

**Initially Installing and Setting Up
the DG/UX™ System
on Stand-Alone Multiuser
AViiON® Computers**

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on Stand-Alone Multiuser
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Preface

This manual tells how to install and set up a DG/UX™ *stand-alone multiuser* system on an AViiON® computer in a traditional time-sharing environment. We assume that this computer has one or more Systech terminal lines controllers, and that it is not connected to a network.

If your multiuser computer is on an Ethernet-based local area network and will communicate via TCP/IP and NFS® network software, then you should use the *Initially Installing and Setting Up the DG/UX™ System on AViiON® Servers with Clients* manual, instead of this manual, to plan and install your DG/UX system. Then return to this manual to set up the multiuser part of your DG/UX system.

If your multiuser computer is a *stand-alone* AViiON 400 series workstation, then you should use the *Initially Installing and Setting Up the DG/UX™ System on Stand-Alone AViiON® Workstations* manual, instead of this manual, to plan and install your DG/UX system. Then return to this manual to set up the multiuser part of your DG/UX system.

About Our Readers

In this manual, we assume you have no familiarity with the DG/UX system, or other versions of UNIX® software. For this reason, the manual is written in a cookbook style with step-by-step instructions and sample display screens that lead you through the process of installing and setting up your DG/UX system. However, we do assume you have some familiarity with another operating system; for example, the MS-DOS® or the AOS/VS system.

The DG/UX System Software Package

In this manual, we assume you purchased the Operating System User's Package for AViiON® Systems which consists of the basic DG/UX system software, the GNU C compiler, and the Documenter's Tool Kit.

If you purchased the DG/UX Client/Server User's Package, you can also use this manual to install your DG/UX system from start to finish if you do not install any of the additional software, listed below, that this package contains.

- DG/UX X Window System™ software.
- TCP/IP, NFS, and YP¹ network software.

¹ LEGAL NOTICE TO USERS: Yellow Pages is a registered trademark in the United Kingdom of British Telecommunications plc, and may also be a trademark of various telephone companies around the world. Sun will be revising future versions of software and documentation to remove references to Yellow Pages.

- XPG3 Compliance Package for the DG/UX Operating System on AViiON Computers. This package is only included on tape-installed systems.

If you want to use any of this software on your multiuser computer, then you should start installing your DG/UX system with either the *Initially Installing and Setting Up the DG/UX™ System on Stand-Alone AViiON® Workstations* manual if your computer is an AViiON 400 series workstation, or the *Initially Installing and Setting Up the DG/UX™ System on AViiON® Servers with Clients* manual if your computer is on an Ethernet-based local area network and will communicate via TCP/IP and NFS® network software. These other manuals will tell you when to return to this manual to set up the multiuser part of your DG/UX system.

Minimum Equipment Configuration

To properly install the DG/UX software, your AViiON multiuser computer must have at least the following configuration:

- A system console.
- A hard (Winchester) disk with a capacity of at least 322-megabytes.
- A QIC-150 cartridge tape drive.

Preloaded DG/UX Software

The Operating System User's Package for AViiON® Systems (except the AViiON 6000 series) can be ordered in one of two ways: preloaded or not preloaded. AViiON 6000 series computers do not ship with preloaded software.

If you ordered preloaded software, all of the DG/UX system software is already loaded on your computer's system disk; but the software is not installed. If you didn't order preloaded software, the software is supplied to you on two tapes: (1) a DG/UX 4.30 release tape; (2) a DG/UX 4.32 update tape. This manual supports the installation of both preloaded and non-preloaded systems.

How This Manual Is Organized

This manual consists of four chapters and three appendixes.

- Chapter 1, “Before You Start,” contains the information you will need before you install and set up your DG/UX system.
- Chapter 2, “Installing the DG/UX System,” describes how to install the DG/UX system on an AViiON computer with a preloaded disk, and how to build a custom kernel.
- Chapter 3, “Determining the tty Lines for Asynchronous Ports,” describes how to figure out which tty lines your DG/UX system assigns to specific ports on your computer’s terminal line controllers.
- Chapter 4, “Setting Up the DG/UX System,” describes how to boot your DG/UX system, invoke administrative mode, change the time and date, create user accounts, create and change passwords, and add local alphanumeric terminals and printers to your DG/UX system. In addition, this chapter explains DG/UX run levels, and tells how to shut down your DG/UX system.
- Appendix A, “Starting the Installation with DG/UX Release Tapes,” describes the first steps of the installation process when installing with a DG/UX 4.30 system release tape and a 4.32 update tape. At the conclusion of Appendix A, you are directed to Chapter 2 of this manual to continue the installation process.
- Appendix B. “Worksheets,” contains duplicate copies of worksheets appearing in Chapters 1, 3, and 4 of this manual.
- Appendix C, “Setting Up a Microcom AX Series Modem,” contains instructions for setting up an Microcom AX series modem to operate on a Systech terminal line controller port.

