   BATCH_INPUT   BATCH  Open
   xxx  x   xxx   xxx    xxx    (Batch jobs appear in this BATCH_INPUT
                                 list. Active jobs have a leading asterisk;
                                 for example,
                                 *34  D JACK :UDD:JACK:?34.CLI.00002.JOB)
   BATCH_OUTPUT  BATCH Closed

   LPT           PRINT  Open
                                 (Print jobs waiting for the first line printer
                                 appear in this LPT list. Active jobs have a
                                 leading asterisk; for example,
                                 *35    JACK  :UDD:JACK:MYFILE)
   )
   ```

If the QDISPLAY shows no active batch or print jobs, you can proceed.

3. Use the WHOS or ? macro to verify that users are logged off. Use BROADCAST and WHOS until all users who stand to lose work are logged off. CLI users might not lose anything when you bring EXEC down (although they might be annoyed if they are not notified). People using text editors — and perhaps user processes running application programs — *will* lose work if you terminate EXEC, so you should try to get them out of their editors or programs before you do it. For example, type

```
) WHOS)

PID:  1  PMGR   PMGR      :PMGR.PR
PID:  2  OP     OP        :CLI.PR
PID:  3  OP     EXEC      :UTIL:EXEC.PR
PID:  5  JACK   00005     :CLI.PR
PID:  6  SALLY  00006     :CLI.PR
PID:  7  SALLY  00007     :UTIL:SED.PR
. . .
PID: 20  OP     00020     :CLI.PR

) BROADCAST  System coming down in 2 min. Please log off now.)
) WHOS)

PID:  1  PMGR   PMGR      :PMGR.PR
PID:  2  OP     OP        :CLI.PR
PID:  3  OP     EXEC      :UTIL:EXEC.PR
PID: 20  OP     00020     :CLI.PR
)
```

4. Within a reasonable time, all users will have logged off or be in the CLI. If not, you must choose from among the following options:

   1. Wait for the user to return to his or her terminal and exit from the program.
   2. Walk to the user's terminal and exit from the program *for* the user.
   3. Proceed with shutdown, at the risk of costing the user some work.

   When you are ready to shut down, continue.

5. Next, you want to bring down the multiuser environment via the DOWN macro. You can do this only from an unlocked master CLI (CLI running as PID 2). How you return to a unlocked PID 2 CLI depends on which CLI you are running (CLI32 or CLI16) and whether that CLI is locked. The best way to discover which CLI is running is to type the WHO command:

```
) WHO)
PID:  n  OP     OP        :xxx
```

6. Look at the program pathnname *xxx*, as indicated in the display. Your next step depends on *xxx*, as explained in the following table.

Program pathname displayed	Meaning and action
:LOCK_CLI.PR	This pathname means you are running a locked CLI16. Skip to step 8.
:CLI16.PR	This pathname means you are running an unlocked CLI16. Look at the PID number, n. If n is 2, you can run the DOWN macro directly; skip to step 9. If the PID number is not 2, type BYE↵, and skip to step 9.
:CLI32.PR	This pathname means you are running CLI32, the 32-bit CLI. It may or may not be unlocked. Continue with the step 7.

7. If CLI32 is running, see whether it is locked or not by typing

) LOCK/STATUS↵

   If the system displays nothing, just the parenthesis prompt, this means you are running CLI32, and it is unlocked. Look at the PID number, n. If n is 2, you can run the DOWN macro directly; skip to step 9. If the PID number is not 2, type BYE↵, and skip to step 9.

   If the system displays a list of commands (*BLOCK, BYE,* and so on), this means you are running a locked CLI32. You must unlock it to shut down. Continue with this step.

   To unlock the CLI, type the UNLOCK command, and then the password. (Setting the password is explained in *Managing AOS/VS and AOS/VS II*, in the security chapter.) For example

) UNLOCK↵	(Start to unlock it.)
Password: XYZZY↵	(Type password; it does not echo. If you see the message *Warning: Passwords did not match, password not accepted,* this means you mistyped the password; the CLI is still locked. Repeat the UNLOCK command
)	

   When the CLI is unlocked, skip to step 9.

8. To unlock the LOCK_CLI program, type the command UNLOCK and then the password. Then sign off the program with the BYE command to reach the master CLI, PID 2. Only PID 2 can run the DOWN macro to shut down the multiuser environment. (Setting the password is explained in *Managing AOS/VS and AOS/VS II*, the security chapter.) Type

) UNLOCK⤶	(Start to unlock LOCK_CLI.)
XYZZY⤶	(Type password; it does not echo.)
) BYE⤶	(Type BYE to return to master CLI. If you mistyped the password, the BYE command is ignored. Repeat the UNLOCK command and retype the password until you see a *CLI Terminating* message.)
AOS/VS II CLI Terminating date time	(This message means you typed the correct password.)
) WHO⤶	
PID: 2 OP :CLI.PR	(Back in the master CLI.)
)	

9. Run the DOWN.CLI macro to bring down the multiuser environment. It's a good idea to specify the root copy of DOWN.CLI (:DOWN), as follows:

) :DOWN ⤶

...(Messages from DOWN.CLI) ...

10. With EXEC terminated, check the processes again with WHOS⤶. There may be only two processes left: the peripheral manager and the master CLI.

If processes like CEO, XODIAC/XTS, and INFOS II are still running, terminate these normally. For CEO, type CEO.SYSTEM STOP⤶; for XODIAC/XTS processes, type DOWN.NETWORK⤶, and so on. If there are other processes (like application-based processes), terminate *these* normally. Eventually, you may want to put all the process-terminating commands needed in the DOWN.CLI macro.

When ready, start shutdown by typing

) BYE⤶

Do you really want to shut the system down?

11. This message gives you a chance to change your mind. To keep AOS/VS II running, type N⤶. To shut it down, type

Y⤶

Starting system shutdown date time

System shutdown at date time

If automatic rebooting was selected (at VSGEN or system startup), the system starts automatic rebooting. If automatic rebooting was not selected, control returns to the SCP CLI. The automatic reboot message is

Rebooting from octal device code n
Automatic reboot will occur in n:n:n

To reboot immediately from the default device, press NEW LINE.
To enter the SCP CLI, type the break sequence.

Reboot from octal device code [n]

...(A *HALTED* message followed by register status appears on some systems)...

SCP-CLI>

12. If the system is rebooting, let the reboot procedure continue or interrupt it with the break sequence. If the SCP CLI prompt appeared, use the BOOT command as explained earlier.

Note that PID 2, the master CLI, can always shut the system down directly via BYE↓. If so, AOS/VS II will say

You have sons. Do you want to terminate?

If you answer Y↓, all processes below PID 2 will be terminated. The system will ask for confirmation again, and then shut down. (If you answer N↓ to the *sons* question, nothing will be terminated.) If any processes other than EXEC are running, it is very dangerous to shut the system down. For example, certain processes that use databases (like CEO) depend on normal shutdown to close the database properly. If shut down improperly, the structure and/or the integrity of the database may be compromised. So, use this quick method only if processes that would not be jeopardized (like CLI processes) are running.

After shutdown, you can boot an AOS/VS II system as described under "Warm Start, Computer Running — All Computers" earlier in this chapter; or you can bootstrap another system or stand-alone program. Or you can leave everything as is; or you can cut power to any or all devices.

To power down your disk(s), on a sealed disk unit, press READY; on a removable-pack disk unit, press the disk switch and give the disk pack time to stop spinning before pressing the DC POWER switch to off. (On a removable-pack unit, cutting power eliminates braking action; if the disk is spinning when you cut power, it will continue spinning without cooling air, which could damage unit bearings.)

To power down a tape unit, take it off line and unload the tape (if a tape is mounted); then press the power switch off. To power down the system console, use the rocker switch behind the console or the knob near the front lower right; or for a hardcopy console, use the switch under the keyboard to the right.

If you power down the computer, the SCP and microcode will vanish and will have to be reloaded later. Thus the next start will be a cold start, described earlier. If you decide to cut power to the computer, press the LOCK switch (if any) to off or unlock, and press the POWER switch to off. Powering down any machine except an MV/8000 deletes the SCP error log (if any), which is kept in volatile memory, so don't do this if you want to retain entries in this log.

Figure 6–2 shows the steps taken by all parties to bring the whole system up. (These don't include the original blue and white MV/8000, which loaded microcode from diskette.)

Figure 6–3 summarizes startup and normal shutdown for computers that have a working boot clock (time–of–day clock); Figure 6–4 does the same thing for computers that don't have a working boot clock.

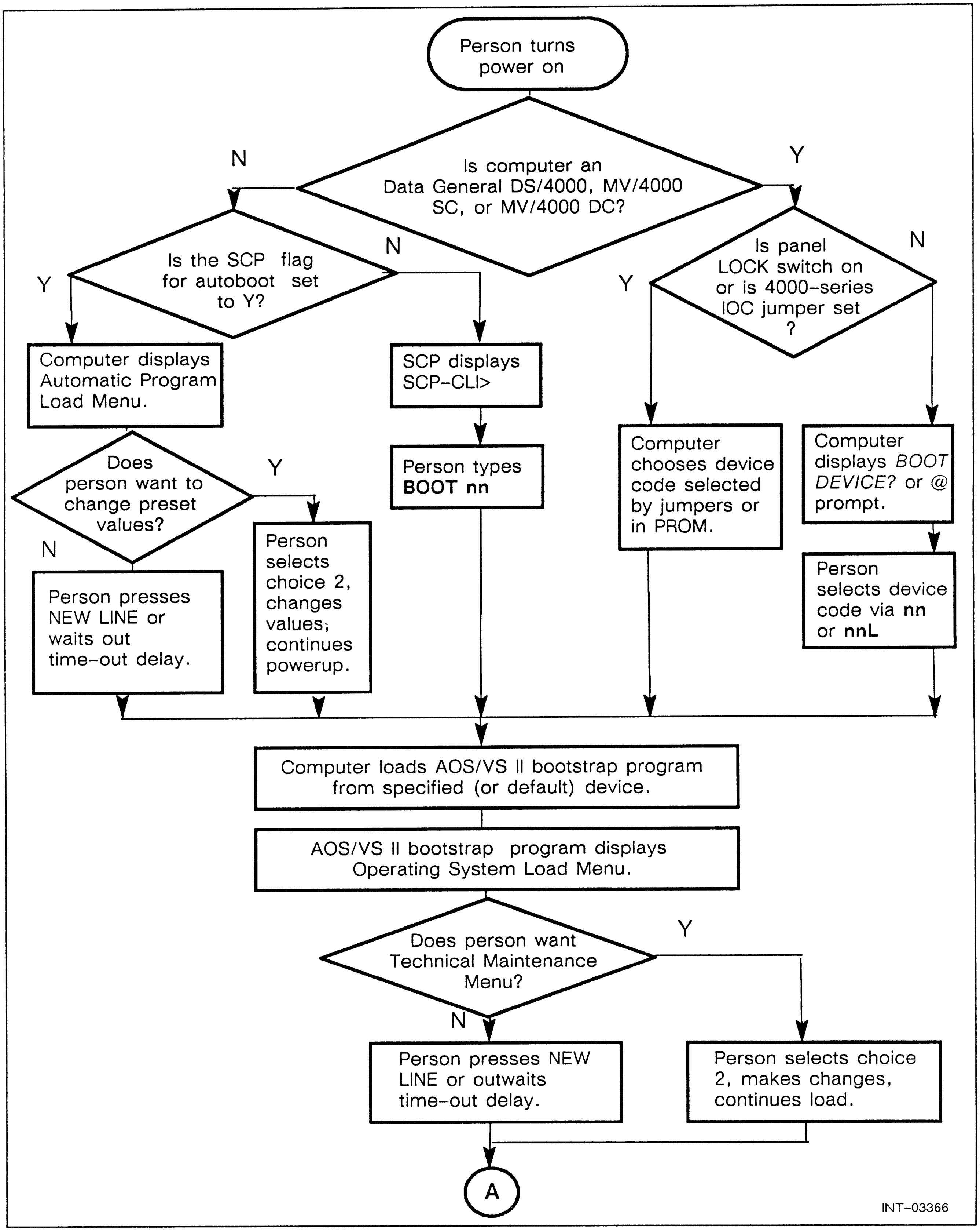


Figure 6-2 How AOS/VS II Comes Up from a Cold Start (continued)

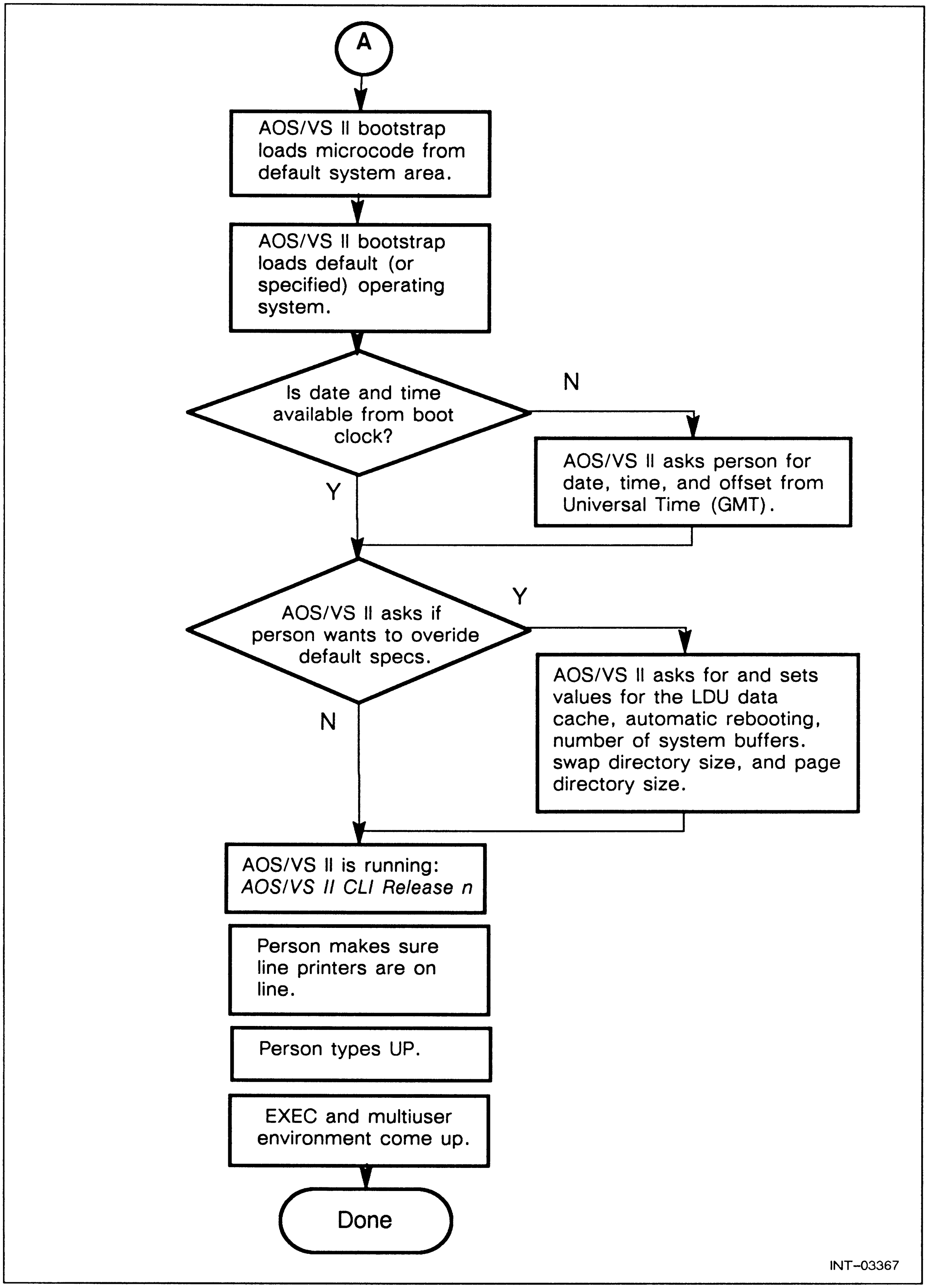


Figure 6-2 How AOS/VS II Comes Up from a Cold Start (concluded)

For a cold start, begin with step 1. For a warm start, type RESET ↵, BOOT 24↵ (or other system LDU device code), and begin with step 4.

1. Turn the system console, disks, and primary tape unit on and put them on line. Disk units must be write enabled and you should wait for them to become ready (if either of these conditions apply).

2. Press front panel POWER switch on.

   POWER UP TESTING COMPLETED

   Automatic Program Load Menu

   ...

3. *Enter choice [1]:* ↵

4. *Operating System Load Menu*

   ...

   1. Proceed immediately with operating system load

   ...

   Enter choice [1]: 1↵

   ... (Microcode loading messages) ...

   Loading file
   xxx (*xxx* is the default operating system pathname)

   AOS/VS II Release n

   Computers with a working boot clock get date and time from the boot clock. (If the boot clock isn't working, AOS/VS II asks *Date?* and *Time?* Specify the current date; for example, 8 23 89↵. Then specify the time, using 24-hour notation; for example, for 1:30 p.m., type 13:30↵. Next, enter (or take default for) the offset from Universal Time (GMT). Think about replacing the battery in the boot clock.)

5. *Override default specs [N] ?* ↵

   AOS/VS II CLI REV n date time
)

6. Verify date and time. Correct them with DATE or TIME commands, if needed.

7. Make sure all line printers are on line, with paper aligned.

8.) UP↵

   Pid n
   ... (EXEC messages) ...

)

Figure 6–3 Startup–Shutdown Summary for Computers with Working Boot Clocks (Time–of–Day Clocks) (continued)

Normal operation continues. When you want to shut AOS/VS II down, follow these steps.

1.) BROADCAST System coming down in 5 minutes. Please log off.↵

2.) QDISPLAY ↵ (Look at queues BATCH_INPUT and LPT to make sure there are no critical batch or print jobs in process.)

3. Use the WHOS or ? macro and BROADCAST until you see that all text editor and other users who stand to lose work have exited from their programs.

4. For each user who remains logged on, decide what to do: wait for user to return to terminal and log off, walk to terminal and log off for user, or proceed with shutdown, at the risk of costing user some work.

5.) WHO↵
   PID: n OP OP :xxx

6. If pathname *xxx* is :LOCK_CLI.PR, skip to step 8. If *xxx* is :CLI16.PR, skip to step 9. If *xxx* is :CLI32.PR, continue with next step.

7. Check lock status of 32-bit CLI: type LOCK/STATUS . If system displays nothing, this means the CLI is unlocked; check PID n and if PID n is 2, skip to step 9; if PID n is *not* 2, type BYE and skip to step 9.

   If the system displays a list of commands (BLOCK, BYE, and so on), this means the CLI is locked. Unlock it by typing UNLOCK↵, XXXXX↵ (CLI password), and BYE↵ . Skip to step 9.

8. Unlock LOCK_CLI. Type UNLOCK↵, XXXXX↵ (LOCK_CLI password), and BYE↵. Make sure you're PID 2 by typing WHO↵. If not, try again.

9.) :DOWN ↵

   From Pid 3 : (EXEC) Terminating on HALT command

10.) BYE↵

11. *Do you really want to shut the system down?* Y↵

    Starting system shutdown date time

    System shutdown

12. If automatic rebooting was selected (at VSGEN or system startup), the system starts automatic rebooting. If automatic rebooting was not selected, the system displays *CPU HALTED* and *SCP-CLI/Jpn*. The automatic reboot message follows.

Figure 6–3 Startup–Shutdown Summary for Computers with Working Boot Clocks (Time–of–Day Clocks) (concluded)

Rebooting from octal device code n
Automatic reboot will occur in n:n:n

To reboot immediately from the default device, press NEW LINE.
To enter the SCP CLI, type the break sequence.

Reboot from octal device code [n]

To interrupt the reboot procedure, type the Break sequence (CMD and BREAK/ESC keys).

SCP–CLI>

Power down devices if you want.

Figure 6–3 Startup–Shutdown Summary for Computers with Working Boot Clocks (Time–of–Day Clocks) (concluded)

For a cold start, begin with step 1. For a warm start, type RESET↵ , BOOT 27↵ (or other system LDU device code), and begin with step 4.

1. Turn the system console, disks (if separate), and tape unit on and put them on line. Disk units must be write enabled and you should wait for them to become ready (if either of these conditions apply).

2. Press front panel LOCK switch (if any) to the on or the lock position.

3. Press front panel power switch to on.

   POWER UP TESTING COMPLETED (or *MV4000 READY*)

   (If, on an MV/10000, nothing happens, you will need to use the SCP SYSTEM MEDIA tape. See steps earlier in this chapter, in section "Cold Start, CPU Power Off, MV/10000-Series, MV/8000 II, and MV/8000 C Computers.")

4. *Operating System Load Menu*

   ...
   1. Proceed immediately with operating system load
   ...
   Enter choice [1]: 1 ↵

   ... (Microcode loading messages, followed by a *Loading file* message) ...

   AOS/VS II Release n

5. *Date (MM/DD/YY) ?* 8 30 90↵ (Specify the current date.)

6. *Time (HH:MM:SS) ?* 14 35↵ (Specify the current time, using 24-hour notation.)

7. *Offset from Universal Time [+00:00] ?* -4:00↵

8. *Override default specs [N] ?* ↵

   AOS/VS II CLI REV n date time
)

9. Verify the date and time. Correct with DATE or TIME commands, if needed.

10. Make sure all line printers are on line, with paper aligned.

11.) UP↵

    Pid n

    ... (EXEC messages) ...

)

Figure 6-4 Startup-Shutdown Summary for Computers Without Working Boot Clocks (continued)

Normal operation occurs. When you want to shut AOS/VS II down, follow these steps.

1.) BROADCAST System coming down in 5 min. Please log off. ↵

2.) QDISPLAY ↵ (Check queues BATCH_INPUT and LPT to make sure there are no critical batch or print jobs in process.)

3. Use the WHOS or ? macro and BROADCAST until you see that all text editor and other users who stand to lose work are out of their programs.

) BYE ↵

4. For each user who remains logged on, decide what to do: wait for user to return to terminal and log off, walk to terminal and log off for user, or proceed with shutdown, at the risk of costing user some work.

5.) WHO↵
   PID: n OP OP :xxx

6. If pathname *xxx* is :LOCK_CLI.PR, skip to step 8. If *xxx* is :CLI16.PR, skip to step 9. If *xxx* is :CLI32.PR, continue with next step.

7. Check lock status of 32-bit CLI: type LOCK/STATUS↵. If system displays nothing, this means the CLI is unlocked; check PID n and if PID n is 2, skip to step 9↵ if PID n is *not* 2, type BYE and skip to step 9.

   If the system displays a list of commands (BLOCK, BYE, and so on), this means the CLI is locked. Unlock it by typing UNLOCK↵, XXXXX↵ (CLI password), and BYE↵. Skip to step 9.

8. Unlock LOCK_CLI. Type UNLOCK↵, XXXXX↵ (LOCK_CLI password), and BYE . Make sure you're PID 2 by typing WHO↵. If not, try again.

9.) :DOWN ↵

   From Pid 3 : (EXEC) Terminating on HALT command

10.) BYE↵

11. *Do you really want to shut the system down?* Y ↵

   Starting system shutdown date time

   System shutdown

12. If automatic rebooting was selected (at VSGEN or system startup), the system starts automatic rebooting. If automatic rebooting was not selected, the system displays *CPU HALTED* and *SCP-CLI/Jpn*. The automatic reboot message follows.

Figure 6–4 Startup–Shutdown Summary for Computers Without Working Boot Clocks (continued)

Rebooting from octal device code n
Automatic reboot will occur in n:n:n

To reboot immediately from the default device, press NEW LINE.
To enter the SCP CLI, type the break sequence.

Reboot from octal device code [n]

To interrupt the reboot procedure, type the Break sequence (CMD and BREAK/ESC keys).

SCP-CLI>

Power down devices if desired. For the computer, press the LOCK switch (if any) to unlock position first.

Figure 6-4 Startup-Shutdown Summary for Computers Without Working Boot Clocks (concluded)

Abnormal Shutdown

An abnormal shutdown is any shutdown not executed with the BYE) command from the master CLI, PID 2, on the system console. If you get an *Abnormal System Shutdown* message during a normal shutdown, then it, too, is an abnormal shutdown.

An abnormal shutdown can result from a deadlock (hang), panic (*AOS/VS FATAL ERROR*), hardware failure (which may cause a panic), or power failure.

There are several software tools to help you handle and recover from abnormal shutdown situations. They are

- The AOS/VS II Emergency Shutdown (ESD) routine. After a fatal AOS/VS II error, ESD can close open files and turn the abnormal shutdown into a normal shutdown. After ESD runs, you can restart AOS/VS II immediately. ESD runs automatically if automatic rebooting was selected at VSGEN or at system startup. ESD is described in this section.

- The Memory Dump routine. This copies main memory to tape or diskette for later analysis. This section describes the Memory Dump routine.

- Diagnostic tests. Most computers include powerup diagnostics, which can help identify faulty hardware. If you have DG's ADEX diagnostic system — either on tape or installed on the system disk — ADEX can pinpoint hardware problems. ADEX may not allow you to restart immediately, but it can tell DG engineers how to fix your system. Powerup diagnostic codes are described in the 014–series "Starting" manual, in the SCP manual). Using ADEX is explained in the *ADEX Operator's Manual.*

Occasionally, an abnormal shutdown will reduce available disk space. (Disk blocks that were allocated for use, but were never used, remain inaccessible.) This loss of space occurs whenever the ESD routine can't close the disk — when ESD reports errors or aborts.

The Disk Jockey utility includes a program named Disk Polisher, which can help you reclaim this disk space. Disk Polisher frees disk blocks that were marked as used but were never used. You should run Disk Polisher whenever the amount of available disk space drops significantly after an abnormal shutdown.

(If you're upgrading from AOS/VS, note that AOS/VS II is more fault tolerant than AOS/VS. AOS/VS requires a disk fixing utility, FIXUP, to correct disk inconsistencies after certain kinds of abnormal shutdown. AOS/VS II doesn't need or include FIXUP; after most abnormal shutdowns, you can restart AOS/VS II immediately.)

In any case, if a problem persists, you should call your DG support organization.

System Deadlocks (Hangs)

If AOS/VS II seems to be denying service, it may be hung in a deadlock. A deadlock can result from a high-priority and/or resident process that malfunctions, monopolizing processor time. A deadlock can also occur if three or four heavily used batch streams are running along with many interactive processes.

The primary symptom of a deadlock is long response time. Another symptom is a process (like a text editor) that is not aborted by the abort sequence CTRL–C CTRL–B. Users may complain that nothing is happening on their terminals; and/or there may be little or no response to commands given at the system console. (If the system console shows a *AOS/VS FATAL ERROR* message, a panic has occurred; see the next section.)

The first thing to do, if a terminal seems dead, is to type CTRL–Q to cancel a CTRL–S that may have frozen its display. If CTRL–Q restores activity, fine. If not, make sure the terminal is on and on line, and that the fault lights (if any) aren't lit. If the keyboard has a HOLD key, make sure the HOLD status light is off (press HOLD until light goes out).

If the problem persists, check processes from the system console by typing WHOS↵ or ?↵. This may identify one or more *hungry* processes (for example, a batch stream that's dumping for file backup). If so, you can then decide whether to block or terminate the process(es) (CLI command BLOCK or TERMINATE), or to reduce the process priority (PRIORITY command) or to change the process type (PRTYPE), or to live with the situation until until the process(es) finish what they are doing.

If you can't identify a problem process, try running PED (explained in *Managing AOS/VS and AOS/VS II*) to see if any process is getting too much processor time. If so, block or terminate the process (or if the process is using a batch stream, use CX FLUSH to flush it). Terminating or flushing a process generally discards work the process has done, so do this only after deciding that the process is using too much processor time to continue.

If the deadlock persists, and/or the system console is not accepting input, you must force a shutdown and bring up AOS/VS II again. Note that if you want to report this deadlock to DG in a Software Trouble Report (STR), you must follow additional steps, described in the STR section of *Managing AOS/VS and AOS/VS II*. To simply force a shutdown, follow these steps:

1. If the computer has a LOCK switch in the lock position, press to unlock.

2. Type the break sequence on the system console. For most CRT terminals, this means pressing the CMD key, holding it down, and pressing BREAK/ESC. For hardcopy terminals, press BRK. For older CRTs, press BREAK.

   The break sequence should bring up the SCP CLI on the system console:

   SCP–CLI>

   If the break sequence has no effect, retry it. If it still doesn't work, the SCP flag LOCK might be set. On the computer front panel, press the CON (or CONSOLE) switch to RST (or RESET).

3. Reset the CPU; then force an emergency shutdown by typing the following:

   SCP–CLI> RESET↵
   SCP–CLI> START 50↵

   This should abort processing and start a shutdown. (If nothing happens, type the break sequence again; then type TTY↵). The system console prompts

Do you want a memory dump (to submit a Software Trouble Report) (Y or N)? [N]

4. To shut down, press NEW LINE and the Emergency Shutdown routine will run as described in the section "About ESD," later in this chapter. To do a memory dump, type Y↵ immediately and proceed as described in the section "Doing a Memory Dump," later in this chapter.

AOS/VS and AOS/VS II Error and Status Messages contains more information on errors. Deadlocks are described under the message *None. Nothing...* in that manual.

Panics

A panic (crash) results from an error that AOS/VS II recognizes but cannot rectify. It may involve hardware or software. On a panic, the system console displays the message

AOS/VS FATAL ERROR: pcode on date time

value1	*value2*	*value3*	*value4*
value5	*value6*	*value7*	*value8*
stack-ptr	*frame-ptr*	*stack-lim*	*stack-base*

Do you want a memory dump (to submit a Software Trouble Report) (Y or N)? [N]

If you want a memory dump, type Y and press NEW LINE immediately; if you don't and automatic rebooting is enabled, the system will run ESD and try to reboot after the delay expires.

The panic values have the following meanings:

pcode is the octal panic code.

values 1–8 may contain additional panic information.

stack-ptr is the value of the hardware stack pointer.

frame-ptr is the value of the hardware frame pointer.

stack-lim is the value of the hardware stack limit.

stack-base is the value of the hardware stack base.

File :UTIL:AOSVS.PANICS.SR can help you interpret panic values. Your site should keep a printout of the *current revision* of this file near the system console. To determine roughly the cause of the panic, identify the panic group (1000 to 1777 octal is a group, 2000 to 2777 octal is another group, and so on). Compare the group base (for example, 1000) to the values in PARU.32.SR that start with .DUSR in column 1. The comment that follows the group base number briefly explains the cause of the panic.

For example, assume the panic code (pcode) is 7300. The group base of 7300 is 7000. Looking sequentially though AOSVS.PANICS.SR, you find the .DUSR entry for 7000 that begins in column 1. The whole line with 7000 says (for AOS/VS II release 1.20):