Reader, Please Note

In this manual, we use the several typefaces (fonts) explained in the table below to differentiate between the information that the DG/UX system displays on your system console's display screen, and the commands and responses that you must type on the system console's keyboard.

In addition, we use italic to indicate variable user input. In this manual, variable user input means that you can type one of two or more responses, depending on how you want to configure your system. (We also use italic in text to indicate new terms and titles of manuals.)

Convention	Meaning
bold	In text and sample screens, indicates commands and responses that you type verbatim from your system console's keyboard.
<i>italic bold</i>	In sample screens, indicates a variable response that you type from your system console's keyboard.
monospace	In text and sample screens, indicates system messages and prompts displayed on your system console.
<i>italic</i>	In sample screens, indicates writer comments about a variable response that you may type on your system console's keyboard.
<Enter>	In sample screens, indicates press the Enter key. (The Enter key is also sometimes referred to as the New Line key or the Return key in the software.)

Sample Display Screens

Most sample display screens of interactive dialog between the DG/UX system's prompts and messages displayed on the system console's display screen and the responses you type on the keyboard are easy to follow. However, some display screens require comments to explain the variables associated with the response(s) you type at your keyboard. An example of a screen with interactive dialog and comments follows.

<p>① User Login Name? james ② <Enter></p> <p>Full User Name? James A Jones</p> <p>User ID? [101] <Enter></p> <p>Group Name? [general] <Enter></p> <p>Parent directory of login directory? [/accounts] ④ <Enter></p> <p>Initial program? [/bin/sh] <Enter></p> <p>The password is currently clear. Password Operation? [set] <Enter></p> <p>Password? February_1973 <Enter></p> <p>Do you want to edit, skip or install this user entry? [install] <Enter></p>	<p>③ <i>Enter your first name or some other name of your choosing; for example, james. Then press <Enter>.</i></p> <p><i>Enter your full name, and then press <Enter>.</i></p> <p><i>You can enter a new "Group Name" or take the default "general."</i></p> <p><i>Press <Enter> for the Bourne shell, or type /bin/csh for the C shell. Then press <Enter>.</i></p> <p><i>Type a password name that contains at least 6 characters, 1 of which must be a numeric or special character; for example, day1_month6. Then press <Enter>. You will need your password to log in to the DGIUX system later in this chapter.</i></p>
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- ① Text in this typeface indicates system messages that are displayed on your system console.
- ② Text in ***bold italic*** indicates variable user input that you type on your system console's keyboard. Although not shown in this sample screen, user input that is **bold** must be typed verbatim.
- ③ Text in *italic* is a comment that explains the variable(s) associated with the user input shown in ***bold italic***.
- ④ <Enter> indicates that you should press the Enter key or the New Line key.

Related Documents

In this manual, we refer to the following manuals that apply to your DG/UX system and your multiuser AViiON computer. See *Read This First* for information about other DG/UX software documentation and AViiON hardware documentation.

Initially Installing and Setting Up the DG/UX™ System on Stand-Alone AViiON® Workstations (069–00520)

Tells how to install and set up the DG/UX system on stand-alone workstations. Aimed at system administrators who are unfamiliar with the UNIX operating system.

Initially Installing and Setting Up the DG/UX™ System on AViiON® Servers with Clients (069–00549)

Tells how to install and set up the DG/UX system on AViiON computers or workstations that function as servers for diskless, DG/UX operating system (OS) clients on AViiON workstations and/or X terminal clients on AVX–30 X terminals. Also supports the setup of those clients. Aimed at system administrators who are unfamiliar with the UNIX operating system.

Installing and Managing the DG/UX™ System (093–701052)

Tells how to install and manage the DG/UX operating system on AViiON computers that will run as stand-alone, server, or client systems. Aimed at system administrators who are familiar with the UNIX operating system.

Setting Up and Starting AViiON® 3000 and 4000 Series Computer Systems (014–001872)

Describes how to unpack and connect system components and optional devices. Explains how to power up the computer and prepare for the operating system installation.

Setting Up and Starting AViiON® 5000 Series Computer Systems (014–001806)

Describes how to unpack and connect system components and optional devices. Explains how to power up the computer and prepare for the operating system installation.

Starting AViiON® 6000 Series Systems (014–001819)

Describes the basic AViiON 6000 series computer system, hardware components, and maximum configurations. Explains how to power up the computer unit and respond to common power-up problems.

Using the AViiON® System Control Monitor (SCM) (014–001802)

Describes how to use the commands and menus of the firmware monitor program to bring up software, control the system environment, and debug programs.

User's Reference for the DG/UX™ System (093–701054)

Describes the commands that constitute the basic user-level software on the DG/UX system.

Using the DG/UX™ Editors (069–701036)

Tells how to use the editors that come with the DG/UX system. This includes the command-line editor (**editread**), the full-screen editor (**vi**), the line editor (**ed**), and the batch editor (**sed**).

Using the DG/UX™ System (069–701035)

Tells how to use the DG/UX system and its Bourne and C shells.

Read This First (069–000519)

Supplies an initial reading path for installers of AViiON hardware and the DG/UX operating system. Also lists and describes the full suite of documentation supporting AViiON hardware and DG/UX software.

Release and Media Notices

In addition to the related manuals described above, you will find useful information in the release and media notices listed below.

Release Notice: DG/UX™ System for AViiON® Computers, Release 4.30.

Update Notice: DG/UX™ System for AViiON® Systems, Release 4.30, Update 2.

Patch Notice: DG/UX 4.32.01.

Update Notice: GNU-C.

Media Notice: Operating System User's Package for AViiON® Systems.

Contacting Data General

Data General wants to assist you in any way it can to help you use its products. Please feel free to contact the company as outlined below.

Manuals

If you require additional manuals, please use the enclosed TIPS order form (United States 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, free telephone assistance is available with your hardware warranty and with most Data General software service options. If you are within the United States or Canada, contact the Data General Service Center by calling 1-800-DG-HELPS. Lines are open from 8:00 a.m. to 5:00 p.m., your time, Monday through Friday. The center will put you in touch with a member of Data General's telephone assistance staff who can answer your questions.

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

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End of Preface

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Chapter 1

Before You Start

This chapter contains the information you will need before you install the DG/UX™ system software on an AViiON® multiuser computer in a traditional time-sharing environment. We assume that this computer has one or more Systech terminal line controllers, and that it is not connected to a network. An illustration of a typical DG/UX multiuser environment appears in Figure 1-1.

NOTE: If your multiuser computer is on an Ethernet-based local area network and will communicate via TCP/IP and NFS® network software, then you should go now to the *Initially Installing and Setting Up the DG/UX™ System on AViiON® Servers with Clients* manual, and then return to this manual to set up the multiuser part of your DG/UX system.

If your multiuser computer is a *stand-alone* AViiON 400 series workstation, then go now to the *Initially Installing and Setting Up the DG/UX™ System on Stand-Alone AViiON® Workstations* manual, and then return to this manual set up the multiuser part of your DG/UX system.

In this chapter, we discuss the following topics:

- The DG/UX multiuser environment.
- I/O device specifications in DG/UX Common Device Specification Format.
- The preloaded DG/UX system disk and factory-installed SCSI ID numbers.
- Preloaded DG/UX software.
- Disk space allocation.
- Hints for using the DG/UX operating system and the DG/UX system administration utility, called **sysadm**.
- Hints for recovering from errors in the DG/UX environment.
- The system console and its display language.