```
DUSR   PNSTR =                  ; AOS/VS TRAPPED, JMP'D 0, ETC
```

The comment AOS/VS TRAPPED... explains the category of panic. It doesn't explain a lot, but does mean that the cause is probably software.

Generally, you should log each panic in a system log book kept near the system console. Note the time, revision of AOS/VS II system, any unusual conditions (like new software or hardware) that may have caused the panic, and the panic values. The written record is especially important if your system console is a CRT. Panic records can be very important to DG personnel whom you may call on for assistance.

The panic may have originated in hardware, as described later in this chapter or in file :UTIL:AOSVS.PANICS.SR. In any case, you may want to do a memory dump. You *will* want to run ESD, described after the memory dump section.

Doing a Memory Dump

AOS/VS II always offers to do a memory dump after a panic. (But if automatic rebooting was selected at VSGEN or system startup, AOS/VS II automatically runs ESD and tries to reboot after a given interval — default 30 seconds; running ESD makes a memory dump useless.) AOS/VS II also offers to do a memory dump after you abort processing by typing the break sequence followed by START 50↵. A memory dump is required if you want to submit a Software Trouble Report (STR). You *can* skip the dump by pressing NEW LINE to the *Do you want a memory dump ...* question. Skip the dump only if you don't want to submit an STR.

To do a memory dump, follow these steps.

1. The system console is displaying

   Do you want a memory dump (to submit a Software Trouble Report) ...? [N]

   Type Y↵.

   Dump to magnetic tape or diskette (T or D) ? [T]

2. Get a scratch tape. For reel-to-reel tape, the tape must be at least 800 feet long. For any tape, the tape itself must be write enabled: make sure there's a write-enable ring or that the RECORD or SAFE switch is in position to allow writing. Mount the tape on unit 0 on the first controller, if available. If the unit has a density switch, choose DENSITY HIGH.

3. To dump to tape, type

   T↵ (or just ↵)

   Please mount tape. Then specify unitname. [xxx]

4. If you mounted the tape on the unit shown as the default *xxx* (for example, MTB0 or, for tape on an MRC bus, MRCTAPE000A00), press NEW LINE. If the tape is on a different unit, type the unit name and press NEW LINE.

   After you respond, the memory dump routine copies main memory and other things to tape. If the routine needs another tape it will display

   Please mount next tape.
   Press NEW LINE when ready.

If you see this *Please* message, remove the tape and mount another. Then press NEW LINE.

When done, the dump routine rewinds the tape and runs Emergency Shutdown Routine.

5. ESD runs as shown in the next section. It displays the following messages.

   Running Emergency Shutdown (ESD)

   File system shutdown

   ... (Other ESD messages) ...

   System shutdown at ddd ttt

   Rebooting from octal device code n (If automatic rebooting is selected)
   Automatic reboot will occur in n:n:n

   To reboot immediately from the default device, press NEW LINE.
   To enter the SCP CLI, type the break sequence.

   Reboot from octal device code [n]

   or

   SCP–CLI> (If automatic rebooting is not selected)

6. Dismount the tape, and if you want to save the dump in preparation for the STR, label the tape.

   (If the memory dump routine encounters an error, it will prompt you to retry. To try again, mount a different tape; then type Y↵.)

About ESD

ESD is an AOS/VS II routine that tries to force a normal shutdown, by writing system buffers to disk and closing open files. It also updates tables that describe disk space usage. ESD is not perfect: it can't cope with certain system errors, and it can't verify the accuracy of system databases that the panic may have affected. But it offers a good way to turn a panic into a normal shutdown.

If automatic rebooting was selected at VSGEN or system startup, the system runs ESD automatically after the given delay interval expires; then the system tries to reboot itself. The system also tries to run ESD after you've done a memory dump, or skipped the memory dump by typing N↵ to the following question:

Do you want a memory dump (to submit a Software Trouble Report) (Y or N)? [N]

The ESD messages are

Running Emergency Shutdown (ESD)
File system shutdown
Flushing buffers
Open file processing
System shutdown at dd–mon–yy hh:mm:ss

Then, depending on the automatic reboot setting, the system starts automatic reboot or gives control to the SCP CLI. You can let automatic rebooting continue, or you can interrupt it and give control to the SCP CLI (type the break sequence). To boot from the SCP CLI, use the BOOT command as explained earlier.

If you want to submit an STR, DG needs the memory dump you just did and the operating system symbol table, pathname :SYSGEN:sys.ST. You must copy the system symbol table to tape after AOS/VS II comes up, and include the tape with the STR. Submitting an STR is detailed in *Managing AOS?VS and AOS/VS II.*

If ESD fails, it issues a *FATAL ERROR* message of its own. You can help us improve ESD by taking a memory dump at this failure, and submitting it with an STR to DG. To take a dump, mount a tape and type Y↵, as described in the previous section. To skip the dump, press NEW LINE. In either case, if ESD fails again, it cannot deal with the error. Reset the computer, and boot the system. You can start AOS/VS II or run the Disk Polisher, described later in section "The Disk Jockey Disk Polisher."

Processor, Controller, or Unit Failures

To run properly, AOS/VS II relies on hardware. Inconsistencies in the processor (including components like the ATU), controllers like IACs or LANs, disk or tape controllers, or the system disk hardware may cause it to panic. However, if your system has redundant components (like multiple job processors, mirrored disks, and — with an MRC subsystem — multiple channels and disk controllers), it may be able to continue running as before. The operating system may be able to use automatic rerouting to work around a failed MRC controller and continue processing as usual.

Processor Errors

If an error occurs in a job processor, AOS/VS II will panic, and/or control may go to the SCP CLI, which may try to describe the error. If your system has more than one job processor, you can run AOS/VS II without the failed job processor. Use the SCP ATTACH command to change the primary job processor, if needed; then use the BOOT command as usual. If autobooting is enabled, AOS/VS II will reboot automatically; you must interrupt this reboot sequence to issue the ATTACH command. (But if your computer is an MV/40000 HA with multiple job processors, and HA mode has been selected via IDOS, the computer will deconfigure the failed job processor and reboot from a working processor without human intervention.) You can bring up the multiuser environment easily via the UP macro if your UP macro has JPINITIALIZE/2=WARNING commands for job processors, since the /2=WARNING switch lets the macro continue if a job processor doesn't acknowledge the JPINITIALIZE command. If the UP macro stops at the failed processor, you must edit the UP macro and remove (comment out) the command line that initializes the failed processor.

Some computers have sensors that will cut ac power under fan failure, high temperature, or brownout (voltage drop) conditions. If such a condition occurs, computer power will be cut, and you must fix the problem if possible. Fault lights on the front panel may identify the problem; if any lights are lit, look at the fault codes in the 014-series "Starting" manual for your computer (or, if there is no "Starting" manual, the SCP manual to see what they mean).

In most cases after a processor error, even if your system can continue running, you should call your Data General support organization. If you have a high availability system like an MV/40000 HA, a DG engineer may be able to replace the board without powering down the system. For details, see the section "Repair Under Power," later in this chapter.

Main Memory Errors

If a single-bit error occurs in memory on certain kinds of processor, AOS/VS II may be able to correct the error and continue. It will print an appropriate message on the system console and log the error in file :ERROR_LOG.

If a hard error occurs in memory, AOS/VS II generally will panic and the SCP will report a hard memory error to the system console. You should call your DG support organization. Do not run ESD after a hard memory error.

On an MV/40000 HA, the SCP (also called IDOS) can detect hard memory errors. If a hard error occurs on a memory board, SCP/IDOS will halt AOS/VS II and deconfigure the bad memory board (remove the board from service, so AOS/VS II won't be able to use it again). If SCP/IDOS has high-availability mode set, it will then boot the the default AOS/VS II system without running ESD. A DG engineer may be able to replace the board under power, as explained in "Repair Under Power," later in this chapter.

Microcode Errors

If abnormal shutdowns recur, there may be a microcode problem. Use the microcode utility to verify processor microcode (if possible). For this, see the SCP command SPAD or VSPAD (or VERIFY) in your SCP manual. If there are microcode verification errors, reload microcode via a cold start. If abnormal shutdowns and microcode verification errors recur often, note the verification results and contact your DG support organization.

If microcode is not the culprit, check the SCP log or :ERROR_LOG (explained in *Managing AOS/VS and AOS/VS II*). If neither of these identifies the problem, contact your DG support organization.

Disk and Tape Errors

If AOS/VS II encounters a hardware error on a disk, it will write one or more error messages to the system console and the system error log file (:ERROR_LOG). Then it may either panic or continue. A hardware error on tape does not bring down AOS/VS II but does evoke a message and an entry in the erorr log file. The error messages for a ECLIPSE-bus and MRC-bus disk have the form

From system on date at time
yyyy Error, Device d, Unit u, Retries r
Statuses: DIx=m, DIx=m1, DIx=m2

or

From system on date at time
yyyy MRC xxx exception
Channel: n/n1 Chassis: n2 Node/Type: n3/n4 Unit/Type: n5/n6
Status 1: n7 Status 2: n8

The items in the error messages have the following meanings:

yyyy is *HARD* or *Soft*. *HARD Error* means that AOS/VS II tried to read from or write to the file 16 (octal) times and failed. Read errors are more important, because hard errors on writes rarely cause system or application failure — since the file system can detect and remap defective areas when it writes to the disk.

If a hard error occurs on a mirrored disk unit, the system will also display a "mirror broken" message and status message that describes the mirrored unit. It will continue running using the mirrored unit.

If in an MRC a disk controller fails and any of its disk units is ported to another disk controller, the operating system will try to establish another route to these disk units. This is also true if MRC channel controller fails and the computer has a second MRC channel controller: the operating system will try to establish a route through the good channel controller. Establishing this other route may take a few minutes. If AOS/VS II can switch to a new route, it will do so; then it will write messages of the following form on the system console and the system error log file:

From system on ddd at tttt
MRC Route Switched
From:
Channel/SI: n/n1   Chassis: n2   Node/Type: n3/n4   Unit/Type: n5/n6
To:
Channel/SI: m/m1   Chassis: m2   Node/Type: m3/m4   Unit/Type: m5/m6

You can use the device with the new route as long as you wish. Probably you will want to have the controller repaired, and then at leisure reboot, since AOS/VS II will not try to switch back to the primary route until the controller is fixed and you reboot.

If the system could not switch to a new route, it will display

From system on ddd at tttt
Unable to switch MRC route
From:
Channel/SI: n/n1   Chassis: n2   Node/Type: n3/n4   Unit/Type: n5/n6

In this latter case, you must decide whether to run without the controller until it is fixed, or to shut down and wait for it to be fixed.

Soft Error means that the read or write operation failed initially but succeeded after fewer than 16 (octal) retries. Soft errors don't terminate user or system processes; but if they occur on disk, they may indicate aging media.

d is the device code; for example, 24.

u is the unit number; for example, 0.

x is A, B, or C.

m values are hardware status codes, described in the disk operator's manual, and in *AOS/VS and AOS/VS II Error and Status Messages*, under *HARD Error* message. The code(s) tell whether the error occurred on a read or write operation and what kind of error it was (like bad sector — bad disk block). On units that have a digital display, the display will show a status code, *s*.

r is the number of retries AOS/VS II made before it gave up and signaled a hard error. Usually, it will try 16 (octal) times. But on certain errors (for example, if a disk goes off line), it does not retry at all.

xxx indicates the cause: controller, channel, unit, power, time-out, or MRCC (the MRC controller). This means an MRC chassis, channel, node, or unit is not responding. Power may not be flowing to the device named in *xxx*. Or a hardware problem may have developed.

n values identify the MRC channel, chassis, node (slot number), and controller type, unit and type, and status. The MOST diagnostic utility has a report function that can interpret the *Status* values *n7* and *n8*.

To recover, proceed as follows.

1. Check the disk unit or MRC chassis for an obvious problem. For example, someone may have turned off power to the disk unit or chassis, or a unit may have gone off line. You can fix such problems with disk panel or chassis switches. If you can fix the problem, do so. Then, if AOS/VS II is hung or has panicked, go to step 4. If AOS/VS II is still running, continue processing as usual. You may need to restart user processes affected by the hard error.

2. If there is no obvious problem with the disk switches or MRC chassis power, try to identify the error. You can use status code *s* (or *n*, *m*, or *l*). The cause may be a disk block that has gone bad (called a bad block or bad sector).

   When AOS/VS II detects a hard error on a read initiated by a user process, it displays *HARD Error* on the system console and returns the error code for physical unit failure to the user process. Unless the user process has nonstandard error handling and takes special action on error codes, the process writes the message *Physical unit failure* on the user terminal or batch output listing. Usually the user process then terminates. (But if the LDU on which the read error occurred is mirrored, AOS/VS II will recover data from the good image and remap the bad block, allowing the application to continue normally and maintaining the mirror images.)

   If AOS/VS II detects a hard error on a *write* and can recover from the error (remap the bad block), the system does not return an error to the user process. So if you see the *HARD Error* message on the system console and no user terminal (or batch output listing) shows the message *Physical unit failure*, generally you can assume that the error involved a new bad block on a write, and that AOS/VS II was able to remap the block. You need not restart any application or user process — but you may want to note such messages since they may indicate media degeneration. AOS/VS II records all hard (and soft) errors in the system error log, :ERROR_LOG.

   If you decide the error resulted from a new bad block, be aware that on MRC and DPJ disks the controller hardware remaps bad blocks before AOS/VS II detects them. So when AOS/VS II reports a hard error caused by a bad block on an MRC or DPJ disk, the disk may have developed too many bad blocks to be usable.

   If the bad block was detected on a read, try to identify the file that contains the defective block. This may be easy. It is easy, for example, if the hard error occurs each time a user types a specific file or executes a specific program. If the flawed file is an AOS/VS II system file, the system may not even come up.

   After identifying the file, you should replace it. For an AOS/VS II system file, this means reloading the file from the AOS/VS II system tape. You can use the LOAD_II program for this, specifying the filename and /DELETE switch unless the file is :DJ or the default operating system. To replace a defective :DJ, repeat the "Installing AOS/VS II Software on the System LDU" steps (Chapter 2) but specify the template DJ; to replace a defective system file, use VSGEN to build the AOS/VS II again and use Disk Jockey to make it the default operating system (Chapter 4). For a non-AOS/VS II system file, it means renaming the file (if you want to save the readable part of it), and then reloading it from the most recent backups. You may want to reconstruct part or all of the file using the readable portion of the flawed one; then delete the flawed file. On the next attempt to write to the bad block, AOS/VS II will discover that the block is bad and remap it on the disk, preventing further access to it.

3. If the LDU on the disk is mirrored, AOS/VS II and your applications will continue running. If AOS/VS II did not need to break any mirror, the images are still synchronized. But if AOS/VS had to break mirrors, or if you suspect media degeneration, you will probably want to schedule a time to get the disk fixed. And after it is fixed, you will want to resynchronize it. After a disk error forces AOS/VS II to break a mirror, you won't be able to run with your normal level of availability, and your UP macro will fail (if it tries to start mirrored disks), until the disk is repaired.

4. If with an MRC the system switched routes, it displayed an *MRC Route Switched* message. You can use the units with the new route as long as you wish. This new route may not be as efficient as the original, primary route in terms of load balancing; if not, system performance may suffer. (For example, if the system must run the original number of disks on fewer controllers, it may not be able to run them as fast.) AOS/VS II will maintain any hardware mirrored images by rerouting all of them to an alternate controller, if possible.

   You can have a failed controller replaced under power as described in the next major section. To restore the original route, you must have the controller repaired, and then reboot, since AOS/VS II will not switch back to the primary route until the controller is fixed and you reboot (or until the secondary controller fails).

5. If AOS/VS II is deadlocked (hung), type the break sequence, then RESET↵ and START 50↵ (octal). This runs ESD. If AOS/VS II has panicked, let ESD run.

   After ESD runs (even if it reports errors or aborts), you can restart AOS/VS II or let it restart. At some point, you may want to run Disk Jockey's Disk Polisher (described later in this chapter).

   If AOS/VS II won't come up, a bad block may have developed in a system file. Recover as explained in step 2. Then try starting your tailored system. If the tailored system won't run, try the starter system (pathname :SYSGEN:SYS.PR); then rebuild your tailored system using the configuration file (form VSGEN/BATCH=configuration-filename) and try the tailored system again.

   If a hard error occurs on a tape unit, try cleaning the unit heads, or use another tape. If the hard error recurs, call your DG support organization, and run the system without the tape unit until it is fixed.

   While AOS/VS II is running, it will record most hardware errors in the system error log file, :ERROR_LOG. System logging is described in *Managing AOS/VS II.*

After a hard disk error, unless there is an obvious problem (as with disk write-enable switches), you will probably want to call your DG support organization. You may want to do so even if your system can continue running on mirrored disks.

Repair Under Power

The MV/40000 HA computer and MRC subsystem both let a person replace printed circuit boards under power. This means that, if you've configured your system for high availability, AOS/VS II — and possibly your application running under AOS/VS II — can continue running after a board fails and while the defective board is being replaced. Your application can continue normally after a unit, controller, or MRC channel failure only if the disk units involved are software mirrored with redundant components, as shown in the sections on high availability in Chapters 3 and 4.

Only a Data General authorized engineer should replace a printed circuit board. We include this section to tell you how to prepare AOS/VS II for board replacement and how to return to normal processing afterwards.

Replacing an MV/40000 HA Board Under Power

If a job processor fails, AOS/VS II will panic. If an MRC channel processor fails, AOS/VS II may panic or continue running. If the system disk is on the failed channel, AOS/VS II will panic; otherwise, it will lose the ability to access devices on the failed channel and will report time-outs for these devices. In any case, on a job or MRC channel processor failure, the SCP system (or IDOS system on an MV/40000) will remove the failed board from service so AOS/VS II cannot use it.

If AOS/VS II has panicked and if high-availability mode is set on the SCP or IDOS, the SCP or IDOS will boot the default AOS/VS II system. AOS/VS II may be able to run without the failed processor (for example, if the computer has two job processors, AOS/VS II can run on the remaining processor). If AOS/VS II can run, the failed item can remain in the chassis, unused by AOS/VS II, until a DG engineer replaces it.

When a DG authorized engineer arrives with a replacement processor, he or she may be able to replace it under power. From the FE mode menu, the engineer selects the quiesce option, then selects the replace option, physically replaces the processor, and finally selects the continue option to have AOS/VS II continue using the new processor. If the new processsor is a job processor, you must type the appropriate JPINITIALIZE command to bring it on line. If the new processor is an MRC channel processor, AOS/VS II will let users on that channel resume processing without operator interaction.

If a hard error occurs on a memory board, the SCP or IDOS will halt AOS/VS II and deconfigure the bad memory board (remove the board from service, so AOS/VS II cannot use it). If SCP/IDOS has high-availability mode set, it will then boot the default AOS/VS II system without running ESD. (With memory bad, it is not safe to run ESD.) AOS/VS II will run without the defective memory. When a DG engineer arrives to replace the board, AOS/VS II can continue running; the engineer can use the same sequence described above (quiesce, replace, and continue) to replace the bad board. To have AOS/VS II use the new memory, you must shut AOS/VS II down and start it again.

Replacing an MRC Subsystem Board Under Power

For an MRC, the program that lets you replace a board under power is called MOST (MRC On-line System Tools). MOST runs under AOS/VS II. Either you or a DG authorized engineer can run MOST; but since MOST's primary use is to allow board replacement under power and only an authorized engineer can replace a board, generally only authorized engineers will run MOST.

Usually, if an MRC channel or disk/tape controller fails, AOS/VS II will continue only if the system disk remains operational (the system disk cannot be attached to the failed controller, or there must be a backup or mirrored controller). Do not try to replace the controller that runs the system disk while AOS/VS II is running.

If the failure does not involve the system disk, you can arrange to have the failing board replaced under power. The MOST system menu offers an option that suspends operating system I/O to the unit and another option to delete or replace a board.

If the failure occurred in a fully redundant, mirrored configuration, your applications will continue normally. After the DG authorized engineer has fixed the problem, be sure to synchronize all mirrors that the system broke to ride through the failure. The high availability sections in Chapters 3 and 4 show such redundant configurations.

If an MRC disk or channel controller failed and the system rerouted around that controller, the system continued running on the secondary route. To restore the original route, you must have the controller repaired, and then reboot. AOS/VS II will not switch back to the primary route until the controller is fixed and you reboot (or until the secondary controller fails).

For more information on MOST, see the *User's Guide to Repair under Power for the Message-Based Reliable Channel (MRC) Model 31703.*

The Disk Jockey Disk Polisher

Generally, abnormal shutdown has little effect on the file system. It may, however, leave some disk blocks marked as used that are *not* used.

ESD, if it succeeds, writes updated usage information to disk, producing correct disk usage information.

But if ESD fails or reports errors, this means ESD could not close one or more LDUs. Disk Jockey's Disk Polisher lets you reclaim disk space on these LDUs. Disk Polisher is *not required* after abnormal shutdown; you *can* simply restart AOS/VS II without running the polisher. The polisher can reclaim lost space at any time — even after AOS/VS II has been running for awhile.

Disk Polisher is part of the Disk Jockey program — an entry on Disk Jockey's Main Menu. There are two Disk Jockey programs: stand–alone Disk Jockey, in the root directory, and stand–among Disk Jockey, in directory :UTIL. Stand–alone Disk Jockey works on any LDU, but it runs only while AOS/VS II is shut down. Stand–among Disk Jockey runs under AOS/VS II control: you can use it while AOS/VS II is running. But since stand–among Disk Jockey works only on LDUs that are not opened, it can't run on the system LDU while AOS/VS is II running, since AOS/VS II has this LDU open.

If You Make a Mistake

While running Disk Jockey, if you make a typing mistake before pressing NEW LINE, press the DEL key to erase characters one–by–one; or enter CTRL–U to erase the entire line. If you have already pressed NEW LINE after typing an incorrect answer, Disk Jockey may recognize your error and repeat the question. If so, type the desired answer.

If you already have pressed NEW LINE, but haven't confirmed by answering the *Execute?* question, you can back up and change the answer. To do this on a CRT, use the cursor control uparrow key to move up to the wrong answer; then correct it. With a hardcopy terminal, you can move up one field by pressing CTRL–W.

To take a default value on a CRT, press NEW LINE. On a hardcopy terminal, press CTRL–A to redisplay the default value; then press NEW LINE.

If you decide to abort and restart a Disk Jockey session, do so as follows. With stand–alone Disk Jockey, enter the break sequence and return to the beginning of the "Running Disk Jockey's Disk Polisher" section. With stand–among Disk Jockey, press CTRL–C CTRL–B and retype the XEQ DJ command. In either case, assume no work has been done during the previous Disk Jockey session; redo all operations done during the previous session.

If Disk Jockey reports a disk error or other error, make sure the disk unit is write enabled (if this applies). If the disk is write enabled, look up the error message in *AOS/VS and AOS/VS II Error and Status Messages* in the alphabetical table.

Running Disk Jockey's Disk Polisher

1. Make sure that all disks are mounted in their units (if removable), write enabled, turned on, and ready.

2. Start Disk Jockey. To start stand-alone Disk Jockey (perhaps to reclaim space on the system LDU), continue with this step. To start stand-among Disk Jockey, skip to step 4.

   On cold start, turn power on and work through the Automatic Program Load Menu (if displayed) to the Operating System Load Menu.

   On warm start, with the SCP CLI prompt showing, type RESET and then type BOOT, using the form BOOT n (n is the system LDU device code). For example,

   SCP-CLI> RESET↵
   SCP-CLI> BOOT 24↵ (Or 116↵) (Use BOOT with the device code of your system disk. For an ECLIPSE-bus disk, it's 24 for a DPJ-type disk and 27 for a DPF-type disk. For an MRC-bus disk, it's 116 (type BOOT 116↵); when the system console asks about node and unit, type 0E,0↵)

   The system displays the Operating System Load Menu:

   Operating System Load Menu

   1. Continue immediately with operating system load
   2. Enter the Technical Maintenance Menu
   ...
   Enter choice: 1

3. To enter the Technical Maintenance Menu, select choice 2:

   2↵

   Depending on your computer, the bootstrap program may display the Technical Maintenance Menu (if so, go to the next paragraph); or it may ask the date, time, and offset from GMT.

   If it asks *Date (MM/DD/YY)?,* type today's date. For example, for August 23, 1990, type 8 23 90↵. To answer *Time (HH:MM:SS)?*, type the time, using a 24-hour clock. For example, for 4:35 p.m., type 16 35↵. To answer the *Offset* question, type 0↵.

   The bootstrap program displays the Technical Maintenance Menu:

   Technical Maintenance Menu

   1. Load and start the default operating system
   2. Load and verify microcode
   ...
   Enter choice: 1

   To access Disk Jockey's Main Menu, type 7↵. And go to step 5.

(If you cannot boot from disk — perhaps because the disk has been damaged — you can start Disk Jockey from tape as follows. Mount an AOS/VS II system tape (either reel) on unit 0 of the first controller. For a tape on an ECLIPSE bus, type BOOT 22↵ or BOOT 62↵; for a tape on an MRC bus, type BOOT 116↵, and then, after the *UNIT, NODE* prompt, type 0A,0↵. Go to step 5.)

4. To use stand–among Disk Jockey, you must work from an upper– and lowercase terminal, because Disk Jockey dialog is upper– and lowercase.

   Stand–among Disk Jockey is file :UTIL:DJ.PR. You can start stand–among Disk Jockey — with :UTIL in the search list — using the command

   XEQ DJ↵

   (If you see the error message *Illogical process address space definition*, you've executed the wrong version of Disk Jockey. Type XEQ :UTIL:DJ↵ instead.)

5. The previous steps read Disk Jockey into memory. It displays its Main Menu:

   Disk Jockey Main Menu

   1. Format a physical disk
   2. Create, view, or change a logical disk unit
   3. Install system software
   4. View or change startup parameters
   5. Run Disk Polisher

   Enter choice:
   ...

   The text lines at the bottom tell you how to exit and how to get Help.

6. To run the Polisher, select choice 5:

   5↵

   Disk Jockey displays the Disk Polisher screen:

   Run Disk Polisher
   Disk units:
   LDU filename:
   LDU unique ID:
   Do you want to Polish this logical disk? (Y or N):
   List output? (P=Printer, F=File, T= Terminal display only):
   Execute? (Y or N):

   As with all Disk Jockey screens, we'll take the items in this screen one by one.

   Disk units:

7. Disk Polisher requires the name of all units that hold the LDU you want to polish. For a system LDU on an ECLIPSE bus, the disk unit name is practially always DPJ0 or DPF0; on an MRC bus, the default name is MRCDISK000E00. For

other LDUs, specify the unit you want. Default disk unit names are explained in Appendix A and Chapter 2.

Usually, the LDU will be on one, or at most two, disk units. If this is the system LDU, the LDU image spans just one unit, since the AOS/VS II starter system is designed for a one-piece LDU.

Specify the disk unit(s) by unit name. Stand-among Disk Jockey, because it's running under AOS/VS II, can always resolve the disk address from its unit name. Stand-alone Disk Jockey relies on the default device names file (explained earlier in this chapter) to resolve the address from the name. If Disk Jockey can't resolve the address from the unit name, it will ask questions via the Device Specification menu explained in the section "Using the Techical Maintenance Menu" earlier in this chapter.

For stand-among Disk Jockey, precede the unit name with @ and omit the device code; for example, @DPJ0↵ or @MRCDISK000E00↵. For multiple units, use the form name,name; for example

@DPJ1,@DPJ2↵ (or @MRCDISK000E00,@MRCDISK000E01↵)

If this is a mirrored LDU and you want to polish all images, you must specify the unit names that hold all images. (If you don't want to polish all images, specify only one image; then when asked whether you want to break the mirror, answer Yes. The images you don't polish will need synchronization later.) Separate the names with an exclamation point (!). For example, with stand-alone Disk Jockey, if the system disk in DPJ0 is mirrored on DPJ10, type DPJ0!DPJ10↵. Or for disks on the MRC bus, type MRCDISK000E00!MRCDISK000F00↵.

For example, with an unmirrored disk,

DPJ0↵ (or MRCDISK000E00↵)

LDU filename:

8. Specify the filename originally given to the LDU with Disk Jockey. When this manual explained building the system LDU (Chapter 2), it suggested the filename ROOT. Obvious choices for other LDUs include UDD1, UDD2, and so on. You can obtain more information on LDUs by returning to the Main Menu and typing LDINFO to access the View LDU Information screen.

Type the LDU filename; for example,

ROOT↵

LDU unique ID:

9. When this manual explained building the system LDU (Chapter 2), it suggested creating the LDU unique ID as the LDU filename plus a suffix in the form .IMAGEn; so the LDU with filename ROOT would have the unique ID of ROOT.IMAGE1 (for the first image). If ROOT were a mirrored LDU, the second image's unique ID would be ROOT.IMAGE2. However, for an LDU named SWAP, PAGE, or BOTH (used as a virtual memory directory), the unique ID is the filename: SWAP, PAGE, or BOTH.

If you specified a mirrored LDU above, you must type the unique IDs of all LDU images involved. As with units, separate the IDs with an exclamation point. For example, if the unique IDs are ROOT.IMAGE1 and ROOT.IMAGE2, type ROOT.IMAGE1!ROOT.IMAGE2↵

If the LDU isn't mirrored, there's only one LDU unique ID.

Remember the unique IDs, or discover then by using the LDU Information screen mentioned in step 8. Then type the ID; for example,

ROOT.IMAGE1↵

Do you want to Polish this logical disk? (Y or N):

10. This question determines whether Disk Polisher will write to the LDU or simply report errors. Unless you type Y↵, all unused disk blocks marked as allocated will remain inaccessible on the LDU(s).

If you answer N↵ (No) or ↵, Disk Polisher will not write to the LDU. You will see the same messages as if you said Yes, but the program will not try to free unallocated blocks. You might answer No if you suspected disk controller hardware problems and didn't want your LDU polished on the basis of hardware problems. Generally, answer Y↵

List output? (P=Printer, F=File, T=Terminal display only):

11. Your answer determines where Disk Polisher messages will be recorded. They're always sent to the terminal, even if you specify the printer or a disk file as well.

Disk Polisher messages describe its actions and, ultimately, how many disk blocks it reclaimed. Generally, having messages logged to a printer or disk file is useful; although for stand-alone Disk Jockey, logging to a printer adds time to the polish operation.

If you specify the printer with stand-alone Disk Jockey, it needs to know the printer device name and device code. Popular default printer names include LPB (commercial data channel printer), LPE (laser printer), or LPD (band printer).

For stand-among Disk Jockey, the printer default is the default print queue, LPT. EXEC must be running for LPT to work. Use LPT unless you have good reason for specifying otherwise. (If EXEC isn't running, use the printer device name, @LPB.)

If you specify a disk file, it asks for the pathname. With stand-alone Disk Jockey, the file you specify must be on a different LDU; Disk Jockey will ask the unit name and device code. With stand-among Disk Jockey, the file must be in the current file system; the pathname must point to a directory on an initialized LDU. Specify the full pathname, from the root directory. If the file doesn't exist, Disk Jockey creates it; if it does exist, Disk Jockey appends to it. A good general-purpose directory for the disk file is the Operator directory, :UDD:OP.

For example, type :UDD:OP:POLISHER.LOG↵

Execute (Y or N):

12. Review the answers you gave to the preceding questions. If you want to change any, you can do so. With a CRT, you can use the cursor control uparrow key to return to the incorrect answer. Then correct it.

    When you're satisfied with the answers, confirm by typing

    Y↵

    If you see an error message, act on it. Perhaps you misspecified a disk unit or device code, or the unique ID doesn't match the LDU name. Correct the answer via cursor control keys and retry. In the worst case, you may need to check LDU information on another Disk Jockey menu, described in step 8, and then start this screen again.

13. Disk Jockey now runs Disk Polisher on the LDU. The amount of time needed depends on the amount of space used on the LDU. Also, when you're running stand-among Disk Jockey, other processing can slow the polish operation. For instance, stand-alone Disk Jockey takes about 5–10 minutes to polish a 192–Mbyte, Model 6061 disk that has about half its space occupied by files.

When Disk Polisher is done, it will display the number of disk blocks reclaimed. The number of reclaimed blocks may be quite impressive.

Disk Polisher and Mirrored LDUs

If you have mirrored LDUs, any changes that Disk Polisher makes to one image must be imposed on the other image(s). There are two ways to do this:

- Run Disk Polisher on all images of the LDU by specifying all unit names (unitname!unitname) and unique IDs when the polisher asks about units and IDs.

- Run Disk Polisher on one image by specifying the unit name and ID of just one image (then, when the polisher asks if you want to break the mirror, answer Yes). Next, from AOS/VS II, initialize the polished image with the command INITIALIZE/NOMIRROR unit1!unit2. Eventually, start synchronizing the second image (and third image, if there is one) with the command MIRROR/SYNC unit1!unit2.

The first approach is simpler, but requires you to wait until all images have been polished before you can use any image. And if one of the images is unusable, you *must* use the second approach.

What Disk Polisher Does

When Disk Polisher runs on an LDU, it performs the following tasks:

- Examines the tree structure for allocated blocks, recomputes available space, creates an updated bitmap, and writes the bitmap to disk.

- Looks for multiple allocation of disk blocks and reports each multiply allocated block it finds. (Your recovery action is described in the manual *AOS/VS II Error and Status Messages,* under the message *Multiply allocated disk block.*)

Primarily, Disk Polisher frees disk space. (When AOS/VS II is running, you can use the CLI command SPACE : ↵ to find how much free space exists in the system LDU.)

Disk Polisher Errors

Generally, Disk Polisher runs without encountering errors. If you do receive an error message and want to learn more about its meaning, look it up in *AOS/VS II Error and Status Messages*.

Disk Polisher Examples

A Disk Polisher example with the simplest dialog follows in Figure 6–5. An example with a mirrored disk LDU appears in Figure 6–6.

(Run Disk Jockey from the Technical Maintenance Menu or type XEQ :UTIL:DJ ↵.)

Disk Jockey Rev n ....

Disk Jockey Main Menu

1. Format a physical disk
2. Create, view, or modify a logical disk unit
3. Install system software
4. View or change startup parameters
5. Run Disk Polisher

Enter choice: 5 ↵

Run Disk Polisher

Disk units: DPJ0 ↵ (or MRCDISK000E00; for stand–among Disk Jockey, you'd type @DPJ0 or @MRCDISK000E00 instead.)

LDU filename: ROOT ↵

LDU unique ID: ROOT.IMAGE1 ↵

Do you want to Polish this logical disk? (Y or N): Y ↵

List output? (P=Printer, F=File, T=Terminal display only): T↵

Execute? (Y or N): Y ↵

... (the program runs)...

... *Disk Polisher completed. 12458 blocks recovered.*

Warm start AOS/VS II or initialize the polished LDU.

Figure 6–5 Simple Disk Polisher Example

(Run Disk Jockey from the Technical Maintenance menu or by XEQ :UTIL:DJ↵ .)

Disk Jockey Main Menu

1. *Format a physical disk*
2. *Create, view, or modify a logical disk unit*
3. *Install system software*
4. *View or change startup parameters*
5. *Run Disk Polisher*

Enter choice: 5 ↵

Run Disk Polisher

Disk units: DPJ1!DPJ11 ↵ (or MRCDISK000E01!MRCDISK000F01; for stand–among Disk Jockey, you'd insert an @ before each disk unit name.)

LDU filename: ROOT↵

LDU unique ID: UDD.IMAGE1!UDD.IMAGE2 ↵

Do you want to Polish this logical disk? (Y or N): Y ↵

List output? (P=Printer, F=File, T=Terminal display only): T↵

Execute? (Y or N): Y ↵

... (program runs)...

Disk Polisher completed. 8458 blocks recovered.

Figure 6–6 Mirrored LDU Disk Polisher Example

Power Failures

Unless your computer has a backup battery, it will lose the contents of volatile memory on a power failure. With a serious power drop (brownout) or very high temperature, the computer may cut its own power to prevent damage. In either case, without battery backup, the state of main memory and all registers is lost; microcode must be reloaded, and someone must run ESD when full power returns.

There are two types of backup battery. One type (Model 8746) provides full backup (power to all computer boards, asynchronous/synchronous controllers, and fans). The other provides partial backup (power to main memory and SCP). Each type can provide power for only a limited time.

With full backup, AOS/VS II will try to restart all critical devices (like disks and asynchronous controllers) when power returns; if this attempt succeeds, the system will continue running as before the power failure. For full backup to work, all the following conditions must be true:

- The computer must have a full backup battery.
- Power must return before the battery is exhausted.
- BBU with full backup and autorestart must have been chosen at VSGEN.
- The computer LOCK switch (if any) must have been in the on or lock position when power went down.

With partial battery backup, AOS/VS II will start its ESD routine when power returns. For partial backup to work, the computer LOCK switch (if any) must be in the on or lock position when power goes down.

Power Failure Recovery

When power returns, look at the system console.

- If the system console shows the messages

  From system on ddd ttt POWERFAIL restart (*ddd* and *ttt are* date and time)

  Now restarting device n unit n
  . . .
  Restart operation complete

  This means that your system has full backup, and AOS/VS II has fully recovered. Press NEW LINE to return the prompt of the program that was running. Interactive users at terminals should be able to press NEW LINE and see repeated the last prompt they saw before the power failure. The power failure is recorded in the :ERROR_LOG log file.

  If AOS/VS II cannot restart a device, it will tell you so. If the device is a disk, you probably should run Disk Jockey's Disk Polisher on it.

  NOTE: If the system console is not displaying the message *Restart operation is complete*, the power outage may have outlasted the backup battery and the system rebooted automatically. User feedback will tell you whether this happened (their terminal sessions will no longer be active).

- If you see the SCP-CLI prompt, warm start the system:

  SCP-CLI> RESET↵
  SCP-CLI> BOOT 24↵ (Or 116↵) (Use BOOT with the device code of your system disk. For an ECLIPSE-bus disk, it's 24 for a DPJ-type disk and 27 for a DPF-type disk. For an MRC-bus disk, it's 116 (type BOOT 116↵); when the system console asks about node and unit, type 0E,0↵)

  Work your way through the menus to AOS/VS II.

Any power failure, regardless of recovery, has the following effects:

- It eliminates vacuum to magnetic tape units; so if tape units that use vaccum were active on your system, someone must press BOT on them to recreate the vacuum, and then press ON LINE.
- It takes line printers off line, and someone must put them back on line.
- It takes the system clock off line for the duration of the failure; so someone must update the system time, using the TIME command from the master CLI process (from PID 2) or from a process with System Manager privilege.

What Next?

This chapter described common SCP commands, CPU switches, system startup, and normal shutdown. It also covered abnormal shutdown: deadlocks, panics, hardware errors, and power failures — and it showed how to handle these with ESD and Disk Jockey's Disk Polisher. In short, this chapter covered the basic steps to start, run, stop, and restart the system.

At first, startup and shutdown might seem complex — but they are really not. To warm start: reset, BOOT device-code, wait for time-out, set date/time if asked, and accept the default answers for everything else. On abnormal shutdown, type N↵ and let ESD run. Periodically, run Disk Jockey's Disk Polisher on your LDU(s). When power returns, proceed as usual (if you had full battery backup), run ESD and warm start the system (if you had partial backup), or load microcode, optionally run Disk Polisher, and warm start the system (if you had no backup).

The next chapter explains, in detail, how to format disks and create LDUs with Disk Jockey. You will need the next chapter if you have more than one disk unit in your system.

End of Chapter

Chapter 7
Formatting Disks and Creating LDUs Using Disk Jockey

Read this chapter when you want to

- understand AOS/VS II logical disk units and how to use them (useful if your system has more than one physical disk);
- format (or reformat) one or more physical disk(s);
- create, view, change, or delete a logical disk unit (LDU);
- view or change LDU parameters.
- view or change bad block or system area information.

The Disk Jockey utility lets you format disks, create LDUs, load AOS/VS II software, install microcode, and manipulate system areas. Disk Jockey also lets you set startup parameters and back up LDUs. Disk Jockey features that relate to formatting disks and creating LDUs are explained in this chapter; setting startup parameters (using the Technical Maintenance Menu) is explained in Chapter 6; and backing up LDUs via Disk Jockey is explained in *Managing AOS/VS and AOS/VS II.*

This chapter assumes that your system has a formatted system disk with AOS/VS II installed on it, and that someone has run VSGEN and generated a tailored operating system. Possibly someone has created the multiuser environment (created user profiles, started EXEC, and edited the UP.CLI and DOWN.CLI macros, as explained in Chapter 5). If your system disk has not been formatted, turn to Chapter 2, format it, and install AOS/VS II; then return here. If your system disk *has* been formatted under AOS/VS II but AOS/VS II has not been installed, turn to the section in Chapter 2 "Installing AOS/VS II Software on Your System LDU" and install the software; then return here. If VSGEN has not been run, turn to Chapter 4, generate a tailored system, and then return here. The major sections of this chapter are

- About LDUs (Logical Disk Units)
- Disk Jockey Menus and Command Screens
- Starting Stand–Among Disk Jockey
- Starting Stand–Alone Disk Jockey
- The Technical Maintenance Menu [TMM]
- Physical Disk Format Menu [PDISK]
- LDUs (Logical Disk Units)
- View or Change Startup Parameters [PARAMETERS]
- Running Disk Polisher [POLISHER]

About LDUs (Logical Disk Units)

An LDU is a portion of one or more physical disks, allocated and named via Disk Jockey. An LDU can include part or all of one physical disk, or of multiple disks, up to a maximum of eight disks. To make an LDU accessible to AOS/VS II, you issue the INITIALIZE command. Users can then access LDU just as any other directory, by its filename.

Some physical disks, such as DPJ–types, are not removable; those disks will always remain in the disk unit where they were formatted. But some disks, such as DPF–types, *are* removable. For removable disks, the disk unit in which you format an LDU is irrelevant to the LDU. You can format an LDU in any disk unit, and still run it in any other disk unit. For example, with removable disk packs, you can format an LDU in unit DPF0 and run it in unit DPF11. However, you will find it easier to operate your AOS/VS II system if each physical disk in an LDU is always in the same disk unit — since the UP macro that initializes disks does so by disk unit name, not LDU name.

Single– and Multiple–Disk LDUs

You can create a single– or multiple–disk LDU with Disk Jockey. A multiple–disk LDU can include up to eight disks. The disks can be different models, unless one of them is a model 6214 602–megabyte disk. An LDU built with a 602–megabyte disk cannot include other disk models.

Single–disk LDUs are easier to understand because they involve only one disk unit. In such cases, the physical disk and the LDU are the same. If you're considering a multiple–disk LDU, be aware that all physical disks involved must be ready (on–line) before you can initialize the LDU.

The real advantage of a multiple–disk LDU is that it allows a contiguous file to span more than one physical disk. Some Data General data management products — like INFOS II — may need such huge contiguous files. If your site will use such a file, you will need to build a multiple–disk LDU for it. Ideally, you would run this LDU in *addition* to a single–disk system LDU.

An example of a system with a single–disk system LDU, a multiple–disk database LDU, and a single–disk user directory LDU follows in Figure 7–1.

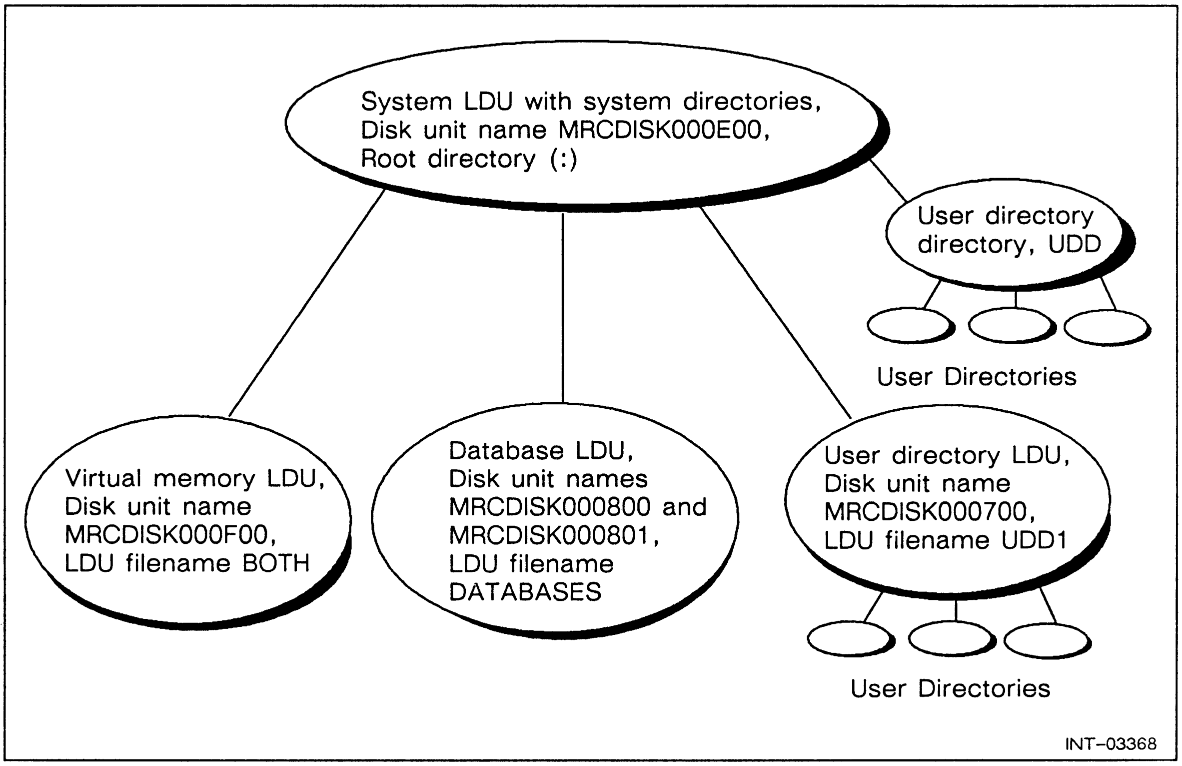


Figure 7-1 A Multiple-LDU AOS/VS II System

After you have created the system LDU (described in Chapter 2), you can set up the system shown in Figure 7-1 by doing the following things:

1. Use Disk Jockey to create a one-piece LDU named BOTH, a two-piece LDU named DATABASES, and a one-piece LDU named UDD1.

2. Bring up AOS/VS II. Initialize the disk units that hold the LDUs named DATABASES (INITIALIZE @MRCDISK000800 @MRCDISK000801) and UDD1 (INITIALIZE @MRCDISK000700). AOS/VS II then sees the LDUs as directories.

3. Back up each user directory that you plan to move, if any of these already exists.

4. For each user you want on the UDD1 LDU, use the CLI MOVE command to put the user directory in UDD1. For example, for user Jack:

) SUPERUSER ON↵
   Su) DIR :UDD↵ (With CLI16, the Superuser prompt is *)
   Su) MOVE/V :UDD1 JACK:# ↵ (Template # specifies all files, including directories.)

... (CLI verifies directories and files moved) ...

5. Delete the user directory in :UDD. For example,

   Su) DELETE/V JACK:# ↵

6. Create a link file with the same name as the username in :UDD to :UDD1:username:

   Su) CREATE/LINK JACK :UDD1:JACK ↵

Thereafter, while UDD1 is initialized, any user whose directory has been moved to UDD1 will log on directly into a user directory on that LDU. The user directory pathname will have the form :UDD1:username, but otherwise the user is treated exactly as if he or she is in the directory :UDD.

At startup, after you bring up AOS/VS II, you can edit the UP.CLI macro to include the following commands to initialize the LDUs:

```
DIR :
INITIALIZE/S  @MRCDISK000800 @MRCDISK000801
WRITE/L=DATABASE.FILENAME  [!STRING]
INITIALIZE/S  @MRCDISK000F00
WRITE/L=UDD1.FILENAME  [!STRING]
```

The DOWN.CLI macro needs only the following commands to release the LDUs:

```
RELEASE  :[DATABASE.FILENAME]
DELETE  :DATABASE.FILENAME
RELEASE  :[UDD1.FILENAME]
DELETE  :UDD1.FILENAME
```

This technique works for any nonmaster LDU. For example, assume you want to put user directories on an LDU named UDD2. Use Disk Jockey to create UDD2, initialize the LDU from the CLI, use the CLI DIRECTORY command to make :UDD your working directory, make a backup copy of each directory you want moved, move each directory you want to UDD2, delete each of these directories from :UDD, and create links in :UDD to :UDD2:username, similar to the example above. Then put appropriate INITIALIZE and RELEASE commands in the UP and DOWN macros.

If you want to change the physical disk configuration of an LDU, you can use the various Disk Jockey command screens (described later in this chapter) to view or change parameters without having to reformat the physical disk(s). You can also use Disk Jockey to create new LDUs composed of different physical disks.

An LDU for the Swap and Page Directories

You can designate a separate LDU for the AOS/VS II SWAP and PAGE directories, or even a separate LDU for SWAP and another separate LDU for PAGE. To create an LDU for SWAP and PAGE directories, you need to create the LDU using the name of the directory (SWAP, PAGE, or BOTH) as both the LDU filename and the LDU unique ID.

To create an LDU to contain both the SWAP and PAGE directories you must give this LDU the LDU filename BOTH and the unique ID BOTH. If you want to create an LDU for just the SWAP directory give it the LDU filename SWAP and the unique ID SWAP. If you want to put the PAGE directory on a separate LDU, give it the filename PAGE and the unique ID PAGE.

For example, suppose you want to put both the SWAP and PAGE directories on the same LDU. The LDU will be a one-disk LDU named BOTH residing in disk unit DPJ1. Then at VSGEN time (or at system boot time by overridding the default specifications) you'd specify

Swap [default]: DPJ1 ⤶
Page [default]: DPJ1 ⤶

AOS/VS II will then know that the SWAP and PAGE directories are on DPJ1. Remember, for the LDU containing the SWAP and PAGE directories to work correctly, the filename and the unique ID of the LDU must match. This is true whether the SWAP and PAGE directories share an LDU (named BOTH) or are on separate LDUs (named SWAP and PAGE, respectively). The ACLs of these LDUs must be changed to +,E. LDU ACLs are discussed later in this chapter.

No CLI commands are needed to initialize an LDU named BOTH, or SWAP, or PAGE. Such LDU(s) are initialized automatically if specified to VSGEN; or you can give the disk unit name(s) during bootstrapping if you override default specs.

If you decide to have a separate LDU for either SWAP or PAGE directories, don't store user or system files on that LDU. AOS/VS II deletes files that are not in a specified format from the SWAP and PAGE directories each time you initialize the system. An LDU named BOTH is not restricted to just the SWAP and PAGE directories; you may put other directories on it if you choose.

Formatting a Multiported Disk

Certain disk models can be connected to two MV/Family computers or two MRC disk controllers at once. You can format such a disk and create LDUs on it from either host or via either controller.

If a disk is multiported to different hosts with different MRC disk controllers, there are advantages to creating multiple LDUs on it. This way, the hosts can share the physical disk, each using its own LDU on the disk. An example is shown in Figure 7–2.

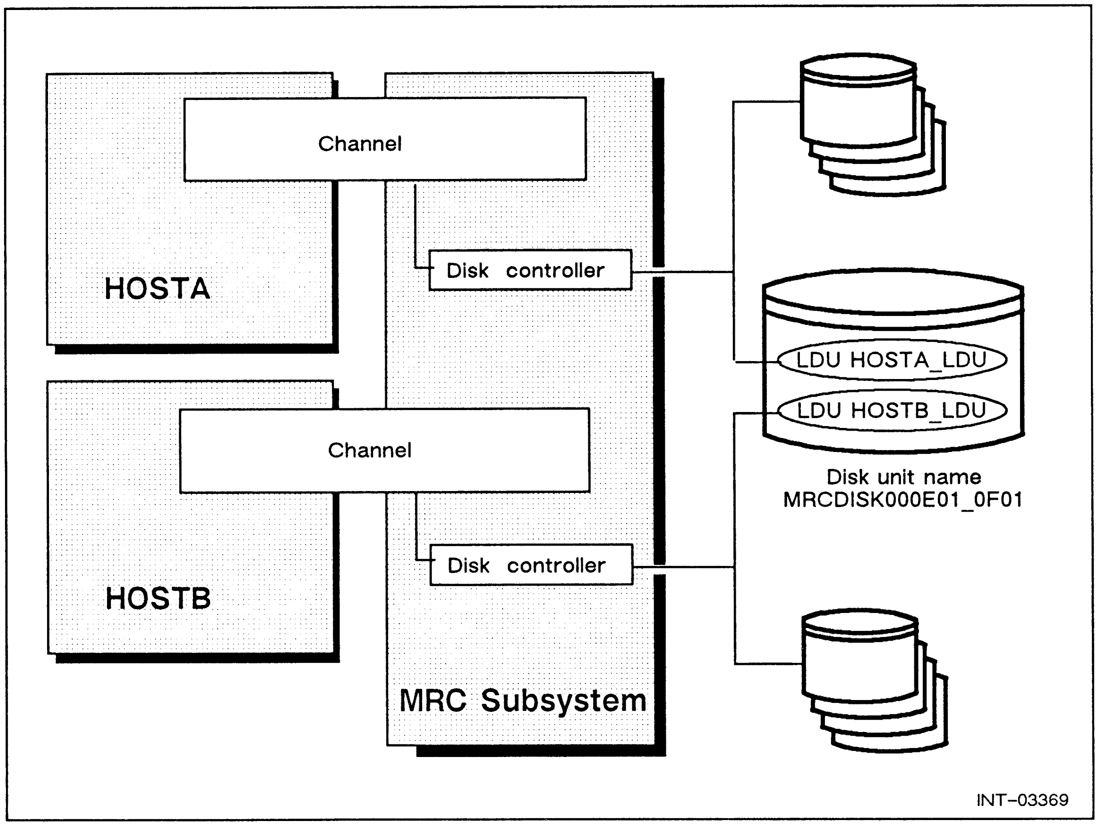


Figure 7–2 Two Host Systems Accessing Two LDUs on a Multiported Disk

Sample INITIALIZE commands for the LDUs on the multiported disk shown in Figure 7–2, as writtent into their hosts' UP.CLI macros, could be as follows.

HOSTA

INITIALIZE/LDUNAME=HOSTA_LDU @MRCDISK000E01_0F01

HOST B

INITIALIZE/LDUNAME=HOSTB_LDU @MRCDISK000E01_0F01

Creating Mirrored LDUs

There are two types of mirroring: hardware and software. With hardware mirroring, the disk controller writes the same data to the images of an LDU. Hardware mirroring creates a physically identical copy of the LDU. These images must have pieces that are the same size, and they must be on the same type of disk and on the same controller.

With software mirroring, the operating system rather than the controller writes the data to the images of an LDU. Software mirroring creates two (or three) logically, but not physically, identical images of an LDU. If your LDUs are not connected for hardware mirroring (the images you want to mirror are not on units connected to one controller), you must use software mirroring.

Hardware mirroring has the advantage of faster synchronization; software mirroring has the advantages of flexibility and higher availability, since the disks need not be on the same controller. You *can* software mirror with an LDU set up for hardware mirroring — so, for greatest flexibility, you might want to set up the LDU images for hardware mirroring even if you plan to software mirror them. To set up for hardware mirroring, specify the same starting and ending disk addresses for all LDU images.

If you decide to mirror an LDU, you will need Disk Jockey to create LDU images of the appropriate sizes. When you create an LDU, Disk Jockey asks the number of images. You can opt for mirroring immediately by specifying two or three images; or you can postpone the issue by selecting one image and create other images later as needed. If you create several images with Disk Jockey, Disk Jockey will synchronize them, and you will initialize them from the CLI using the INITIALIZE command, as shown in Chapter 5.

Figures 7–3 and 7–4 show disks with controllers set up for software and hardware mirroring respectively. The mirrored LDUs are the root (:), UDD1, and CEO. These are copies of figures shown in Chapter 4.

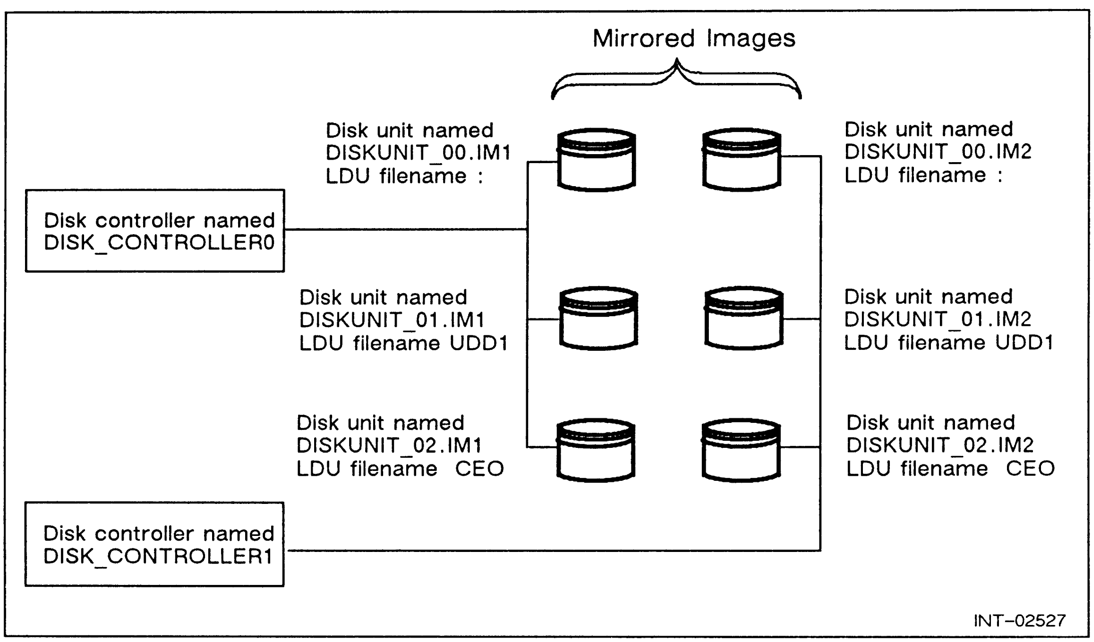


Figure 7–3 Disk Controllers and Units with Software Mirroring

(The device names shown are hypothetical. Typical device names for MRC devices are MRCDISK_CONTROLLER_000E and MRCDISK000E00; typical ECLIPSE–bus device names are DPJ_CONTROLLER_0 and DPJ0.)

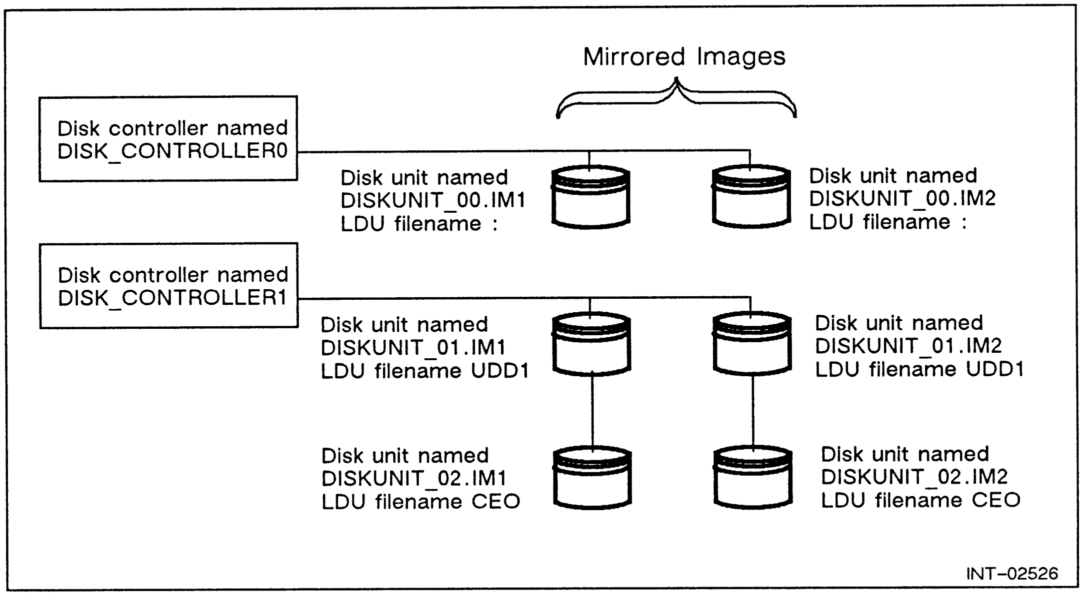


Figure 7–4   Disk Controllers and Units with Hardware Mirroring

With hardware mirroring, the mirrored LDUs must be on the same controller. As shown in Figure 7–4, with identical disks, this structure allows either hardware or software mirroring.

Sample INITIALIZE commands for the LDUs shown in Figures 7–3 and 7–4, as written into the UP.CLI macro, could be as follows.