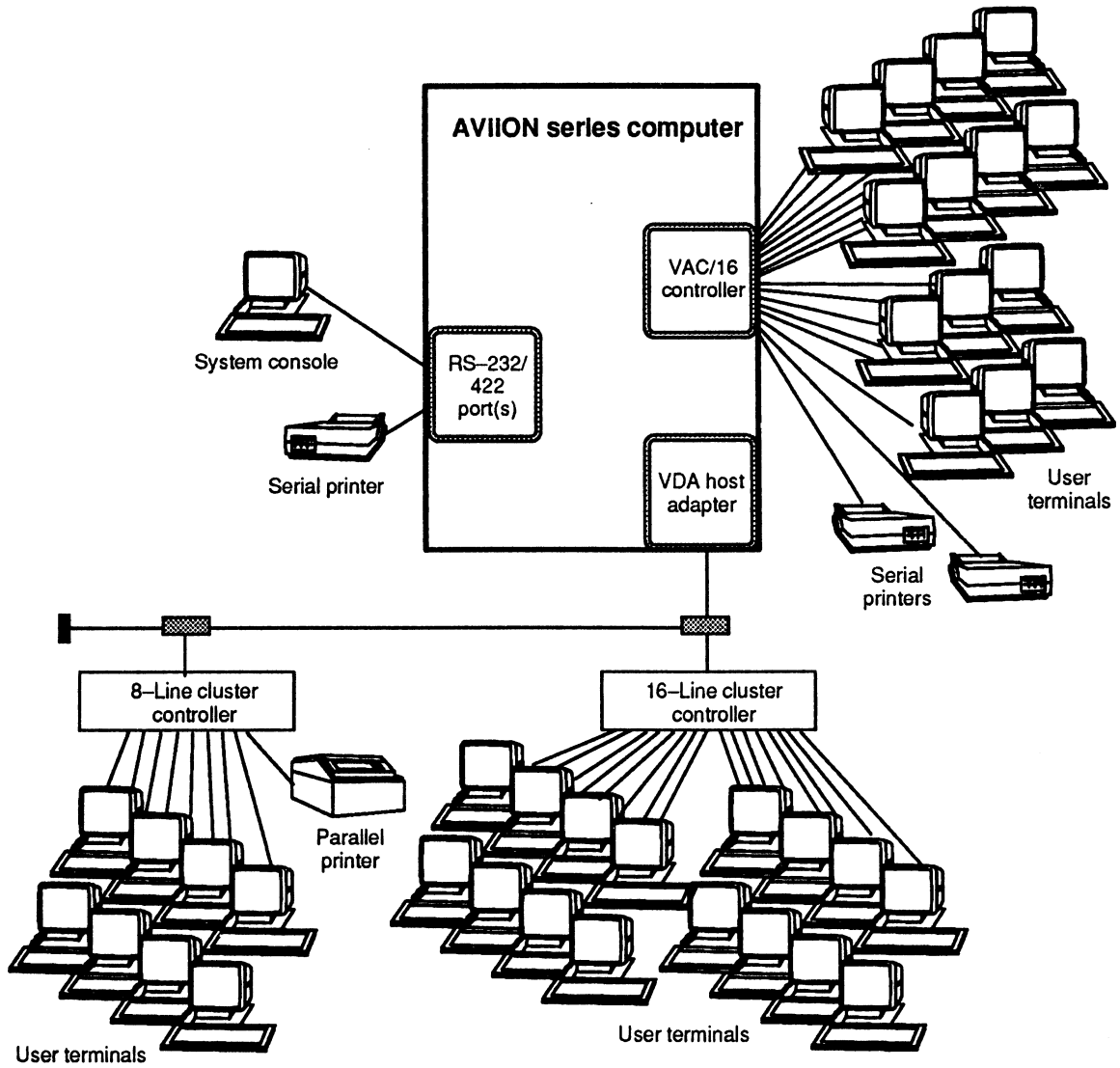


Figure 1-1 Example of a DG/UX Stand-Alone Multiuser Environment

I/O Device Specifications in DG/UX Common Device Specification Format

As you install your DG/UX system, the software prompts you to enter or to verify the names of the I/O devices present on your AViiON computer. You must use the DG/UX Common Device Specification Format (also referred to in this manual as DG/UX device name) for the I/O devices. Otherwise, you will receive error messages.

We have listed the DG/UX device names for the I/O devices common to each AViiON computer system in tables in the following sections:

- AViiON 5000 Series and AViiON 6000 Series I/O Devices.
- AViiON 3000 Series and AViiON 4000 Series I/O Devices.

See the section for your AViiON computer type. While reviewing the I/O device table for your AViiON computer, we recommend that you check or highlight the names of those I/O devices present in your particular computer. Also mark the page, as you will find this information useful when you are planning and installing your DG/UX system.

AViiON 5000 Series and AViiON 6000 Series I/O Devices

AViiON 5000 series and AViiON 6000 series computers support the same set of I/O devices with a few exceptions. However, the number of devices of the same type that are supported by each particular model in the AViiON 5000 series and AViiON 6000 series computers may differ.

Table 1–1 lists the I/O devices common to AViiON 5000 series and AViiON 6000 series computers. It also supplies their DG/UX device names.

**Table 1-1 For AViiON 5000 Series and AViiON 6000 Series Computers:
I/O Devices and Their DG/UX Device Names**

I/O Device	DG/UX Device Name In Common Device Specification Format
RS-232-C system console port and RS-232-C terminal/modem port on computer unit	duart()
Parallel printer port on computer unit	lp()
On Ciprico SCSI controller ¹ 0 :	
disk ² with SCSI ID number 0	sd(cisc(),0)
disk with SCSI ID number 1	sd(cisc(),1)
disk with SCSI ID number 2	sd(cisc(),2)
disk with SCSI ID number 3	sd(cisc(),3)
tape ² with SCSI ID number 4	st(cisc(),4)
tape with SCSI ID number 5	st(cisc(),5)
tape with SCSI ID number 6	st(cisc(),6)
On Ciprico SCSI controller ¹³ :	
disk with SCSI ID number 0	sd(cisc(1),0)
disk with SCSI ID number 1	sd(cisc(1),1)
disk with SCSI ID number 2	sd(cisc(1),2)
disk with SCSI ID number 3	sd(cisc(1),3)
tape with SCSI ID number 4	st(cisc(1),4)
tape with SCSI ID number 5	st(cisc(1),5)
tape with SCSI ID number 6	st(cisc(1),6)
On ESDI disk controller ⁴ 0:	
disk unit 0	cied(0,0)
disk unit 1	cied(0,1)
disk unit 2	cied(0,2)
On SMD disk controller ⁵ 0:	
disk unit 0	cimd(0,0)
disk unit 1	cimd(0,1)
disk unit 2	cimd(0,2)
disk unit 3	cimd(0,3)
Interphase VME Ethernet controller 0	hken()
Interphase VME Ethernet controller 1	hken(1)
First Systech asynchronous terminal line controller ⁶	syac()
Second Systech asynchronous terminal line controller ⁶	syac(1)
Third Systech asynchronous terminal line controller ⁶	syac(2)
Fourth Systech asynchronous terminal line controller ⁶	syac(3)
Fifth Systech asynchronous terminal line controller ⁶	syac(4)
First Systech synchronous controller	sdcp()
Second Systech synchronous controller	sdcp(1)
Third Systech synchronous controller	sdcp(2)
Fourth Systech synchronous controller	sdcp(3)

- 1 SCSI is the acronym for Small Computer Systems Interface. Each SCSI controller supports seven SCSI devices, maximum. Each of the seven SCSI devices is identified by its unique SCSI ID (identification) number within the range 0 through 6.

NOTE: If you have an AViiON 5200 computer (model 70331 or 70332) or an AViiON 5220 computer (model 70333) with two internal SCSI controllers, the Ciprico SCSI controller 0 supports only three internal SCSI hard disk drives and no external drives. The Ciprico SCSI controller 1 supports only two internal, half-height devices (tape and/or disk drives) and five external devices (tape and/or disk drives).
- 2 Notice that the prefix **sd** in the DG/UX device name specifies a SCSI-based disk device. Similarly, the prefix **st** in the DG/UX device name specifies a SCSI-based tape device. Select the prefix of each DG/UX device name according to the type of device (disk or tape) assigned to the particular SCSI ID number in your system. The prefix shown in the table for each SCSI device ID number reflects the typical manufacturing SCSI ID assignments.
- 3 If your system supports more than two SCSI controllers, substitute **cisc(2)** for **cisc(1)** when specifying the third SCSI controller and its disk and tape units. Similarly, substitute **cisc(3)** for **cisc(1)** when specifying the fourth SCSI controller and its disk and tape units.
- 4 Available only on AViiON 5000 series computers.
- 5 Available only on AViiON 6000 series computers. AViiON 6000 series computers support four SMD controllers, maximum, based on configuration. When specifying additional controllers and their disk units, substitute **cimd(1,0)** for **cimd(0,0)** when specifying the second SMD controller. Similarly, substitute **cimd(2,0)** for **cimd(0,0)** when specifying the third SMD controller; and substitute **cimd(3,0)** for **cimd(0,0)** when specifying the fourth SMD controller.
- 6 The DG/UX device name **syac** (Systech asynchronous terminal line controller) specifies one of the following: a Systech VME-based, 16-line asynchronous multiplexer/controller (also called the VAC/16 controller); a Systech VME-based, 128-line asynchronous distributed host adapter (also called the VDA/128 host adapter), a Systech VME-based, 255-line asynchronous distributed host adapter (also called the VDA/255 host adapter). Notice that each VDA/128 and VDA/255 host adapter supports its data terminal devices (128 devices, maximum, and 255 devices, maximum, respectively) via a network of one or more 8-line or 16-line asynchronous cluster controllers. The 8-line cluster controller also supports one parallel printer.