```
INITIALIZE  @DISKUNIT_01.IM1!@DISKUNIT_01.IM2
...
INITIALIZE  @DISKUNIT_02.IM1!@DISKUNIT_02.IM2
```

If after creating an unmirrored LDU you decide to mirror it, you can do so without reformatting and/or destroying data on the original. To do this, use Disk Jockey to create an LDU of the same size and name as the original, but with a different unique ID. To set up for hardware mirroring, specify identical disk addresses for the LDUs. (For hardware mirroring to occur, the disks must be on the same controller.) Then, from the CLI, initialize the original image with the INITIALIZE command and start synchronizing the new image(s) via the MIRROR command. After the images are synchronized, you can routinely initialize them all with the INITIALIZE command (as in the UP macro) instead of using INITIALIZE, and then MIRROR.

Using mirroring productively requires some planning. Mirroring concepts are explained near the beginning of Chapter 4, in the section on LDUs and high availability. The INITIALIZE and MIRROR commands that actually start mirroring are explained in Chapter 5, in the major section "Editing the UP and DOWN Macros." Further details on mirroring appear in *Managing AOS/VS and AOS/VS II*, the high availability chapter.

Disk Jockey Menus and Screens

Disk Jockey menus and command screens help make it easy to use. If you have used software such as the CEO system or the System Management Interface (SMI), you are already familiar with menus.

Using Menus

A menu is a screen that contains choices from which you can select what you want to do next. The Disk Jockey menus offer diverse disk–related choices of activity. As an example, here is the Disk Jockey Main Menu.

Disk Jockey Release n *date time*

Disk Jockey Main Menu

1. Format a physical disk
2. Create, view, or change a logical disk unit
3. Install system software
4. View or change startup parameters
5. Run Disk Polisher

Enter choice: 1

The top line of the menu is called the status line. It shows you the revision of Disk Jockey that you are running, as well as the current system date and time if you are running in stand–among mode. Disk Jockey cannot supply the time and date in stand–alone mode because it has not yet been given that information. Instructions for setting the system date and time are found later in this chapter.

Following the *Enter choice* prompt on each menu, you will see a number. That number indicates the default choice; that is, the choice we think you are most likely to want at that particular time. Also, on all Disk Jockey menus, you will see an arrow (–>) pointing to the default choice. This is the menu cursor. You can always select any choice. In the Main Menu, choice 1 is the default.

Selecting Menu Choices

To accept the default choice on a CRT terminal, just press NEW LINE. To accept the default choice on a hardcopy terminal, press CTRL–A (hold down the CTRL key and press A); then press NEW LINE. To select a choice, type its number and press NEW LINE. Or you can use the cursor control uparrow and downarrow keys to move the menu cursor to a different choice. For example, suppose the default choice is 1. To select choice 2 you can either type 2 and press NEW LINE, or you can press the downarrow key. The menu cursor will move down to the 2, and the number 2 appears following the Enter choice prompt. To select the choice, press NEW LINE.

If you select a choice that is not on the menu, you will get an error message that prompts you to enter a valid choice.

Using Command Screens

A command screen is a screen that consists of one or more prompts followed by input fields, at which you are expected to enter information. That information might be anything from a disk unit name and device code, to a simple Y (Yes) or N (No) response to a prompt. The input fields of the Disk Jockey command screens often contain default values. The Format a Physical Disk command screen, following, is a representative sample of the command screens you will see with the Disk Jockey utility.

Format a Physical Disk [FORMAT]

WARNING: FORMATTING A PHYSICAL DISK DESTROYS ALL DATA ON THE PHYSICAL DISK

Disk unit name:

Test for bad blocks (surface analysis):	*Y*
Number of test patterns (1 - 5):	*n*
Format as a bootable disk:	*Y*
Reserve a diagnostic area on this disk:	*Y*
Size of diagnostic area in blocks (decimal):	*n*
Maximum number of user-defined system areas:	*10*
Maximum number of LDU pieces:	*8*
Maximum number of entries in the bad block table:	*n*

Execute? (Y or N):

Like the Disk Jockey menus, the command screens display a status line at the top of the screen. Instructions on getting on-line Help and exiting from the screen are given at the bottom of each screen. (The Help instructions are different for CRT terminals and hardcopy terminals; follow the instructions at the bottom of the screen to obtain Help.)

Providing Command Screen Input

The places on the command screens where you enter information are called input fields. Most input fields require you to enter a value; some ask you for a yes or no response to a question.

To accept any default response on a CRT terminal, just press NEW LINE while the cursor is on that prompt. To enter a different response, type over the default response, being careful to erase any extra characters by pressing ERASE EOL or the Space Bar the appropriate number of times. You can also press CR, which will erase to the end of the current line (same as ERASE EOL), and position the cursor at the next input field. CR acts the same as pressing ERASE EOL, and then NEW LINE.

On a CRT terminal you can also use the uparrow and downarrow keys and the BACKFIELD function key (SHIFT-F11) to move the screen cursor between input fields. For example, if you had already answered the first and second prompts on a particular screen, and then decided to change your answer, you could use the arrow keys to move the screen cursor back to a previous input field. Then you could simply type over your previous answer (being careful to erase any extra characters), and continue to the next input field. You can also use the downarrow key instead of the NEW LINE or CR keys to move to the next input field.

On a CRT terminal, you can press the EXECUTE function key (F1) from any prompt on the screen to indicate that the values shown are correct. For example, in Figure

2–3 you might press NEW LINE to accept the default value for the second input field (*Test for bad blocks (surface analysis)*), type a value for the second input field (*Number of test patterns*), type a value for the fifth input field (*Size of diagnostic area in blocks*), and then press the EXECUTE function key to accept the default values for the remaining input fields.

Besides the arrow keys and functions keys you can also use screen edit functions including CTRL–E (Insert mode) and CTRL–U (erases input) to move around the Disk Jockey screens.

To accept any default on a hardcopy terminal, press CTRL–A and NEW LINE. To back up one line, press CTRL–W. To move forward, you must reenter your answer (CTRL–A and NEW LINE for the default value). To erase characters on a hardcopy terminal, use the DEL key (the DEL key echos one character for each character erased) or CTRL–U (to erase the entire input line).

Exiting from Menus and Command Screens

If at any time you decide you don't want to select any of the choices on a particular Disk Jockey menu, you can exit from the menu by pressing the CANCEL/EXIT function key (F11) if your system console is a CRT terminal. If your system console is a hardcopy terminal, press ESC, and then C. Pressing CANCEL/EXIT (or ESC, and then C for hardcopy terminals) will return you to the menu from which you entered the current screen.

If you press CANCEL/EXIT from the Main Menu, Disk Jockey displays a message asking you if you really want to exit from the utility. If you decide you do not want to exit from the Disk Jockey utility, press CANCEL/EXIT a second time, or press NEW LINE at the *Execute?* prompt; Disk Jockey will return you to the Main Menu.

Otherwise, follow the directions given on the intermediate screen for continuing the CANCEL/EXIT function by typing Y and pressing NEW LINE to exit from Disk Jockey.

If you entered the Disk Jockey Main Menu from the Technical Maintenance Menu, Disk Jockey will return you directly to the Technical Maintenance Menu. If you entered Disk Jockey from the SMI Main Menu, Disk Jockey will return you to the SMI Main Menu.

Using Keywords

As you become more proficient with the Disk Jockey menus and screens, you will find that they branch and make different menu paths.

Suppose you are positioned in the LDU Information command screen and you want to perform a function that is on the Main Menu. Using the method we described earlier, you would have to press the CANCEL/EXIT key once to get to the LDU Menu, press CANCEL/EXIT a second time to get to the Main Menu, and then select the number representing the function you want to perform. You might find this method too time–consuming.

Fortunately, you can get from wherever you are in the Disk Jockey utility to any menu by entering a keyword. A keyword uniquely identifies a menu or command screen. Typing a keyword from any *Enter choice* prompt in Disk Jockey and pressing

NEW LINE allows you to go from wherever you are in the Disk Jockey utility directly to the menu or command screen associated with that keyword. For example, the keyword for the Install System Software Menu is SOFTWARE. You can type the keyword SOFTWARE from any *Enter choice* prompt within Disk Jockey to go directly to the Install System Software Menu.

When you exit from the menu or command screen, you will return to where you were when you issued the keyword.

Some keywords start an operation directly, without an intervening menu or command screen. The keyword DIAGNOSTICS (to run the AOS/VS II ADEX diagnostic package), DEFAULTOS (to boot the default operating system), and SCP (to return to the SCP–CLI prompt) execute these choices directly. Similarly the keyword BYE will exit from Disk Jockey.

You can enter keywords in either upper– or lowercase. You can abbreviate keywords to minimal uniqueness; that is, you can type the fewest number of characters that uniquely identifies that keyword. For example, three of the keywords for the Disk Jockey utility are SACREATE, SADELETE, and SARENAME. Since all three keywords begin with the letters SA, you must type three characters for a unique abbreviation; SAC, SAD, and SAR, respectively. If you type too few characters, Disk Jockey will prompt

Non–unique keyword specified

The BYE keyword allows you to exit from Disk Jockey. If you entered Disk Jockey from the CLI or the SMI, then you will return to the CLI or the SMI when you exit from Disk Jockey. If you entered Disk Jockey from the Technical Maintenance Menu, typing BYE will put you back in the Technical Maintenance Menu.

Table 7–1 lists the Disk Jockey keywords. You can list them on your screen by typing KEYWORDS and pressing NEW LINE.

Table 7-1 Disk Jockey Keywords

Keyword	What It Does
BBT	Views the bad block table.
BOOT	Boots from a different disk.
BOOTPR	Runs a specified program.
BOOTSTRAPS	Installs bootstrap programs.
BYE	Exits from the Disk Jockey utility.
DEFAULTOS	Loads and starts the default operating system.
DIAGNOSTICS	Runs diagnostics.
DJMAIN	Displays the Disk Jockey Main Menu.
FORMAT	Format a physical disks.
KEYWORDS	View a list of Disk Jockey keywords.
LDCOPY	Copies an LDU for backup.
LDDELETE	Deletes an LDU.
LDINFO	Views LDU information.
LDMENU	Displays the LDU menu.
LDMODIFY	Changes LDU parameters.
LDMPCR	Creates a multiple-piece LDU.
LDRENAME	Renames an LDU.
LDSPCR	Creates a one-piece LDU.
LOADOS	Installs an AOS/VS II release or update.
LOADMCODE	Installs microcode.
MICROSA	Creates a microcode system area.
PARAMETERS	Views or changes startup parameters.
PDISK	Displays the disk format menu.
POLISHER	Runs Disk Polisher.
SACREATE	Creates a user-defined system area.
SADELETE	Deletes a user-defined system area.
SAINFO	Views system area information.
SALOAD	Installs a file into a system area.
SAMCODE	Creates a microcode system area.
SAMENU	Displays the system area menu.
SARENAME	Renames a system area.
SCP	Enters the SCP.
SOFTWARE	Installs system software.
TMMENU	Enters the Technical Maintenance Menu.

CRT Versus Hardcopy Terminals

The way Disk Jockey displays screen information and input field default values depends on whether you're using a CRT or a hardcopy terminal.

On a CRT terminal, Disk Jockey displays a screen, complete with default answers (if any), and you move the cursor from question to question. You can accept the default to any question by pressing NEW LINE.

On a hardcopy terminal, Disk Jockey displays a screen (complete with default answers), but then posts the questions on the menu one by one, without displaying the default values. On a hardcopy terminal, you can press CTRL–A to see the default value for an input field. Then you can press NEW LINE to accept that default value for the input field.

Running Disk Jockey is easier on a CRT; use a CRT if you can. (If your system console is a hardcopy terminal, you must use the hardcopy terminal to format your system LDU. Later you can format your other disks by running stand–among Disk Jockey from a user terminal.)

Correcting Mistakes and Errors

If you type an incorrect answer to a Disk Jockey question and have not yet pressed NEW LINE to enter the answer, press the DEL key to erase the wrong characters or CTRL–U to erase the entire response. If you have already pressed NEW LINE, you can use the uparrow key to back up to previous input fields, press CANCEL/EXIT or ESC–C to clear the screen and return to the previous menu or screen, or enter N (No) at the *Execute* prompt.

If you have already executed a Disk Jockey command screen and feel you must abort the stand–alone Disk Jockey, type the break sequence as follows. On a CRT terminal, press CMD, hold it down, and press the BREAK/ESC key (on older model CRTs press the BREAK key). On a hardcopy terminal, press BRK. If you must abort the stand–among Disk Jockey, type CTRL–C CTRL–B; however, this is not recommended.

If you abort Disk Jockey while it's testing for bad blocks, restart the bad block test.

If Disk Jockey reports a disk error or other error, make sure the disk unit is write–enabled (if this applies). If the disk is write–enabled, check the error message in the manual *AOS/VS and AOS/VS II Status and Error Messages*.

You can find complete instructions on bringing up your AOS/VS II system for the first time, and formatting the system disk in the manual *Installing, Starting, and Stopping AOS/VS II*.

Getting On–Line Help (HELP Function Key)

At times you may find yourself looking at a menu or screen that has choices you don't completely understand. There may also be an input field on a command screen for which you aren't sure what value to enter. If this happens, you can either consult the appropriate portion of this manual, or for a quick explanation of your choices, you can press the HELP function key (SHIFT–F1) for on–line Help. On a hardcopy terminal, press ESC, and then H.

If the cursor is positioned at a menu when you request help, the on-line Help system will supply a brief explanation of that menu's choices, to assist you in making your selection. If you press the HELP function key while at a command screen, the on-line Help will address the input field corresponding to the cursor position.

On-line Help is available throughout the Disk Jockey utility. Asking for help does not interrupt the activity in progress; when you are finished viewing the Help file, you will return to exactly where you were when you requested help.

Scrolling the Help Display

Some Help files may be more than one screen long. If this is the case, you will see the first Help screen, and then can choose if you want to view additional Help screens or return to the Disk Jockey screen you were using when you requested help. If you want to view additional Help screens, you can scroll the screen by pressing the NEXT SCREEN (F4) and PREVIOUS SCREEN (F3) function keys located on the top row of your keyboard. NEXT SCREEN scrolls ahead one screen. The NEXT SCREEN function key will not work if you are positioned on the last Help screen. Similarly, the PREVIOUS SCREEN function key scrolls backward one screen. The PREVIOUS SCREEN function key will not work if you are positioned on the first Help screen.

Since you cannot scroll the Help display on a hardcopy terminal, Disk Jockey will print out the whole Help file for the topic you choose.

Running Disk Jockey in Tutorial Mode

Stand-among Disk Jockey has a special feature that allows you to run the utility in Tutorial mode. When you run Disk Jockey in Tutorial mode, any functions you perform via Disk Jockey's menus and command screens will not really be performed. Tutorial mode allows you to practice with the Disk Jockey without fear of doing damage to your system. For example, you can run Disk Jockey in Tutorial mode and practice creating user-defined systems areas. The real system areas on your disk(s) will remain exactly as they were; you will not have created any new system areas. This is an excellent way of getting to know the functions and features of Disk Jockey without the risk of accidentally destroying information.

Tutorial mode is available only when you are running Disk Jockey under AOS/VS II (this is called stand-among Disk Jockey). To run Disk Jockey in Tutorial mode, use the /T switch when you type the XEQ DJ command; for example

```
) XEQ DJ/T ⤶
```

Adding the /T switch to the XEQ DJ command will bring up Disk Jockey in tutorial mode. The word Tutorial appears on the status line at the top of the screen. To exit from Disk Jockey while in tutorial mode, enter BYE from any prompt, or press CANCEL/EXIT from the Main Menu.

If Disk Jockey Terminates Abnormally

If you are running Disk Jockey under AOS/VS II (this is called stand-among Disk Jockey), and the program terminates abnormally, it will issue the error message

Error: From Disk Jockey
Abnormal Program Termination

Do you wish to take a memory dump in order to file an STR? [Y]

Disk Jockey asks if you want to take a memory dump so that the dump can be sent to Data General along with an STR reporting the problem.

If you type Y (Yes) and press NEW LINE, AOS/VS II will create a dump file in the working directory named in the form

DJ_dd-mon-yy_hh:mm:ss.MDM

where dd-mon-yy is the current date and hh:mm:ss is the current time

The messages that the system console issues in the event Disk Jockey terminates abnormally and the steps to follow to perform a memory dump appear in *Managing AOS/VS and AOS/VS II* in the section "Gathering STR Information."

Stand-Alone and Stand-Among Disk Jockey

There are two versions of Disk Jockey — a stand-alone version that you boot from the SCP CLI when AOS/VS II is not running, and a stand-among version that runs under AOS/VS II. Typically, you use the stand-alone version when you first bring up your system, to format your system disk. Then once you have formatted the system disk and installed AOS/VS II, you can use the stand-among version of Disk Jockey to format your remaining disks.

NOTE: If you enter Disk Jockey from the System Management Interface (SMI) Main Menu, you will be using the stand-among version of Disk Jockey — not the stand-alone version. If you enter Disk Jockey from the SMI, skip to the section entitled "Selecting Main Menu Choices."

Starting Stand-Among Disk Jockey

The stand-among Disk Jockey program file is in directory :UTIL; its filename is DJ.PR. DJ.PR is among the system files loaded on the disk when you install system files.

You can use the stand-among version of Disk Jockey to format any disk that is not part of the master LDU or any disk that is currently initialized. Stand-among Disk Jockey allows AOS/VS II to remain up while Disk Jockey runs. You can run the stand-among version of Disk Jockey from the system console or any user terminal enabled by EXEC.

Make sure your searchlist includes :UTIL and :HELP (for on-line help). If you plan to change anything on a disk (for example, its name or ACL, or if you want to create an LDU on it or run Disk Polisher on it), you will need write access to disk unit name entry in :PER or Superuser on.

Execute Disk Jockey by typing

```
) SEARCHLIST :UTIL,:HELP↵
) SUPERUSER ON↵
Su)                    (With CLI16, the Superuser prompt is *) instead of Su)
```

The system will run Disk Jockey, which will display its Main Menu. With the Main Menu displayed, skip the following sections to the section "Selecting Main Menu Choices."

Starting Stand–Alone Disk Jockey

You must use stand–alone Disk Jockey to work with the system LDU, as perhaps when you want to run disk Jockey's Disk Polisher on the system LDU. For other LDUs, it is easier to start AOS/VS II (if not running), and then run stand–among Disk Jockey from AOS/VS II.

Booting from Magnetic Tape

Generally, you will boot from disk. You would boot from tape only if you could not boot from disk. To boot from tape, see Chapter 2.

Booting from Disk

If AOS/VS II has already been installed on the system disk, you can boot from disk by typing

SCP-CLI> RESET ↲
SCP-CLI> BOOT 24 ↲ (Or BOOT 27↲ for a DPF–type disk or BOOT 116↲ for a disk on an MRC bus)

With the tape on an MRC bus (you typed BOOT 116), you see the question

Enter NODE,UNIT of MRC boot device in hex [x,y]

The value of the default unit (*x,y*) depends on the last default set. If a default has never been set, *x,y* shows *No default given*. Generally, the primary MRC tape controller is in node A (slot number 0A, in hex) and the unit is number 0, so type 0A,0↲. After you answer, the hardware might ask if you want the new value to be the default. Respond No by pressing NEW LINE, since you specified the default earlier, when you installed AOS/VS II.

After a brief pause, the Operating System Load Menu appears.

Operating System Load Menu

1 Load and start default operating system
2 Enter the Technical Maintenance Menu
3 Load and verify microcode
4 Run diagnostics

Loading will continue automatically unless you respond within 45 seconds.

Enter choice [1]: 1

Choice 1, "Load and start default operating system," loads the default AOS/VS II operating system (either the starter system or your own tailored AOS/VS II system). Choice 2, "Enter the Technical Maintenance Menu," gives you access to the Disk Jockey utility.

Type 2 and press NEW LINE. If the Technical Maintenance Menu appears, skip past the next section. If you are asked the date and time, answer as described next.

Specifying the Date and Time

Disk Jockey needs to know the date and time. If Disk Jockey can get this information from the computer boot clock, it will. (Stand–among Disk Jockey gets the date and time from the system clock. Stand–alone Disk Jockey might be able to get the date and time from the computer's boot clock, if your computer has one.) If Disk Jockey can get the date and time from the system clock, it displays the Operating System Load Menu, from which you can load the default operating system or select the Technical Maintenance Menu (from which you access the Disk Jockey Main Menu).

If Disk Jockey cannot get the date and time from the system, it displays the Set System Date and Time command screen:

Set System Date and Time

System Date [MM/DD/YY]	*1/01/69*
System Time [HH:MM:SS]	*00:00:00*
Offset to GMT [+HH:MM:SS]	*+0:00*

Execute? (Y or N):

If you will install software later, it's critically important to set the date and time accurately here to provide accurate timestamps for files. In any case, you might as well do it right. We will take the questions one by one.

System Date [MM/DDD/YY]:

Type the date as numbers for month, day, and year. You can use spaces or slashes to separate the numbers. For example, for August 23, 1990, type

08 23 90 ⤶

System Time [HH:MM:SS]:

Type the time, based on a 24–hour clock, in hours, minutes, and seconds. Minutes and seconds are optional. If you omit them, the system sets each to 0. Use spaces or colons (:) to separate the numbers. For example, for 2:30 p.m., type

14 30 ⤶

Offset to GMT [+HH:MM:SS]:

Take the default: with a CRT terminal, press NEW LINE; with a hardcopy terminal, press CTRL–A, and then press NEW LINE. After you set the date and time, and enter Y (Yes) after the *Execute?* prompt, the Technical Maintenance Menu will come up after approximately 10 seconds.

The Technical Maintenance Menu [TMM]

The Technical Maintenance Menu lets you access the Disk Jockey Main Menu so you can format your disk(s), create or modify LDUs, or polish the system LDU. You use the stand–alone Disk Jockey to software format disks, create LDUs, load bootstrap programs, view or change startup parameters, install an AOS/VS II release or update, and reclaim unused disk space. The Technical Maintenance Menu follows.

Technical Maintenance Menu

1. Load and start the default operating system
2. Load and verify microcode
3. Enter the SCP CLI
4. View or change startup parameters
5. Run diagnostics (appears if the ADEX diagnostic system is installed on disk)
6. Run a specified program
7. Enter the Disk Jockey Main Menu
8. Boot from a different disk unit
9. Size system configuration

Enter choice:

The Technical Maintenance Menu also gives you a way to enter the SCP CLI, load microcode, and run the AOS/VS II ADEX diagnostic package.

To use Disk Jockey, you want choice 7. Other choices are explained in Chapter 6, section "Using the Technical Maintenance Menu." Type

7⤶

Disk Jockey will then display its Main Menu. Continue to the next section.

Selecting Main Menu Choices [keyword DJMAIN]

Disk Jockey displays its Main Menu, which follows.

Disk Jockey Main Menu

1. *Format a physical disk*
2. *Create, view, or change a logical disk unit*
3. *Install system software*
4. *View or change startup parameters*
5. *Run Disk Polisher*

Enter choice: 1

The remainder of this chapter describes choices under these in the Main Menu. That is, the sections explain all submenu choices under 1, "Format a physical disk" (four choices); then they explain all choices under 2, "Create, view, or change a logical disk unit," and so on. To select the choice you want, enter the number of your selection or press the EXECUTE function key (F1).

For example, typing 3 and pressing NEW LINE would display the Install System Software Menu.

You can also move the cursor to the selection you want using the uparrow and downarrow keys, and make your selection with either the NEW LINE key or the EXECUTE function key (F1).

Exiting from the Main Menu [BYE]

Pressing the CANCEL/EXIT function key (F11) (ESC–C for hardcopy terminals) from the Main Menu brings up an intermediate screen asking you if you really want to exit from the Disk Jockey utility. To exit, type Y and press NEW LINE. To return to the Main Menu press NEW LINE to accept the default response "No," or press CANCEL/EXIT (ESC–C for hardcopy terminals). If you entered the Disk Jockey Main Menu from the Technical Maintenance Menu, you will return to the Technical Maintenance Menu.

You can type the keyword BYE from the *Enter choice* prompt on the Main Menu (or any other menu in Disk Jockey). You cannot type the BYE keyword from the *Execute?* prompt at a command screen and expect Disk Jockey to exit. At a command screen, press CANCEL/EXIT to return to the previous menu, and then type BYE and press NEW LINE to exit from Disk Jockey. The BYE command exits immediately from Disk Jockey.

Physical Disk Format Menu [PDISK]

The Physical Disk Format Menu, accessible from choice 1 on the Main Menu or via keyword, lets you format disks and create or delete system areas; it also lets you *examineM* system areas and check the bad block table. The menu follows.

Physical Disk Format Menu

1. *Software format a physical disk*
2. *View or modify the bad block table*
3. *View system areas*
4. *Create, change, or delete user-defined system areas*

Enter choice: 1

The following sections explain these choices — after giving some background on formatting.

Formatting Physical Disks — Some Background

Before AOS/VS II can use a disk, the disk must have been software formatted and one or more logical disk units (LDUs) created on it. This is true for the system disk — before AOS/VS II is installed on it — and all other disks. Even if your disks were software formatted under Data General's AOS/VS operating system, they must be reformatted to run under AOS/VS II. (Software formatting is different from hardware formatting. All Data General disks are hardware formatted before they are shipped to you. All references to formatting in this chapter indicate software, not hardware, formatting.)

Generally, formatting is needed only once; after a disk has been formatted, you can create, delete, and expand LDUs on it at any time. If you want to work with a disk that has been formatted, do not format the disk; just skip to the appropriate section on LDUs.

When you format a physical disk, Disk Jockey writes tables that destroy access to all data on the disk, including any LDU pieces or AOS/VS II files. So, before you proceed to format a physical disk, be sure there is no data on the disk that you want to save.

If you want to format a disk that has meaningful information on it, be certain to dump all its files to tape using either the DUMP_II or LDCOPY utility. (You could also use the DUMP_3 utility, which is a separate product not shipped with AOS/VS II.) Whichever method you use, we strongly suggest that you make at least two backup sets. Later, after you've formatted your disks and created LDUs, you'll have to reload all your files using the LOAD_II or LOAD_3 utilities; or if you used LDCOPY, with LDCOPY.

For additional details on the DUMP_II/LOAD_II and LDCOPY utilities, see the appropriate backup chapter of *Managing AOS/VS and AOS/VS II.*

If you want to move files from a disk formatted under AOS/VS (not AOS/VS II), you must use the DUMP command or DUMP_II, since LDCOPY is not available under AOS/VS and the AOS/VS PCOPY and MSCOPY utilities are not available under

AOS/VS II. Also, you should also read the new file system migration document in the AOS/VS II directory :UTIL:NEWFS_MIGRATION:NEWFS_MIGRATION.DOC.

Software Formatting a Physical Disk [FORMAT]

The first choice that the Physical Disk Format Menu offers is 1, "Software format a physical disk." When you select this choice. Disk Jockey displays the Format a Physical Disk screen:

Format a Physical Disk [FORMAT]

WARNING: FORMATTING A PHYSICAL DISK DESTROYS ALL DATA ON THE PHYSICAL DISK

Disk unit name:

Test for bad blocks (surface analysis):	*Y*
Number of test patterns (1 – 5):	*n*
Format as a bootable disk:	*Y*
Reserve a diagnostic area on this disk:	*Y*
Size of diagnostic area in blocks (decimal):	*n*
Maximum number of user-defined system areas:	*10*
Maximum number of LDU pieces:	*8*
Maximum number of entries in the bad block table:	*n*

Execute? (Y or N):

NOTE: As the warning indicates, formatting a physical disk, as you're about to do, destroys all information on the disk (if there is any information). However, if you have never formatted your disks under AOS/VS II, you *must* format them. If your disk is already formatted for AOS/VS II, you don't need to format it again.

Disk Jockey is asking the question

Disk unit name:

You need to identify the disk unit that holds the disk to be formatted. To do this, type the disk unit name. Disk unit names may be as long as 31 filename characters. There are default names for disk units, but nondefault names can be assigned during VSGEN.

If you are running stand–among Disk Jockey, and this disk has been identified to the operating system (someone has run VSGEN and identified the disk unit), this means the disk unit name already exists. (The name is an entry in the peripherals directory, :PER.) Try to remember (and type) the correct disk unit name.

If you are running stand–alone Disk Jockey and have set the default device .NAMES file to your tailored operating system (as suggested in Chapter 4), Disk Jockey will know all disk unit names. If you type a name it doesn't recognize, it will prompt you to identify the disk unit.

If this disk has never been identified to the operating system, the name you type here may not really matter. The name you type will not be permanently recorded, and

Disk Jockey will prompt you to identify the disk unit. Later, you will need to generate a new AOS/VS II system to support the unit.

Default device names of disks on some controllers are as follows, in Table 7–2. All device codes are octal.

Table 7–2 Default Device Names of Disk Units

Unit Number on Controller	DPJ Disk Controllers and Device Codes First, 24	Second, 64	DPF Disk Controllers and Device Codes First, 27	Second, 67	MRC Disk Controller in Slot Number E, Channel Device Code 116
First	DPJ0	DPJ10	DPF0	DPF10	MRCDISK000E00
Second	DPJ1	DPJ11	DPF1	DPF11	MRCDISK000E01
Third	DPJ2	DPJ12	DPF2	DPF12	MRCDISK000E02
Fourth	DPJ3	DPJ13	DPF3	DPF13	MRCDISK000E03
Fifth	DPJ4	DPJ14	N.A.	N.A.	MRCDISK000E04
Sixth	DPJ5	DPJ15	N.A.	N.A	MRCDISK000E05
Seventh	DPJ6	DPJ16	N.A.	N.A.	MRCDISK000E06
Eighth	DPJ7	DPJ17	N.A.	N.A.	MRCDISK000E07

On MRC controllers, the six characters following MRCDISK indicate the MRC chassis number (two digits), slot occupied by the disk controller (two digits), and unit number (two digits). All MRC numbers are hexadecimal. Therefore, MRCDISK000E03 means the first MRC (00), slot E (0E), unit 3 (fourth unit).

Default device names are further described in Chapter 2 (Tables 2–1 and 2–2), Chapter 4, and Appendix A.

Type the name of the disk unit; for example,

DPJ3↵ (Or MRCDISK000E03↵)

Next, using the Device Specification screen, Disk Jockey asks other questions to identify the disk.

Device Specification

Device name:	*xxx*	
Bus type (ECL or MRC):	*xxx*	
Device type:	*xxx*	*ddd,ddd,ddd,ddd* *ddd,ddd,ddd,ddd*
Unit number:		
Device code (octal):		
MRC slot number (hex):		
Execute (Y/N):		

If you are running stand–alone Disk Jockey, and it recognizes the unit you specify, it will fill in default values for all fields. You cannot edit these fields; Disk Jockey will position the screen cursor at the *Execute?* prompt, and you should type Y (Yes) and press NEW LINE to accept the device specification. If the default values that Disk Jockey displays are not the values you want for this LDU, type N (No) and press NEW LINE. Disk Jockey will then let you specify a different LDU.

If stand–among Disk Jockey does not recognize the device you specified, it will not bring up the Device Specification command screen; it will instead return an error message to the current screen. Type the correct unit name.

If you are running stand–alone Disk Jockey, it will try to provide defaults. But if it is the first time you have specified a unit, you must answer all questions on the Device Specification screen. If you already have identified a device in this session, Disk Jockey will remember those specifications, fill in the input fields of the Device Specification screen, and position the screen cursor at the *Execute?* prompt.

We will explain the device specification questions one by one.

Device name: *xxx*

Here, the device name *xxx* is copied from the previous question; you can't change it.

Bus type: *x*

If the disk is connected via an ECLIPSE bus, enter ECL. If it is connected via an MRC bus, enter MRC.

Once you specify the bus type, Disk Jockey provides you with defaults to as many of the remaining input fields as it can.

If the bus type is ECL and the device name is of the default AOS/VS II form (for example, DPJ13), Disk Jockey will fill in the device type, unit number, and device code as you go along. For the device code, Disk Jockey will use only the code for the first device; for example, for DPJ13, it would use 64.

If the bus type is MRC, Disk Jockey will fill in the device type and device code. You will have to specify the unit and slot numbers.

Device type: *x*

Specify the correct device type from those shown in parenthesis following the input field, and press NEW LINE. Or if the default is correct, take it.

Unit number:

Specify the number of the unit on its controller. For an ECLIPSE–busdisk, use octal notation; for an MRC–bus disk, use hexadecimal. Or if the default is correct, take it.

Device code:

The table above and Tables 2–1 and 2–2 in Chapter 2 show the standard AOS/VS II disk unit names and device codes. For an MRC–bus disk, this is the device code of the MRC channel interface (MVCI or CI); for an ECL–bus disk, it is the device code of the disk controller. Specify the device code; or if the default is correct, take it.

MRC slot number (hex):

Specify the slot number of the disk controller in the MRC chassis. For the first disk controller in an MRC chassis, the default slot is E (hex); for the second disk controller it is F (hex). Or if the default is correct, take it.

Execute? (Y/N)

Although Disk Jockey checks the syntax of each answer immediately after you press NEW LINE, it does *not* check for the existence of the disk until you fill the entire screen and confirm via this *Execute?* question. At that point, if the disk doesn't exist on the given device code, Disk Jockey might hang, requiring you to abort and restart it. So try to specify the correct disk unit, device code, and, if needed, slot.

If the answers on the screen are correct, confirm by entering Y. If not, return to any incorrect answer and fix it.

If you receive an error message, respecify the disk unit information and press NEW LINE. Disk Jockey will move the screen cursor to the next input field, *Test for bad blocks*.

Test for bad blocks (surface analysis):

Disk Jockey is asking if you want to test for bad blocks on this disk. Bad blocks are flawed areas that won't hold information on the surface of the disk. It's important to identify and record all bad blocks (if they exist) so that AOS/VS II can avoid them.

NOTE: You need not run patterns on any disk whose controller can detect bad blocks.

Disks whose controllers can detect and bypass bad blocks (and which you need not test for bad blocks) include

Model 6236 (354 Mbytes) and multiple-unit Model 6237.

Model 6239 (592 Mbytes) and multiple-unit Models 6290 and 6240.

Model 6357 (862 Mbytes) and multiple-unit Models 6398 and 6399.

Model 6446 (234 Mbytes).

Model 6491 (322 Mbytes).

Model 6492 (727 Mbytes).

Model 6581 (500 Mbytes) and multiple-unit Models 6582 and 6584.

Model 6621 (1.2 Gbytes).

Other disk controllers cannot detect bad blocks.

You need not run patterns on any disk that has a valid bad block table (produced by the Disk Jockey or, if the disk was formatted under AOS/VS, by the Disk Formatter). Disk Jockey can read the entries in this bad block table and use them in its own table. For any such disk, answer No to this *Test for bad blocks* prompt and skip to the prompt *Format as a bootable disk.*

To identify bad blocks, Disk Jockey writes a pattern to each 16-bit word on the disk, and then reads it back and compares the two numbers. Disk Jockey records the address of any bad blocks it finds in a Bad Block Table (BBT) that is stored on the physical disk. AOS/VS II then keeps the BBT partially in memory. When AOS/VS II wants to access a block whose address is noted in the BBT, the table directs it to a good block in an area called the remap area. AOS/VS II automatically remaps any bad blocks it encounters on a write operation.

Surface analysis can take up to 50 minutes per pattern, depending on the model of disk being tested.

If a disk controller can detect bad blocks, or the disk was formatted under AOS/VS II or AOS/VS, skip the surface analysis. Answer No and skip the next question.

If a disk has never been formatted and its controller cannot detect bad blocks, we strongly suggest that you invest the time and have Disk Jockey test for bad blocks. It is a wise investment, especially since you will rarely, if ever, have to test for bad blocks again.

Number of test patterns:

Disk Jockey can run as many as 5 patterns on the disk. If you answered Yes to the prompt *Test for bad blocks*, Disk Jockey requires that you answer this question with a digit between 1 and 5. How many patterns you choose to run depends on how confident you are of your disks, and how much time you want to spend running patterns. For approximate times needed to run patterns on various disk models, see Chapter 2, Table 2-3.

If you answered No to the question *Test for bad blocks*, Disk Jockey skips the question *Number of test patterns*.

Format as a bootable disk:

A bootable disk is a logical disk unit (LDU) that has software bootstrap programs installed on it; you can start software from it. (The disk usually has an operating system as well as the bootstrap programs.) A Yes answer to this question reserves space on the disk for bootstrap programs and microcode, which you later install using Disk Jockey.

On an ECLIPSE I/O bus (as opposed to a MRC I/O bus), the hardware can boot from only the first disk on a controller. For example, you could boot from DPJ0 or DPJ10, but not from DPJ1 or DPJ11. Therefore, for an ECLIPSE disk it may waste space to answer Yes for a disk that is not (or cannot be inserted as) the first disk on a controller. Always answer No for a disk you know you won't boot from (like a diskette). On an MRC I/O bus, the hardware can boot from any disk.

Generally, you will want to answer N (No) unless this is your system disk, formatted earlier as described in Chapter 2. But if you're sure you want to set up this disk as a bootable disk — perhaps to serve as a second system disk — answer Y (Yes).

Reserve a diagnostic area on the disk:

This question lets you reserve an area on the disk for later installation of Data General's Advanced Diagnostic Executive system (ADEX). Diagnostics can run from a medium other than disk, but they run much faster from disk. Also, it is easier to run diagnostics remotely (over a modem, for example) if ADEX is on disk. ADEX is available for any system with a valid Data General service contract or can be purchased separately under the Cooperative Maintenance Organization (CMO) agreement.

Diagnostics can run only from one bootable disk per system, usually the system disk. So generally you will want to answer N (No) unless this is your system disk (formatted earlier as described in Chapter 2). But if you are sure you want to set up this disk as a bootable disk and Data General will install diagnostics for you, answer Y (Yes).

If you answer N (No), Disk Jockey skips the next question.

Size of diagnostic area in blocks (decimal):

The default value is a midpoint between the maximum (15000) and the minimum (3000) number of blocks. For specific instructions on how to calculate the number of blocks that will be required for the diagnostic area, see the manual *Coresident Diagnostics System Operator's Reference Guide*. If you prefer to use the default value of 10000 blocks, press NEW LINE. If you have calculated the number of blocks required, type the number and press NEW LINE.

Maximum number of user-defined system areas:

System areas are areas on the disk, outside of the file system, reserved for microcode and bootstraps. *User-defined* system areas are those you can use for your own purpose — perhaps for disk identifiers or similar purposes. User programs can open user-defined system areas via the ?GOPEN system call (described in the manual *AOS/VS, AOS/VS II, and RT32 System Call Dictionary, ?A through ?M*) using the form

disk-unitname:system-area-ID

User programs can read and write to these system areas as if they were any other file (for example, @DPJ0:1005). Also, you can use the CLI command COPY to read from and write to a user-defined area. The :PER entries for the disk unit must have ACLs that allow the kind of access needed to use the system area: Read to open and Write to modify.

Decide on the (decimal) number of user-defined system areas you will want on this disk and type this value, or accept the default value. (The system adds the number you specify here to the number of LDU pieces — specified next — and stores the result as the limit of both items. Therefore you may be able to create more system areas than you specify here, but only at the expense of future LDU pieces. For example, if you specify 8 system areas and 8 LDU pieces, you can create up to 16 system areas, but if you create 16 areas you will not be able to create any LDU pieces.)

Maximum number of LDU pieces:

Each physical disk can consist of one or more LDU pieces. This question is asking for the upper limit of LDU pieces that can be created on this particular physical disk.

Each LDU (or portion of an LDU) on a physical disk occupies one piece. So if a disk will hold one LDU (or part of one), at least one piece must be allocated; and if a disk will hold two LDUs (or part of two), at least two pieces must be allocated. If a disk will hold n LDUs (or pieces of LDUs), it must have at least n pieces allocated. The maximum number of LDU pieces permitted on a physical disk is 499.

You don't *need* to create as many LDUs as the number of pieces you specify; this question simply sets the upper limit. So, unless you plan to create many LDUs on this disk, you should take the default. If you plan to create many LDUs on the disk, take the number you plan, add four or so for possible expansion, and type that number (decimal). The system prompts

Maximum number of entries in the Bad Block Table:

You can limit the number of bad block entries made in the Bad Block Table. Disk Jockey provides a default of 128 (decimal), which you can change if you require a larger number. The default should prove sufficient for most disk models; however, for a model 6214 disk, we suggest a minimum of 1024 bad block entries.

Usually, if the number of bad blocks exceeds the number of bad block table entries you allotted, you can assume there is a hardware problem with the disk. Therefore, there is no useful purpose in specifying a value greater than the default, since you probably cannot use a disk with a large number of bad blocks. On the other hand, if you specify a number smaller than the default, you may have to prematurely reformat a disk. We suggest you accept the default number specified by Disk Jockey, unless you are using model 6214 disks. If you specify a nondefault value, Disk Jockey rounds it up to the nearest integer multiple of 61 and creates a bad block table of that size.)

Execute?

When you have answered all the questions, the screen cursor moves to the *Execute?* prompt. To software format the disk, type Y and press NEW LINE.

If you want change any input field, type N and press NEW LINE. Disk Jockey will move the cursor to the first input field of the command screen. To change any of the input fields, move the screen cursor to the desired input field using the uparrow and downarrow keys or the NEW LINE key. You can then type over any answer you want to change. When you are satisfied with the content of all the input fields, move the cursor to the *Execute* prompt and type Y and press NEW LINE, or press the EXECUTE function key (F1).

Disk Jockey now tries to access the disk you identified earlier. If you see no new messages for a period of, say, 60 seconds or more, perhaps you specified a nonexistent disk unit or device code. You may want to abort Disk Jockey (press the break sequence) and respecify the disk. Normally, Disk Jockey will be able to access the disk and it will display a message to explain what's happening.

If you said No to bad block testing, skip past the next two paragraphs. If you said Yes to bad block testing, Disk Jockey tests the disk surface for bad blocks, describing its progress across the disk.

If Disk Jockey finds too many bad blocks, it notifies you and asks if you want to continue. If you answer Yes, it will let you enlarge the bad block table. You might choose to enlarge the table, say by 50 percent. But generally, too many bad blocks means a hardware problem like head misalignment; you may want to consider running diagnostics on the disk unit (with a different disk pack if possible). You don't want bad blocks noted on the disk if the disk is fine but the disk unit heads are out of alignment.

In most cases, it's simply a matter of waiting for testing to finish. When Disk Jockey finished testing for bad blocks, it notes any bad blocks in the disk's bad block table.

Disk Jockey now creates the tables AOS/VS II needs. You will see messages about disk tables being created. This takes just a few moments. When done, Disk Jockey returns to the Physical Disk Format Menu, allowing you to format other disks.

Normally, after you format a physical disk, you will want to create LDU(s) on it. However, since this manual shows the entries in the order they appear on the menus, the next section we describe is "Viewing the Bad Block Table." If you want to creating an LDU now, skip to the section "LDUs (Logical Disk Units)."

Surface Analysis Example

Figure 7–5 illustrates the messages you will see if Disk Jockey finds more bad blocks than will fit in the Bad Block Table. In this example, the user elects to enlarge the BBT and continue with the surfaceanalysis.

```
Running patterns -- Disk size = 132567

Analyzing 20 percent of disk (221130 octal blocks)
New bad blocks: 0                Total bad blocks: 0

Analysis 20 percent complete

New bad blocks: 2                Total bad blocks: 2
.
.
.
Analysis 60 percent complete

New bad blocks: 4                Total bad blocks: 128
You have specified 128 blocks as the Bad Block Table size.
So far 128 bad blocks have been found.
Would you like to continue [Y/N]?   Y ⤶

Supply New Bad Block Table Size [128]:  256 ⤶

Analysis is 80 percent complete
New bad blocks: 5                Total bad blocks: 133

Analysis is complete
Now adding the bad blocks to the BBT
.
.
.
Please wait while the disk is Software Formatted
```

Figure 7–5 Software Formatting Surface Analysis Dialog

Disk Jockey messages tell you what percentage of the disk has had patterns run on it, how many (if any) new bad blocks Disk Jockey found in that area of the disk, and the total number of bad blocks discovered on the disk. For example:

Analysis 40 percent complete

New bad blocks: 4   Total bad blocks: 128

In the example above, Disk Jockey found two bad blocks in the first 20 percent of the disk that it analyzed. Disk Jockey continued analyzing the disk, finding bad blocks as it went, until the point where it found enough bad blocks and reached the user–imposed limit of 128. At this point it offered the opportunity to revise the Bad Block Table size and continue.

Viewing the Bad Block Table [BBT]

Choice 2 on the Physical Disk Format Menu is "View or modify the bad block table." Use this to see a list of bad blocks that Disk Jockey found (by running patterns), or to add additional blocks that you know are bad.

After you select 2, Disk Jockey will bring up a blank display similar to the following.

Bad Block Table for xxx

Pick one: (1. Change disk unit, 2. Add bad block,
3. Top of display, 4. Print) 1

Choice 1, "Change disk unit," is the default choice, before you specify a disk unit. Press NEW LINE to accept the default.

Disk unit name:

The cursor is at the *Disk unit name:* prompt. Type the disk unit name (for example, DPF1) for which you want the Bad Block Table displayed, and press NEW LINE. Disk Jockey displays the address of each bad block found on that disk. At the top of the screen Disk Jockey displays the total number of bad blocks on that disk. To scroll the display, use the PREVIOUS SCREEN (F3) and NEXT SCREEN (F4) function keys.

Bad Block Table for DPF1

5 bad disk blocks

Addr: 00000574537
Addr: 00000747566
Addr: 00000747570
Addr: 00000747571
Addr: 00000747572

Pick one: (1. Change disk unit, 2. Add bad block,
3. Top of display, 4. Print) 1

Other choices at the *Pick one* prompt let you add additional bad blocks, return to the top of the display (useful when the display is several screens long), and print the list of bad blocks displayed on the screen.

If you select choice 2, "Add bad block," Disk Jockey will provide an input field for you to specify the address of an additional bad block.

Type the address of the bad block and press NEW LINE. Disk Jockey will add the address you typed to the list of bad blocks. Disk Jockey allows you to specify one additional bad block address. Press CANCEL/EXIT to exit this choice.

If you select choice 3, "Top of display," Disk Jockey will return the screen cursor to the first line of the display. This is useful when viewing the Bad Block Table of a disk with a large number of bad blocks.

If you select choice 4, "Print," Disk Jockey will display a second *Pick one* prompt:

Pick one: (1. File, 2. Printer) 1
Pathname:

Type the number for file or printer and press NEW LINE. Disk Jockey will then ask you for a pathname. Type the file's pathname or the name of the printer and press NEW LINE.

For a file, the file will be created in the directory from which you booted or executed Disk Jockey, unless you specify a different directory. (If you booted Disk Jockey from tape, you cannot specify a file here.)

For a printer, type the name of the printer (for example, LPB) and press NEW LINE. In stand-among Disk Jockey, the printer you choose cannot be owned by EXEC, that is, it cannot have been started with an EXEC START command.

To exit from the bad block display, press the CANCEL/EXIT function key.

Viewing System Area Information (SAINFO)

Choice 3, "View system areas," on the Physical Disk Format Menu lets you view the System Area Table (SAT), which lists the ID, name, starting address (in octal), and the size of existing system areas on a disk.

When Disk Jockey first displays the System Area Information command screen, the display portion of the screen will be blank and the screen cursor will be positioned at the question *Disk unit name*. Specify the name of the disk for which you want to view the system area statistics and press NEW LINE. Disk Jockey will display the system area information for the disk you specified.

A sample system area information display follows.

System Area Information for DPJ1

System Area ID	*System Area Name*	*Starting Address (Octal)*	*Size (Octal)*
1	*Primary SAM Area*	*0*	*7*
13	*Pri DF Boot Area*	*7*	*3*
17	*Pri Ucode Loader*	*11*	*25*
2	*Secondary SAM Ar*	*36*	*32*
3	*Primary SAT*	*67*	*7*

Pick one: (1. Change disk unit, 2. Top of display, 3. Print) 1

The choices at the *Pick one:* prompt let you change the disk unit, return to the top of the display, or print the list of system areas displayed on the screen.

If you select choice 1, "Change disk unit," Disk Jockey will display the "Disk unit name" prompt input field so you can specify another disk.

If you select choice 2, "Top of display," Disk Jockey will return the screen cursor to the first line of the system area display.

If you select choice 3, "Print," Disk Jockey will display a second *Pick one* prompt:

Pick one: (1. File, 2. Printer) 1
Pathname:

Type the number for file or printer and press NEW LINE. Disk Jockey will then ask you for a pathname. Type the file's pathname or the name of the printer and press NEW LINE.

For a file, the file will be created in the directory from which you booted or executed Disk Jockey, unless you specify a different directory. (If you booted Disk Jockey from tape, you cannot specify a file here.)

For a printer, type the name of the printer (for example, LPB) and press NEW LINE. In stand–among Disk Jockey, the printer you choose cannot be owned by EXEC, that is, it cannot have been started with an EXEC START command.

To exit from the system area information display, press the CANCEL/EXIT function key and Disk Jockey will return to the Physical Disk Format Menu.

Creating, Changing, and Deleting System Areas

Choice 4 "Creating, changing, and deleting system areas," of the Physical Disk Format Menu allows you to manipulate any of the user-defined system areas on your disk from the User-Defined System Areas Menu.

User-defined system areas are optional; you need not create any user-defined system areas in order to create and use LDUs.

System areas are areas on a disk, outside of the file system, that are reserved for items like microcode as well for your own purposes: perhaps disk identifiers, for example. User programs can open user-defined system areas via the ?GOPEN system call (described in the manual *AOS/VS, AOS/VS II, and RT32 System Call Dictionary, ?A through ?M*) using the format disk-unitame:system-area-ID; for example, @DPJ0:1005. User programs can then read and write to these areas as if they were any other file. The :PER entries for the disk unit must have ACLs that allow the kind of access needed to open and modify system areas: Read to open and Write to modify.

User-Defined System Areas Menu [SAMENU]

The User-Defined System Areas Menu follows.

User-Defined System Areas Menu

1. Create a system area
2. Create a microcode system area
3. Delete a system area
4. Install into a system area
5. Rename a system area

Enter choice: 1

From this menu, you choose any of the system area operations.

Creating a System Area [SACREATE]

The first choice offered by the User-Defined System Areas Menu is to create a user-defined system area. The screen that Disk Jockey displays when you select choice 1, "Create a system area" follows.

Create a User-Defined System Area

Disk unit name:
System area name:
System area ID (1001 to 9999 decimal):
System area size in blocks (decimal):
System area physical starting address (octal):
Remap any bad blocks in this area? (Y or N): Y
Remap area size in blocks (decimal):

Execute? (Y or N): Y

Space (blocks) for system areas must be set aside before you allocate all other space on the physical disk. The size of the LDU must allow for any system areas you want to create. You can either create any system areas you want before you create an LDU, or when you create an LDU you can leave some blocks for system areas you may want to create later.

The Create a User-Defined System Area screen requires you to specify the disk that will contain the system area, the system area name, the system area ID, the size of the system area, and the system area's starting address. This command screen also has you specify whether to remap any bad blocks found in the system area, the size of the remap area, whether to create the system area as a bootable system area, and whether to install microcode into the system area. The input fields of the command screen are explained in the following sections.

Disk unit name:

Specify the name of the unit that contains the disk on which you want to create the system area. There are default names for disk units, but nondefault names can be assigned during VSGEN. Default device names of disks on some controllers are shown earlier, in Table 7-2.

System area name:

The system area ID, not the name, identifies the system area. You can think of the system area name as a comment field, designed to let you know what is stored in the system area. System area names, like filenames, can be as many as 31 characters in length, but they will be truncated to 15 characters in the system area display. Think up a name to serve as a tag for the system area you want to create; then type it and press NEW LINE.

For more information about the system areas on this disk, you can examine the "View System Areas" screen (keyword SAINFO).

System area ID (1001 to 9999 decimal):

The system area ID is a unique four-digit decimal number that identifies each system area to Disk Jockey. You assign the system area ID when you create the system area. Each system area you create needs a unique ID to distinguish it from all other system areas. If you get confused and forget a system area ID, you can display the system area information (discussed earlier in the chapter) to get a list of the system areas.

System areas with a system area ID of up to 1000 are system-defined system areas, as opposed to user-defined system areas. Note that number 1001 identifies the default microcode system area; it is reserved for the microcode file for your machine.

System area size in blocks (decimal):

Specify the number of blocks that this system area is to occupy. The system area size is a decimal number. Disk Jockey will provide a default, which is the largest contiguous area currently available on the disk.

Generally, do not take the default, since the new system area will consume the entire largest span of contiguous space on the disk — preventing you from creating an LDU (which is generally more useful) in that space.

To determine the number of blocks needed for any file, divide the byte count of the file by 512 and round up any remainder.

You can either accept the default value by pressing NEW LINE, or you can select a smaller size and press NEW LINE.

System area physical starting address (octal):

Disk Jockey calculates the default address based on the size of the system area and the space available on the disk. The value you specify here must be octal. You can either accept the default value by pressing NEW LINE, or you can type over it with a new octal value and press NEW LINE. We suggest you take the default, or you might fragment the disk with system areas.

Remap any bad blocks in this area? (Y or N):

Disk Jockey needs to know if you want AOS/VS II to remap any bad blocks found in this system area during a read operation.

Disk Jockey records any bad blocks it finds in a Bad Block Table (BBT) that is stored on the physical disk. When AOS/VS II wants to access a block whose address is noted in the BBT, it looks for a good block in an area called the remap area. AOS/VS II uses a good block from the remap area instead of the bad block noted in the Bad Block Table. AOS/VS II automatically remaps any existing bad blocks on the disk, as well as bad blocks it encounters on a write operation.

If you answer No to this question, Disk Jockey will will not remap any bad blocks encountered in this area. AOS/VS II will issue an error message if the operating system tries to write to a bad block.

You might answer No if you wanted all blocks to be contiguous on the disk (for example, in a large database file). If a bad block developed in the database, you would want to be notified with an error message so you could move the database. (By default, the system would remap the bad block without displaying a message.)

If you want all bad blocks remapped, type Y and press NEW LINE. If you do not want bad blocks that Disk Jockey finds during write operations remapped, type N and press NEW LINE. If you answer N, Disk Jockey skips to the *Execute?* question.

Remap area size in blocks (decimal):

Assuming that you answered Yes to the previous question, Disk Jockey asks you to calculate the size of the remap area. The number of blocks you specify for the remap area are blocks that must be set aside out of the number of blocks available for the system area.

To accept the suggested size offered by Disk Jockey press NEW LINE. If you want to change the value in this input field, type the new decimal value and press NEW LINE.

Execute?

When you have answered all the questions, the screen cursor moves to the *Execute?* prompt. To create the system area you just specified, type Y and press NEW LINE. If you want to change any of the input fields, type N and press NEW LINE. Disk Jockey will move the cursor to the first input field of the command screen. To change any of the input fields, move the screen cursor to the desired input field using the uparrow and downarrow keys or the NEW LINE key. You can then type over any answer you want to change. When you are satisfied with the content of all the input fields, move the cursor to the *Execute?* prompt and type Y and press NEW LINE, or press the EXECUTE function key (F1). Disk Jockey will create the system area you specified.

Creating a Microcode System Area [MICROSA]

When you format a disk as a bootable disk, Disk Jockey creates one microcode system area by default. You can create additional microcode system area(s) by selecting choice 2, "Create a microcode system area," from the User–Defined System Areas Menu. Microcode system areas should only be created on your bootable system disk, since only system disks contain the microcode loader bootstrap program. The Create a Microcode System Area screen follows.

Create a Microcode System Area

Disk unit name:

Microcode area name:

Microcode area ID (1001 to 9999 decimal):

Size of area in blocks (decimal):

Starting physical address of area (octal):

Execute? (Y or N): Y

We will explain the questions one by one.

Disk unit name:

Specify the unit name of the disk on which you want to create the system area.

Microcode area name:

The microcode area ID, not the name, identifies the area. The name is really a comment field, designed to let you know what is stored in the area. System area names, like filenames, can be as many as 31 characters in length, but they will be truncated to 15 characters in the system area display. Think up a name to serve as a tag for the system area you want to create; then type it and press NEW LINE.

For more information about the system areas on this disk, you can examine the View System Areas screen (keyword SAINFO).

Microcode area ID (1001 to 9999 decimal):

The system area ID is a unique four-digit decimal number that identifies each system area to Disk Jockey. You assign the system area ID when you create the system area. Each system area you create needs a unique ID to distinguish it from all other system areas. If you get confused and forget a system area ID, you can display the system area information (discussed above) to list the system areas.

System areas with a system area ID of up to 1000 are system-defined system areas, as opposed to user-defined system areas. Note that number 1001 identifies the default microcode system area; it is reserved for the microcode file for your computer.

Size of area in blocks (decimal):

Specify the number of blocks for this system area to occupy, in decimal. The Disk Jockey default is the largest contiguous area available on the disk.

Generally, do not take the default, since the new system area will consume the entire largest span of contiguous space on the disk — preventing you from creating an LDU (which is more useful) in that space.

To determine the number of blocks needed for any file, divide the byte count of the file by 512 and round up any remainder. For example, an ECLIPSE MV/20000 microcode file is 200,592 bytes. To reserve a user-defined microcode area for an ECLIPSE MV/20000 microcode file, you might type 400 and press NEW LINE.

Starting physical address of area (octal):

Disk Jockey also provides a default value for this input field. Disk Jockey selects the starting physical address based on the value you specified for size of the area. Unlike the previous two values, this value must be an octal number. To accept the default starting address press NEW LINE. To change the default value, type over it and press NEW LINE. We suggest you accept the default.

Execute?

When you have answered all the questions, the screen cursor moves to the *Execute?* prompt. To create the microcode system area you just specified, type Y and press NEW LINE. If you want to make changes to any of the input fields, type N and press NEW LINE. Disk Jockey will move the cursor to the first input field of the command screen. To change a field, move the screen cursor to that field using the uparrow and downarrow keys or the NEW LINE key. You can then type over any answer you want to change. When you are satisfied with the content of all the input fields, move the cursor to the *Execute?* prompt and type Y and press NEW LINE, or press the EXECUTE function key (F1).

Deleting a System Area [SADELETE]

Just as you can create user-defined system areas, you can also delete user-defined system areas that you no longer want. The Delete a System Area screen follows.

Delete a System Area

WARNING: DELETING A SYSTEM AREA DESTROYS ALL DATA IN THE SYSTEM AREA

Disk unit name:

System area ID:

Delete system area name:

Execute? (Y or N): N

The first thing you should notice about this command screen is the warning message that Disk Jockey displays

WARNING: DELETING A SYSTEM AREA DESTROYS ALL DATA IN THE SYSTEM AREA

This warning message indicates that, if you proceed, all information the system area will be destroyed.

If you wish to save information in the system area, press CANCEL/EXIT to return to the screen you came from (probably the User-Defined System Areas Menu). You may want to reconsider deleting the system area, — perhaps after backing it up to tape with the COPY command — or you may want to simply rename it.

Disk unit name:

Specify the disk unit name containing the system area that you want deleted, and press NEW LINE.

ID of the system area to delete:

Disk Jockey is asking you for the unique ID you specified when you created this system area. The system area ID is a four-digit decimal number between 1001 and 9999. Type the system area ID and press NEW LINE.

If you forget the ID of the system area that you want to delete, you can view system areas (keyword SAINFO) to refresh your memory.

Delete system area name: xxx
Execute?

With the *Delete system area name: xxx* display, Disk Jockey is double-checking that the system area you specified in the previous two questions is really the system area you want to delete. Disk Jockey displays this line for your information only.

The screen cursor moves to the *Execute?* prompt. To delete the system area you just specified, type Y and press NEW LINE.

If you want to change a field, type N and press NEW LINE. Disk Jockey will move the cursor to the first field of the screen. Move the screen cursor to the desired input field using the uparrow and downarrow keys or the NEW LINE key. You can then type over any answer you want to change. When you are satisfied with all fields, move the cursor to the *Execute?* prompt and type Y and press NEW LINE, or press the EXECUTE function key (F1).

Installing into a System Area [SALOAD]

Once you've created a user-defined system area, you will eventually want to load a file into it. You can do this via the Install into a System Area screen, which follows. (Or from AOS/VS II, you can use the COPY command in the following form:
COPY @system-area-ID pathname.)

Installing into a System Area — Stand-Alone [SALOAD]

When you install a file into a system area, Disk Jockey's questions depend on whether you're using stand-alone or stand-among Disk Jockey. With stand-alone Disk Jockey, you must specify disk unit and LDU information.

Stand-among Disk Jockey doesn't ask for unit and LDU information, but it does require that the file to be loaded into a system area exist on the same disk where the system area is defined.

The stand-alone Disk Jockey Install into a System Area screen follows.

Install into a System Area

Disk unit name:

System area ID:

Specify the LDU and pathname of the file to install in the system area.

LDU filename:

LDU unique ID:

Pathname of file to install:

Execute? (Y or N): Y

As before, we will explain the questions one by one.

Disk unit name

Specify the name of the unit that contains the disk containing the system area. There are default names for disk units, but nondefault names can be assigned during VSGEN. Default device names of disks on some controllers are shown earlier, in Table 7-2. Type the correct disk unit name and press NEW LINE.

System area ID:

Disk Jockey is asking for the unique ID that you specified when you created this system area. The system area ID is a four-digit decimal value from 1001 to 9999. Type the system area ID and press NEW LINE.

For more information about the system areas on this disk, you can examine the View System Areas screen (keyword SAINFO).

Specify the LDU and the pathname of the file to be put into the system area

LDU filename:

The LDU filename is the name you assigned to the LDU when you (or someone else) created it; it is the directory name. Type the LDU filename and press NEW LINE.

LDU unique ID:

Type the unique ID given to this LDU image when it was created.

Pathname of the file to install:

To install from disk, type the complete pathname, starting from the LDU root directory, of the file that you want installed in this system area; then press NEW LINE.

Execute?

When you have answered all the questions, the screen cursor moves to the *Execute?* prompt. Disk Jockey will display the name of the file that you specified to confirm your choice. To install the file into the system area you specified, type Y and press NEW LINE. If you want to change a field, type N and press NEW LINE. Disk Jockey will move the cursor to the first field. Move the screen cursor to the desired input field using the uparrow and downarrow keys or the NEW LINE key. You can then type over any answer you want to change. When you are satisfied with the content of all the input fields, move the cursor to the *Execute?* prompt and type Y and press NEW LINE, or press the EXECUTE function key (F1).

Disk Jockey will copy the file from the specified pathname into the system area you specified.

Installing into a System Area — Stand-Among [SALOAD]

The stand-among Disk Jockey screen for installing into a system area follows.

Install into a System Area

Disk unit name:

System area ID:

Pathname of file to install:

Execute? (Y or N): Y

We will explain the questions one by one.

Disk unit name

Specify the name of the unit that contains the disk that contains the system area. There are default names for disk units, but nondefault names can be assigned during VSGEN. Default device names of disks on some controllers are shown earlier, in Table 7-2. Type the correct disk unit name, and press NEW LINE.

System area ID

Disk Jockey is asking for the unique ID that you specified when you created this system area. The system area ID is a four-digit decimal value between 1001 and 9999. Type the system area ID and press NEW LINE.

For more information about the system areas on this disk, you can examine the View System Areas screen (keyword SAINFO).

Pathname of file to install

Disk Jockey needs the complete pathname (from the root (:) directory) of the file that you want put into this system area. For example, to install file FILE_1 from working directory :UDD:DENNIS:ARCANE, you would type

:UDD:DENNIS:ARCANE:FILE_1 ⤶

Execute?

When you have answered all the questions, the screen cursor moves to the *Execute?* prompt. Disk Jockey will display the name of the file that you specified as a means of confirming your choice. To install the file into the system area you specified, type Y and press NEW LINE.

If you want to change a field, type N and press NEW LINE. Disk Jockey will move the cursor to the first field. Move the screen cursor to the desired input field using the uparrow and downarrow keys or the NEW LINE key. You can then type over any answer you want to change. When you are satisfied with the content of all fields, move the cursor to the *Execute?* prompt and type Y and press NEW LINE, or press the EXECUTE function key (F1).

Renaming a System Area [SARENAME]

If you decide to rename a system area, you can do so using choice 5, "Rename a system area," on the User-Defined System Areas Menu. Renaming a system area does not change the contents of the area. It changes only the name, which is really a comment to explain what is in the system area. For example, you may think of a more descriptive name for a system area. Or you may want to keep two versions of the same file in two separate system areas. You could rename the system area containing the older version as a way of denoting that difference. The Rename a System Area screen follows.

Rename a System Area

Disk unit name:

System area ID:

New system area name:

Rename system area name:

Execute? (Y or N): Y

We will explain the questions one by one.

Disk unit name:

Specify the name of the unit that contains the disk that contains the system area. There are default names for disk units, but nondefault names can be assigned during VSGEN. Default device names of disks on some controllers are shown earlier, in Table 7–2. Type the correct disk unit name, and press NEW LINE.

System area ID:

Disk Jockey is asking for the unique ID that you specified when you created this system area. The system area ID is a four-digit decimal value between 1001 and 9999. Type the system area ID and press NEW LINE.

For more information about the system areas on this disk, you can examine the View System Areas screen (keyword SAINFO).

New system area name:

Type the new name you want to assign to this system area. Pick a name that will describe the data that is loaded into that system area. System area names, like other filenames, can be as many as 31 characters although they are truncated to 15 characters on the display screen.

Rename system area name xxx (*xxx* is the old name)
Execute? (Y or N):

Disk Jockey displays the old name of the system area for confirmation and moves the screen cursor to the *Execute?* prompt.

When you have answered all questions, the screen cursor moves to the *Execute?* prompt. To rename the system area you specified, type Y and press NEW LINE. If you want to change a field, type N and press NEW LINE. Disk Jockey will move the cursor to the first field. Move the screen cursor to the desired field using the uparrow and downarrow keys or the NEW LINE key. You can type over any answer you want to change. When you are satisfied with the content of all the input fields, move the cursor to the *Execute?* prompt, type Y and press NEW LINE, or press the EXECUTE function key (F1).

LDUs (Logical Disk Units)

LDUs are the foundation of the AOS/VS II file system. You will use the LDU Menu many times as you configure your AOS/VS II system. You can access a series of command screens from the LDU Menu that allow you to create, delete, change parameters, or view LDU information.

The LDU Menu [LDMENU]

After you have formatted your physical disks, the next step is to create LDUs. When you select choice 2, "Create, view or change a logical disk unit," on the Disk Jockey Main Menu, the LDU Menu appears. The LDU Menu follows.

Logical Disk Unit Menu

1. Create a one-piece LDU
2. Create a multiple-piece LDU
3. Delete an LDU
4. Change LDU parameters
5. View LDU information
6. Rename an LDU
7. Copy an LDU

Enter choice: 1

We will explain these one by one.

Creating a One-Piece LDU [LDSPCR]

The first choice on the LDU Menu is "Create a one-piece LDU." You will probably create one-piece LDUs most frequently. Your system disk, for example, must be a one-piece LDU. When you select choice 1, "Create a one-piece LDU," Disk Jockey asks for additional information as follows:

LDU filename
Number of images

Answer the filename question with the filename by which you want the LDU accessed in the future. You can use a filename of as many as 31 characters. All legal AOS/VS II filename characters are permitted in LDU filenames. If this is the system LDU (:), the filename you assign is not critical for file access.

For any LDU that is not the system LDU, the filename you type here becomes the name by which users access the LDU. Users will use this name just as any other directory filename. For example, if you have many users and want to put some of them on a nonsystem LDU, you might choose a name like UDD1. You can temporarily change the LDU filename later, after the LDU is initialized, with the CLI RENAME command, or you can rename the LDU via the Disk Jockey LDRENAME screen.

Number of images

Specify the number of images you want this LDU to have. If you don't want to create a mirrored LDU, answer 1. If you want to create a mirrored LDU, then choose the number of images (2 or 3) that you want.

Even if you create an unmirrored LDU, you can always create a mirror image for it later, as explained in the section "Creating Mirrored LDUs", earlier in the chapter.

After you specify the LDU filename and the number of images, Disk Jockey will display the Create One-Piece LDU screen, as follows:

Create One-Piece LDU

LDU filename: ROOT
Disk unit name:
LDU unique ID:
Size: *Starting address (octal):*

Change LDU parameters? (Y or N): N

Execute? (Y or N):

We will explain these one by one.

Disk unit name:

Specify the name of the unit on which you want to create the LDU. There are default names for disk units, but nondefault names can be assigned during VSGEN. Default device names of disks on some controllers are shown earlier, in Table 7-2.

If the default unit name that Disk Jockey displays is the one you want, accept the default. (It displays the name of the last unit accessed in this Disk Jockey session.)

If this unit holds the second or third image of a mirror, remember that different images of an LDU must be on different physical disks. Specify the correct disk unit name for the second or third image. If the default name is incorrect, type the correct one and press NEW LINE; otherwise, take the default.

If you are running stand-among Disk Jockey and it recognizes the unit you specify, it will display the Device Specification screen with all fields filled; then it will position the cursor at the *Execute?* question. You cannot edit fields on the stand-among Device Specification screen. Type Y and press NEW LINE. Or if you specified the wrong unit, answer N, correct the unit name, and then confirm with Y and NEW LINE.

If stand-among Disk Jockey does not recognize the device you specify, it will return an error message. Type the correct unit name and press NEW LINE. If you cannot remember the name, exit from Disk Jockey and list the disk units in directory :PER (FILESTATUS/TYPE=DKU @+).

If you are running stand-alone Disk Jockey and the program recognizes the disk unit name, it will display the Device Specification screen with all fields filled. Then it will position the cursor at the *Execute?* question. You can change any of these fields, but they will generally be correct; if so, confirm with Y and NEW LINE. (Disk Jockey recognizes all units whose names are defined in a device names file, created by VSGEN, that was made the default names file via the Technical Maintenance Menu choice "Change Startup Parameters." It also recognizes any unit you previously defined in this session.)

If stand-alone Disk Jockey does not recognize the disk unit name you typed, it will display the Device Specification Screen. This would happen if you acquired a new disk and were formatting it for use with AOS/VS II. To the Device Specification Screen, you must specify the bus type, device type, unit number, device code, and, if the disk is on an MRC subsystem, the disk controller slot number. Filling this screen is explained earlier in this chapter in the section "Software Formatting a Physical Disk [FORMAT]."

When Disk Jockey has all the information it needs to identify the disk, it asks

LDU unique ID:

The LDU unique ID is an identifier, an AOS/VS II filename of as many as 31 characters, used to distinguish one LDU image from another (for mirroring). Even if the LDU in question is a single-image LDU, the LDU needs to have a unique ID.

For a nonremovable disk, you might choose to use the disk unit name of the disk, for example, DPJ1. Or you can use the following technique, which we recommend: add the characters .IMAGEn to the LDU filename. For example, for the first image of an LDU named UDD, you specify a unique ID of UDD.IMAGE1; for the second image, specify a unique ID of UDD.IMAGE2; and, if you have a third image, specify UDD.IMAGE3.

If you plan to mirror this LDU, remember that the unique ID will serve to distinguish this image from the others. (In a mirrored LDU, all images have the same LDU filename, but each image has its own unique ID.)

You may have a naming scheme that you prefer. Just make sure that each image has a unique ID. Disk Jockey cannot check the ID for uniqueness, so you must make certain that the ID is unique. Type whatever unique ID you select, for example

UDD1.IMAGE1 ↵

Size:

Disk Jockey will display a default size for the LDU. The default value that Disk Jockey displays is the largest contiguous span currently available on the disk; roughly, this is the capacity of the disk minus any blocks required for existing LDUs, other system areas, and system tables.

Generally, you will want to make your LDUs as large as possible; but if you want to create other LDUs or system areas on this disk, estimate their size requirements and subtract this from the default size. You cannot change the size of an LDU after creating it. If this LDU will be mirrored, the size you specify here will be allocated to each other image.

Take some time now to decide on how many blocks you want for this LDU. Then, to accept the default press NEW LINE or type the size you want and press NEW LINE.

Starting address (octal):

Disk Jockey will provide the starting address for the LDU. Disk Jockey looks for the best fit when deciding on the default value for this field. The default value that Disk Jockey displays is the beginning of the smallest contiguous block of the size you requested. Accept the default by pressing NEW LINE, or change it by typing another starting address (octal) and pressing NEW LINE.

If you specified one image for this LDU, the screen cursor will move to the question *Change LDU Parameters*. If you specified more than one image, Disk Jockey will repeat the questions *Disk unit name, LDU unique ID, Size,* and *Starting address* for the second image, and again for the third image if you specified three images.

If you try to create multiple images of an LDU on the same physical disk, Disk Jockey displays an error message. Remember to give each image its own unique ID. You can safely accept the defaults for the questions *Size* and *Starting address* because Disk Jockey ensures that the sizes of the images will match.

The second (and third) LDU images you specify must provide exactly as much storage as the original image. Therefore the disk unit(s) you specify for the mirror image(s) must have at least enough capacity to hold the original LDU image.

For hardware mirroring, an LDU and disk tables like the bad block table must start at the same disk address; also, the disks must be on the same controller. For software mirroring, the images do not have to be on the same disk model or start at the same disk address, but if the disks are on the same controller and you keep the addresses the same, you have the option of hardware or software mirroring — a handy choice. Hardware mirroring tends to be faster, especially for synchronizing images. For hardware or software mirroring, the Bad Block Table size must be the same for all images of the LDU.

NOTE: Bootable disks and disks with diagnostics areas reserved on them have less room (contiguous space) for LDU creation.

Change LDU parameters? (Y or N)

The LDU parameters include the placement of the disk bitmap, the bad block table size, the LDU's access control list (ACL), primary and secondary data element sizes, primary and secondary index element sizes, and the maximum index level.

The default values for the LDU parameters are as follows. The default disk bitmap position is 33 percent of the distance into the first disk in the LDU. The default ACL is +,E, lets users use this directory name in a pathname (but not list or read files in this directory); the ACL of +,E is sufficient for general needs, but you may want to consider changing it for greater system security. The default data element and index element size is 4, and the maximum index level is 3. These defaults should work well for most situations. LDU parameters are discussed in more detail in the section "Changing LDU Parameters," later in this chapter.

If you want to check or change any of these parameters, answer Y (Yes) to the question *Change LDU parameters*. Then skip to the section entitled "Changing LDU Parameters." If you want to accept the default LDU parameters, press NEW LINE.

Execute?

Review the answers on the screen for the image(s) of this LDU. Pay particular attention to the disk unit name and unique ID answers. Make any changes that you need to, and then after the *Execute?* prompt type Y and press NEW LINE. Disk Jockey will create the LDU and return to the LDU menu.

If you type N (No) at the *Execute?* prompt, Disk Jockey will return the screen cursor to the question, and you can respecify any field. If you press CANCEL/EXIT, Disk Jockey will return to the LDU Menu without creating the LDU you specified.

Creating a Multiple-Piece LDU [LDMPCR]

Sometimes you may need an LDU that is composed of more than one piece. You may, for example, have a database too large to fit on a single physical disk. A multiple-piece LDU is designed to meet this need and can be composed of as many as eight physical disks.

Each disk that is part of an LDU must be on-line when you create the LDU. Similarly, under AOS/VS II each disk that is part of an LDU must be on-line when you initialize the LDU with the CLI INITIALIZE command.

You create a multiple-piece LDU in much the same way you create a one-piece LDU. When you select choice 2, "Create a multiple-piece LDU," from the LDU Menu Disk Jockey displays the same questions it does for creating a one-piece LDU:

LDU filename:
Number of images:

Answer the filename question with the filename by which you want the LDU accessed in the future. LDU filenames can have as many as 31 characters. All legal AOS/VS II filename characters are permitted in LDU filenames.

As mentioned earlier, the filename you type here becomes the name by which users access the LDU. Users will use this name just as any other directory filename. You can temporarily change the LDU filename later, after the LDU is initialized, with the CLI RENAME command, or you can permanently change the name with the Disk Jockey LDRENAME screen.

Number of images:

Specify the number of images you want this LDU to have. If you don't want to create a mirrored LDU, answer 1. If you do want to create a mirrored LDU, then choose the number of images (2 or 3) that you want.

Even if you create an unmirrored LDU, you can always create a mirror image for it later, as explained in the section "Creating Mirrored LDUs", earlier in the chapter.

After you specify the LDU filename and the number of images, Disk Jockey will display the Create a Multiple-piece LDU screen, as follows:

Create a Multiple-Piece LDU

LDU filename: xxx (*xxx* is the LDU filename you specified)

Pick one (1. Add an image, 2. Delete an image, 3. Modify an image,
4. Create LDU parameters, 5. Print, 6. Execute): 1
Image 1 LDU unique ID:
Number of pieces:

When you start creating an LDU, Disk Jockey automatically selects choice 1, "Add an image," as the default and places the screen cursor at the *LDU unique ID* prompt.

We will explain the questions one by one.

LDU unique ID:

As mentioned in the section "Creating a One-Piece LDU", the LDU unique ID is an identifier, an AOS/VS II filename of as many as 31 characters, used to distinguish one LDU image from another (for mirroring). Even if the LDU in question won't be mirrored, it needs a unique ID.

For the unique ID, you might use a technique like this one: add the characters .IMAGEn to the LDU filename. For example, for the first image of an LDU named DATABASE, you'd specify a unique ID of DATABASE.IMAGE1; and if there were second image, for the second image, you'd specify a unique ID of DATABASE.IMAGE2. Whatever naming scheme you choose, make sure that each image has a unique ID. Disk Jockey cannot check the ID for uniqueness, so you must make certain that the ID is unique. Type whatever unique ID you select, for example

DATABASE.IMAGE1)

NOTE: If you press CANCEL/EXIT at the question *LDU unique ID*, Disk Jockey will return the screen cursor to the question *Pick one*. If you press CANCEL/EXIT from the question *Pick one*, then Disk Jockey will exit from this screen. The LDU itself has not yet been created. The LDU will be created later when you select choice 6, "Execute."

Number of pieces:

Disk Jockey is asking you for the number of pieces for the first image. Since you specified a multiple-piece LDU, you probably want to answer at least 2.

NOTE: Do not confuse the number of images of an LDU with the number of pieces that together make up the LDU. The number of pieces refers to the portions of one or more physical disks that make up a single image of an LDU. The maximum number of pieces for one LDU image is 8. The number of images refers to the number of copies of the entire LDU. The maximum number of images for one LDU is 3.

You must specify a number of pieces to continue. Disk Jockey will ask *Disk unit name*, *Size*, and *Starting address* questions about each piece. Then, if you specified more than one image, Disk Jockey will ask questions about pieces for the other image(s). For example, if you want to create a two-piece LDU, type

2↲

After you specify a number, Disk Jockey changes the prompt *Image n* to *Piece n*, to indicate that you're working on pieces of an image. And it asks about each piece.

Identifying an LDU Piece

For each piece of each image, Disk Jockey asks questions about the disk unit name and size and starting address of the piece as follows.

Disk unit name:

Specify the name of the unit on which you want to create the piece. There are default names for disk units, but nondefault names can be assigned during VSGEN. Default device names of disks on some controllers are shown earlier, in Table 7-2.

If this piece will hold the second or third image of a mirror, remember that different images of an LDU must be on different physical disks. Type the correct disk unit name and press NEW LINE; or if the default is correct, take it.

If you are running stand-among Disk Jockey and it recognizes the unit you specify, it will display the Device Specification screen with all fields filled; then it will position the cursor at the *Execute?* question. You cannot edit fields on the stand-among Device Specification screen. Type Y and press NEW LINE. Or if you specified the wrong unit, answer N, correct the unit name, and then confirm with Y and NEW LINE.

If stand-among Disk Jockey does not recognize the device you specify, it will return an error message. Type the correct unit name and press NEW LINE. If you cannot remember the name, exit from Disk Jockey and list the disk units in directory :PER (FILESTATUS/TYPE=DKU @+).

If you are running stand-alone Disk Jockey and the program recognizes the disk unit name, it will display the Device Specification screen with all fields filled. Then it will position the cursor at the *Execute?* question. You can change any of these fields, but they will generally be correct; if so, confirm with Y and NEW LINE. (Disk Jockey recognizes all units whose names are defined in a device names file, created by VSGEN, that was made the default names file via the Technical Maintenance Menu choice "Change Startup Parameters." It also recognizes any unit you previously defined in this session.)

If stand-alone Disk Jockey does not recognize the disk unit name you type, it will display the Device Specification Screen. This would happen if you had acquired a new disk and were formatting it for use with AOS/VS II. To the Device Specification Screen, you must specify the bus type, device type, unit number, device code, and, if the disk is on an MRC subsystem, the disk controller slot number. Filling this screen is explained earlier in this chapter, in the section "Software Formatting a Physical Disk [FORMAT]."

When Disk Jockey has all the information it needs to identify the disk, it asks about the size of the piece:

Size:

The default size is the largest contiguous span currently available on the disk; roughly, this is the capacity of the disk minus any blocks required for existing LDUs, other system areas, and system tables.

Generally, you will want to make your LDUs as large as possible, per the default; but if you want to create other LDUs on this disk, estimate their size requirements and subtract this from the default size. If this LDU will be mirrored, you will need to allocate the total size of all pieces in the first image to the second (or third) image.

You cannot change the size of a piece after creating it (creation occurs when you confirm at the Execute prompt). You can, however, delete the piece and recreate it. Take some time now to decide on how many blocks you want for this piece. Then, to accept the default press NEW LINE, or type the size you want and press NEW LINE.

Starting address (octal):

The default is the starting address of the smallest contiguous span that fits your space requirements. Generally, you will want the default, but if you want a different starting address (perhaps because you want to use hardware mirroring, and the other image starts at an address other than the default), specify the starting address. If the piece will not fit at the address you specify, the program will display an error message; choose another address,

Now Disk Jockey updates the screen display with the information you provided about this piece. If there are more pieces to define, Disk Jockey returns to the *Disk unit name* question, explained earlier in the section "Specifying a Piece."

If you selected more than one image earlier, and still have an image to add, take the default, 1, "Add an image." After you answer the questions *LDU unique ID* and *"Number of pieces* for the next image, Disk Jockey will display the column heads for the next image. Disk Jockey will lead you through the definition of pieces in the next image.

For software mirroring, the sizes of individual pieces of the second and/or third image do not have to equal the sizes of the pieces of the first image; the only requirement is that the two images be of equal size. For hardware mirroring, the starting and ending addresses of all pieces must be the same.

When you have specified all pieces of the last (or only) image, you must confirm by selecting 6, "Execute" from the Pick One menu. Review the display of pieces. If you like the values specified for the pieces, type 6 and press NEW LINE. If your values are legal, Disk Jockey will then create the LDU image(s) and return to the previous menu.

If you want to change a piece, select choice 3, "Modify an Image." Disk Jockey will start at the question *LDU unique ID* and step through each piece in order. Make any necessary changes, and when you are satisfied that everything about this image is correct, confirm by selecting choice 6, "Execute."

NOTE: If you have not defined pieces for all images you specified earlier, or if the size of this image doesn't match the size of the previous image, Disk Jockey will display the error messsage *Size of image n does not match the size of 1st image.*

If you see this message, look at the displayed size(s) of the images. If they are the same, or if only one image is shown, this means you still have an image to define. Proceed to add the image. But if the displayed image sizes are different, you must make them the same. Use choice 3, "Modify an image" to step through the images and make the total space the same size. If you want to use hardware mirroring, the starting addresses of the LDU pieces must be the same.

The following displays, Figures 7–6 and 7–7, show sample screens after a two-piece, two-disk LDU has been specified — before the person defining the LDU has confirmed with *6. Execute*. The first display shows a single image LDU, the second a two-image LDU.