AViiON 3000 Series and AViiON 4000 Series I/O Devices

Table 1–2 lists the I/O devices common to AViiON 3000 series and AViiON 4000 series computers. It also supplies their DG/UX device names.

**Table 1–2 For AViiON AViiON 3000 Series and AViiON 4000 Series Computers:
I/O Devices and Their DG/UX Device Names**

I/O Device	DG/UX Device Name In Common Device Specification Format
RS–232–C port A on computer unit (for system console)	duart()
RS–232–C port B on computer unit	duart(1)
Parallel printer port on computer unit	lp()
On integrated SCSI controller:	
disk ² with SCSI ID number 0	sd(inc(),0)
disk with SCSI ID number 1	sd(inc(),1)
disk with SCSI ID number 2	sd(inc(),2)
disk with SCSI ID number 3	sd(inc(),3)
tape ² with SCSI ID number 4	st(inc(),4)
tape with SCSI ID number 5	st(inc(),5)
tape with SCSI ID number 6	st(inc(),6)
Integrated Ethernet controller	inen()
Interphase VME Ethernet controller 0	hken()
Interphase VME Ethernet controller 1	hken(1)
First Systech asynchronous terminal line controller ³	syac()
Second Systech asynchronous terminal line controller ³	syac(1)
First Systech synchronous controller	sdcg()
Second Systech synchronous controller	sdcg(1)

- 1 SCSI is the acronym for Small Computer Systems Interface. The SCSI controller supports seven SCSI devices, maximum. Each of the seven SCSI devices is identified by its unique SCSI ID (identification) number within the range 0 through 6.
- 2 Notice that the prefix **sd** in the DG/UX device name specifies a SCSI–based disk device. Similarly, the prefix **st** in the DG/UX device name specifies a SCSI–based tape device. Select the prefix of each DG/UX device name according to the type of device (disk or tape) assigned to the particular SCSI ID number in your system. The prefix shown in the table for each SCSI device ID number reflects the typical manufacturing SCSI ID assignments.
- 3 The DG/UX device name **syac** (Systech asynchronous terminal line controller) specifies one of the following: a Systech VME–based, 16–line asynchronous multiplexer/controller (also called the VAC/16 controller); a Systech VME–based, 128–line asynchronous distributed host adapter (also called the VDA/128 host adapter). Notice that a VDA/128 host adapter supports 128 data terminal devices, maximum, via a network of one or more 8–line or 16–line asynchronous cluster controllers. The 8–line cluster controller also supports one parallel printer.

More About SCSI Devices

As noted under Tables 1–1 and 1–2 above, all SCSI-based hard disks use the same format: either **sd(cisc(),n)** or **sd(insic(),n)**. Similarly, all SCSI-based tape drives use the same format: either **st(cisc(),n)** or **st(insic(),n)**. In both instances, **cisc()** or **insic()** refers to the computer's SCSI controller, and **n** refers to the SCSI ID number that is jumpered on the drive unit; or, in the case of diskette drives, the drive units' SCSI-adapter board.