```
                    Create a Multiple-Piece LDU
                    LDU filename: DATABASE
                    Total size: 1920000
_____________________________________________________________
Current size: 1920000    Image 1 LDU unique ID: DATABASE.IMAGE1

Piece     Disk Unit Name      Size       Starting Address (octal)
  1        MRCDISK000E02      960000                         100
  2        MRCDISK000E03      960000                         100

_____________________________________________________________
Pick one (1. Add an image, 2. Delete an image, 3. Modify an image,
       4. Create LDU parameters, 5. Print, 6. Execute):  1
```

Figure 7–6 Multiple–Piece, Single–Image LDU Creation Screen

```
                    Create a Multiple-Piece LDU
                    LDU filename: DATABASE
                    Total size: 1920000
_____________________________________________________________
Current size: 1920000    Image 1 LDU unique ID: DATABASE.IMAGE1

Piece     Disk Unit Name      Size       Starting Address (octal)
  1        MRCDISK000E02      960000                         100
  2        MRCDISK000E03      960000                         100

Current size: 1920000    Image 2 LDU unique ID: DATABASE.IMAGE2

Piece     Disk Unit Name      Size       Starting Address (octal)
  1        MRCDISK000F02      960000                         100
  2        MRCDISK000F03      960000                         100
_____________________________________________________________
Pick one (1. Add an image, 2. Delete an image, 3. Modify an image,
       4. Create LDU parameters, 5. Print, 6. Execute):  1
```

Figure 7–7 Multiple–Piece, Multiple–Image LDU Creation Screen

Changing LDU Parameters at Creation

After you specify all images of an LDU, Disk Jockey lets you view and/or change the parameters it will assign to the LDU. These parameters include the address of the bitmap, LDU access control list (ACL), and default element size. You can change these now — at LDU creation — or later on. There are a few, mentioned below, that you cannot change later.

If you answered Yes to the Change LDU parameters question on the "Create ... LDU screen," the Disk Jockey displays the Change LDU Parameters screen:

Change LDU Parameters

Placement of the bitmap into the LDU (%): 33
Number of remap blocks: 256
Specify the ACL for this LDU: +,E

	File defaults
Primary data element size: 4	*Secondary data element size: 4*
Number of primary elements: 1	*Index element size: 1*
Maximum index level: 3	
	Directory defaults
Primary data element size: 1	*Secondary data element size: 1*
Number of primary elements: 1	
	LDU specifications
Primary data element size: 1	*Secondary data element size: 1*
Number of primary elements: 1	*FIT file element size: 4*

Execute? (Y or N):

NOTE: The placement of the bitmap, and the number of blocks in the remap area can be set only when you create an LDU. The FIT file element size can be set only when you create the LDU. You cannot change any of these on an existing LDU.

If, after creating an LDU, you find you must change the FIT file size, you must delete the LDU (losing all the data on the LDU), recreate it, and respecify all pieces of the LDU and all images. Then you can change the parameters and have Disk Jockey recreate the LDU.

We will take the questions one by one.

Placement of the bitmap into the LDU (%)

Disk Jockey is asking where you want the bitmap to be placed within the LDU.

The bitmap is an area on each LDU that describes which blocks are available and which are used for data storage. There is a bitmap on every LDU. AOS/VS II must access the bitmap each time it creates or deletes a file. The location of this area on the LDU can affect system performance.

You can choose where to place the bitmap when Disk Jockey creates the parameters for the LDU. The default bitmap address is one third the distance across the first disk in the LDU.

This bitmap location is a good general-purpose location for a single-disk LDU. The bitmap is close to the center, which gives fast access to data if the LDU is nearly full of files. It is also close to the beginning of the LDU, which gives relatively fast access if the LDU contains few files.

You may have reasons for starting the bitmap at the beginning of the LDU. For example, if a multiple-disk LDU that will hold (or does hold) very large contiguous files (for example, INFOS II, DG/SQL, or DG/DBMS database files), you might want to select a nondefault location for the bitmap. In such a case, specify 0 (the beginning of the LDU) as the location for the bitmap to begin. Contiguous file space will then stretch from nearly the beginning of the LDU (immediately after the bitmap) to the end of the LDU.

Unless you have good reason to change the default, accept it.

If the bitmap location you specify or the default location you accept from Disk Jockey contains bad blocks, AOS/VS II will automatically remap them.

Number of remap blocks:

Disk Jockey is asking you to specify the number of blocks for the remap area. The remap area contains good blocks that can be substituted for the bad blocks listed in the Bad Block Table. The number of blocks in the remap area should be at least the same as the maximum number of entries in the bad block table, so that AOS/VS II can substitute a good block for each bad block it finds.

The default value is 256. To change the default, type the number of blocks (decimal) that you want and press NEW LINE. To accept the default of 256 blocks for the remap area, press NEW LINE.

Specify the ACL for this LDU

Disk Jockey is asking you to specify the access control list for this LDU. These access control lists are explained next.

LDU Access Control Lists (ACLs)

AOS/VS II maintains an Access Control List (ACL) for each initialized LDU. The ACL records usernames of users who can access the LDU and the type(s) of access each user has. To create the ACL, you specify usernames and the access privilege types you want those users to have.

The ACL assigned by default when an LDU is created is +,E. You can specify a different ACL when you create an LDU by answering Yes to the *Change default LDU parameters* question on the Create a One-Piece LDU or the Create a Multiple-Piece LDU command screens. You can change the ACL of an existing LDU via keyword LDMODIFY or by selecting choice 4, "Change LDU parameters", on the LDU Menu.

For the master LDU (the LDU that includes the system disk), the default ACL of +,E is necessary so that AOS/VS II can execute programs (like the CLI) for users. All users need to have Execute (E) access to the root directory. (At VSGEN, if access control was not enabled for this system, the default system ignores all ACLs. Generating and running a system without access control is useful only if you want all users to have access to all files.)

Specifying Username Templates and Access Types

You can specify a username literally (e.g., ADAM for a user who will log on as ADAM), or you can specify one or more username templates. A username template allows a group of users with a variety of usernames to access the LDU. Disk Jockey takes an ACL string, similar to the way the CLI handles an ACL string. A username template uses one or more template characters to represent other filename characters. The template characters are hyphen (–), plus (+), and asterisk (*).

\+ represents any string of filename characters;

– represents any string of filename characters, except periods;

* represents any single character, except a period.

For example, the template

*FORTRAN

matches username AFORTRAN, but not AMFORTRAN, nor .FORTRAN.

The template –FORTRAN

matches username BOBFORTRAN, but not BOBFORT, nor BOB.

The template FORTRAN+

matches username FORTRANA and FORTRAN.USER, but not .FORTRAN, nor AFORTRAN.

The template –FORTRAN+

uses two template characters and matches usernames BOBFORTRAN.XX and FORTRAN, but not FORT.RAN, nor .FORTRAN.

A user can have as many as five types of access to a directory (which an LDU is); or a user can have no access. The access types are O, W, A, R, or E. Their meanings are shown in Table 7–3.

Table 7–3 Access Types

Access Type	A User Who Has It	Can
O	Owner access	Initialize the LDU and change its ACL.
W	Write access	Insert, delete, and rename files in the primary directory of the LDU.
A	Append access	Add files to the primary directory of the LDU.
R	Read access	List files in the primary directory of the LDU.
E	Execute access	Use the filename of the LDU in a pathname.

You can assign combinations of access types. For example, RE allows the specified user(s) to use the LDUs name in a pathname (E) and list the files in its primary directory (R).

To initialize an LDU, a user needs the following privileges (unless he or she has Superuser on):

- Owner access to the LDU (set with Disk Jockey);
- Write access to the directory in which he or she wants to initialize the LDU; and
- Execute access to the device entry (like @DPJ10) in directory :PER (often set by the UP.CLI macro).

Decide on the usernames and access privileges you want for the LDU. For multiple user groups, remember to type the specific usernames first, and the most general usernames (templates) last. For the first username, you might type OP.

Disk Jockey allows a maximum of seven username–access groups (or 256 characters) in an ACL. This allows you to set up very a specific ACL. Or, you can press NEW LINE to assign a null ACL, which denies access to all but superusers.

From the Change LDU Parameters command screen, describe the users and the access types you want for the user(s); for example, +, RE. To give users no access type +,,; this is useful when you do not want users to have access to an LDU.

For example, assume you want to give all usernames except those beginning with $ Execute access to an LDU. Type $+ to cover all usernames beginning with $, then type two commas (for no privileges). Type + to cover the usernames not beginning with $, comma, and then E (for Execute access). Then press NEW LINE. The ACL should look like this

```
$+,, +,E
```

User Groups

As part of its access control mechanism, AOS/VS II supports user groups. A user group is a set of users, associated by group name. Groups offer a simple way to handle access control for projects, since people gain access to files by group name, not username. Their main benefit is that they eliminate the maintenance of long, intricate ACLs. They do not allow you to do anything you couldn't otherwise do with an ACL command.

Disk Jockey lets you specify group names in ACLs you assign to LDUs. The format for group access in an ACL is

username:groupname, access *[...]*

Template characters are allowed in both username and group name. For example, assume that there is a group named MARK_II. The ACL +:MARK_II,OWARE allows access to all members of the group. As usual with ACLs, the username lets you allow different kinds of access to different users. For example, the ACL

```
JKM:MARK_II,WARE   +:MARK_II,RE
```

gives user JKM WARE access to the file(s) and other members of the group RE access.

The order of username:group specifications in ACLs works the same way as the order of usernames. If you use template characters, you must order the username and group name specifications carefully to get the results you want. Generally, you will want to order them from specific to general. For example, take the following ACL:

```
JKM,OWARE   CSTONE:MARK_II,WARE   +:MARK_II,RE    +,E
```

This ACL gives user JKM all access to the file; the OWARE specification, since it comes first, overrides any other specification (group or nongroup) for JKM. The ACL gives CSTONE WARE access the file when CSTONE is a member of group MARK_II; it gives other members of group MARK_II RE access; and it gives all other users E access.

Users join groups by using the GROUPLIST command.

For your system to use groups, someone acting as system manager must create a :GROUPS directory and group name files, as explained in Managing AOS/VS and AOS/VS II.

Generally, since groups tend to change with time, you may find it more convenient to have user group names assigned to files with the ACL command or by the default ACL (DEFACL command than to assign them via Disk Jockey. However, you can assign an ACL with a group name via Disk Jockey. If you want to learn more about groups, see the description of user groups in *Managing AOS/VS and AOS/VS II.*

Changing ACLs Using the ACL Command

For nonmaster LDUs, the ACL you specify with Disk Jockey (or the default if you do not specify an ACL) becomes effective when you initialize the LDU from the CLI. If the LDU has a null ACL, you must specify some kind of access before anyone other than a superuser can access the LDU. You can change an LDU ACL with the CLI ACL command any time after you initialize the LDU. The easiest way to specify the ACL is to include the CLI ACL command in the UP.CLI macro.

The following example, which is from an UP macro, uses the CLI DIRECTORY command to make the root (:) directory the working directory, and then it initializes the LDU in disk unit DPJ10, has the system write the current ACL (in this case OP,WARE,,,,+,E) to the terminal, and assigns that ACL to the LDU.

```
DIR  :
INITIALIZE/S   @DPJ10
WRITE  Initialized :DPJ10 as [!STRING]. Setting ACL to  OP WARE,,,,+ E
ACL  [!STRING]   OP,WARE   +,E
```

When you assign a multiple–user ACL, proceed from specific usernames to general usernames (templates). For example, the ACL

```
+,RE     OP,WARE    $+,
```

gives all users (including OP) only Read and Execute access. The W and A privileges for OP are ignored. The ACL also tries to establish null access to usernames beginning with $, but the +,RE overrides this access. The ACL defeats itself. You can rearrange the username groups as follows:

```
OP,WARE    $+,,     +,RE
```

This ACL gives OP the privileges WARE, gives usernames beginning with $ no access (null), and gives all remaining users Read and Execute privileges. When you define more than one username group in an ACL, place specific username(s) first and the most general username template last.

The ACL assigned to an LDU with an ACL command is effective only while that LDU is initialized. The ACL specified with Disk Jockey returns when the LDU is released. If you know what ACL you want, assign it when you create the LDU. This eliminates the need for an ACL command in the UP.CLI macro. If you need to change the ACL at runtime, you can do it at will as previously shown.

If you don't know exactly which usernames and access types you want for an LDU, a secure, general-purpose ACL is +,E. This ACL gives all users Execute access. Assigning null ACL access prevents anyone but a superuser from initializing or accessing the LDU. Later, if necessary, you can use the ACL command to override the LDU's assigned ACL; or you can change the assigned ACL via the Change LDU Parameters screen.

Proceeding

After you specify or take the default for the ACL, Disk Jockey asks

Primary data element size

Disk Jockey is asking if you want to change the primary data element size for this LDU. Every disk file consists of one or more elements. An element is a series of contiguous 512-byte disk blocks. The default element size for nondirectory files is four disk blocks. The default for directory files and LDUs is one block. This input field allows you to change the primary data element size.

When you first create a file, AOS/VS II allocates the number of blocks that you have specified as your primary data element size for that file to use. If you accept the default value offered by Disk Jockey, that number will be four. Each time you create a new file, AOS/VS II will allocate four disk blocks to the new file. The file will always grow in increments of four contiguous disk blocks.

You can change the primary data element size to any number you choose from 1 to 99. AOS/VS II will always allocate the number of blocks you specify for the primary data element size whenever you create a new file. If you specify 99 as the primary data element size, then the file will always grow in increments of 99 contiguous disk blocks.

These blocks are located at consecutive logical (not necessarily physical) addresses. As the file grows, AOS/VS II allocates disk space to the file according to its file element size. The blocks that make up an element are always contiguous, but the elements themselves may not be contiguous.

Finding 99 contiguous disk blocks is more difficult than finding 4 contiguous disk blocks. You might, therefore, decide that you want to make one large initial allocation of disk space with a primary element size of 99 contiguous blocks, and to add to the file in much smaller increments, say 8 contiguous blocks. You can accomplish this kind of allocation using the next two fields on this command screen: *Secondary data element size* and *Number of primary elements*.

You can also use the CLI command CREATE to create a file with a nondefault primary element size. The CLI lets you create a file with a maximum element size of 512,000,000.

Secondary data element size

As with the primary element, the default secondary element size for nondirectory files is four disk blocks and the default for directory files and LDUs is one block. You can change this value to any number from 1 through 99. You can use the secondary data element size, together with the primary data element size, in a variety of combinations to most efficiently allocate disk space for your files.

For example, you can choose to set the primary data element size of a particular LDU at 8 and the secondary data element size at 4. Subsequently when you create files on this LDU, each file will be allocated eight contiguous disk blocks. After you exhaust the number of primary elements (the next input field on this command screen), AOS/VS II will allocate disk blocks according to the file element size found in the secondary data element size input field, which in this case is 4.

Number of primary elements

Disk Jockey is asking you to specify the number of times that you want the primary data element allocated to any file on this LDU. The range for this value is from 1 through 99. The default value for this input field is one. That means that AOS/VS II will allocate one data element of the size specified in the primary data element input field. After that, for every request for more disk space, AOS/VS II will allocate a data element of the size specified here. In the example mentioned above, a file created on this particular LDU gets an initial allocation of eight contiguous (512–byte) disk blocks. After the one primary element is used, the file is allocated any additional disk blocks in increments of four contiguous (512–byte) disk blocks each.

These three input fields — primary data element size, secondary data element size, and number of primary elements — work together to manage the orderly accumulation of files on the LDU.

Index element size

Disk Jockey wants you to specify the maximum number of blocks for the index element. The default is 1.

While the disk blocks that make up each data element of a file are contiguous, the elements themselves are not contiguous. The elements are stored in different areas on the disk. AOS/VS II keeps track of all the elements for each file by indexing them. An index is a disk block that points to the addresses of as many as 124 separate data elements. When a file contains more than 124 data elements, a second index (a second disk block) can organize and point to an additional 124 data elements. The maximum number of these index blocks, each of which can organize and point to the addresses of 124 separate data elements, is 32. Specify the total number of index blocks for a single file and press NEW LINE.

Maximum index level

To keep track of each file's data elements, AOS/VS II maintains one or more index levels for each file. The default number of index levels is three, which is also the maximum number for index levels for a single file.

Since files with large data element sizes have fewer separate elements, they require fewer index levels. Similarly, since files with smaller data element sizes have more separate elements, they require more index levels.

Each first-level of indexing organizes and points to the addresses of as many as 32 index blocks. And when a file is so large as to require more than one level of indexing, there can be multiple index levels, up to a maximum of three.

Type the maximum number of index levels that you want the LDU to have and press NEW LINE.

Directory Defaults

These parameters set the defaults for directories created on this LDU. Whenever anyone creates a directory via the CREATE/DIR or CREATE/CPD commands, the directory will be created according to these settings.

Please refer to the file descriptions above for the following directory parameters: primary element size, secondary element size, and number of primary elements.

LDU Specifications

These parameters set the defaults for this LDU.

The last three questions that you will see on the Change LDU Parameters command screen when you bring it up at LDU creation time are concerned with the creation of LDU specifications. You may want to have different element sizes (on the actual LDU) from the default element sizes for all directories created under that LDU.

Please refer to the file descriptions above for the following directory parameters: primary element size, secondary element size, and number of primary elements.

FIT file element size

The file information table (FIT) is where AOS/VS II finds the LDU parameters. Choosing an optimum file element size for the FIT ensures that the FIT is contiguous, and thus can speed up file access.

You can determine a nondefault FIT file element size by computing the average number of files per directory. To choose a nondefault FIT file element size when you create an LDU, apply the following formula:

```
FIT-file-size-element-size = (average_number_files_per_directory + 1) / 3
```

For example, suppose the average number of files per directory on your system is 29. Following the formula above, you'd add 1 to 29 for a total of 30. Then divide 30 by 3 which equals a FIT file element size of 10.

Execute?

Once again, when you are satisfied with the answers you have supplied for each of the input fields of the command screen, confirm your choices by typing Y (Yes) and pressing NEW LINE. To change any answer(s), type N (No) and press NEW LINE. Disk Jockey will return the cursor to the first field of the screen, and you can type over any existing value.

Applying the Changes

After you change LDU parameters, Disk Jockey returns to *Pick one* on the "Create ... LDU" screen.

To create the LDU or apply the changes you made, select choice 6, "Execute" from the *Pick one* prompt. If you do not execute this screen, your changes will not be made, and if you were changing parameters while creating an LDU, the LDU will not be created.

Each disk that is part of an LDU must be on-line when you create the LDU — so make sure each disk is on line when you confirm with Execute.

Deleting an LDU [LDDELETE]

When you select choice 3, "Delete a logical disk," from the LDU Menu, the Delete an LDU command screen (shown next) appears. It allows you to delete an LDU.

You might want to delete an LDU if it had become obsolete or if you had copied its files onto another LDU. Or you might delete one image of an LDU if you wanted to stop mirroring and run just one image; deleting the secondary or tertiary image is the fastest way to free the disk space occupied by the image.

Each disk that is part of an LDU must be on-line when you delete the LDU. If the LDU is mirrored and you want to delete all images, you will need to specify each image manually. Disk Jockey will delete only one image at a time.

Delete an LDU

WARNING: DELETING AN LDU DESTROYS ALL DATA IN THE LDU
Disk unit name:

LDU filename:

LDU unique ID:

Execute? (Y or N):

The warning message

WARNING: DELETING AN LDU DESTROYS ALL DATA IN THE LDU

emphasizes that all data contained in the LDU will be lost when you delete the LDU. If you have data in the LDU that you want to save, press CANCEL/EXIT to return to the LDU Menu.

Disk unit name

Specify the name of the unit that contains the LDU you want to delete. If the LDU occupies more than one disk, specify all the disks it occupies, separating the names with a semicolon (for example, DPJ11;DPJ12). There are default names for disk units, but nondefault names can be assigned during VSGEN. Default device names of disks on some controllers are shown earlier, in Table 7-2.

If you are running stand-among Disk Jockey and it recognizes the unit you specify, it will display the Device Specification screen with all fields filled; then it will position the cursor at the *Execute?* question. You cannot edit fields on the stand-among Device Specification screen. Type Y and press NEW LINE. Or if you specified the wrong unit, answer N, correct the unit name, and then confirm with Y and NEW LINE.

If stand-among Disk Jockey does not recognize the device you specify, it will return an error message. Type the correct unit name and press NEW LINE. If you cannot remember the name, exit from Disk Jockey and list the disk units in directory :PER (FILESTATUS/TYPE=DKU @+).

If you are running stand–alone Disk Jockey and the program recognizes the disk unit name, it will display the Device Specification screen with all fields filled. Then it will position the cursor at the *Execute?* question. You can change any of these fields, but they will generally be correct; if so, confirm with Y and NEW LINE. (Disk Jockey recognizes all units whose names are defined in a device names file, created by VSGEN, that was made the default names file via the Technical Maintenance Menu choice "Change Startup Parameters. It also recognizes any unit you previously defined in this session.)

If stand–alone Disk Jockey does not recognize the disk unit name you typed, it will display the Device Specification Screen. This would happen if you had acquired a new disk and were formatting it for use with AOS/VS II. To the Device Specification Screen, you must specify the bus type, device type, unit number, device code, and, if the disk is on an MRC subsystem, the disk controller slot number. Filling this screen is explained earlier in this chapter, in the section "Software Formatting a Physical Disk [FORMAT]."

When Disk Jockey has all the information it needs to identify the disk, it asks the filename:

LDU filename

The LDU filename is the name given to the LDU when it was created. If you cannot remember the filename, you can get more information via the LDINFO keyword. Type the LDU filename and press NEW LINE.

LDU unique ID

Earlier, we suggested that you use the form ldu–filename.IMAGEn for LDU unique IDs. If you cannot remember the unique ID, use the the LDINFO keyword to discover it. Type the LDU unique ID and press NEW LINE.

Execute? (Y or N)

When you have answered all questions, the screen cursor moves to the *Execute?* prompt. If you specified the correct LDU, type Y and press NEW LINE. If Disk Jockey can delete the LDU, itwill do so; if not, it will display an error message, probably one of those explained below under "Error Conditions."

If you want to change an answer, type N and press NEW LINE. Disk Jockey will return the cursor to the first field. Move the screen cursor as desired using the uparrow and downarrow keys or the NEW LINE key. You can type over any answer you want to change. When you are satisfied with all answers, move the cursor to the *Execute?* prompt, type Y and press NEW LINE, or press the EXECUTE function key (F1).

Error Conditions

After you confirm at the Execute prompt, Disk Jockey may display one of the following error messages. You can recover as explained in the text.

HARD error or *physical unit failure.*

This means the system or Disk Jockey cannot access the disk unit. Perhaps the unit is not on line. Check and correct if possible.

You haven't specified disks for all pieces of this LDU
n of m pieces were specified.
Do you want to continue?

This means that not all disk units that hold pieces of the LDU have been specified. We strongly recommend that you specify them all so that the entire LDU can be deleted. If you can identify all the LDU pieces and put those disks on line, proceed as follows: Answer N (No), and specify the missing pieces; then repeat the delete steps.

If you cannot remember which units hold LDU pieces, answer N, use the LDINFO keyword to check disk units for the LDU pieces, and retry the delete sequence.

If you cannot specify all pieces (as, for example, if a disk unit is down), answer Y (Yes) to have Disk Jockey delete the LDU pieces you specified. Make a note to delete the pieces you did not delete later on, when this is possible, to free the disk space they occupy.

This logical disk is normally mirrored.
Do you want to continue? [Y or N]

This message means that the LDU you specified is mirrored; it is simply an informational note. To have Disk Jockey delete this image, answer Y; if you want to reconsider, answer N. In any case, Disk Jockey deletes only one image of an LDU at a time; if you want to delete any other image(s), you must specify them manually the same way you did this one.

Changing the Parameters of an Existing LDU [LDMODIFY]

Choice 4,"Change LDU parameters," on the LDU Menu lets you change the ACL or element size of an existing LDU. This screen is accessible via the keyword LDMODIFY. The screen follows.

Change LDU Parameters

Disk unit name(s):

LDU filename:
LDU unique ID:

ACL:

File defaults

Primary data element size: n	*Secondary data element size: n*
Number of primary elements: n	*Index element size: n*
Maximum index level: n	

Directory defaults

Primary data element size: n	*Secondary data element size: n*
Number of primary elements: 1	

Execute? (Y or N):

You can change many, but not all, of the parameters of an existing LDU via this command screen. There are three parameters of an existing LDU that you cannot change. They are the placement of the bitmap, the number of blocks in the remap area, and the FIT file element size. These three LDU parameters can only be changed at the time you create the LDU. See the section "Changing the Parameters of an LDU" for more information about changing the placement of the bitmap, the number of blocks in the remap area, and the FIT file element size.

The other LDU parameters can all be changed on an existing LDU. These parameters are discussed in the following sections.

Disk unit name(s):

Specify the name of the unit that contains the LDU whose parameters you want to change. There are default names for disk units, but nondefault names can be assigned during VSGEN. Default device names of disks on some controllers are shown earlier, in Table 7–2.

If you are running stand–among Disk Jockey and it recognizes the unit you specify, it will display the Device Specification screen with all fields filled; then it will position the cursor at the *Execute?* question. You cannot edit fields on the stand–among Device Specification screen. Type Y and press NEW LINE. Or if you specified the wrong unit, answer N, correct the unit name, and then confirm with Y and NEW LINE.

If stand–among Disk Jockey does not recognize the device you specify, it will return an error message. Type the correct unit name and press NEW LINE. If you cannot remember the name, exit from Disk Jockey and list the disk units in directory :PER (FILESTATUS/TYPE=DKU @+).

If you are running stand-alone Disk Jockey and the program recognizes the disk unit name, it will display the Device Specification screen with all fields filled. Then it will position the cursor at the *Execute?* question. You can change any of these fields, but they will generally be correct; if so, confirm with Y and NEW LINE. (Disk Jockey recognizes all units whose names are defined in a device names file, created by VSGEN, that was made the default names file via the Technical Maintenance Menu choice "Change Startup Parameters. It also recognizes any unit you previously defined in this session.)

If stand-alone Disk Jockey does not recognize the disk unit name you typed, it will display the Device Specification Screen. This would happen if you had acquired a new disk and were formatting it for use with AOS/VS II. To the Device Specification Screen, you must specify the bus type, device type, unit number, device code, and, if the disk is on an MRC subsystem, the disk controller slot number. Filling this screen is explained earlier in this chapter, in the section "Software Formatting a Physical Disk [FORMAT]."

When Disk Jockey has all the information it needs to identify the disk, it asks the LDU filename:

LDU filename:

The LDU filename is the name given to the LDU when it was created. If you cannot remember the filename, you can get more information via the LDINFO keyword. Type the LDU filename and press NEW LINE.

LDU unique ID

Earlier, we suggested that you use the form ldu-filename.IMAGEn for LDU unique IDs. If you cannot remember the unique ID, use the the LDINFO keyword to discover it. Type the LDU unique ID and press NEW LINE.

After you identify the LDU, Disk Jockey displays the LDU parameters for you to change. If the program cannot read the LDU, perhaps because you didn't specify all pieces, it will display an error message. You must specify all pieces.

Any changes you make to the parameters are noted by Disk Jockey as you type them, but the changes are not made until you answer Yes to the *Execute?* prompt at the bottom of the screen. Changes you make to any image of a mirrored LDU apply to all images.

ACL

AOS/VS II maintains an access control list (ACL) for each initialized LDU. The ACL contains usernames of users who can access the LDU and the type(s) of access each user has. To create the ACL, you specify usernames and the access privilege types you want users to have. To change an ACL, you can either specify additional usernames and the access privileges you want those users to have, or delete one or more of the usernames (along with associated access privileges) currently in the ACL.

When you change an ACL, proceed from specific usernames to general usernames or templates (for example, OP,OWARE $+,, +,RE). This ACL gives OP the privileges

OWARE, gives usernames beginning with $ no access (null), and gives all remaining users Read and Execute privileges.

ACLs are described in greater detail earlier in this chapter, section "LDU Access Control Lists (ACLs)."

File Defaults

Primary data element size:

This question introduces the file default questions. You can change the default values for any file that anyone subsequently creates on the LDU.

Disk Jockey is asking if you want to change the primary data element size for this LDU. Every disk file consists of one or more elements. An element is a series of contiguous 512–byte disk blocks. The default element size for nondirectory files is four disk blocks. The default for directory files and LDUs is one block. This input field allows you to change the primary data element size.

When you first create a file, AOS/VS II allocates the number of blocks that you have specified as your primary data element size for that file to use. If you accept the default value offered by Disk Jockey, that number will be four. Each time you create a new file, AOS/VS II will allocate four disk blocks to the new file. The file will always grow in increments of four contiguous disk blocks.

You can change the primary data element size to any number you choose from 1 through 99. AOS/VS II will always allocate the number of blocks you specify for the primary data element size whenever you create a new file. If you specify 99 as the primary data element size, then the file will always grow in increments of 99 contiguous disk blocks.

These blocks are located at consecutive logical (not necessarily physical) addresses. As the file grows, AOS/VS II allocates disk space to the file according to its file element size. The blocks that make up an element are always contiguous, but the elements themselves might not be contiguous.

Finding 99 contiguous disk blocks is more difficult than finding four contiguous disk blocks. You might, therefore, decide that you want to make one large initial allocation of disk space with a primary element size of 64 contiguous blocks, and to add to the file in much smaller increments, say 8 contiguous blocks. You can accomplish this using the next two input fields: *Secondary data element size* and *Number of primary elements*.

You can also use the CLI command CREATE to create a file with nondefault primary element size. The CLI lets you create a file with aa maximum element size of 512,000,000.

Secondary data element size:

As with the primary element, the default secondary element size for nondirectory files is four disk blocks and the default for directory files and LDUs is one block. You can change this value to any number from 1 through 99. You can use the secondary data element size, together with the primary data element size, in a variety of combinations to most efficiently allocate disk space for your files.

For example, you may choose to set the primary data element size of a particular LDU at 8 and the secondary data element size at 4. Subsequently when you create files on this LDU, each file will be allocated eight contiguous disk blocks. After you exhaust the number of primary elements (the next input field on this command screen), AOS/VS II will allocate disk blocks according to the file element size found in the secondary data element size input field, which in this case is 4.

Number of primary elements:

Disk Jockey is asking you to specify the number of times that you want the primary data element allocated to any file on this LDU. The range for this value is from 1 through 99. The default value for this input field is 1. That means that AOS/VS II will allocate one data element of the size specified in the primary data element input field. After that, for every request to AOS/VS II for more disk space, AOS/VS II will allocate a data element of the size specified in the secondary data element size input field. In the example mentioned above, a file created on this particular LDU gets an initial allocation of eight contiguous (512-byte) disk blocks. After that one primary element (as specified in this input field) is exhausted, the file is allocated any additional disk blocks in increments of four contiguous (512-byte) disk blocks each.

These three input fields — primary data element size, secondary data element size, and number of primary elements — work together to manage the orderly accumulation of files on the LDU.

Index element size:

Disk Jockey wants you to specify the maximum number of blocks for the index element. The default is one.

While the disk blocks that make up each data element of a file are contiguous, the elements themselves are not contiguous. The elements are stored in different areas on the disk. AOS/VS II keeps track of all the elements for each file by indexing them. An index is a disk block that points to the addresses of as many as 124 separate data elements. When a file contains more than 124 data elements, a second index (a second disk block) can organize and point to an additional 124 data elements. The maximum number of these index blocks, each of which can organize and point to the addresses of 124 separate data elements, is 32. Specify the total number of index blocks for a single file and press NEW LINE.

Maximum index level:

To keep track of each file's data elements, AOS/VS II maintains one or more index levels for each file. The default number of index levels is three, which is also the maximum number for index levels for a single file.

Since files with large data element sizes have fewer separate elements, they require fewer index levels. Similarly, since files with smaller data element sizes have more separate elements, they require more index levels.

Each first-level of indexing organizes and points to the addresses of as many as 32 index blocks. And when a file is so large as to require more than one level of indexing, there can be multiple index levels, up to a maximum of three.

Type the maximum number of index levels that you want the LDU to have and press NEW LINE.

For details on remaining parameters on the Change LDU Parameters screen, see the section "Changing The Parameters of a Newly Created LDU," earlier in this chapter.

Viewing LDU Information [LDINFO]

The fifth choice on the LDU Menu is to view LDU information. You can use the LDU Information screen to check the LDU filename and LDU unique ID, as well as what LDUs you have on any physical disk.

NOTE: AOS/VS II Release II includes the LDUINFO utility, which can report information on any physical disk or initialized LDU. If AOS/VS II is running, using LDUINFO is easier than using the Disk Jockey LDINFO screen. LDUINFO is further described in *Managing AOS/VS and AOS/VS II.*

The LDU Information screen follows.

LDU Information

Pick one: (1. Change Disk Unit, 2. Top of Display, 3. Print): 1

Disk unit name:

We will explain the questions one–by–one.

Change disk unit

This choice lets you specify another disk. Disk Jockey will display a prompt below the *Pick one* prompt asking you to specify the disk unit name of the disk you want to view information about. When you first access this screen, this is the default choice.

Disk unit name

Type the disk unit name (as many as 31 alphanumeric characters) of the LDU that you want information about and press NEW LINE.

If you are running stand–among Disk Jockey and it recognizes the unit you specify, it will display the Device Specification screen with all fields filled; then it will position the cursor at the *Execute?* question. You cannot edit fields on the stand–among Device Specification screen. Type Y and press NEW LINE. Or if you specified the wrong unit, answer N, correct the unit name, and then confirm with Y and NEW LINE.

If stand–among Disk Jockey does not recognize the device you specify, it will return an error message. Type the correct unit name and press NEW LINE. If you cannot remember the name, exit from Disk Jockey and list the disk units in directory :PER (FILESTATUS/TYPE=DKU @+).

If you are running stand–alone Disk Jockey and the program recognizes the disk unit name, it will display the Device Specification screen with all fields filled. Then it will position the cursor at the *Execute?* question. You can change any of these fields, but they will generally be correct; if so, confirm with Y and NEW LINE. (Disk Jockey recognizes all units whose names are defined in a device names file, created by VSGEN, that was made the default names file via the Technical Maintenance Menu choice "Change Startup Parameters. It also recognizes any unit you previously defined in this session.)

If stand–alone Disk Jockey does not recognize the disk unit name you typed, it will display the Device Specification Screen. This would happen if you had acquired a new disk and were formatting it for use with AOS/VS II. To the Device Specification Screen, you must specify the bus type, device type, unit number, device code, and, if the disk is on an MRC subsystem, the disk controller slot number. Filling this screen is explained earlier in this chapter, in the section "Software Formatting a Physical Disk [FORMAT]."

When Disk Jockey has all the information it needs to identify the disk, it displays information on each LDU on the disk: the LDU filename, the LDU unique ID, the number of blocks in the LDU, the number of pieces that make up the LDU, and, if it is a mirrored LDU, the unique IDs of mirrored images. A sample display follows.

LDU Information for MRCDISK000E01

LDU filename: UDD1
LDU unique ID: UDD1.IMAGE1
Number of blocks: 960000 Piece number: 1
Mirror unit names: MRCDISK000F01

Pick one: (1. Change Disk Unit, 2. Top of Display, 3. Print): 1

Choice 2, "Top of display," lets you return quickly to the first line. This is useful when the LDU information display is several screens long. On a CRT terminal, you can also scroll through the display by using the PREVIOUS SCREEN (F3) and NEXT SCREEN (F4) function keys, as well as the uparrow and downarrow keys.

Print

If you select choice 3, "Print," Disk Jockey will put up a second *Pick one* prompt directly below the first. This second *Pick one* prompt offers you a choice of having the LDU information sent to either a file which Disk Jockey creates (it cannot already exist) or to a printer that you specify. Select file (choice 1) or printer (choice 2) and press NEW LINE. Disk Jockey will then ask you for either the pathname of the file or the name of the printer to receive the printout. Type the file pathname or the name of the printer and press NEW LINE. You can exit from the LDU Information display by pressing CANCEL/EXIT.

Renaming an LDU [LDRENAME]

You can change an LDU filename while retaining the unique ID, or you can rename both the LDU and its unique ID. To do this, select choice 6, "Rename an LDU," from the LDU Menu. The screen that Disk Jockey displays follows.

Rename a Logical Disk Unit

Disk unit name(s):

LDU filename:

LDU unique ID:

New LDU filename:

New LDU unique ID:

Execute? (Y or N):

We will explain these one-by-one.

Disk unit name(s):

If you are renaming a mirrored LDU, you must specify all images (either 2 or 3) of the LDU in order for Disk Jockey to rename the LDU.

Separate mirrored disk unit names with an exclamation point (!). For example, if disk units DPJ1 and DPJ10 are mirrored images, type DPJ1!DPJ10. If an image occupies several disks, type the unit names of all disks, separated by a semicolon; for example DPJ11;DPJ12.

LDU filename:

The LDU filename is the name given to the LDU when it was created. If you cannot remember the filename, you can get more information via the LDINFO keyword. Type the LDU filename and press NEW LINE.

LDU unique ID

Earlier, we suggested that you use the form ldu-filename.IMAGEn for LDU unique IDs. If you cannot remember the unique ID, use the the LDINFO keyword to discover it. Type the LDU unique ID and press NEW LINE.

If this is a mirrored LDU, you must specify all images of the LDU. Separate the unique IDs with an exclamation point (!); for example,

UDD1.IMAGE1!UDD1.IMAGE2 ↵

If you do not to specify all images of a mirrored LDU, Disk Jockey will return an error message. Type the unique IDs and press NEW LINE.

New LDU filename:

Specify the new filename for this LDU. Users will use this name as a directory filename to access the LDU. The filename can be as many as 31 characters. Type the new filename and press NEW LINE.

New LDU unique ID:

You may also assign a new unique ID to the LDU image that you want renamed. The unique ID can be as many as 31 characters. Just as with the old LDU unique ID, if this is a mirrored LDU, you must specify all images. Separate the images' unique IDs with an exclamation point. Accept the default, or type the new unique ID(s) that you want the LDU image(s) to have and press NEW LINE.

Execute?

Review the answers on the screen. If you specified the correct old and new filenames and unique IDs for the LDU you want to rename, type Y and press NEW LINE. If you want to change an answer, type N and press NEW LINE. Disk Jockey will move the screen cursor to the first field of the screen. Move the cursor to the desired field using the downarrow or uparrow keys or the NEW LINE key. You can type over any answer you want to change. When you are satisfied with the answers, move the cursor to the *Execute?* prompt, type Y and press NEW LINE, or press the EXECUTE function key (F1).

If AOS/VS II or Disk Jockey fails while you are renaming an LDU, the renaming operation may or may not have completed. Try to initialize the LDU in question using first the old name. If the LDU is still accessible by the old LDU name, then you can retry the rename screen. If the old name fails, try the new name. If the LDU is accessible by the new LDU name, then the rename operation was successful.

If AOS/VS II or Disk Jockey failed while you were renaming a mirrored LDU, one image may have been renamed while other(s) were not. If this is the case, when you try to access the LDU Disk Jockey will display the following question:

Disk is normally mirrored.
Do you want to break the mirror?

You must break the mirror and finish the renaming operation on those images of the LDU that were not renamed. Then under AOS/VS II use the MIRROR command to resynchronize the images, using their new LDU name.

Copying an LDU [LDCOPY]

AOS/VS II allows you to copy an entire LDU with Disk Jockey, via choice 7, "Copy an LDU," from the LDU Menu. Doing this is described in a backup chapter of *Managing AOS/VS and AOS/VS II.*

Installing Software [SOFTWARE]

The Install System Software Menu lets you

- install an AOS/VS II release or update
- install bootstrap programs
- install microcode

Generally, you will want to perform these tasks only when building your system disk. Therefore, these tasks are described in Chapter 2 (for the first installation of AOS/VS II) and Chapter 8 (for installing updates and new releases of AOS/VS II).

View or Change Startup Parameters [PARAMETERS]

Choice 4, "View or change startup parameters," on the Disk Jockey Main Menu brings up the same screen as does choice 4 of the Technical Maintenance Menu, described earlier in this chapter. The "View or or change startup parameters" choice allows you to change any of the default settings for the root LDU or any of your other LDUs. The View or Change Startup Parameters screen follows.

View or Change Startup Parameters

Disk unit name(s):

LDU filename:

LDU unique ID:

Operating system pathname:

Names file system pathname:

Disk Jockey pathname:

Microcode system area ID:

Execute? (Y or N):

Disk Jockey will display the current startup parameters for the disk. If you are satisfied with the startup parameters, press CANCEL/EXIT (on a CRT terminal) or ESC-C (on a hardcopy terminal). To change any value, move the cursor through the input fields until you reach the parameter(s) that you want to change. Change the parameter(s) that you want, and continue through the screen to the *Execute?* prompt.

Changing the startup parameters is described in Chapter 6, section "Using the Techical Maintenance Menu."

Running Disk Polisher [POLISHER]

Selecting choice 5, "Run Disk Polisher," from the Disk Jockey Main Menu displays the Disk Polisher command screen. Disk Polisher reclaims blocks that were not allocated to any program or file, but which you could (for whatever reason) not access. The Disk Polisher screen follows.

Run Disk Polisher

Disk unit names(s):

LDU filename:

LDU unique ID:

Do you want to polish this logical disk? (Y or N): N

List output? (P = printer, F = file, T = terminal only): T

Execute? (Y or N): Y

Running Disk Polisher is explained in Chapter 6.

What Next?

Now that you know how format disks and create LDUs, you may want to learn more about installing new AOS/VS II releases (described in the next chapter) or PREDITOR, EXEC, other runtime tools, or system management, as described in *Managing AOS/VS and AOS/VS II.*

End of Chapter

Chapter 8
Handling Updates and New Releases from DG

Read this chapter

- When you want to install a new AOS/VS II update or release received from DG.
- When you want to install new computer microcode received from DG.
- When you want to revert to an old release of AOS/VS II, AOS/VS, or microcode.

Data General continually improves its software and microcode products. It sends the new software products (with new manuals) to all customers who are on the Software Subscription Service. And it sends new revisions of microcode and emulator software to customers on the Microcode Subscription Service. If you subscribe to one or both services, you will periodically get tapes or diskettes and new manuals. Generally, you should install the new products. In nearly all cases, they will run your existing applications even better than your current revision.

AOS/VS II software and microcode releases have revision numbers, each greater than the last. For AOS/VS II, the numbers go 1.00, 1.10, 1.20, 2.00, and so on. Data General may issue one or more *updates* for each release. Update revision numbers proceed from the release number; for example, for AOS/VS II release 1.10, the updates go 1.11, 1.12, 1.13, and so on.

Releases and updates are shipped on reel–to–reel tape or cartridge tape, depending on your system. Releases and updates have the same logical file format: tape file 0 is the tape bootstrap that automatically reads file 1. File 1 is Disk Jockey, and file 2 is a dump file that includes all disk files that make up the update or release. The dump file contains a directory structure that corresponds to the structure on your system.

This chapter tells how to upgrade your system software and microcode with updates and new releases of those products from DG. The major sections are

- Installing an AOS/VS II Update
- Installing an AOS/VS II Release
- Updating Your Manuals
- Installing New Microcode
- Reloading an Old Release or Update

The chapter is organized this way because usually, you'll need to install one or more updates before installing a release or new microcode. In fact, when you get a new release, you'll probably get a new revision of this manual.

Installing an AOS/VS II Update

Each AOS/VS II update includes one or more tapes, each with a paper label marked with UD, and a printed update notice. The update notice explains reasons for the update and tells how to install it.

The update includes improved versions of some programs shipped in the original AOS/VS II release. An update also includes patches (needed changes to one or more program files) and an *Update tool* utility to apply the patches. New program files are shipped in their usual directories; the Update tool is shipped in directory :UPDATE; and patches are shipped in a directory beneath :UPDATE named for the update.

The number of an update is based on the release it updates; for example, the updates for 1.20 proceed 1.21, 1.22, 1.23, and so on. Every update includes all changes from previous updates. For example, update 1.23 includes changes from updates 1.21, 1.22, *and* 1.23.

Updates do not include new manuals, but they often *do* include new documentation changes files and Help files.

Installing an update has several phases: using Disk Jockey to install the update software on disk, running VSGEN (if your hardware has changed or you want to change your tailored system), and running the Update tool.

NOTE: Use the tape-based Disk Jockey, not the LOAD_II program or LOAD command, to install update software. If you use a different method, like LOAD_II, you may not be able to boot from disk later on.

Cautions and Conditions

Successful installation of an update depends on the following conditions.

- You must not have changed the directory structure shipped by DG. For example, if the old revision of SED.PR is not in directory :UTIL, the new revision will not overwrite it; there will be two revisions of the program on the LDU.

- Your system LDU cannot include disks other than those on the first controller, because the starter system supports only the primary controller.

Installation Steps

To install the update, follow these steps.

1. Read the update notice. This will tell you about any exceptions to the instructions given in this section.

   Also, make a list of DG–supplied files you have tailored for your system. Each file in the update will be placed in the AOS/VS II directory structure; this means that some files already in the structure will be deleted and replaced. There may be one or two existing files you want to protect (like :UTIL:LINK_ERMES.CLI and other CLI macros you have edited). To protect any such file from deletion, rename it (perhaps just add the character 1 to the original name, as in RENAME LINK_ERMES.CLI LINK_ERMES1.CLI↵). Do not try to protect any DG–supplied files by setting permanence on for them.

2. Mount the update tape, marked UD, in unit 0 of the first tape controller.

3. You want to work from the SCP CLI. If AOS/VS II is running, shut it down. If AOS/VS II is not running, cold start your computer. From the Operating System Load menu, select choice 2 (not 1) to display the Technical Maintenance Menu. From the Technical Maintenance Menu, enter the SCP CLI.

4. Boot from tape by typing BOOT and the tape controller device code. The standard device codes are as follows.

Unit Type	Device Code Information
ECLIPSE–bus MTB	Default device code (octal) is 22.
ECLIPSE–bus MTC	Default device code (octal) is 22.
ECLIPSE–bus MTD	Default device code (octal) is 62.
ECLIPSE–bus MTJ	On combined storage subsystem (CSS), the default device code (octal) is 23.
MRC–bus MRCTAPE	Default device code for the MRC chassis controller is 116 (octal) or 10E (hex); the default slot (node) number of the tape controller is 0A (hex); and the default tape unit number is 0.

For example,

`BOOT 22↵` (Or 116 or 62)

If you type an invalid device code or the tape unit isn't ready, nothing happens. If nothing happens after 30 seconds or so, enter the break sequence: on a CRT, press the CMD key, hold it down, and press the BREAK/ESC key. On a hardcopy terminal, press BRK. This returns the SCP CLI prompt. Correct any obvious problems and return to the beginning of this step.

If the tape unit is on an ECLIPSE–bus controller, skip to step 6. If the tape unit is on an MRC subsystem (you typed BOOT 116), the hardware needs to know what MRC slot the tape controller is in and what the tape unit number is.

5. If the tape unit is on an MRC, you see the question

Enter NODE,UNIT of MRC boot device in hex. [x,y]

The value of the default unit (*x,y*) depends on the last default set. If a default has never been set, *x,y* shows *No default given*. Generally, with a 23–slot MTC, the primary MRC tape controller is in node A (slot number 0A, in hex) and the unit is number 0, so with a 23–slot MRC, type 0A,0↵.

For a 10–slot MRC, the tape controller slot varies depending on the number of other boards in the chassis. The tape unit number is usually 0. For a 10–slot MRC, type the node (slot number) of the tape controller and the unit number. For example, with a 10–slot MRC, type 5,0↵.

After you answer, the hardware will ask if you want the new value to be the default. Respond No by pressing NEW LINE. You want the default to be the device you boot AOS/VS II from, which will be disk, not tape.

The hardware tries to read from the specified device. If you see a *Timeout* message or nothing happens, this means that the system tape isn't mounted on the unit you specified. Enter the break sequence. Then make sure the tape unit is on and on line, with the AOS/VS II system tape mounted. Type BOOT 116 and press NEW LINE again, and specify the correct slot number and unit number.

6. The hardware reads the AOS/VS II tape bootstrap program from the system tape and the tape bootstrap displays

   Loading tape file 1; please wait.

   There's a pause while the tape bootstrap loads tape file 1, Disk Jockey. Then Disk Jockey needs the date and time. If your computer has a boot clock and the boot clock is working, Disk Jockey gets the date and time from the clock. If so, Disk Jockey displays its Main Menu; skip to step 10. Generally, Disk Jockey displays its Set Date and Time menu.

   If there is no working boot clock, Disk Jockey displays

   Set System Date and Time

   Date (MM/DD/YY): *1/01/69*

   Time [HH:MM:SS]: *00:00:00*

   Offset to GMT [+HH:MM:SS]: *+0:00*

   We will take the questions one by one.

   System Date [MM/DD/YY]: *1/01/69*

7. Type the date as numbers for month, day, and year. You can use spaces or slashes to separate numbers. For example, for August 23, 1990, type

   8 23 90↵

   System Time [HH:MM:SS] *00:00:00*

8. Type the time, based on a 24–hour clock, in hours, minutes, and seconds. Use spaces or colons to separate items. For example, for 2:30 p.m., type

   14 30↵

   Offset to GMT [+HH:MM:SS]: *+0:00*

9. Take the default: with a CRT terminal, press NEW LINE; with a hardcopy terminal, press CTRL–A and then NEW LINE.

10. Disk Jockey displays its Main Menu:

Disk Jockey Main Menu

1. Format a physical disk
2. Create, view, or modify a logical disk unit
3. Install system software

.

.

Enter choice: 1

11. You want to install system software, so type 3:

3↲

Disk Jockey displays the Install System Software Menu:

Install System Software Menu

1. Install an AOS/VS II release or update
2. Install bootstrap programs
3. Install microcode

Enter choice:

12. To install an AOS/VS II update or release, select choice 1:

1↲

Disk Jockey asks some questions about the LDU. We will take the questions one by one:

Disk unit name:

13. Type the unit name of your system disk. The default unit name of an ECLIPSE-bus system disk is usually DPJ0 (device code 24) or DPF0 (device code 27). The default unit name of an MRC-bus system disk is MRCDISK000E00. Model numbers, device types, default device codes, and default unit names of disks on an ECLIPSE and MRC bus appear in Appendix A.

If the system disk is mirrored, you must identify all the disk units involved. Separate the unit names with an exclamation point (!). For example, if the primary image is on DPJ0 and the mirror image on DPJ10, type DPJ0!DPJ10↲.

Type the disk unit name; for example

DPJ0↲ (or, for a disk on an MRC bus, MRCDISK000E00↲)

Next, Disk Jockey displays the Device Specification screen to ask for address information:

Device Specification

Device name:	*xxx*
Bus type (ECL or MRC):	*xxx*
Device type:	*xxx*
Unit number:	*n*
Device code (octal):	*n*
MRC slot number (hex):	
Execute (Y/N):	

14. The default answers are probably not right; you must type answers to at least some questions. Here's a summary of responses for your system disk.

	ECLIPSE–Bus Disk	**MRC–Bus Disk**
Device name:	DPJ0 or DPF0	MRCDISK000E00
Bus type (ECL/MRC):	ECL	MRC
Device type:	DPJ or DPF	MRCDISK
Unit number:	0	0 or other unit
Device code (octal):	24 (DPJ) or 27	116
MRC slot number (hex):	Does not apply	0E

If your system disk is mirrored, Disk Jockey will repeat device specification questions for the unit that holds the second and third images. For example, if your system disk DPJ0 will be mirrored on an image in DPJ10, Disk Jockey will repeat device information questions for DPJ10. To specify the address of the second (or third) image, you must change at least one default answer: unit number (for a mirror image on a different unit), device code (for a mirror image on a different controller), and/or MRC slot number (for a mirror image on a different MRC controller). Correct the wrong answers, take the default for each correct answer, and when you reach the *Execute?* prompt, type Y and press NEW LINE.

15. Disk Jockey asks about the LDU filename:

LDU filename:

16. Type the filename of the LDU. When this manual described creating the system LDU, it suggested the filename ROOT. If you can't remember or discover the filename, you can access it via the Disk Jockey View LDU Information screen (keyword LDINFO); then return to this menu. When you know the correct filename, type it; for example,

ROOT↵

LDU unique ID:

17. Type the unique ID of the LDU. When this manual explained creating the system LDU, it suggested the unique ID ROOT.IMAGE1.

If the system LDU is mirrored, indicate the unique IDs of all images involved. As with unit names, separate the IDs with an exclamation point. For example, if the IDs are ROOT.IMAGE1 and ROOT.IMAGE2, type ROOT.IMAGE1!ROOT.IMAGE2↵.

If need be, you can discover the unique ID(s) as explained in the previous step. When you know the unique ID, type it (or type them). For example,

ROOT.IMAGE1↵

Now that you've identified the LDU to receive software, Disk Jockey asks for load information:

Install an AOS/VS II Release or Update

Load from tape or diskettes (T = Tape, D = Diskettes): T
Pathname to load from: MTx0:2

Pathname template: #

Delete existing files with same names as files you are loading, or ask for confirmation? (D = Delete, C = Confirm): D

List files loaded? (P = Printer, F = File, T = Terminal only): T

Execute? (Y or N)

We'll explain these as you need them.

18. Make sure the AOS/VS II tape unit is ready and on line.

The first question is *Load from tape or diskettes (T = Tape, D =Diskettes): T*

19. Take the default as follows. With a CRT, press NEW LINE. With a hardcopy terminal, press CTRL-A and then NEW LINE. For example,

↵

Pathname to load from: MTx0:2

20. If the default is not correct, type the tape unit name, according to the device code you originally booted from at the beginning of this chapter. Follow the name with :2, to indicate tape file 2, as follows.

Device Code	Pathname to Type
22	MTC0:2
62	MTD0:2
23	MTJ0:2
116	MRCTAPE000A00:2

For example,

MTC0:2↵ (or MRCTAPE000A00:2↵)

Disk Jockey displays the Device Specification screen to ask more about the tape.

Device Specification

Device name: *xxx*

Bus type (ECL or MRC): *xxx*

Device type: *xxx*

Unit number: *n*

Device code (octal): *n*

MRC slot number (hex):

Execute (Y/N):

As before, we will explain these one by one.

Device name: *xxx*

21. Any default answers are probably not right; you must give answers to at least some questions. Here's a brief summary of what they should be for your system tape.

	ECLIPSE–Bus Tape	**MRC–Bus Tape**
Device name:	MTB0, MTC0, or MTD0	MRCTAPE000A00
Bus type (ECL/MRC):	ECL	MRC
Device type:	MTB, MTC, or MTD	MRCTAPE
Unit number:	0	0 or other unit
Device code (octal):	22 (MTB, MTC) or 62 (MTD)	116
MRC slot number (hex):	Does not apply	0A

22. Correct the answers you need to, take the default for each correct answer, and when you reach the *Execute?* prompt, type Y. For example,

Y↵

Disk Jockey doesn't check for the existence of the device at the specified device code until you confirm all answers with the *Execute?* question. After it accepts the answers, it returns to the previous menu.

Pathname template: #

23. You want to load all files (as indicated by the template #).

As you can see, it is possible to select one or two files from the update (for example, you can load SED text editor files by specifying UTIL:SED+). Generally, specifying files here is not recommended because new features in the program may depend on new features in the operating system (this is called rev–locking). Better install the whole release or update. Take the default. With a CRT, press NEW LINE; with a hardcopy terminal, press CTRL–A and then NEW LINE. For example,

↵

Delete existing files with same names as files you are loading, or ask for confirmation? (D = Delete, C = Confirm): D

24. You want to delete existing files; take the default. For example,

⤶

List of files loaded? (P = Printer, F = File, T = Terminal only): T

25. By default, filenames loaded are listed to the terminal. (The files in each update and release are also listed in a disk file, pathname :UTIL:n.nn_AOSVSII_FILES (n.nn is the update name), and in Appendix B of this manual.) If you want an additional listing to the printer, type P⤶; Disk Jockey will ask for more information after you tell it to Execute.

For the default file listing, take the default. For example,

⤶

Execute? (Y or N)

26. After checking your answers, confirm with Y:

Y⤶

At this point, if you specified listing to a printer or a disk file, Disk Jockey asks for device information. For the printer, specify the printer unit name and other information (similar to ECLIPSE–bus tape, except that the device code is usually 17). For a disk file, specify the pathname from the root directory. Disk Jockey will create this file if it doesn't already exist.

27. Disk Jockey advances the tape through tape file 2, loading AOS/VS II files. Depending on your tape unit, this may take from 20 minutes to over an hour.

If someone has turned permanence on for any file, Disk Jockey will ask if you want it turned off. Always answer Yes; AOS/VS II may not work properly if you retain an outdated file.

When Disk Jockey has loaded all files in tape file 2, it will display

Load completed.
Do you have another release or update tape to load (Y or N): N

Most updates fit on one tape. If there is another update tape, mount it on the same unit and answer Y⤶; then confirm with NEW LINE and wait for the load to complete. If there is no other tape, type N⤶.

CAUTION: *If you are installing a new release, do not mix update and release tapes. Most releases come on multiple tapes, while most updates use just one. Load all the release tapes, and then the update tapes. (This caution doesn't apply if you're loading just an update.)*

28. After loading all update software and rewinding the AOS/VS II system tape, Disk Jockey offers to install bootstrap programs.

Install all bootstrap programs (Y or N):

The bootstrap programs let you start AOS/VS II from disk. There are several of them and you want to install them all. Installing the bootstraps copies them from the LDU's file system into reserved areas called system areas, from which the hardware can execute them. (The bootstrap programs were *loaded onto the LDU* — but not installed — in previous steps.)

29. You should always install bootstrap programs, since the update software may require new bootstraps. To install the bootstraps, type

    Y⮐

    Disk Jockey reads bootstrap files from the LDU and copies them into system areas. This takes a few minutes. Then Disk Jockey prompts

    Press NEW LINE to continue.

30. To continue, press NEW LINE:

    ⮐

    Disk Jockey returns control to the Install System Software Menu:

    Install System Software Menu

    1. Install an AOS/VS II release or update
    2. Install bootstrap programs
    3. Install microcode

    Enter choice:

31. Exit from Disk Jockey by typing

    BYE⮐
    ...
    SCP-CLI>

32. Bring up the AOS/VS II starter system, :SYSGEN:SYS.PR (not your tailored system) as follows.

    For an ECLIPSE-bus disk, type BOOT 24⮐ or BOOT 27⮐. For an MRC-bus disk, type BOOT 116⮐. At the *NODE, UNIT* question, for a 23-slot MRC, type 0E,0⮐; with a 10-slot MRC, specify the node (slot) and unit number in the form node,slot.

    At the Operating System Load Menu, type 2⮐ to display the Technical Maintenance Menu. From this menu, select choice "Run a specified program" by typing 6⮐. When the program prompts *Pathname of the file to boot*, type the starter system pathname, :SYSGEN:SYS.PR⮐. Then confirm by answering Yes to the *Execute?* question.

    Specify the date and time if asked and take the default for the *Offset to GMT* question. Then, at the *Override default specs?* prompt, answer No by pressing NEW LINE.

33. The starter system asks if you want to load from a nonstandard tape device. Answer No unless your tape unit is connected through an MRC to a nonstandard tape controller or unit. (The system displays a list of standard tape units.) Answer Yes if your tape unit is connected to a nonstandard tape unit; then identify the tape unit.

34. If you have the XTS II or TCP/IP network transport system, you may need to move an updated copy of QNET.LB from directory :NET:UTIL to directory :SYSGEN. (When you run VSGEN, QNET.LB provides essential transport routines for the new AOS/VS II system.) If you do not have XTS II or TCP/IP, go to the next numbered step.

    If you have XTS II, use the FILESTATUS command to compare the QNET.LB files:

) SUPERUSER ON↵
    Su) FILES/AS :NET:UTIL:QNET.LB :SYSGEN:QNET.LB↵ (CLI16 Superuser prompt is *)

    If the two files have the same length and creation date/time, you're all set. Skip to the next numbered step.

    If the file in :NET:UTIL is much larger than the file in :SYSGEN, or if it's about the same size and newer than the file in :SYSGEN, see if you've received a new update of XTS II. If you *have* received a new update of XTS II, mount the tape and load it as described in the XTS II Release Notice (go to directory :NET; turn Superuser on; load tape file 0).

    Next, whether or not you received (and loaded) a new update of XTS II, move the file in :NET:UTIL to :SYSGEN as follows:

    Su) DIR :NET:UTIL↵
    Su) MOVE/V/DELETE :SYSGEN QNET.LB↵
    DELETED QNET.LB (CLI verifies deletion of the QNET.LB in :SYSGEN)
    QNET.LB
    Su)

    Having moved the XTS II version of QNET.LB into :SYSGEN, you can proceed.

35. Run VSGEN if necessary (if you want to specify a new device or a different host parameter). Use the /DEFAULT switch, as follows, in the form VSGEN/DEFAULT=configuration-pathname. Omit the .CONFIG suffix from the configuration filename. For example,

    Su) SEARCHLIST :UTIL↵
    Su) DIR :SYSGEN↵
    Su) VSGEN/DEFAULT=MSIS_01↵

    If the configuration file has information for more than one host, make sure the correct host is selected (in VSGEN, you can select a different host with the HOST keyword). Use VSGEN as described in Chapter 4 to edit or add the devices and parameters you want. Then save the configuration using the SAVE keyword.

36. After leaving VSGEN, run the Update tool to build and update the new AOS/VS II system file. Go to directory :UPDATE. Then run the Update tool in

the form UPDATE/REV=n.nn system-pathname, where n.nn is the update revision. For example,

Su) DIR :UPDATE↵
Su) UPDATE/REV=2.03 :SYSGEN:MSIS_01.PR↵

If the configuration filename differs from the system filename (as it might if it contains information for more than one host), you must use the /CONFIG= switch when you run the Update tool. For example, assume configuration file GENERAL.CONFIG defines HOSTA and MSIS_01, the system pathname you want to update is HOSTA.PR, and the update is 2.03. You would type

Su) UPDATE/REV=2.03/CONFIG=:SYSGEN:GENERAL.CONFIG :SYSGEN:HOSTA.PR↵

The Update tool updates the system file (it runs VSGEN and patches the system file). If you receive an error message, see the next section, "Update Errors."

37. Shut down the starter system, start up your new AOS/VS II system, and test it. Then make it the default system. These steps are described in Chapter 4. The section names are "Testing the New System,"and "Making the New System and Names Files the Defaults."

38. If you renamed any file in step 1, earlier, compare the original and new files (perhaps by printing the files and comparing them). Often, you'll be able to see what DG has changed in the new file. If you can see what DG changed, make appropriate changes to your tailored file; then delete the DG file and rename your file to its original name. If you *can't* tell how DG has changed the file, edit the DG file and adapt it to do what your tailored file does. Then delete your original tailored file.

39. If you run a locked CLI on the system console, a new password file might have overwritten your old one. If your UP macro includes the CLI32 command PASSWORD/FILE=PASSWORD, be aware that DG might have supplied a new PASSWORD file with the original password (:PASSWORD). If the Data General file did overwrite your own PASSWORD file, you should delete the Data General password file and recreate the file with your custom password as explained in Chapter 5. If the CLI32 password is in a file other than :PASSWORD, then your custom file remains intact.

    If instead of CLI32 you run LOCK_CLI, be aware that the newly installed LOCK_CLI has overwritten the old one; you must edit the LOCK_CLI.PR file with FED and change the default password — PASSWORD — to the desired password. Changing the LOCK_CLI password is covered in *Managing AOS/VS and AOS/VS II,* the security chapter.

40. Create a new error message file (:ERMES). Usually, this is just a matter of going to directory :UTIL, turning Superuser on, running the LINK_ERMES.CLI macro, and then moving the new ERMES file to the root directory. Chapter 5 of this manual had you create a macro (example name TAILORED_ERMES) that executed LINK_ERMES; if you followed that suggestion, substitute the name of your tailored macro for LINK_ERMES below. The commands are as follows:

) DIR :UTIL↵
) SUPERUSER ON↵
    Su) xxx↵ (xxx is the name of your tailored macro to run LINK_ERMES)

(A pause occurs here. If any error message appears, like *File does not exist* or *File has permanence set*, fix the error condition by creating links, changing the search list, or turning permanence off; then rerun your tailored macro.)

```
Su) MOVE/V/R :   ERMES↵
Deleted :ERMES
ERMES
Su)
```

The new ERMES won't be used by any currently running processes until you shut down AOS/VS II and start it up again, so you might want to do this now.

41. Some existing Data General programs have been overwritten by newer versions. If you edited the preambles of any DG utility programs (to take advantage of PID-size type, for example), you may need to use SPRED on the newer versions. You may want to use SPRED to examine the preamble settings of any programs you changed for a previous revisions. SPRED is described in *Managing AOS/VS and AOS/VS II.*

42. Bring up EXEC and the multiuser environment:

```
Su) :UP↵
```

Fix any errors that occur. There should be few, if any.

43. Create a system tape set as described in Chapter 4, section "Making a Tailored System Tape Set."

44. Update your manuals as described later in this chapter. You're done!

Update Errors

The Update tool reports errors to the terminal from which you run it; also, the tool logs errors and status messages in a file named UPDATE.LOG in a directory named in the form :UPDATE:n.nn_date_time.LOG. In the log directory filename, n.nn is the update revision, date is the date — day, month, year — and time is hour and minute — for example, :UPDATE:2.09_25AUG90_1015. The tool runs a verification pass to detect errors before it actually does anything. If the tool encounters an error during the verification pass, it will stop, allowing you to correct the error and restart it.

Most errors occur because file access is denied or because permanence is set on for a file the Update tool needs to replace. (The tool does not turn Superuser on or permanence off.) To overcome access errors, turn Superuser on and run the tool again.

To overcome a permanence error, turn permanence off for the pertinent file(s). If any of these is a file you need to protect (like a macro you've edited yourself, such as :UP.CLI and :UTIL:LINK_ERMES.CLI), rename the file, possibly adding the character 1 (as described in step 1 of the previous section). Then restart the tool.

Installing an AOS/VS II Release

An AOS/VS II release includes all program and support files needed to tailor and run AOS/VS II. Each release supersedes the previous one, although DG will continue supporting the old release for some specified amount of time. The new release is shipped to all new customers and customers on the Software Subscription Service. DG creates releases as needed for new hardware and software features — usually 6 to 12 months after the previous release.

Along with each release, DG ships a new set of AOS/VS II manuals and a printed Release Notice. The Release Notice describes, among other things, new features supported by the release. The section that describes new features is called "Changes and Enhancements"; read it to discover reasons for installing the release. (The Release Notice is also supplied as a disk file in :UTIL; the filename begins with the characters 085.)

Release software does *not* include changes made in updates to that release. If (as sometimes happens) you receive an update with the release, load the release first, and then the update, as covered in this chapter.

If, as might happen, you receive a *microcode* update with an AOS/VS II release or update, load the microcode file into the computer (described in Appendix D or E, depending on your computer) before loading the AOS/VS II software. This makes any new microinstructions available to the new AOS/VS II software. After installing the AOS/VS II software, generating a new operating system, and testing the system, shut down AOS/VS II and use Disk Jockey to install the new microcode in the default microcode system area. Loading a new revision of microcode is described later in this chapter.

1. Read the Release Notice, "Notes and Warnings" section to identify any interrevision incompatibilities.

2. Protect DG–supplied files you've tailored for your system. For the new release to work properly, each system file must be placed in the AOS/VS II directory structure; this means that all AOS/VS II system files already in the structure will be deleted and replaced.

   Generally, the only files shipped in an AOS/VS II release are those in the root directory and directories :UTIL, :SYSGEN, :HELP, and :UPDATE. There may be one or two existing files you want to protect (like :UTIL:UP.CLI, :UTIL:DOWN.CLI, :UTIL:LINK_ERMES.CLI, and other CLI macros you have edited). Rename these files, perhaps just adding 1 to the original name (for example, RENAME UP.CL1 UP1.CLI↵). Do not try to protect any DG–supplied files by setting permanence on for them.

3. Mount the AOS/VS II system tape in unit 0 of the first controller. If there are two tapes, mount the first one (although generally the order is unimportant).

4. Return to Chapter 2, section "Installing AOS/VS II Software on Your System LDU," and complete all steps given there.

Updating Your Manuals

The only printed documentation supplied with an update is the update notice; changes to your *manuals* are provided as disk files.

Printed documentation provided with a release includes the Release Notice *and* manuals; but for some manuals there's updated material in disk files.

After installing an update or release, you may want to check for disk files that contain documentation changes. (These are called documentation changes files.) The pathnames are in the form :UTIL:sss_pppppp_rr, where sss is the series, pppppp is the part number, and rr is the revision. For example, for manual 093–000539–02 (this manual), the documentation changes file pathname is

:UTIL:093_000539_02

To keep your manuals up-to-date, we suggest that you read these files, print the ones you want, and update the pertinent manuals. Then, if you need the disk space, delete the files. You can always reload any or all of them, if needed, from the AOS/VS II system tape set.

Installing New Microcode

Microcode is the foundation of your ECLIPSE MV/Family CPU. It's important to run the current revision of microcode.

DG maintains a Microcode Subscription Service, similar to its Software Subscription Service. New customers get membership automatically for a certain amount of time. If your membership has expired, we suggest that you renew it.

With the Microcode Subscription Service, you will periodically receive new revisions of microcode and the SCP operating system.

Generally, microcode and the SCP-OS are shipped on tape. Tape file 0 is the SCP-ADEX system (a subset of ADEX), bootable from tape. File 1 is the combined microcode and SCP OS file, in AOS/VS II dump format. (For original MV/8000s, microcode is shipped on diskette in a format the SCP can read. When you get the diskette, simply remove the old diskette from the CPU diskette unit, insert the new one, and turn CPU power off and on again to try it.)

There are two parts of the microcode procedure: loading the microcode file onto your system LDU, and installing the file's contents in the default microcode system area (from which an AOS/VS II bootstrap will load it automatically on cold starts). You can use Disk Jockey or the CLI for the first part; only Disk Jockey can do the second part. So you might as well use Disk Jockey for both parts. Follow these steps.

1. Mount the SCP SYSTEM MEDIA tape or diskette on unit 0.

2. Protect the old microcode file by renaming it to a name that includes its revision number. For example, on an MV/40000 (whose microcode filename is MV40000.MCF), you might type

) SUPERUSER ON↵
   Su) DIR :↵ (For CLI16, the Superuser prompt is *)
   Su) RENAME MV40000.MCF MV40000_2.00.MCF↵

   This rename step saves the old microcode file, which otherwise will be deleted when Disk Jockey loads the new one. If ever you need to use the old file, you can reinstall it in the default microcode system area via Disk Jockey; then the old one will be loaded automatically on cold start.

3. Shut down AOS/VS II.

4. Boot from your system disk. Next to the SCP prompt, type the BOOT command followed by the device code of the disk. For an ECLIPSE-bus disk, the device code is usually 24 or 27; for an MRC-bus disk, the code is 116 (octal) or 10E (hex). For example,

   BOOT 24↵ (or BOOT 116↵)

After a pause, the system console displays the Operating System Load Menu:

Operating System Load Menu

1. Continue immediately with operating system load
2. Enter the Technical Maintenance Menu
...
Enter choice:

5. To display the Technical Maintenance Menu, answer

   2↲

6. Depending on your computer, date and time questions might appear here. If so, answer the date and time questions and take the default for the *Offset to GMT* question.

7. Disk Jockey displays the Technical Maintenance Menu:

   Technical Maintenance Menu

   1. Load and start the default operating system
   2. Load and verify microcode
   ...
   7. Enter the Disk Jockey Main Menu
   ...

8. You want Disk Jockey's Main Menu, not choice 2, which loads microcode from a system area on disk. To access the Disk Jockey Main Menu, type 7:

   7↲

   Disk Jockey displays its Main Menu:

   Disk Jockey Main Menu

   1. Format a physical disk
   2. Create, view, or modify a logical disk unit
   3. Install system software
   ...
   Enter choice: 1

9. You want to install system software, so type 3:

   3↲

   Disk Jockey displays the Install System Software Menu:

   Install System Software Menu

   1. Install an AOS/VS II release or update
   2. Install bootstrap programs
   3. Install microcode

   Enter choice:

10. To install microcode, choose item 3:

3↵

Disk Jockey asks some questions about the LDU:

Disk unit name:

System area ID to install into: 1001

The microcode file will be loaded into the system area as well as into the root logical disk.

LDU filename:

LDU unique ID:

Install from tape or disk (T = Tape, D = Disk) T

Pathname: @MTC0:1

Execute (Y or N):

Take the questions one by one:

Disk unit name:

11. Identify the system LDU by typing the disk unit name. For an ECLIPSE–bus disk, the default disk unit name is DPJ0 (if you booted from device code 24) or DPF0 (if you booted from device code 27). For an MRC–bus disk, the default disk unit name is MRCDISK000E00 (if you booted from device code 116).

    If the root LDU is mirrored, you must identify all the units involved. (If you don't specify all the units, you'll receive an *Incomplete mirrored LDU* error message.) Separate the unit names with an exclamation point (!). For example, if you specified the images DPJ0 and DPJ10, and these units are on their default device codes, type DPJ0!DPJ10↵. For example,

    DPJ0↵ (or MRCDISK000E00↵)

    Disk Jockey tries to resolve the address of the disk you specified using the AOS/VS II device names file. If the program cannot do so, it asks device specifications, explained in steps beginning with step 14 in the section "Installing an AOS/VS II Update." Usually, Disk Jockey will be able to get address information from the names file, and will display

    System area ID to install into: 1001

12. Choose the default system area ID. With a CRT, press NEW LINE. With a hardcopy terminal, press CTRL–A and then NEW LINE. For example,

    ↵

    LDU filename:

13. Type the filename of the LDU. When this manual described creating the system LDU, it suggested the filename ROOT. If you can't remember or find the filename, you can access it via the Disk Jockey View LDU Information screen

(keyword LDINFO); then return to this menu. When you know the correct filename, type it; for example

ROOT↲

LDU unique ID:

14. Type the unique ID of the LDU. When this manual explained creating the system LDU, it suggested the unique ID ROOT.IMAGE1.

If the system LDU is mirrored, specify the unique IDs of all images. As with unit names, separate the IDs with an exclamation point. For example, if the IDs are ROOT.IMAGE1 and ROOT.IMAGE2, type ROOT.IMAGE1!ROOT.IMAGE2↲.

If need be, you can discover the unique ID(s) as explained in the previous step. When you know the unique ID, type it (or type them). For example,

ROOT.IMAGE1↲

Install from tape or disk (T = Tape, D = Disk) T

15. This question lets you install microcode directly from tape (Disk Jockey loads the file into the root directory, and then installs the file from disk) or from disk (Disk Jockey looks on disk for the file you specify, and then installs it). You want to install from tape. Take the default. For example,

↲

Pathname: @MTC0:1

16. If Disk Jockey shows the correct tape unit name, take the default. If Disk Jockey doesn't show the correct name, type the correct name over the displayed name. Follow the name with :1, to indicate tape file 1, as follows.

Device Code	Pathname to Type
22	MTB0:1 (for MTB unit) or MTC0:1 (for MTC unit)
62	MTD0:1
23	MTJ0:1
116	MRCTAPE000A00:1

For example,

MTB0:1↲ (or MRCTAPE000A00:1↲)

As before, Disk Jockey tries to find the address of this tape unit. If it cannot do so, it asks device specifications, explained in steps beginning with step 21 in the section "Installing an AOS/VS II Update." Usually, Disk Jockey will be able to get address information from the names file, and will display

Execute? (Y or N):

17. Confirm the microcode load by typing

Y↲

Disk Jockey advances the tape to load the microcode file into the LDU root directory (with the filename of the form xxx.MCF, where xxx is your computer name). Loading takes a few minutes. Then Disk Jockey displays the filename(s) loaded and asks for confirmation before installing the default file:

Install file xxx.MCF in microcode system area (Y or N)

18. By DG convention, microcode files end in .MCF. Generally, use the default; type Y and press NEW LINE. (But if the display shows more than one microcode file, and the default is not the microcode file you want, type N and press NEW LINE. The program will ask *Filename to install: xxx.MCF.* Type the filename you want; then press NEW LINE; for example, if you have an MV/4000 with hardware floating-point unit, type MV4000FP.MCF↵.)

To install the default file, type

Y↵

Disk Jockey copies the disk file into the reserved microcode system area, from which a bootstrap program can load it on startup. Finally, the program rewinds the tape. When done, the program displays

Press NEW-LINE to continue.

19. Press NEW LINE:

↵

Disk Jockey returns control to the Install System Software Menu:

Install System Software Menu

1. Install an AOS/VS II release or update
2. Install bootstrap programs
3. Install microcode

Enter choice:

20. You're finished with Disk Jockey. Exit from Disk Jockey by typing BYE and pressing NEW LINE:

BYE↵

SCP-CLI...>

You've left Disk Jockey and returned to the SCP CLI. Next, you'll bring up AOS/VS II.

21. Turn computer power off.

22. If the computer has a lock switch, put it in the lock position. Turn computer power on.

After a pause, the system console displays the *POWER UP* message.

23. Next the system console may display the Automatic Program Load Menu; if so, press NEW LINE. Then it displays the Operating System Load Menu:

Operating System Load Menu

1. Continue immediately with operating system load
2. Enter the Technical Maintenance Menu
...
Enter choice:

24. As before, type

1↵

You will see microcode loading messages, and, after a pause

Loading file
xxx (*xxx* is the default operating system pathname)

Another pause occurs. Then

AOS/VS II Release n

25. If asked the date and time, specify them. Specify or take the default for the *Offset from GMT* question.

26. When asked *Override default specs?*, type N and press NEW LINE.

A pause will occur. Then

AOS/VS II CLI Release n date time
)

When you see the AOS/VS II CLI prompt, you know that microcode has been loaded from disk. (AOS/VS II can't run until microcode has been loaded.)

If, instead of the prompt, you see an error message about microcode, you must reload microcode from the SCP SYSTEM MEDIA tape as described in Appendix D or E, depending on your computer. After you run through the steps in Appendix D or E, repeat steps 4 through 26 in this section.

27. Remove the tape from the unit; clip the cover ring around it (if there is one); and store the tape safely. You may need it again. Clip cover rings on all DG–supplied tapes (if applicable) and store them safely too.

If you have a machine that uses emulator firmware (for example, an MV/4000 DC, which runs an emulator in its IOC), you may also receive new emulator revisions. If you receive a new emulator, install it via the dialog shown in Appendix D, taking steps that include the I/O CB EMULATOR diskette.

Keep all the system tapes and diskettes you receive from DG, and those you make yourself, in a safe place.

Disk Controller Microcode Updates

Many types of disk units have their own microcode, which is independent of CPU microcode. Disk microcode is stored on part of the disk that's invisible to AOS/VS II. It's loaded into disk controller memory automatically the first time AOS/VS II accesses a disk on the controller.

Data General installs microcode on each disk that requires it. However, the current release of AOS/VS II, or a program supplied with it, may require updated disk microcode. If updated microcode is needed, AOS/VS II will display the message *Controller microcode needs to be updated.*

A program to update disk microcode is shipped on tape, along with the disk controller. The updating program is called the *Peripheral Microcode Installer* — its model number is 30976. You can run this program, when AOS/VS II is not running, by mounting the tape on unit 0 of your primary tape controller and typing the BOOT command followed by the device code of the primary tape controller. For an ECLIPSE-bus disk, the device code is usually 24 or 27; for an MRC-bus disk, the code is 116 (octal) or 10E (hex). For example,

BOOT 24↵	(or 116)	(Use 62 for an MTD tape unit. For an MRC-bus tape unit, the system console will ask a node/unit question; answer it with 0A,0↵

... (Peripheral microcode installer prompt) ...

The peripheral microcode installer program will then lead you through the steps needed to update your disk microcode. Afterward, the program will return control to the SCP CLI and you can bring up AOS/VS II. You need not update disk microcode again unless you see the *Controller microcode...* message.

Changing the Default Microcode System Area

On cold start, an AOS/VS II bootstrap program automatically loads microcode from the default system area — unless, via the Technical Maintenance Menu, you specify a different microcode system area. When you specify a different microcode system area, you can change the default microcode system area.

NOTE: Do not change the default microcode system area unless you must. By default, the original default microcode area contains the correct microcode for your machine. *Your system will not work without correct microcode.*

You can change the default microcode area as described in Chapter 6, in the section "Using the Technical Maintenance Menu."

Reloading an Old Release or Update

If, for any reason, you want to reload an old release of AOS/VS II or AOS/VS (before AOS/VS II), you'll need to find and use the old system tape set. Then, to reinstall AOS/VS II before this release, see the appropriate revision of this manual. To reinstall AOS/VS (any revision), use the manual *How to Generate and Run AOS/VS*, Chapter 2 or 3; you'll need to reformat all your disks as described there.

To return to an old *update* (for example, to return to 2.02 from 2.03), you must reinstall the original release (described in "Installing an AOS/VS II Release," earlier). Then install the update you want — instead of the update you want to back out of.

What Next?

This chapter explained how to update your AOS/VS II software and microcode with new releases of these products you received from DG.

This chapter ends the body of this *Installing, Starting, and Stopping AOS/VS II* manual. Now that you've installed, started, stopped, and updated your system, you may want to know about management issues, like backup, process management, and security. These issues, and many others, are explained in *Managing AOS/VS II and AOS/VS II.*

End of Chapter

Appendix A
Peripheral Device Names and Types

This appendix gives some background. Then it lists Data General peripherals supported by AOS/VS II.

Device Names After AOS/VS II Release 1.00

In AOS/VS II Release 1.00 (and in AOS/VS), device names were rigidly defined. They represented both a device type and address. For example, DPJ0 meant "a disk of type DPJ that is the first unit on the DPJ controller."

In Release 1.10 and later releases, a device name can be any valid AOS/VS II filename of up to 31 characters. Device names are assigned during VSGEN. However, the conventional device names, in which the name gives the address, remain the default; when VSGEN is run with a Release 1.00 spec file or Disk Jockey sizer output file (via the form VSGEN/DEFAULT=filename or VSGEN/BATCH=filename), VSGEN assigns the same device names as previous revisions of AOS/VS and AOS/VS II. For devices that didn't exist in AOS/II Release 1.00 and AOS/VS, like MRC controllers and units, there are new default names (for example, MRCDISK000E00 and MRCTAPE000A00).

This appendix gives the default device names. Table A–1 describes ECLIPSE peripheral devices by default AOS/VS II controller name, alphabetically. Table A–2 describes ECLIPSE–bus disk models supported by AOS/VS II, and their default unit names, and Table A–3 describes MRC–bus disk models supported by AOS/VS II, and their default unit names. Table A–4 lists DG device codes, and the device mnemonics and types associated with these codes.

System users rarely see device names; the only names they might see are tape unit names. For disks, after an LDU in a disk unit is initialized, users access it by the LDU filename, not by its device name. Users access printers by queue name — for example, LPT — not by device name.

Note that the disk names recognized by ADEX or DTOS hardware diagnostics may differ from the default AOS/VS II names. Usually, hardware diagnostics access all disks on one controller as a single device. For the device names, consult the product documentation or your DG support organization. You can get more details on DG hardware from your Data General representative.

Some Background

When you generate a tailored AOS/VS II system, software drivers for the device controllers you specify become *part* of the system.

When you bring up the tailored system, it creates the peripherals directory (:PER, shorthand @) and writes entries for all the devices into this directory. Users can then access devices via the @ prefix. When you shut the system down, it deletes the peripherals directory, so each tailored AOS/VS II system always has its own tailored peripherals directory as it runs.

AOS/VS II can support devices other than those you specify at VSGEN, but someone must code drivers for these devices, and the drivers must be identified at runtime via ?IDEF system calls.

Devices and Controllers

Each I/O device is run by a *controller* board, generally within the computer chassis. The controller may support one or more devices. For example, some disk controllers can support up to eight devices (units). The controller is connected to a device code in the computer chassis. Through the device code connection, AOS/VS II accesses the controller and — through it — the unit.

Table A-1 Devices by AOS/VS II Default Controller Name

AOS/VS II Default Name	Device and Description
@CON0	The system console, a CRT or hardcopy terminal connected to its own controller and the SCP.
@CON2, @CON3,...	Asynchronous communications lines, connecting an asynchronous controller (for example, IAC, MCP1, LAC, DRT, or CPI/24) with a user terminal, modem, or printer. The CON number is the line number plus 2; for example, the device at the end of line 0 is number 2 and has the filename @CON2. See also PADCON, PCCON, TCON, VCON.
@DPx_CONTROLLER_n	ECLIPSE-bus disk controller. The x is F, J, or I, depending on disk model (shown in Tables A-2 and A-3). The F controllers are named DPF, DPF1, DPF2, ..., DPF7. AOS/VS II supports up to 24 J-type controllers, whose default names are DPJ, DPJ1, DPJ2,..., DPJ7, DPJ8, DPJ9, DPJA, DPJB, DPJC, DPJD, DPJE, DPJF, DPJG, DPJH, DPJI, DPJJ, DPJK, ... The units on each controller are numbered 0 through 7 (if the controller supports eight) or 0 through 3 (if the controller supports fout). So default unit names on the first controller are DPx0, DPx1,...DPx3. On the second controller the default names are DPx10, DPx11,... DPx13; on the third they are DPx20, DPx21,...DPx23; on the sixteenth (DPJ controllers only), they are DPJF0, DPJF1, ..., and DPJF7; and so on. NOTE: When you're running stand-alone Disk Jockey, omit the commercial "at" sign (@) from the disk unit name (there is no peripherals directory under stand-alone Disk Jockey).
@LPB, @LPB1	First and second data channel line printer controllers. Each controller supports one printer.
@LPD, @LPD1	First and second DASHER LP2 line printer controllers. Each controller supports one printer.
@LPE, @LPE1	First and second laser printer controllers. Each controller supports one printer.
@LPJ	A printer controller specifically for DS/7500, MV/2500 DC, MV/2000 DC, MV/1400 DC, and MV/1000 DC systems.

(continued)

Table A-1 Devices by AOS/VS II Default Controller Name

AOS/VS II Default Name	Device and Description
@MCAR, @MCAT	First multiprocessor communications adapter (MCA) controllers. The receiver and transmitter each has its own device code.
@MCAR1, @MCAT1	Second MCA receiver and transmitter.
@MRCDISK_CONTROLLER_ccnn	MRC-bus disk controller. The cc is the MRC chassis number (00, 01, 02, and so on) and nn is the slot number, within the MRC chassis, that the controller occupies. MRC disk unit names have the form MRCDISKccnnuu, where cc and nn are the same as for the controller, and uu is the unit number (in hex). The first MRC disk controller has the default name MRCDISK_CONTROLLER_000E (slot 0E), and the first disk unit on this controller has the default name MRCDISK000E00. The second MRC disk controller has the default name MRCDISK_CONTROLLER_000F (slot 0F), and the first disk unit on this controller has the default name MRCDISK000F00.
@MRCTAPE_CONTROLLER_ccnn	MRC-bus tape controller, for Model 6299 and 6300 units. As with MRC disks, the cc is the MRC chassis number (00, 01, 02, and so on) and nn is the slot number, within the MRC chassis, that the controller occupies. MRC tape unit names have the form MRCTAPEccnnuu, where cc and nn are the same as for the controller, and uu is the unit number (in hex). The first MRC tape controller has the default name MRCTAPE_CONTROLLER_000A, and the first tape unit on this controller has the default name MRCTAPE000A00.
@MTB_CONTROLLER_n	ECLIPSE-bus MTB tape controllers. These are the default names of the first and second dual-density (800/1600 bpi) Model 6026 tape controllers. An MTB unit has a DENSITY rocker switch on its front panel. Each controller can support eight units. Units are numbered 0 through 7, so the default unit names on the first controller are @MTB0, @MTB1, ...@MTB7; on the second controller they are @MTB10, @MTB11,... @MTB17.

(continued)

Table A-1 Devices by AOS/VS II Default Controller Name

AOS/VS II Default Name	Device and Description
@MTC_CONTROLLER_n	ECLIPSE-bus MTC-type (*streaming)* tape controller, Model 6125, 6231, or 6311. Model 6125 uses reels side by side, at a density of 1600 bpi; a 6125 controller can support up to four units, with default names @MTC0, @MTC1, @MTC2, and @MTC3. Models 6231 and 6311 use cartridges, at 6400 bpi; a controller can support one unit, @MTC0. The default device code for the first MTC controller is 22.
@MTD_CONTROLLER_n	ECLIPSE-bus MTD-type, dual-density (1600/6250 bpi) tape controller. The model number is 4307 (switches at top) or 6299/6300 (touch-sensitive switch panel). A controller can handle up to four units. On the first controller, the default names are @MTD0, @MTD1, @MTD2, and @MTD3. On the second controller, default names are @MTD10, @MTD11, @MTD12, and @MTD13. The default device code for the first MTD controller is 62.
@MTJ_CONTROLLER_n	ECLIPSE-bus MTJ-type *streaming* tape controller, Models are 6341, 6351, 6352, 6577, 6588, 6589, 6590, 6591, 6656, and 6679. These units are available with a Combined Storage Subsystem (CSS) or with a desk-side system (DS/7500, MV/2500, MV/2000 DC, MV/1400 DC) only. An MTJ controller, of any model, can support up to four tape units, with default names @MTJ0, @MTJ1, @MTJ2, and @MTJ3. The default device code of the first MTJ controller is 23. A Model 6341 unit (for desk-side systems only) uses reels side by side, at a density of 1600 bpi. A Model 6351 unit (for desk-side systems only) uses a 21-Mbyte cartridge. A Model 6352 unit uses a 120-Mbyte cartridge. Models 6577, 6656, and 6679 are 1/4-inch cartridge tape units with a capacity of 139 Mbytes; 6577 is for desk-side systems and 6656 and 6679 are for other ECLIPSE systems. Models 6588 and 6589 are 6250 b/pi tape units with a capacity of 140 Mbytes per tape. Models 6590 and 6591 units have a capacity of 2 Gbytes per tape; they perform best with a buffer size of 32,768 bytes (32K).

(concluded)

Table A-1 Devices by AOS/VS II Default Controller Name

AOS/VS II Default Name	Device and Description
@PADCON0, @PADCON1,...	Terminals connected to a PAD soft controller. These attach to a network controller; network software manages the interfaces.
@PCCON0, @PCCON1,...	Terminals connected to a PCVTSERVER soft controller. These attach to a network controller like an ILC; DG/PC*I software manages the interfaces.
@SLN0, @SLN1,...	Synchronous communications lines (for example, for DG/SNA or a XODIAC network) connected to an ISC, MCP1 (synchronous controller part), or DCU.
@TCON0, @TCON1,...	Terminals connected to a TELNET soft controller. These attach to a network controller like an ILC; network software manages the interfaces.
@VCON0, @VCON1,...	Terminals connected to a VTASERVER soft controller or managed by the XODIAC Networking VTA agent. These are connected to an ILC, LLC, MCA, ISC, MCP1, NBA, or DCU (remote). Network software manages the interfaces.

(concluded)

Table A-2 ECLIPSE-Bus Disks, Default Device Codes, and Default Unit Names

<table>
<tr><th>Disk Model Number and Description</th><th>Device Type</th><th>Controller / Default Device Code</th><th>Unit Number</th><th>Default Disk Unit Name</th></tr>
<tr><td rowspan="5">6236, 6237, 6239, 6240, 6290, 6297, 6298, 6299, 6309, 6310, 6328, 6329, 6363, 6446, 6491,6492, 6578, 6579, 6581, 6582, 6584, and 6621

Models with numbers 6236 though 6299 are 14-inch disks. They have a power switch at the upper right and an LED display that shows the current cylinder or fault code. A controller can run four units. Three units fit in a cabinet. A Model 6236 holds 354 Mbytes; a Model 6239 holds 592 Mbytes; a Model 6290/6240 is two or three 6239 units in one cabinet on one controller. A Model 6297 holds 862 Mbytes; a Model 6298/6299 is two or three 6297 units in one cabinet on one controller.

Models 6309, 6310, 6328, 6329, and 6363 are 5.25-inch diskettes and disks built into a MV/4000 DC system cabinet.

Models 6491 and 6446 are 5.25-inch disks that hold 322 or 234 Mbytes, respectively, in a Combined Storage Subsystem (CSS). Up to four units fit in a CSS chassis.

Models 6492, 6578, and 6579 are sealed 8-inch disks; one disk holds 727 Mbytes. A 6492 has one disk; 6578 two disks; and 6579, four disks.

Models 6581, 6582, 6584, and 6621 are Rapid Access Mass Storage (R.A.M.S.) disks. A 6581 holds one 500-Mbyte disk; a 6582 holds two 500-Mbyte disks; and a 6584 holds four 500-Mbyte disks. A 6621 is one 1.2 Gbyte disk.</td><td rowspan="5">DPJ</td><td>First / 24</td><td>First
Second
Third
Fourth</td><td>DPJ0
DPJ1
DPJ2
DPJ3</td></tr>
<tr><td>Second / 64</td><td>First
Second
Third
Fourth</td><td>DPJ10
DPJ11
DPJ12
DPJ13</td></tr>
<tr><td>Third / none</td><td>First
Second
Third
Fourth</td><td>DPJ20
DPJ21
DPJ22
DPJ23</td></tr>
<tr><td>Fourth / none</td><td>First
Second
Third
Fourth</td><td>DPJ30
DPJ31
DPJ32
DPJ33</td></tr>
<tr><td>nth / none (n proceeds 0, 1, 2,..., 8, 9, A, B, C, D, E, F, G, H, I, J, ...)</td><td>First
Second
Third
Fourth</td><td>DPJ(n–1)0
DPJ(n–1)1
DPJ(n–1)2
DPJ(n–1)3</td></tr>
<tr><td rowspan="3">6060 and 6061; 6067; 6122; 6160 and 6161; 6214

The 6060, 6061, 6067, and 6122 units use removable packs; a controller can run four units. The 6160 and 6161 units use non-removable disks; a controller can run two units. A Model 6060 holds 96 Mbytes; a 6061 holds 190 Mbytes; a 6067 holds 50 Mbytes; a 6122 holds 277 Mbytes. A 6160 holds 73 Mbytes and a 6161 holds 147 Mbytes.</td><td rowspan="3">DPF</td><td>First / 27</td><td>First
Second
Third
Fourth</td><td>DPF0
DPF1
DPF2
DPF3</td></tr>
<tr><td>Second / 67</td><td>First
Second
Third
Fourth</td><td>DPF10
DPF11
DPF12
DPF13</td></tr>
<tr><td>nth / none</td><td>First</td><td>DPF(n–1)0</td></tr>
</table>

(continued)

Table A-2 ECLIPSE-Bus Disks, Default Device Codes, and Default Unit Names

Disk Model Number and Description	Device Type	Controller/ Default Device Code	Unit Number	Default Disk Unit Name
A 6214 is a freestanding unit with a nonremovable disk; one controller can run two units. A unit holds 602 Mbytes.		DPF	Second Third Fourth	DPF(n−1)1 DPF(n−1)2 DPF(n−1)3
6234. A sealed moving-head disk, bay mounted. It holds 50 Mbytes.	DPI	First / 33 Second / 73	Only Only	DPI0 DPI10
4314. A 5.25-inch diskette. It holds 0.737 Mbyte.	DPM	First/20	First Second	DPM0 DPM1
		Second/60	First Second	DPM10 DPM11

(concluded)

Table A-3 MRC-Bus Disks, Default Slot Numbers, and Default Unit Names

Disk Model Number and Description	Device Type	Controller and Default Slot Number	Unit Number	Default Disk Unit Name
6236, 6237, 6239, 6290, 6240, 6298, 6298, 6299, 6492, 6578, 6579, 6581, 6582, 6584, and 6621 Models with numbers between 6200 and 6300 are sealed 14-inch disks. The power switch is at the upper right; an LED display shows the current cylinder or fault code. A controller can run four units. As many as three units fit in a cabinet. A Model 6236 holds 354 Mbytes; a Model 6239 holds 592 Mbytes; a Model 6290/6240 is two or three 6239 units in one cabinet on one controller. A Model 6297 holds 862 Mbytes; a Model 6298/6299 is two or three 6297 units in one cabinet on one controller.	MRCDISK	First/0E (hex)	First Second Third Fourth Fifth Sixth Seventh Eighth	MRCDISK000E00 MRCDISK000E01 MRCDISK000E02 MRCDISK000E03 MRCDISK000E04 MRCDISK000E05 MRCDISK000E06 MRCDISK000E07
		Second/0F (hex)	First Second Third Fourth Fifth Sixth Seventh Eighth	MRCDISK000F00 MRCDISK000F01 MRCDISK000F02 MRCDISK000F03 MRCDISK000F04 MRCDISK000F05 MRCDISK000F06 MRCDISK000F07
Models 6581, 6582, 6584 and 6621 are Rapid Access Mass Storage (R.A.M.S.) disks. A Model 6581 holds one 500-Mbyte disk; a 6582 holds two 500-Mbyte disks; and a 6584 holds four 500-Mbyte disks. A controller runs 8 units. A Model 6621 holds 1.2 Gbytes; a controller supports four units.		nth/none	First Second Third Fourth Fifth Sixth Seventh Eighth	MRCDISKccnn00 MRCDISKccnn01 MRCDISKccnn02 MRCDISKccnn03 MRCDISKccnn04 MRCDISKccnn05 MRCDISKccnn06 MRCDISKccnn07 cc = MRC chassis number at site, hex. nn = node (slot) number in MRC chassis (hex).

Table A-4 Data General Standard I/O Device Codes

Device Code	Hardware Mnemonic	Description
00	—	Power fail/auto restart.
01	WCS	Writable control store (WCS) in CPU.
02	ERCC	Error checking and correction (ERCC).
03	BMAP	ECLIPSE memory allocation and protection (MAP).
04	UPSC	Universal power supply controller.
05	BMC	Burst multiplexor channel.
06	MCAT	First multiprocessor communications adapter (MCA) transmitter.
07	MCAR	First MCA receiver.
10	TTI	System console input (keyboard).
11	TTO	System console output (screen or printer).
12	—	Mouse.
14	RTC	Real-time clock.
16	—	MRC channel (AOS/VS II mnemonic is MRCCHANNEL)
17	LPT	First line printer controller.
21	LPJ	First LPJ-type printer controller (AOS/VS II mnemonic).
22	MTA	First magnetic tape controller.
23	MTJ	First MTJ-type magnetic tape controller (AOS/VS II mnemonic).
24	DPJ	First DPJ-type disk controller (AOS/VS II mnemonic).
25	—	First ISC or MCP1 synchronous line controller.
27	DPF	First DPF-type disk controller (AOS/VS II mnemonic).
33	DPI	First DPI-type moving-head disk controller.
34	MUX	First communications system controller or DRT.
40	SDCU0	First data control unit (DCU) or ISC (synchronous lines).
43	PIT	Programmable interval timer.
44	SLM	Synchronous line multiplexor

(continued)

Table A-4 Data General Standard I/O Device Codes

Device Code	Hardware Mnemonic	Description
45	—	SCP notifies AOS/VS II to log an event in SYSLOG.
46	MCAT1	Second MCA transmitter or LAN transmitter.
47	MCAR1	Second MCA receiver or LAN receiver.
50		Second asynchronous line controller.
51		Third asynchronous line controller.
52		Fourth asynchronous line controller.
54	RTC1	Second real-time clock.
56	—	Second MRC channel (AOS/VS II mnemonic is MRCCHANNEL)
57	LPT1	Second line printer controller.
61	LPJ1	Second LPJ-type printer controller.
62	MTA1	Second magnetic tape controller (first type MTD controller).
63	MTJ1	Second MTJ-type magnetic tape controller (AOS/VS II mnemonic).
64	DPJ1	Second DPJ-type moving-head disk controller (AOS/VS II mnemonic).
65	IOP	First asynchronous line controller (for example, IAC).
67	DPF1	Second DPF-type moving-head disk controller.
73	DPI1	Second DPI-type moving-head disk controller (AOS/VS II mnemonic).
74	FPU1	Single-precision floating-point unit.
75	FPU2	Double-precision floating-point unit.
76	FPU	Floating-point unit controller.
77	CPU	Central processor and console functions.

(concluded)

End of Appendix

Appendix B
Files Shipped with AOS/VS II

This appendix lists and describes files that are part of AOS/VS II release 2.00, in Table B–1. Nearly all these files are shipped on the Release Tape. Update patch files, part of each AOS/VS II update, are shipped to install in a directory of the form :UPDATE:n.nn (n.nn is the update revision number; for example, 2.03).

The current microcode file for your machine, whose filename has the form MVn.MCF, is shipped with the computer on the SCP SYSTEM medium, not with AOS/VS II. Generally, this is the file loaded into the computer on cold start (since, by default, this is the file Disk Jockey installs in the microcode system area, from which it is loaded on cold starts).

Table B–1 lists files alphabetically by filename (not pathname), followed by the parent directory name and a brief description. Unless noted otherwise, each file is included on the AOS/VS II release tape. For brevity, some filenames include templates to indicate more than one file. The normal template rules apply (* means one character, + means any number of characters, and so on).

General filename suffix rules also apply: a .CLI suffix indicates a CLI macro; a .PR suffix, a program file; an .OL suffix, an overlay file; and an .ST suffix, a symbol table (needed for patching the program, if needed, automatically).

This table was correct when the manual went to print. For a more recent list of files (which may describe files added at the last minute), see the file :UTIL:2.00_AOSVSII_SYSTEM_FILES.

Table B-1 Files Shipped with AOS/VS II

Filename (not pathname)	Parent Directory	Description
069_000031_**	:UTIL	Documentation changes for manual *Learning to Use Your AOS/VS System.*
069_000311_**	:UTIL	Documentation changes for *Using the AOS/VS II System Management Interface (SMI).*
069_000293_**	:UTIL	Documentation changes for *Starting and Updating Preinstalled AOS/VS II.*
078_000+	:UTIL	Instructions for installing the AOS/VS II update (a printed version is also shipped with each update).
085_000930+	:UTIL	AOS/VS II Release Notice, describes features and cautions not explained in manuals.
093_000242_**	:UTIL	Documentation changes for *AOS/VS Macroassembler (MASM) Reference Manual.*
093_000245_**	:UTIL	Documentation changes for *AOS/VS Link and Library File Editor (LFE) User's Manual.*
093_000246_**	:UTIL	Documentation changes for *AOS/VS Debugger and File Editor Users Manual*
093_000335_**	:UTIL	Documentation changes for *AOS/VS System Concepts.*

(continued)

Table B-1 Files Shipped with AOS/VS II

Filename (not pathname)	Parent Directory	Description
n.nn_AOSVSII_ SYSTEM_FILES	:UTIL	File with names of all AOS/VS II files for Release n.nn.
AGENT.PR, AGENT.ST	: (root)	Agent program, provides user interface to AOS/VS II system calls.
ALPHARS.PR, ALPHARS.ST	: (root)	Operating system to run in MIOC controller, used on MV/7800 DCX/DC and MV/4000 DC/SC systems. AOS/VS II loads it into the MIOC on startup.
ANSI_IACRS.PR, ANSI_IACRS.ST	: (root)	Operating system that lets IAC controller support ANSI terminals (VT100 terminals). AOS/VS II loads it into the IAC(s) on startup.
AOSVSII_MODEL	:UTIL	File that contains model number that indicates whether AOS/VS II system is preinstalled.
AOSVSII.CONFIG, AOSVSII.NAMES, AOSVSII.PR, AOSVSII.ST	:SYSGEN	Tailored AOS/VS II operating system to support deskside computer systems (of the MV/2000 DC class) without using the SMI (the system specifies no initial IPC file for PID 2).
AOSVSII_SMI.CONFIG, AOSVSII_SMI.NAMES, AOSVSII_SMI.PR, AOSVSII_SMI.ST	:SYSGEN	Tailored AOS/VS II operating system to support deskside computer systems (of the MV/2000 DC class) that uses the SMI (the system specifies UP_EXEC.CLI as the initial IPC file for PID 2).

(continued)

Table B-1 Files Shipped with AOS/VS II

Filename (not pathname)	Parent Directory	Description
AOSVS.PANICS.SR	:UTIL	Explanation of panic codes (as displayed with *AOS/VS II FATAL ERROR* message).
ASCII	:UTIL:FORMS	EXEC mapper file that defines the printable 7-bit ASCII character set.
BELL.CLI	:UTIL	A file used by the System Management Interface (SMI). The SMI uses this file to ring the terminal bell (beep).
BOOMER.SR	:UTIL:SYSTEM_CALL_SAMPLES	Sample assembly language program. For more detail, see *AOS/VS, AOS/VS II, and AOS/RT32 System Call Dictionary* (2 vols).
BRAN.PR, BRAN.ST	:UTIL	Break file analyzer, useful for problem diagnosis by system programmers.
BROADCAST.CLI	:UTIL	A macro that lets a user send a message to all users on the system.
BROADCAST_SELF.CLI	:UTIL	A macro the System Management Interface (SMI) uses. It simulates a broadcast when SMI is in tutorial mode.
BSCGEN.PR, BSCGEN.ST	:SYSGEN	Program to generate support for bisynchronous communications lines, needed if your system will communicate with IBM systems using bisync protocol.
CHECK_CON0.CLI	:UTIL	A macro the System Management Interface (SMI) uses. Used by the BROADCAST.CLI macro to see if CON0 is a link.
CHECK_SPACE.CLI	:UTIL	CLI macro to monitor disk space remaining in the system log directory.
CLEAR	: (root)	File to clear a laser document printer.
CLEAR_SCREEN.CLI	:UTIL	File that displays a form feed when typed by other macros.
CLI.CLI	:UTIL	A macro the System Management Interface (SMI) uses. The macro chains to the CLI.

(continued)

Table B-1 Files Shipped with AOS/VS II

Filename (not pathname)	Parent Directory	Description
CLI.PR	: (root)	Link file to :CLI32.PR or :CLI16.PR, depending on which CLI is the default CLI for the operating system.
CLI.CMD.+	:HELP	CLI16 command Help files (about 100) with text for CLI HELP/V displays.
CLI16.OL, CLI16.PR, CLI16.ST	: (root)	CLI16 — 16-bit version of the user interface to AOS/VS II.
CLI.PSM.+	:HELP	CLI16 pseudomacro Help files (approximately 55). They provide text for Help displays for CLI pseudomacros.
CLI.TPC.+	:HELP	CLI topic Help files (about 45 with AOS/VS II; other software has additional topic Help files). They provide the text for CLI HELP and Help topic displays.
CLI32.CMD.+	:HELP	CLI32-only command Help files that provide text for CLI32-only command HELP displays.
CLI32.PR, CLI32.ST	: (root)	CLI32 — 32-bit version of the user interface to AOS/VS II.
CLI32.PSM.+	:HELP	CLI32-only pseudomacro Help files that provide text for CLI32-only pseuedomacro Help displays.
CLI32ERMES.OB	:UTIL	Message file with text for CLI32 error messages.
CLIBT.LB	:SYSGEN	System-generation library VSGEN uses to build the special CLI used for initial load.
CLREERMES.OB	:UTIL	Error message text for programming languages in the Common Language Runtime Environment (CLRE); these include practically all programming languages available from DG.

(continued)

Table B-1 Files Shipped with AOS/VS II

Filename (not pathname)	Parent Directory	Description
CONTEST.+.PR CONTEST.+.ST	:UTIL:& CONTEST	CONTEST program to test hardware and software (program and symbol table files).
CONTEST.CLEAN.CLI	:UTIL	Macro to delete temporary files created by CONTEST.
CONTEST.CLI	:UTIL	Macro to execute CONTEST test suite.
CONTEST.ERRORS.CLI	:UTIL	Macro to display errors found by CONTEST.
CONVERT.PR, CONVERT.ST	:UTIL	Program to convert an RDOS object file (.RB file) to an AOS/VS II, AOS/VS, or AOS object file (.OB file).
CPIO.CLI, CPIO.PR, CPIO.ST	:UTIL	Macro and program to dump or load files in UNIX cpio format (CPIO.PR is a link to TAR.PR); has UNIX option interface.
CPIO_VS.CLI, CPIO_VS.PR, CPIO_VS.ST	:UTIL	Macro and program to dump or load files in UNIX cpio format (CPIO_VS.PR is a link to TAR_VS.PR); has familiar AOS/VS II switch interface.
CPIRS.PR, CPIRS.ST	: (root)	Operating system to run in a CPI/24 (Computer-PBX Interface) asynchronous line controller. The AOS/VS PMGR loads this into CPI(s) on startup.
CREATE_WINDOW.SR	:UTIL:SYSTEM_ CALL_SAMPLES	Sample assembly language program. For more detail, see *AOS/VS, AOS/VS II, and AOS/RT32 System Call Dictionary* (2 vols).
CX.CLI	:UTIL	CLI macro that contains CONTROL @EXEC %-%. It lets you issue EXEC commands using the form CX cmd.
DEBUG4.+	:HELP	Help files for assembly-language debugger (28 files).
DEFAULT.SPEC	:SYSGEN	File with default specs for BSCGEN.PR.

(continued)

Table B-1 Files Shipped with AOS/VS II

Filename (not pathname)	Parent Directory	Description
DGI	:UTIL:FORMS	EXEC XLPT mapper file that defines the printable 8-bit Data General International character set.
DGI_TO_ASCII	:UTIL:FORMS	EXEC XLPT mapper file that defines the printable 8-bit Data General International character set, mapped to 7-bit ASCII characters (where possible).
DGLERMES.OB	:UTIL	Message text for DG/L language errors.
DISCO.PR, DISCO.ST	:UTIL	DISCO disk-load monitor program.
DISKETTE_BACKUP.CLI	:UTIL	A macro the System Management Interface (SMI) uses. The macro lets users back up files to diskettes.
DISKETTE_RESTORE.CLI	:UTIL	A macro the System Management Interface (SMI) uses. The macro lets users restore files from diskettes.
DISPLAY.PR, DISPLAY.ST	:UTIL	DISPLAY program, to display contents of any file (program file, magnetic tape file, and so on).
DJ, DJ.ST	: (root)	Stand-alone Disk Jockey, to create a logical disk unit (LDU), install AOS/VS II on it, load microcode, and bring up AOS/VS II.
DJ.PR, DJ.ST DJ_ERMES, DJ_TEXT	:UTIL	Stand-among Disk Jockey, to create a logical disk unit (LDU), and install AOS/VS II on it. Runs under AOS/VS II.
DJ_HELP	:HELP	Text files for Help messages for stand-among Disk Jockey.
DJ_TEXT	:UTIL	Text files for Disk Jockey screens.
DLIST.SR	:UTIL:SYSTEM_ CALL_SAMPLES	Sample assembly language program. For more detail, see *AOS/VS, AOS/VS II, and AOS/RT32 System Call Dictionary* (2 vols).

(continued)

Table B-1 Files Shipped with AOS/VS II

Filename (not pathname)	Parent Directory	Description
DOWN.CLI	:UTIL	Macro to bring down multiuser environment.
DUMP_II.CLI, DUMP_II.PR,DUMP_II.ST DUMP_LOAD_ERMES	: (root)	DUMP_II macro and program for fast file backup.
DUMP_II.CLI, DUMP_II.PR,DUMP_II.ST DUMP_LOAD_ERMES	:UTIL	Links to DUMP_II files in the root directory (except DUMP_II.CLI, which duplicates the file in the root).
DUMPLIB.LB	:SYSGEN	System-generation library of routines to create a memory dump driver.
EBID.SR, ECID.SR	:UTIL	ECLIPSE basic and commercial instruction definitions, used to create macroassembler permanent symbol file.
EDIT.CLI	:UTIL	A macro the System Management Interface (SMI) uses. It lets SMI users edit macros like UP.CLI.
EMASM.CLI	:UTIL	Macro to assemble error message object files (+ERMES.OB); for AOS/VS II programs, these object files are shipped ready-made.
ERMES	: (root)	Error message file. As shipped, this file includes error text for all AOS/VS II programs, C, DG/L, FORTRAN 77, PL/I, and assembly language runtime errors.
ERMES.SR	:UTIL	Source file that explains the format of ERMES error messages in AOS/VS II.
EXEC.+	:HELP	EXEC help files; they provide text for XHELP commands (about 50 files).
EXEC.PR, EXEC.ST	:UTIL	EXEC program, which manages user logon and logoff, batch, spooling, and labeled tape mounts for users.
F77ERMES.OB	:UTIL	Message text for FORTRAN 77 runtime errors.

(continued)

Table B-1 Files Shipped with AOS/VS II

Filename (not pathname)	Parent Directory	Description
FCU.PR, FCU.ST	:UTIL	Forms control utility, creates printer spec files for special form printing.
FED.+	:HELP	Help files for assembly language disk file editor (16 files).
FED.PR, FED.ST	:UTIL	Disk file editor, to change contents of disk locations.
FF.CLI	:UTIL	Macro to print a form feed.
FILCOM.PR, FILCOM.ST	:UTIL	Program to compare binary files and display differences (a better program to compare text files is SCOM.PR).
FILCREATE.SR	:UTIL:SYSTEM_ CALL_SAMPLES	Sample assembly language program. For more detail, see *AOS/VS, AOS/VS II, and AOS/RT32 System Call Dictionary* (2 vols).
FILELOADER	: (root)	Bootstrap program that loads files (like Disk Jockey or an AOS/VS II system).
FORMS	:UTIL	Directory with forms files for special forms printing.
FS_+LB	:SYSGEN	VSGEN libraries for file system routines.
FS_ERMES.OB	:UTIL	Text for AOS/VS II file system errors.
FULL_BACKUP.CLI	:UTIL	Macro to execute full backup of user files and non–AOS/VS II files to diskettes.
FULL_DUMP.CLI	:UTIL	Macro to execute full backup of user files and non–AOS/VS II files to labeled magnetic tape.
GATE.ARRAY.SR	UTIL:SYSTEM_ CALL_SAMPLES	Sample assembly language program. For more detail, see *AOS/VS, AOS/VS II, and AOS/RT32 System Call Dictionary* (2 vols).
GSMGR.PR, GSMGR.ST	: (root)	Global sync–line manager program; run it if your system will use sync lines.
HEAR.SR	UTIL:SYSTEM_ CALL_SAMPLES	Sample assembly language program. For more detail, see *AOS/VS, AOS/VS II, and AOS/RT32 System Call Dictionary* (2 vols).

(continued)

Table B-1 Files Shipped with AOS/VS II

Filename (not pathname)	Parent Directory	Description
HELPV.CLI	:UTIL	Macro to display verbose Help messages.
HISTO.DOC,* HISTO.PR, HISTO.ST	:UTIL	Histogram generator documentation file and program files.
HISTOREPORT.PR, HISTOREPORT.ST	:UTIL	Histogram report generator (works on files created by HISTO.PR).
IACRS.PR, IACRS.ST	: (root)	Operating system to run in an IAC asynchronous line controller. The AOS/VS PMGR loads this into IAC(s) at startup.
IAC8RS.PR, IAC8RS.ST	: (root)	Operating system to run in a new IAC-8 asynchronous line controller. The AOS/VS II PMGR loads this into the IAC-8(s) at startup.
IAC24RS.PR, IAC24RS.ST	: (root)	Operating system to run in a new IAC-24 asynchronous line controller. The AOS/VS II PMGR loads this into the IAC-24(s) at startup.
INC_BACKUP.CLI	:UTIL	Macro to run incremental backup of user files to diskettes. Used between full backups done by FULL_BACKUP.CLI.
INC_DUMP.CLI	:UTIL	Macro to run incremental backup of user files to labeled mag tape. Used between full backups done by FULL_DUMP.CLI.
INRING.SR	:UTIL:SYSTEM_CALL_SAMPLES	Sample assembly language program used by RINGLOAD program. For more detail, see *AOS/VS, AOS/VS II, and AOS/RT32 System Call Dictionary* (2 vols).
INSTALL.CLI	:UTIL	A macro the System Management Interface (SMI) uses. The macro lets a user load files from AOS/VS II release media.
IODRV.LB	:SYSGEN	A library VSGEN uses to build systems.

(continued)

Table B–1 Files Shipped with AOS/VS II

Filename (not pathname)	Parent Directory	Description
IO_ERMES.OB	:UTIL	Message text for AOS/VS II I/O errors.
IPC.LB	:SYSGEN	A library VSGEN uses to build systems.
IS_RING0.LB	:SYSGEN	A library VSGEN uses to build systems.
ITCnRS.PR, ITCnRS.ST	: (root)	Operating system to run in an Intelligent Terminal Controller (ITC) for systems other than MV/2500 DC; (n is 1, 2, or 3). The AOS/VS PMGR II loads it into the ITC on startup.
KANJI	:UTIL:FORMS	EXEC XLPT mapper file that defines the printable Kanji character set.
KANJI_IACRS.PR, KANJI_IACRS.ST	: (root)	Operating system that lets IAC controller support the Kanji character set. AOS/VS II loads it into the IAC(s) on startup.
KATAKANA	:UTIL:FORMS	EXEC XLPT mapper file that defines the printable Katakana character set.
LABEL.PR, LABEL.ST	:UTIL	Tape labeling program; writes label information to each volume in a labeled tape set before it's used.
LACRS.PR, LACRS.ST	: (root)	Operating system to run in a Local–Bus Asynchronous Controller (LAC, also known as IAC–12). The AOS/VS II PMGR loads it into the LAC on startup.
LAC32RS.PR, LAC32RS.ST	: (root)	Same as LACRS above, but for a 32–line LAC.
LANG_RTERMES.OB	:UTIL	Message text for DG runtime errors.
LFCOPY.PR, LFCOPY.ST	:UTIL	Labeled diskette copy program, copies a memory dump that was done to diskettes. Intended for DG personnel.
LFE.PR, LFE.ST	:UTIL	Library file editor program, builds libraries from program routines.

(continued)

Table B-1 Files Shipped with AOS/VS II

Filename (not pathname)	Parent Directory	Description
LIB0.LB, LIB1.LB, LIB2.LB, LIB3.LB, LIB4.LB	:SYSGEN	System-generation libraries, used to build AOS/VS II operating systems.
LINK.PR, LINK.ST	:UTIL	Linker program, creates executable program files from object files.
LINKERMES.OB	:UTIL	Error message text for Link program errors.
LINK_ERMES.CLI	:UTIL	Macro to create new error message file (ERMES).
LOAD_II.CLI, LOAD_II.PR, LOAD_II.ST	: (root)	LOAD_II macro and program for fast file backup.
LOAD_II.CLI, LOAD_II.PR, LOAD_II.ST	:UTIL	Links to LOAD_II files in the root directory (except LOAD_II.CLI, which duplicates the file in the root).
LOCK_CLI.OL, LOCK_CLI.PR, LOCK_CLI.ST	:(root)	A CLI that can be locked in a harmless state, designed to safeguard the system console.
LOGCALLS.DOC, LOGSCALLS.PR,	:UTIL	System call logger documentation and program.
LPMGR.PR, LPMGR.ST	: (root)	Peripheral manager (PMGR) program that runs terminals for users; the system loads it into memory at startup.
LTCnRS.PR, LTCnRS.ST	: (root)	Operating system to run in a Intelligent Terminal Controller for MV/2500 systems. (n is 1, 2, or 3.) The AOS/VS II PMGR loads it into the ITC on startup.
MASM16.PR, MASM16.PS, MASM16.ST	:UTIL	Macroassembler program for 16-bit programs and permanent symbol file (MASM16.PS).
MASM.PR, MASM.ST, MASM.PS, MASM_32CHAR.PS	:UTIL	Macroassembler program, permanent symbol file (MASM.PS), and 32-character symbol file.

(continued)

Table B-1   Files Shipped with AOS/VS II

Filename (not pathname)	Parent Directory	Description
MASMERMES.OB	:UTIL	Error text for macroassembler errors.
MASMXR.PR, MASMXR.ST	:UTIL	Macroassembler cross-reference generator.
MICROLOADER.PR, MICROLOADER.ST	: (root)	Program that Disk Jockey invokes to load microcode.
MILERMES.OB	:UTIL	Error message text for MRC subsystem erorrs.
MIL.LB	:SYSGEN	A library VSGEN uses to build systems to support MRC subsystems.
MKABS.PR, MKABS.ST	:UTIL	Program to copy an RDOS save file (program file) into an absolute binary file.
MKP_KERNEL.LB	:SYSGEN	A library VSGEN uses to build systems to support MRC subsystems.
MOVER.+	:UTIL:NEWFS_ MIGRATION	Program to copy files between AOS/VS format LDUs and AOS/VS II format LDUs.
MOVER.TPC	:HELP	MOVER program help topic file.
NEWFS_MIGRATION& .DOC	:UTIL:NEWFS_ MIGRATION	Manual that explains migrating from the AOS/VS file system to the AOS/VS II file system.
NEWTASK.SR	:UTIL:SYSTEM_ CALL_SAMPLES	Sample assembly language program. For more detail, see *AOS/VS, AOS/VS II, and AOS/RT32 System Call Dictionary* (2 vols).
NOMIL.LB	:SYSGEN	A library VSGEN uses to build systems.
OBSOLETE_3900_FILES	:UTIL	A file that holds the names of files you can delete if you are running standard (not preinstalled) AOS/VS II. Use the form DELETE/V [OBSOLETE_3900_FILES].
OIS+	:UTIL:OIS	DG Online Information Service files.
PARFS_ERMES.SR	:UTIL	Message text for AOS/VS II file system errors, in ASCII.

(continued)

Table B-1 Files Shipped with AOS/VS II

Filename (not pathname)	Parent Directory	Description
PARIO_ERMES.SR	:UTIL	Message text for AOS/VS II I/O errors, in ASCII.
PARMIL_ERROR.SR	:UTIL	Source file for error message text for MRC subsystem erorrs.
PARU.16.SR	:UTIL	User parameter definitions for 16-bit macroassembler.
PARU.32.SR	:UTIL	User parameter definitions for 32-bit macroassembler.
PARU_LONG.SR	:UTIL	User parameter definitions for system calls used in 32-bit high-level language programs (defines long symbol names).
PATCH.PR, PATCH.ST	:UTIL	Patch program to install patches supplied with AOS/VS II updates.
PED.CLI, PED.PR, PED.ST	:UTIL	Process environment display macro and program.
PIDCALL_CHECK16.FED, PIDCALL_CHECK32.FED	:UTIL	FED input files used by PIDCALL_CHECK.CLI.
PIDCALL_CHECK.CLI	:UTIL	Macro that checks a program for system calls that may require change to let a program run with big PIDs.
PIDSIZE.CLI	:UTIL	Macro that checks a program's PID-size type.
PIMnRS.PR, PIMnRS.ST	: (root)	Operating system to run in a Processor Interface Module (PIM) controller (n is 1 or 2). The AOS/VS II PMGR loads it into the PIM(s) on startup.
PL1ERMES.OB	:UTIL	Message text for PL/I runtime errors.
PL1ERMES16.OB	:UTIL	Message text for 16-bit PL/I runtime errors.
PLNERMES.OB	:UTIL	Message text for PL/Nichols runtime errors (this is a custom DG version of PL/I).

(continued)

Table B–1 Files Shipped with AOS/VS II

Filename (not pathname)	Parent Directory	Description
PM.CLI	:UTIL	A macro that places a user's terminal in page mode.
PMGR.PR, PMGR.ST	: (root)	Peripheral manager (PMGR) program, loaded by system at startup.
PREDITOR.PR, PREDITOR.ST	:UTIL	PREDITOR user profile editor program to create profiles and assign privileges.
PREINSTALL	:UPDATE	Directory that contains files (like UP_EXEC.CLI) that AOS/VS II uses to run in preinstalled mode (it runs the System Management Interface — SMI program — on startup).
PREINSTALLED	:UPDATE or : (root)	File that, if in the root directory, tells AOS/VS II to run in preinstalled mode (see PREINSTALL above)
QCMP.PR, QCMP.ST	:UTIL	Queue compression (cleanup) program.
QNET.LB	:SYSGEN	Library file to let sites that don't have XTS or DG/PC*I build tailored systems. If you have XTS, make sure you move the QNET.LB shipped with XTS in directory :NET:UTIL to :SYSGEN (use the MOVE/DELETE command) before running VSGEN.
RDOS.OL, RDOS.PR, RDOS.ST	:UTIL	Program that converts RDOS files, tapes, and disks to AOS/VS II format and vice versa.
REPORT.PR, REPORT.ST	:UTIL	Program to generate reports from system log files and error log files.
RESOLVE.LB	:SYSGEN	System-generation library to avoid Link errors for devices you omit at VSGEN.
RESTORE.CLI	:UTIL	Macro to restore data backed up by FULL_BACKUP.CLI and INC_BACKUP.CLI, using diskettes.

(continued)

Table B-1 Files Shipped with AOS/VS II

Filename (not pathname)	Parent Directory	Description
RESTORE_TAPE.CLI	:UTIL	Macro to restore data backed up by macros FULL_DUMP.CLI and INC_DUMP.CLI, using tape.
RINGLOAD.SR	:UTIL:SYSTEM_ CALL_SAMPLES	Sample assembly language program. For more detail, see *AOS/VS, AOS/VS II, and AOS/RT32 System Call Dictionary* (2 vols).
RUNTIME.SR	:UTIL:SYSTEM_ CALL_SAMPLES	Sample assembly language program. For more detail, see *AOS/VS, AOS/VS II, and AOS/RT32 System Call Dictionary* (2 vols).
SALOADER, SALOADER.ST	: (root)	Bootstrap program to load other files (primarily Disk Jockey) into memory.
SCOM.PR, SCOM.ST	:UTIL	Program to compare text (source) files and display differences.
SED.+	:HELP	Help files for SED text editor (40 files). They contain the text for HELP commands in SED.
SED.DICTIONARY	:UTIL	Word list the SED text editor uses for spelling assistance.
SED.PR, SED.ST	:UTIL	SED text editor program.
SEDERMES.OB	:UTIL	Error message text for SED text editor.
SETUP.CLI	:UTIL and : (root)	A macro the System Management Inter– face (SMI) uses as the default initial IPC file for all user profiles. The macro sets the default ACL and search list.
SIZER.+	:UTIL:NEWFS_ MIGRATION	Program to check directory and LDU sizes before you migrate from AOS/VS to AOS/VS II. Explained in file NEWFS_MIGRATION.DOC in SIZER's parent directory.
SKIPS.SR	:UTIL	File that defines useful assembly language macros for skips and graphics instructions.

(continued)

Table B-1 Files Shipped with AOS/VS II

Filename (not pathname)	Parent Directory	Description
SLDCU.PR	: (root)	Operating system to run in a DCU sync line controller. The GSMGR program loads it into the DCU when you create the GSMGR process.
SLISC.PR	: (root)	Operating system to run in an ISC sync line controller. The GSMGR program loads it into the ISC when you create the GSMGR process.
SMI.CLI	:UTIL	A macro the System Management Interface (SMI) uses. The macro executes the SMI program.
SMI.PR, SMI.ST	:UTIL	The System Management Interface (SMI) program.
SMI_CLI.OL, SMI_CLI.PR, SMI_CLI.ST	:UTIL	A special CLI program that performs CONTROL @EXEC status commands for the System Management Interface (SMI).
SMI_DOWN.CLI	:UTIL	A DOWN.CLI macro for systems that use the System Management Interface (SMI).
SMI_ERMES	:UTIL	SMI error message text file.
SMI_HELP	:HELP	SMI Help text file library.
SMI_TEXT	:UTIL	SMI screen text file library.
SMI_UP.CLI	:UTIL	A modified UP.CLI for systems that use the System Management Interface (SMI).
SON.SR	:UTIL:SYSTEM_CALL_SAMPLES	Sample assembly language program. For more detail, see *AOS/VS, AOS/VS II, and AOS/RT32 System Call Dictionary* (2 vols).
SPEAK.SR	:UTIL:SYSTEM_CALL_SAMPLES	Sample assembly language program. For more detail, see *AOS/VS, AOS/VS II, and AOS/RT32 System Call Dictionary* (2 vols).
SPEED.PR, SPEED.ST	:UTIL	SPEED text editor program.
SPEEDERMES.OB	:UTIL	Error text for SPEED program errors.

(continued)

Table B-1 Files Shipped with AOS/VS II

Filename (not pathname)	Parent Directory	Description
SPRED.PR, SPRED.ST	:UTIL	Symbolic Preamble Editor program, to edit program preambles and specify items like the number of pages to load on a page fault.
STR_FORM, STR_FORM_AOSVSII	:UTIL	Forms to help you fill out a software trouble report (STR). File STR_FORM is designed for software other than AOS/VS II; file STR_FORM_AOSVSII is designed for AOS/VS II. You can print these forms. Filing an STR is explained in *Managing AOS/VS and AOS/VS II.*
SYS.CONFIG, SYS.NAMES, SYS.PR, SYS.ST	:SYSGEN	AOS/VS II starter system configuration, names, and program files.
SYS_REV	:SYSGEN	File with current AOS/VS II release number.
SYSERMES.OB	:UTIL	Error message text for general system runtime errors.
SYSID.16.SR SYSID.32.PR	:UTIL	Definition files for 16-bit and 32-bit system calls, respectively.
SYSTAPE.CLI	:SYSGEN	Macro to create a tailored system tape.
TAPE_BACKUP.CLI	:UTIL	A macro the System Management Interface (SMI) uses; it lets users back up files to tape.
TAPE_RESTORE.CLI	:UTIL	A macro the System Management Interface (SMI) uses; lets users restore files from tape.
TAR.CLI, TAR.PR, TAR.ST	:UTIL	Macro and program to dump or load files in UNIX tar format; has UNIX option interface.
TAR_VS.CLI TAR_VS.PR, TAR_VS.ST	:UTIL	Macro and program to dump or load files in UNIX tar format; has familiar AOS/VS II switch interface.
TBOOT, TBOOT.ST	: (root)	Tape bootstrap program; when copied to file 0 of a tape, lets you boot tape and asks which tape file to load into memory.
TBOOT1, TBOOT1 .ST	: (root)	Tape bootstrap program; when copied to file 0 of a tape, lets you boot the tape and automatically loads tape file 1 into memory.

(continued)

Table B-1 Files Shipped with AOS/VS II

Filename (not pathname)	Parent Directory	Description
TCPIP_xTC_IMAGE.PR,	:(root)	Network transport program that AOS/VS II loads into ITC/LTC controllers when TCP/IP protocol was selected at VSGEN .
TIMEOUT.SR	:UTIL:SYSTEM_ CALL_SAMPLES	Sample assembly language program. For more detail, see *AOS/VS, AOS/VS II, and AOS/RT32 System Call Dictionary* (2 vols).
TS+.LB	:SYSGEN	Libraries used by VSGEN to build a tailored AOS/VS II system.
UFCM.LB	:SYSGEN	Library used by VSGEN to build a tailored AOS/VS II system.
UP.CLI	:UTIL	Sample macro to bring EXEC and the multiuser environment up.
UP_EXEC.CLI	:UTIL and : (root)	A macro the System Management Interface (SMI) uses. It runs EXEC on the system console, requiring you to log on to use the system console.
UPPER	:UTIL:FORMS	EXEC XLPT mapper file that defines the printable 8-bit Data General International character set, but maps lowercase characters to uppercase.
UPDATE	: (root)	Directory that holds directories with update tool, patch files, and update script used to install AOS/VS II updates.
URT16.LB URT32.LB	:UTIL	User runtime libraries for 16-bit and 32-bit programs respectively; contain essential runtime code for user programs.
VSGEN.CLI, VSGEN.DATA,VSGEN.PR, VSGEN.QUES, VSGEN.ST	:SYSGEN	VSGEN macro, data, program, question, and symbol table files.
VSGEN_ERMES, VSGEN_HELP, VSGEN_TEXT	:SYSGEN	VSGEN text files for error messages, Help, and dialog.

(continued)

Table B-1 Files Shipped with AOS/VS II

Filename (not pathname)	Parent Directory	Description
WAIT_FOR_NO_PORT.CLI	:UTIL	Macro that DOWN.CLI macro uses to determine that EXEC is halted.
WAIT_FOR_PORT.CLI	:UTIL	Macro that UP.CLI macro uses to determine that EXEC is running.
WHOS.CLI	:UTIL	Macro that displays the names of all processes running on the system.
WRITE.SR	:UTIL:SYSTEM_ CALL_SAMPLES	Sample assembly language program. For more detail, see *AOS/VS, AOS/VS II, and AOS/RT32 System Call Dictionary* (2 vols).
XBAT.PR XBAT.ST	:UTIL	Batch program, works with EXEC to manage batch queues and streams.
XERMES.OB	:UTIL	Error message file with text for EXEC errors.
XHELP.CLI	:UTIL	Macro to display EXEC Help messages.
XLPT.PR, XLPT.ST	:UTIL	XLPT program, works with EXEC to manage printers and other spooled devices.
XMNT.PR XMNT.ST	:UTIL	Mount facility manager program, works with EXEC to user tape mount requests.
XNET.PR XNET.ST	:UTIL	Network queue manager program, works with EXEC to manage network queues.
XNS_xTC_IMAGE.PR, XNS_xTC_IMAGE.ST	:(root)	Network transport program that AOS/VS II loads into ITC/LTC controllers when XNS protocol was selected at VSGEN (default).
XYZZY.PS	:SYSGEN	AOS/VS II permanent symbol file, used for macroassembly during system builds.
XYZZY1.SR, XYZZY2.SR, XYZZY3.SR	:SYSGEN	AOS/VS II symbol definition files, may be needed for macroassembly during system builds.
XYZZYERMES.OB	:UTIL	Message file with text for AOS/VS II errors.
ZERMES.OB	:UTIL	Message file with text for CLI16 error messages.

(concluded)

End of Appendix

Appendix C
Major Differences Between AOS/VS II Releases 2.00, 1.20, and 1.10

This appendix describes *major* changes between AOS/VS II Releases 2.00, 1.20, and 1.10. It might interest you if you are curious about changes that DG has implemented for AOS/VS II between Releases 1.10 and 1.10 and 1.20 and 2.00.

Differences Between AOS/VS II Releases 2.00 and 1.20

1. AOS/VS II Release 2.00 supports automatic rerouting (auto-reroute) around failed controllers on an MCR channel. This helps increases system availability in event of hardware failure.

2. AOS/VS II Release 2.00 offers network transport services in the operation system itself (in ring 0). This helps performance on terminals supported (via XTS or TCP/IP network) on a network controller. Software support includes four new "soft" terminal controllers: PAD, PCVTSERVER, TELNET, and VTASERVER; to support terminals connected via these, AOS/VS II uses four new types of console filename: PADCON, PCCON, TCON, and VCON (the latter includes terminals of the type that were supported by the XODIAC agent VTA).

3. AOS/VS II Release 2.00 includes a new CLI, CLI32, that supports user groups with the GROUPLIST command, has a HISTORY feature, and allows command redirection with the /STR switch. Both the old CLI, CLI16, and CLI32 are included with Release 2.00. CLI32 is the default CLI. It is explained in *Using the CLI (AOS/VS and AOS/VS II)*.

4. AOS/VS II Release 2.00 supports user groups via the system call ?GROUP and the CLI32 command GROUPLIST and pseudomacro !GROUPLIST. (For groups to work, the system manager must create the groups directory and a file for each group, as explained in *Managing AOS/VS and AOS/VS II.)*

5. AOS/VS II Release 2.00 includes four UNIX-oriented programs to provide interoperability with UNIX-based systems. The programs are CPIO_VS.PR and CPIO.PR and TAR_VS.PR and TAR.PR. CPIO_VS.PR and CPIO.PR can dump or load files in UNIX-based CPIO format; CPIO_VS.PR uses familiar AOS/VS II switch format and CPIO uses UNIX option format. TAR_VS.PR and TAR.PR can dump or load files in UNIX-based TAR format; TAR_VS.PR uses familiar AOS/VS II switch format and CPIO uses UNIX option format. CPIO_VS.PR and TAR_VS.PR are explained in *Using the CLI (AOS/VS and AOS/VS II)*.

6. AOS/VS II Release 2.00 includes a new utility program, LDUINFO.PR, to display LDU status information. You can execute LDUINFO from the CLI. It is explained in *Managing AOS/VS and AOS/VS II.*

6. The AOS/VS II Release 2.00 starter system supports any disk or tape unit on any controller you have. As before, if the unit is on an ECLIPSE bus, you can boot from it only if it is unit 0 on the controller.

Differences Between AOS/VS II Releases 1.20 and 1.10

1. AOS/VS II Release 1.20 supports the message-based reliable channel (MRC) I/O subsystem with multiple hosts (MV/4000, MV/20000, MV/10000, and any other ECLIPSE MV/Family computer that uses BMC (burst multiplexor channel) I/O.
2. AOS/VS II Release 1.20 supports hardware mirroring of disks on an MRC subsystem.
3. AOS/VS II Release 1.20 supports sharing of tape units on an MRC subsystem.
4. AOS/VS II Release 1.20 supports repair under power on ECLIPSE MV/40000 HA computers and MRC subsystems.
5. AOS/VS II Release 1.20 supports the 64-line Local-Bus Terminal Controller (LTC64), 128-line PIM-T1, and 16-line Local-Bus Asychronous Controller (LAC-16).
6. AOS/VS II Release 1.20 supports Digital Equipment Corporation VT100 terminals.
7. On MV/40000 HA computer, AOS/VS II Release 1.20 supports as many as four job processors.
8. On MV/40000 HA computer, AOS/VS II Release 1.20 supports as many as 256 Mbytes of memory.
9. AOS/VS II Release 1.20 supports LDU data caching.
10. AOS/VS II Release 1.20 supports physical data copying of LDUs via program LDCOPY.

End of Appendix

Appendix D
Powering Up for the First Time and Loading Microcode — ECLIPSE MV/4000 DC, MV/4000 SC, and Data General DS/4000-Series Computers

This appendix tells you how to load microcode for the first time and bring up the SCP on the following machines:

ECLIPSE MV/4000 DC and MV/4000 SC
Data General DS/4000-series

Read it only if you need to build (or rebuild) AOS/VS II from scratch on a blank disk. If the SCP CLI prompt (*SCP-CLI>*) is showing on the system console, you don't need to execute these steps; use Chapter 2.

Note to ECLIPSE MV/2500 DC, MV/2000 DC, MV/1400 DC, MV/1000 DC, and DS/7500-Series System Users

If you have an ECLIPSE DS/7500-Series, MV/2500 DC, MV/2000 DC, or MV/1400 DC computer with AOS/VS II, don't continue with this appendix! Your system arrived with an easy-to-use model of AOS/VS II already installed on the disk. Using preinstalled AOS/VS II is explained in the manual *Starting and Updating Preinstalled AOS/VS II.*

First-Time Powerup

In this section, you'll power up your computer and load microcode.

All MV/4000 DC, MV/4000 SC, and DS/4000 computer systems include at least one 737,000-byte diskette unit. An optional extra is a tape unit. Several programs (the IOC emulator and SCP/microcode) are supplied on diskettes. AOS/VS II is supplied only on tape.

To power up, you need two diskettes, from the following groups:

- The I/O CB emulator, on one diskette. The diskette label, second line, includes the words "I/O CB EMULATOR."
- System media and microcode, on two diskettes or a cartridge tape. If you received system media on diskettes, one of the diskette labels includes, on its second line, the words "... SYSTEM MEDIA"; this is the first diskette. On the

other diskette, the second text line includes text in the form "MVn000xxx.MCF" and the last line includes "AOS FMT." You'll use the first diskette to power up, and you'll use the second after installing AOS/VS II (Chapter 2).

If you received system media on tape, the tape label has words in the form "xxx SYSTEM MEDIA" on its second line.

1. If CPU power is on, turn it off.

2. Turn on the system console. The switch is an on/off rocker behind the console or a push switch on the front. The console may display a test message and beep. If there is an ON LINE light on the keyboard, it should glow. (If the light doesn't glow, press the CMD key, hold CMD down, and press the ON LINE key. The ON LINE light should glow.) If there is no ON LINE key, use the ON LINE switch behind the unit.

   Adjust screen brightness by moving the brightness control (a slide under the right side of the unit or a knob on the lower right); ensure that brightness is set to let you see the screen cursor.

   If your keyboard has an ALPHA LOCK key (next to the space bar), press it to make the ALPHA LOCK light glow. You need to set ALPHA LOCK because one of the programs you'll use doesn't accept lowercase letters.

3. If you have a tape unit, turn it on now, by moving its switch to ON–1. (To use the tape unit, you must turn it on before turning computer power on.)

4. Find the diskette labeled "I/O CB EMULATOR." Insert it in unit 0 as follows. If you have two diskette units, the right one is unit 0.

   a. Turn the latch beside the diskette slot to the vertical position.

   b. Remove the diskette from its outer envelope. Don't try to remove the inner envelope — the diskette must remain in this.

   c. Hold the diskette by the edges and examine it. One side has a paper label and the other is blank. On each side, the envelope is cut away to expose part of the diskette surface. Just a reminder — *don't touch the diskette surface.* The oil on your finger could make that part of the diskette unreadable. One edge of the diskette has a small notch (about 1/4 x 1/4 inch). This is the *write-enable* notch. When this notch is uncovered, information can be written to the diskette.

   d. Hold the diskette with the write-enable notch up and your fingers on the label. Slide it into the unit slot. The diskette should slide in smoothly and come to a firm stop.

   e. Turn the latch beside the slot to the horizontal position. This locks the diskette in the unit.

5. Turn computer power on via the power switch on the cabinet. The power light above the switch should glow. The computer runs power-up tests.

6. With an MV/4000-series system, the system console prompts

   MV4000 READY

   IOC EMULATOR INSTALLER

   (Wait 50 to 60 seconds here.)

   STATUS OF IOC EMULATOR ON HARD DISK

   1. INSTALL AND RUN IOC EMULATOR ON HARD DISK
   2. VERIFY IOC EMULATOR ON HARD DISK
   3. RUN ONLY
   4. INSTALL ONLY
   5. EXIT

   CHOOSE ONE: [1]

   If nothing happens after 30 seconds, perhaps you misinserted the diskette. Remove the diskette, turn computer power off, and return to step 4.

   If you see an incomplete *READY* message after 30 seconds, turn computer power off and on again. If the full message still does not appear, perhaps the system has problems; depending on your contract with DG, consult your DG support organization.

7. You must now install the I/O CB emulator on the hard disk. To install and run the emulator, choose the default (1) by pressing NEW LINE:

   ↲

   A few moments pass. Then

   EMULATOR INSTALLED
   @

8. Remove the diskette from unit 0.

9. If you received system media on a cartridge tape, skip to step 13. If you received system media on diskette, continue.

10. Get the system media diskette with the label that has SCP SYSTEM MEDIA written on it.

11. Insert the diskette in unit 0 (right unit, if you have two) as explained earlier.

12. Next to the @ prompt, type 64L — for example,

    @ 64L

    A loader program reads the diagnostic operating system from the diskette. After 5 seconds or so, you'll hear a click as the diskette drive engages. Reading the system from diskette takes 10 to 20 seconds. The system console displays

TESTOK
...
COPYRIGHT DATA GENERAL ...
ALL RIGHTS ...

*

If this message doesn't appear after a minute or so, perhaps you misinserted the diskette. Type the break sequence (CMD and BREAK/ESC). Remove the diskette from the unit and return to step 12.

With the prompt * showing, skip to step 16.

13. Get the tape with SYSTEM MEDIA on it.

14. Insert the cartridge tape in your tape unit, with the label facing right.

15. Wait for the tape unit READY light to glow. Then, next to the @ prompt, type 22L — for example,

@ 22L

A loader program reads the diagnostic operating system from the tape. This may take a few moments. Then the system console displays

TESTOK
...
COPYRIGHT DATA GENERAL ...
ALL RIGHTS ...

*

If this message doesn't appear after a minute or so, type the break sequence (CMD and BREAK/ESC keys); then retry this step.

16. Tell the diagnostic system to load the correct CPU microcode file.

- With an MV/4000 DC or SC and no hardware options (like floating-point unit or graphics instruction set), the filename is MV4000
- With an MV/4000 DC or SC and optional hardware floating-point unit, but without the graphics instruction set, the filename is MV4000FP
- With an MV/4000 DC or SC and optional graphics instruction set (without hardware floating-point unit), the filename is MV4000G
- With an MV/4000 DC or SC and both hardware floating-point unit and graphics instruction set, the filename is MV4000GFP

Next to the * prompt, type the LOAD command, followed by the correct microcode filename for your machine. For example,

* LOAD MV4000FP↵ (For an MV/4000 with FPU).

After a few moments, you'll see messages like

MV4000... MICROCODE REV n LOADING

.

.

.

MV4000... MICROCODE REV n LOADED AND VERIFIED
*

17. Exit from the diagnostic system by typing EXIT:

* EXIT↵

CPU HALTED
SCP-CLI>

18. Microcode is loaded into the computer, and the SCP CLI, which allows you to start other programs, has control (as you can tell by the prompt).

19. Remove the diskette or tape from unit 0. For diskette, return the diskette to its outer envelope. For tape, return the cartridge to its protective case.

You're finished with first-time powerup. This sequence will work anytime you want to cold start your system, but it's easier to have everything loaded automatically, as will happen after you format your system disk and install microcode on it. To format your system disk, return to Chapter 2.

End of Appendix

Appendix E
Powering Up for the First Time and Loading Microcode — ECLIPSE MV/20000, MV/15000, MV/10000, MV/8000, MV/7800, MV/6000, and MV/4000 Computers

This appendix tells you how to load microcode for the first time and bring up the SCP on the following machines:

MV/20000 Models 2, 1, and C
MV/15000 Models 20, 10, and 8
MV/10000 SX and MV/10000
MV/8000 II and MV/8000 C
MV/8000
MV/7800, MV/7800 C, and MV/7800 XP
MV/6000
MV/4000

Read it only if you need to build (or rebuild) AOS/VS II from scratch on a blank disk. If the SCP CLI prompt (*SCP–CLI>*) is showing on the system console, you don't need to execute these steps; return to Chapter 2. For first–time powerup on an MV/40000 system, see the manual *Starting ECLIPSE MV/40000–Series Systems*, supplied with the computer.

Note to DS/7500–Series and ECLIPSE MV/2500 DC, MV/2000 DC, MV/1400 DC, and MV/1000 DC System Users

If you have a DS/7500–Series or ECLIPSE MV/2500 DC, MV/2000 DC, MV/1400 DC, or MV/1000 DC computer with AOS/VS II, don't continue with this appendix! Your system arrived with an easy–to–use model of AOS/VS II already installed on the disk. Using preinstalled AOS/VS II is explained in the manual *Starting and Updating Preinstalled AOS/VS II.*

First–Time Powerup

In this section, you'll power up your computer and load microcode.

1. Find the correct tape. This tape, shipped with the computer hardware, is labeled as your computer's SCP SYSTEM MEDIA tape (for example, the "MV/20000 SCP SYSTEM MEDIA" tape). It contains firmware that's independent of the operating system: a diagnostic program, diagnostic operating system (SCP–ADEX), CPU diagnostics, CPU microcode, and the SCP operating system. This tape is vital for first–time powerup; you can also use it in subsequent powerups (although powerups will be much easier if you install the tape's programs on your system disk, as described in Chapter 2).

2. These steps assume that CPU power is off. If it's on, turn it off.

3. Ready the system console. If this is a hardcopy (printing) terminal, turn it on using the power switch under the keyboard or behind the unit, near the floor. Press the ON LINE switch and the READY light will glow.

   If the system console is a CRT display, turn it on. The switch is a rocker switch behind the unit or a push–pull knob on the front lower right corner. The screen may display a self–test message and beep. Check the ON LINE status light (if any). If this light glows, fine. If it doesn't glow, depress the CMD key, hold CMD down, and press the ON LINE key. The ON LINE light should glow. (If there is no ON LINE key, use the ON LINE switch behind the unit.)

   On a CRT display, test the brightness by moving the brightness control (a slide under the right side of the unit or a knob on the lower right); ensure that brightness is set to let you see the screen cursor.

4. Make the disk(s) ready for I/O. If your primary disk unit is a sealed unit, press ON–1 (or READY or START). Soon, the READY light will glow.

   If the primary disk uses a removable disk pack, make sure a pack is inserted in the unit. Doing this is described in the illustrated disk instruction booklet. Press ON or DC POWER ON, WRITE ENABLE, and DRIVE START. Soon, the READY lamp will light.

   If you want to format multiple disks, make sure they are ready as above.

5. Make the tape unit ready for I/O. If you have a choice among units, choose the one nearest the computer. (It must be unit 0 — the first unit — on the first tape controller.) Turn unit power on.

   If the unit's control panel has a SELECT thumbwheel, it is an MTB unit. The starter system requires that the MTB controller be connected to the first tape controller device code, 22. Dial 0 on the thumbwheel and make sure that no other unit that is on line has the same number. Then press the MTB unit's panel switch to HIGH DENSITY.

   If the tape unit has no SELECT thumbwheel and its reels are side by side, it is an MTC unit. The default device code for an MTB controller is 22. For AOS/VS II Release 2.00, the starter system supports an MTJ controller on other device codes. If you want to boot from the tape unit, it must be connected as the first device on its controller.

If the tape unit uses a cartridge (a 4 x 4 inch, 120–Mbyte cartridge with half–inch tape or a small tape–cassette size, 21–Mbyte cartridge), it is a type MTJ unit. Or if it has reels side–by–side and model number 6341, it is a type MTJ unit. A 120–Mbyte cartridge unit may be mounted in a separate rack or in a Combined Storage Subsystem (CSS) chassis. The default device code for an MTJ controller is 23. For AOS/VS II Release 2.00, the starter system supports an MTJ controller on other device codes. If you want to boot from the tape unit, it must connected as the first device on its controller.

If the tape unit has touch–sensitive (membrane) switches, or if it has switches at the top, it is a self–threading 1600/6250 bpi unit, type MTD. The default device code for an MTD controller is 62. For AOS/VS II Release 2.00, the starter system supports an MTD controller on other device codes. If you want to boot from the tape unit connected to an ECLIPSE bus, it must be connected as the first device on its controller. You can boot from any unit on an MRC bus.

6. Mount and thread the SCP SYSTEM MEDIA tape, or insert it in the unit, whichever applies. If the unit has a door, close the door, since some units won't operate with the door open.

Tell the unit to load the tape. (On an MTB or MTC unit, press the tape UNLOAD/BOT switch to BOT, and then press ON LINE; the tape will move forward and stop. On an MTD unit, press Reset, Load, and On Line.)

7. With any machine except a blue and white MV/8000, skip to step 8. With a blue and white MV/8000, proceed as follows.

a. If the MV/8000 system diskette (supplied with the computer) is not in the computer's diskette slot, insert it. Then close the diskette door. Press the computer POWER switch to ON. The computer then runs some power–up tests, displays *CONSOLE READY*, and prompts

ENTER DATE (MO DAY YR)

b. Type the date, separating month, day, and year by spaces (for example, 8 23 90) and press NEW LINE. Then type the time, based on a 24–hour clock (for example, 13:30 for 1:30 p.m.) and press NEW LINE. Then if the system asks about microcode, accept the default microcode file by pressing NEW LINE.

The SCP now loads its operating system and the MV/8000 microcode from the diskette. This takes a few moments. Finally, it displays

SCP–CLI>

Go to step 13.

8. With any machine except a blue and white MV/8000, do the following:

On the computer's front panel, if there is a LOCK switch, press the switch to the OFF or to the unlock position.

Press the computer POWER (or PWR) switch to ON. The computer then runs power-up tests. Then, depending on your computer, the system console displays either

POWER UP TESTING COMPLETED	(on MV/20000, MV/15000, and MV/7800)
...	
SCP-CLI/Jpn>	(*Jpn* is not displayed on MV/7800s. If displayed, *n* is usually 0.)

or

*** POWER UP TESTING COMPLETED *** *BOOT* ...	(on MV/10000, MV/8000, and MV/6000)

or

MV4000 READY @	(on MV/4000)

If you see nothing, or *POWER UP TESTING – FAILED*, or an incomplete *POWER UP* or *READY* message, press the power switch to off and on again. If the message remains incomplete, or if the failure occurs again, make sure the system console is on and on line, and that the computer has power. If the system console is a CRT, perhaps the screen is too dim; adjust the brightness control. If there's no obvious problem, the computer may need service. How you receive service depends on your Data General Field Service Maintenance Agreement.

9. Now you must tell the computer to load from the tape. Proceed to the step appropriate for your machine:

- With an MV/20000, MV/15000, or MV/7800, continue with this step.
- With an MV/10000 SX or MV/10000, skip to step 10.
- With an MV/8000 II, MV/8000 C, or MV/6000, skip to step 11.
- With an MV/4000, skip to step 12.

a. With an MV/20000, MV/15000, or MV/7800, execute this and the following steps to select automatic booting, set the date and time, and load microcode. First, type

FLAGS AUTO YES⤶

Boot from what device? [0]

b. Type the device code of the disk from which you will want to start AOS/VS II in the future. Generally, for nonremovable disks, the device code is 24; for disks with removable packs, it's 27. Table 2–1, in Chapter 2, gives specific model numbers and device codes. For example,

24↵

Then, on an MV/20000 Model 2, it asks for the channel number. Type 0↵.

c. Turn computer power off and on again. It displays an Automatic Program Load Menu. You want to change preset values, so type 2↵.

It displays the Change Preset Values Menu.

d. You want to change the date and time, so type 2↵.

e. Type the date in the specified format. For MV/20000s and MV/15000s, this is dd–mmm–yy (for example, 23–AUG–90). For MV/7800s, the format is mm–dd–yy; (for example 8–23–90).

f. Type the time, based on a 24–hour clock; for example, for 1:30 p.m., type 13:30↵.

g. To answer the question *Offset to GMT,* for now, press NEW LINE. You may want to set the value later. The time offsets are further described in Chapter 6.

h. Select choice 6 on the menu, the SCP CLI, by typing 6↵.

SCP–CLI> 6↵

i. Type BOOT 22↵ (Or for an MTJ unit, type BOOT 23↵; or for a 6250 bpi unit, type BOOT 62↵.)

Then, on an MV/20000 Model 2, press NEW LINE to choose the default channel number.

It displays the SCP–ADEX menu.

j. You want to load microcode, choice 2, so type 2↵. Wait for the microcode loading messages to stop. Then it displays

SCP–CLI...>

Skip to step 13.

10. With an MV/10000 SX or MV/10000, the system console displays

BOOT WHAT DEVICE? (CHANNEL AND DEVICE CODE):

a. Type the break sequence: CMD and BREAK/ESC key or BRK key.

b. Next to the prompt, type 22 (to load from an MTB unit), 23 (to load from an MTJ unit), or 62 (to load from an MTD tape unit) and press NEW LINE:

   22 ↓ (Or 23 or 62)

c. This brings the ADEX system from tape. It displays some messages, and then a menu. Choose the option "Load and verify microcode." Confirm the load of MV/10000 microcode, if needed.

d. The system displays initialization messages, followed by

   SCP-CLI>

   Go to step 13.

11. On an MV/8000 II, MV/8000 C, or MV/6000, the system console displays

BOOT DEVICE?

Type 22 and press NEW LINE:

BOOT DEVICE? 22↓ (Or 62 if tape is on a type MTD tape unit.)

The loader program reads the diagnostic operating system from the tape. It displays a *TOP OF MEMORY* message, and then

*

a. Next to the * prompt, type

   * LOAD SCPOS↓
   LOAD SCPOS REV. n

   You'll see some *loading...* messages. After 70 seconds or so, you'll see an SCP message, followed by a request for the date.

b. Type the date, separating month, day, and year by spaces; for example, 8 23 89; press NEW LINE.

c. Type the time, based on a 24-hour clock (for example, for 1:30 p.m., type 13:30 and press NEW LINE). It displays initialization messages, followed by

   SCP-CLI>

   Go to step 13.

12. With an MV/4000, the system console shows @. Type

@ 22L

This command loads the diagnostic operating system from the tape. You'll see some copyright messages, and then

*

a. Tell the diagnostic operating system to load CPU microcode. For an MV/4000 with a hardware floating-point unit (FPU), the filename is MV4000FP; for an MV/4000 *without* FPU, the filename is MV4000. Type the LOAD command, followed by the appropriate filename for your machine. For example,

* LOAD MV4000⤶ (or MV4000FP⤶)

After a few moments, you'll see microcode messages, followed by

*

b. Type

EXIT⤶

CPU HALTED
SCP-CLI>

13. CPU microcode has been loaded and the SCP CLI, which allows you to start other programs, has control, as you can tell by the prompt.

14. Dismount the SCP SYSTEM MEDIA tape. Use the tape switches (if any) to take the tape off line and unload it; and then remove it from the tape unit.

You're finished with first-time powerup. This sequence will work anytime you want to cold-start your system, but it's easier to have everything loaded automatically, as will happen after you format your system disk and install microcode on it. To format your system disk, return to Chapter 2.

End of Appendix

Index

A boldface page number indicates the primary reference. If no boldface type appears, the first page number shown indicates the primary reference.

Symbols

Numbers

A

B

D

E

F

G

L

M

N

O

P

Q

R

S

T

U

W

X

Y

Z

Document Set

For Users

Learning to Use Your AOS/VS System (069–000031)

A primer for all users, this manual introduces AOS/VS (but the material applies to AOS/VS II) through interactive sessions with the CLI, the SED and SPEED text editors, programming languages, Assembler, and the Sort/Merge utility. *Using the CLI (AOS and AOS/VS)* is a good follow-up.

Using the CLI (AOS and AOS/VS) (093–000646)

For all users, this manual explains the AOS/VS and AOS/VS II file and directory structure and how to use the CLI, a command line interpreter, as the interface to the operating system. This manual explains how to use the CLI macro facility, and includes a dictionary of CLI commands and pseudomacros.

Using the AOS/VS System Management Interface (SMI) (069–000203)
Using the AOS/VS II System Management Interface (SMI) (069–000311)

For those working with preinstalled systems and those on regular systems who want an alternative to the CLI, the SMI is an easy-to-use, menu-driven program that helps you with system management functions and some file maintenance tasks.

AOS/VS and AOS/VS II Glossary (069–000231)

For all users, this manual defines important terms used in AOS/VS and AOS/VS II manuals, both regular and preinstalled.

OIS CONNECTION User's Guide (014–001426)

Using this manual, all users in North America can use the OIS CONNECTION software, a communications product that lets users access the On-line Information System from the CLI or CEO. Templates are *OIS CONNECTION* template (D200–SERIES) (093–000603) and *OIS CONNECTION* template (D210–series) (093–000604).

SED Text Editor User's Manual (AOS and AOS/VS) (093–000249)

For all users, this manual explains how to use SED, an easy-to-use screen-oriented text editor that lets you program function keys to make repetitive tasks easier. The *SED Text Editor* template (093–00036l) accompanies this manual.

For System Managers and Operators

Starting and Updating Preinstalled AOS/VS (069–000293)
Starting and Updating Preinstalled AOS/VS II (069–000294)

For those working with preinstalled (as opposed to regular) systems, these manuals explain how to start, update, and change certain system parameters on systems that come with AOS/VS or AOS/VS II preinstalled and with the System Management Interface (SMI) enabled. The manuals help interpret power–up errors. *Using the AOS/VS System Management Interface* and *Using the AOS/VS II System Management Interface* are companion manuals.

Information Update: Starting Your ECLIPSE MV/1000 DC (014–001728)

Updates *Starting and Updating Preinstalled AOS/VS* and *Starting and Updating Preinstalled AOS/VS II.*

Installing, Starting, and Stopping AOS/VS (093–000675)
Installing, Starting, and Stopping AOS/VS II (093–000539)

For system managers and operators of regular (as opposed to preinstalled) systems, these manuals explain the steps necessary to format disks, install a tailored operating system, create the multiuser environment, update the system or microcode, and routinely start up and shut down the system. *AOS/VS and AOS/VS II Error and Status Messages* and *Managing AOS/VS and AOS/VS II* are companions to these manuals.

AOS/VS and AOS/VS II Menu–Based Utilities (093–000650)

A template. A number of system management programs, such as Disk Jockey, VSGEN, and the SMI, use the function keys shown on this template.

AOS/VS and AOS/VS II Error and Status Messages (093–000540)

For all users, but especially for system managers and operators of regular systems, this manual lists error and status messages, their source and meaning, and appropriate responses. This manual complements *Installing, Starting, and Stopping AOS/VS, Installing, Starting, and Stopping AOS/VS II*, and *Managing AOS/VS and AOS/VS II.*

Managing AOS/VS and AOS/VS II (093–000541)

For system managers and operators, this manual explains managing an AOS/VS or AOS/VS II system, but programmers will also find material of interest to them. Topics include editing user profiles, managing the multiuser environment, backing up and restoring files, improving system availability, using runtime tools, diagnosing system error conditions, fine–tuning system performance, and maintaining system security. Appendixes cover such topics as modem support and printer mapper files. This manual complements the "Installing" manuals, whether for regular or preinstalled systems.

Supplement I to Managing AOS/VS and AOS/VS II (093–000714)

For system managers and operators of regular (as opposed to preinstalled) AOS/VS II systems, this supplement describes the new EXEC program that manages the multiuser environment. Insert this supplement as Chapter 3 in the manual *Managing AOS/VS and AOS/VS II.*

Supplement II to Managing AOS/VS and AOS/VS II (093–000715)

For system managers and operators of regular (as opposed to preinstalled) AOS/VS systems, this supplement describes the EXEC program that manages the multiuser environment. Insert this supplement as Chapter 3 in the manual *Managing AOS/VS and AOS/VS II.*

For Programmers

SPEED Text Editor (AOS and AOS/VS) User's Manual (093–000197)

For programmers, this manual explains how to use SPEED, a powerful (but unforgiving) character–oriented text editor.

AOS/VS Macroassembler (MASM) Reference Manual (093–000242)

For assembly language programmers, this reference manual describes the use and operation of the MASM utility, which works under AOS/VS and AOS/VS II.

AOS/VS Link and Library File Editor (LFE) User's Manual (093–000245)

For AOS/VS and AOS/VS II programmers, this manual describes the Link utility, which builds executable program files from object modules and library files, and which can also be used to create programs to run under the AOS, MP/AOS, RDOS, RTOS, or DG/UX™ operating systems. This manual also describes the Library File Editor utility, LFE, for creating, editing, and analyzing library files; and the utilities CONVERT and MKABS, for manipulating RDOS and RTOS files.

AOS/VS Debugger and File Editor User's Manual (093–000246)

For assembly language programmers, this manual describes using the AOS/VS and AOS/VS II debugger for examining program files, and the file editor FED for examining and modifying locations in any kind of disk file, including program and text files. The *AOS/VS Debug/FED* template (093–000396) accompanies this manual.

AOS/VS System Concepts (093–000335)

For system programmers and application programmers who write assembly–language subroutines, this manual explains basic AOS/VS system concepts, most of which apply to AOS/VS II as well. This manual complements both volumes of the *AOS/VS, AOS/VS II, and AOS/RT32 System Call Dictionary.*

AOS/VS, AOS/VS II, and AOS/RT32 System Call Dictionary, ?A through ?M (093–000542)
AOS/VS, AOS/VS II, and AOS/RT32 System Call Dictionary, ?N through ?Z (093–000543)

For system programmers and application programmers who want to use system calls, this two-volume manual provides detailed information about system calls, including their use, syntax, accumulator input and output values, parameter packets, and error codes. *AOS/VS System Concepts* is a companion manual.

Other Related Documents

AOS/VS and AOS/VS II Performance Package User's Manual (093–000364)

For system managers, this manual explains how to use the AOS/VS and AOS/VS II Performance Package (Model 30718), a separate product that is useful for analyzing and perhaps improving the performance of AOS/VS and AOS/VS II systems.

Backing Up and Restoring Files With DUMP_3/LOAD_3 (093–000561)

For system managers, operators, and experienced users, the DUMP_3/LOAD_3 product, separately available, provides backup and enhanced restoration functions, including precise indexing of files on a backup tape set.

Configuring Your Network with XTS (093–00689)

Describes how to manage and operate Data General's XODIAC™ Transport Service (XTS) under AOS/VS. Intended for network administrators, managers, or operators responsible for designing, configuring, or maintaining a network management system.

Managing AOS/VS II ONC/NFS (093–000667)

For network managers and operators, explains how to install and manage a TCP/IP network under AOS/VS II.

Installing and Administering DG TCP/IP (093–701027)

For network managers and operators, explains how to install and manage a TCP/IP network under AOS/VS.

Managing AOS/VS II TCP/IP (093–000704)

For network managers and operators, explains how to install and manage a TCP/IP network under AOS/VS II.

Managing and Operating the XODIAC™ Network Management System (093–000260)

For network managers and operators, describes how to install and manage the Data General proprietary network software.

Managing XTS II with DG/OpenNMS (093–000698)

Explains how to use DG/OpenNMS to manage the XTS II transport service for large communications networks. Identifies the XTS components and explains how to use the NMI menus and screens to manage the XTS subsystems and the Message Transport Agent (MTA).

Managing Your Network with DG/OpenNMS (093–000486)

Describes how to use the Data General/Open Network Management System (DG/OpenNMS) software. Explains how to load the software, create the DG/OpenNMS environment, and use the Network Management Interface (NMI) to manage the network. Intended for network managers, administrators, and operators.

Managing Your XODIAC™ Network with DG/ONMS (093–000625)

Explains how to manage XTS II, MTA, and the XODIAC agents (FTA, RMA, and SVTA) with DG/OpenNMS.

Using CLASP (Class Assignment and Scheduling Package) (093–000422)

For system managers, this manual explains how to use the AOS/VS and AOS/VS II Class Assignment and Scheduling Package (Model 31134), a separate product that is useful for tailoring process scheduling to the needs of a specific site.

Using the Dump Tool (093–000519)

For experienced system programmers and operating system experts, this manual explains how to use the Dump Tool to find and display the values of locations in memory dump and break files.

TIPS ORDERING PROCEDURES

TO ORDER

1. An order can be placed with the TIPS group in two ways:
   a) MAIL ORDER – Use the order form on the opposite page and fill in all requested information. Be sure to include shipping charges and local sales tax. If applicable, write in your tax exempt number in the space provided on the order form.

      Send your order form with payment to: Data General Corporation
      ATTN: Educational Services/TIPS G155
      4400 Computer Drive
      Westboro, MA 01581–9973

   b) TELEPHONE – Call TIPS at (508) 870–1600 for all orders that will be charged by credit card or paid for by purchase orders over $50.00. Operators are available from 8:30 AM to 5:00 PM EST.

METHOD OF PAYMENT

2. As a customer, you have several payment options:
   a) Purchase Order – Minimum of $50. If ordering by mail, a hard copy of the purchase order must accompany order.
   b) Check or Money Order – Make payable to Data General Corporation.
   c) Credit Card – A minimum order of $20 is required for Mastercard or Visa orders.

SHIPPING

3. To determine the charge for UPS shipping and handling, check the total quantity of units in your order and refer to the following chart:

Total Quantity	Shipping & Handling Charge
1–4 Units	$5.00
5–10 Units	$8.00
11–40 Units	$10.00
41–200 Units	$30.00
Over 200 Units	$100.00

If overnight or second day shipment is desired, this information should be indicated on the order form. A separate charge will be determined at time of shipment and added to your bill.

VOLUME DISCOUNTS

4. The TIPS discount schedule is based upon the total value of the order.

Order Amount	Discount
$1–$149.99	0%
$150–$499.99	10%
Over $500	20%

TERMS AND CONDITIONS

5. Read the TIPS terms and conditions on the reverse side of the order form carefully. These must be adhered to at all times.

DELIVERY

6. Allow at least two weeks for delivery.

RETURNS

7. Items ordered through the TIPS catalog may not be returned for credit.
8. Order discrepancies must be reported within 15 days of shipment date. Contact your TIPS Administrator at (508) 870–1600 to notify the TIPS department of any problems.

INTERNATIONAL ORDERS

9. Customers outside of the United States must obtain documentation from their local Data General Subsidiary or Representative. Any TIPS orders received by Data General U.S. Headquarters will be forwarded to the appropriate DG Subsidiary or Representative for processing.

TP ____________________

TIPS ORDER FORM

Mail To: Data General Corporation
Attn: Educational Services/TIPS G155
4400 Computer Drive
Westboro, MA 01581 - 9973

BILL TO:	SHIP TO: (No P.O. Boxes - Complete Only If Different Address)
COMPANY NAME ____________	COMPANY NAME ____________
ATTN: ____________	ATTN: ____________
ADDRESS ____________	ADDRESS (NO PO BOXES) ____________
CITY ____________	CITY ____________
STATE ____________ ZIP ________	STATE ____________ ZIP ________

Priority Code ____________ (See label on back of catalog)

Authorized Signature of Buyer (Agrees to terms & conditions on reverse side) ____________ Title ____________ Date ________ Phone (Area Code) ________ Ext. ______

ORDER #	QTY	DESCRIPTION	UNIT PRICE	TOTAL PRICE

A SHIPPING & HANDLING

☐ UPS	ADD
1-4 Items	$ 5.00
5-10 Items	$ 8.00
11-40 Items	$ 10.00
41-200 Items	$ 30.00
200+ Items	$100.00

Check for faster delivery

Additional charge to be determined at time of shipment and added to your bill.

☐ UPS Blue Label (2 day shipping)
☐ Red Label (overnight shipping)

B VOLUME DISCOUNTS

Order Amount	Save
$0 - $149.99	0%
$150 - $499.99	10%
Over $500.00	20%

Tax Exempt # or Sales Tax (if applicable) ____________

ORDER TOTAL	
Less Discount See B	-
SUB TOTAL	
Your local* sales tax	+
Shipping and handling - See A	+
TOTAL - See C	

C PAYMENT METHOD

☐ Purchase Order Attached ($50 minimum)
P.O. number is________. (Include hardcopy P.O.)
☐ Check or Money Order Enclosed
☐ Visa ☐ MasterCard ($20 minimum on credit cards)

Account Number ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐ Expiration Date ☐☐☐☐

____
Authorized Signature
(Credit card orders without signature and expiration date cannot be processed.)

THANK YOU FOR YOUR ORDER

PRICES SUBJECT TO CHANGE WITHOUT PRIOR NOTICE.
PLEASE ALLOW 2 WEEKS FOR DELIVERY.
NO REFUNDS NO RETURNS.

* Data General is required by law to collect applicable sales or use tax on all purchases shipped to states where DG maintains a place of business, which covers all 50 states. Please include your local taxes when determining the total value of your order. If you are uncertain about the correct tax amount, please call 508-870-1600.

Form 702
Rev. 8/87

DATA GENERAL CORPORATION TECHNICAL INFORMATION AND PUBLICATIONS SERVICE TERMS AND CONDITIONS

Data General Corporation ("DGC") provides its Technical Information and Publications Service (TIPS) solely in accordance with the following terms and conditions and more specifically to the Customer signing the Educational Services TIPS Order Form. These terms and conditions apply to all orders, telephone, telex, or mail. By accepting these products the Customer accepts and agrees to be bound by these terms and conditions.

1. CUSTOMER CERTIFICATION
Customer hereby certifies that it is the owner or lessee of the DGC equipment and/or licensee/sub-licensee of the software which is the subject matter of the publication(s) ordered hereunder.

2. TAXES
Customer shall be responsible for all taxes, including taxes paid or payable by DGC for products or services supplied under this Agreement, exclusive of taxes based on DGC's net income, unless Customer provides written proof of exemption.

3. DATA AND PROPRIETARY RIGHTS
Portions of the publications and materials supplied under this Agreement are proprietary and will be so marked. Customer shall abide by such markings. DGC retains for itself exclusively all proprietary rights (including manufacturing rights) in and to all designs, engineering details and other data pertaining to the products described in such publication. Licensed software materials are provided pursuant to the terms and conditions of the Program License Agreement (PLA) between the Customer and DGC and such PLA is made a part of and incorporated into this Agreement by reference. A copyright notice on any data by itself does not constitute or evidence a publication or public disclosure.

4. LIMITED MEDIA WARRANTY
DGC warrants the CLI Macros media, provided by DGC to the Customer under this Agreement, against physical defects for a period of ninety (90) days from the date of shipment by DGC. DGC will replace defective media at no charge to you, provided it is returned postage prepaid to DGC within the ninety (90) day warranty period. This shall be your exclusive remedy and DGC's sole obligation and liability for defective media. This limited media warranty does not apply if the media has been damaged by accident, abuse or misuse.

5. DISCLAIMER OF WARRANTY
EXCEPT FOR THE LIMITED MEDIA WARRANTY NOTED ABOVE, DGC MAKES NO WARRANTIES, EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, WARRANTIES OF MERCHANTABILITY AND FITNESS FOR PARTICULAR PURPOSE ON ANY OF THE PUBLICATIONS, CLI MACROS OR MATERIALS SUPPLIED HEREUNDER.

6. LIMITATION OF LIABILITY
A. CUSTOMER AGREES THAT DGC'S LIABILITY, IF ANY, FOR DAMAGES, INCLUDING BUT NOT LIMITED TO LIABILITY ARISING OUT OF CONTRACT, NEGLIGENCE, STRICT LIABILITY IN TORT OR WARRANTY SHALL NOT EXCEED THE CHARGES PAID BY CUSTOMER FOR THE PARTICULAR PUBLICATION OR CLI MACRO INVOLVED. THIS LIMITATION OF LIABILITY SHALL NOT APPLY TO CLAIMS FOR PERSONAL INJURY CAUSED SOLELY BY DGC'S NEGLIGENCE. OTHER THAN THE CHARGES REFERENCED HEREIN, IN NO EVENT SHALL DGC BE LIABLE FOR ANY INCIDENTAL, INDIRECT, SPECIAL OR CONSEQUENTIAL DAMAGES WHATSOEVER, INCLUDING BUT NOT LIMITED TO LOST PROFITS AND DAMAGES RESULTING FROM LOSS OF USE, OR LOST DATA, OR DELIVERY DELAYS, EVEN IF DGC HAS BEEN ADVISED, KNEW OR SHOULD HAVE KNOWN OF THE POSSIBILITY THEREOF; OR FOR ANY CLAIM BY ANY THIRD PARTY.

B. ANY ACTION AGAINST DGC MUST BE COMMENCED WITHIN ONE (1) YEAR AFTER THE CAUSE OF ACTION ACCRUES.

7. GENERAL
A valid contract binding upon DGC will come into being only at the time of DGC's acceptance of the referenced Educational Services Order Form. Such contract is governed by the laws of the Commonwealth of Massachusetts, excluding its conflict of law rules. Such contract is not assignable. These terms and conditions constitute the entire agreement between the parties with respect to the subject matter hereof and supersedes all prior oral or written communications, agreements and understandings. These terms and conditions shall prevail notwithstanding any different, conflicting or additional terms and conditions which may appear on any order submitted by Customer. DGC hereby rejects all such different, conflicting, or additional terms.

8. IMPORTANT NOTICE REGARDING AOS/VS INTERNALS SERIES (ORDER #1865 & #1875)
Customer understands that information and material presented in the AOS/VS Internals Series documents may be specific to a particular revision of the product. Consequently user programs or systems based on this information and material may be revision-locked and may not function properly with prior or future revisions of the product. Therefore, Data General makes no representations as to the utility of this information and material beyond the current revision level which is the subject of the manual. Any use thereof by you or your company is at your own risk. Data General disclaims any liability arising from any such use and I and my company (Customer) hold Data General completely harmless therefrom.

134-755-02

moisten & seal

CUSTOMER DOCUMENTATION COMMENT FORM

Your Name ______________________ Your Title ______________________

Company ______________________ Phone ______________________

Street ______________________

City ______________________ State __________ Zip ________

We wrote this book for you, and we made certain assumptions about who you are and how you would use it. Your comments will help us correct our assumptions and improve the manual. Please take a few minutes to respond. Thank you.

Manual Title ______________________ Manual No. ______________________

Who are you?

- ☐ EDP/MIS Manager
- ☐ Senior Systems Analyst
- ☐ Engineer
- ☐ Analyst/Programmer
- ☐ Operator
- ☐ End User
- ☐ Other ______________________

How do you use this manual? *(List in order: 1 = Primary Use)*

- ___ Introduction to the product
- ___ Reference
- ___ Tutorial Text
- ___ Operating Guide
- ___ Other ______________________

About the manual:

	Yes	No
Is it easy to read?	☐	☐
Is it easy to understand?	☐	☐
Are the topics logically organized?	☐	☐
Is the technical information accurate?	☐	☐
Can you easily find what you want?	☐	☐
Does it tell you everything you need to know?	☐	☐
Do the illustrations help you?	☐	☐

If you wish to order manuals, use the enclosed TIPS Order Form (USA only) or contact your sales representative or dealer.

Comments:

Installing, Starting, and Stopping AOS/VS II

093-000539-02

Cut here and insert in binder spine pocket

Data General

Data General Corporation, Westboro, Massachusetts 01580

093-000539-02

Installing, Starting, and Stopping AOS/VS II

093-000539-02

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL

FIRST CLASS PERMIT NO. 26 WESTBORO, MA 01581

POSTAGE WILL BE PAID BY ADDRESSEE

DataGeneral

Customer Documentation
MS E-111
4400 Computer Drive
P.O. Box 4400
Westboro, MA 01581-9890

134-755-02