If you have diskette drives configured in your system, the DG/UX Common Device Specification Format is extended to include not only the SCSI ID number of the dual-diskette drives' SCSI adapter board but also the logical unit number of the particular diskette drive. For example, to specify diskette drive unit 0 in a dual-diskette subsystem, use the format **sd(cisc(),n,0)** or **sd(insic(),n,0)** as appropriate for your computer. Similarly, to specify diskette drive unit 1, use the format **sd(cisc(),n,1)** or **sd(insic(),n,1)**. In all cases, **n** refers to the SCSI ID number of the diskette drives' adapter board, and **0** or **1** specifies the unit number of the particular diskette drive.

The Preloaded Disk and Factory-Installed SCSI ID Numbers

When shipped from the factory, the first SCSI-based hard disk connected to the first Ciprico SCSI controller (AViiON 5000 series and AViiON 6000 series computers) or to the integrated SCSI controller (AViiON 3000 series and AViiON 4000 series computers) is jumpered for SCSI ID 0. If you ordered preloaded DG/UX system software, this is your preloaded DG/UX system disk. Also, when shipped from the factory, the first cartridge tape drive connected to the integrated SCSI controller or to the first Ciprico SCSI controller is jumpered for SCSI ID 4.

Therefore, throughout the installation processes described in this manual, we refer to **sd(cisc(),0)** or **sd(insic(),0)** when specifying your preloaded system disk. And we refer to **st(cisc(),4)** or **st(insic(),4)** when specifying your cartridge tape drive as your software loading device.

NOTE: AViiON 6000 computers are not available with preloaded DG/UX system software. You must load the system software from cartridge tape.

The Preloaded DG/UX Software

The preloaded system disk contains the DG/UX software. When preloading the DG/UX system, the factory creates the following *logical disks* and their file systems as appropriate on your SCSI-based system disk: **root**, **usr**, and **swap**. In concept, logical disks are similar to other operating systems' partitions. Each logical disk contains a configurable number of physical disk blocks. Each disk block contains 512 bytes of physical disk space.

NOTE: If you do not have a preloaded disk, you will create the **root**, **usr**, and **swap** logical disks as part of the installation of your DG/UX system.

After these logical disks and their file systems are created, the factory *mounts* each logical disk, except **swap**, on a directory called the mount point. The mount point provides a directory pathname for the logical disk's file system. Then the factory loads the system software on to the logical disks. This makes the **root** (/) and the **usr** file systems (groups of files and their directories) accessible for use by the DG/UX software when you install your system.

The **swap** logical disk does not have an associated directory pathname or file system. The DG/UX system uses this logical disk for swapping pages of processes in and out of virtual memory.

Table 1-3 shows how your preloaded physical disk (SCSI ID 0) is preconfigured at the factory on either a 332-megabyte, a 662-megabyte, or a 1-gigabyte disk.

Table 1-3 Preconfigured System Disk Layout

SCSI-Based Physical Disk	Logical Disk	Piece	Size in Blocks	Mount Point
0	swap	1	50,000	—
0	root	1	40,000	/
0	usr	1	160,000	/usr
0	free_space			
	332-Mbyte disk		400,000*	—
	662-Mbyte disk		1,050,000*	—
	1-Gbyte disk		1,880,000*	
0	total_space			
	332-Mbyte disk		650,000*	—
	662-Mbyte disk		1,300,000*	—
	1-Gbyte disk		2,130,000*	—

* = approximate

The "Logical Disk" column lists the name of each logical disk on physical disk 0 [**sd(cisc(),0)** or **sd(insc(),0)**]. It also lists the following information:

- "Free_space" refers to the number of physical disk blocks that are not yet allocated to logical disks, based on the capacity of the particular disk drive.

- “Total_space” refers to the total capacity in disk blocks of the particular disk drive.

Your system may have disk drives of different capacities than those listed above. See Table 1–5 for the capacities of other supported disk drives.

The “Piece” column shows that each logical disk is created as one piece. With the exception of **swap**, **root**, and **usr**, the DG/UX system allows you to create logical disks consisting of a maximum of 32 pieces, which can be distributed across several physical disk drives.

The “Size in Blocks” column shows the following information:

- The number of physical disk blocks allocated to the **swap**, **root**, and **usr** logical disks.
- The number of unallocated physical disk blocks (“free_space”) on the 332–megabyte, the 662–megabyte, and the 1–gigabyte physical disk drives
- The total number of allocated and unallocated disk blocks (“total_space”) on the 332–megabyte, the 662–megabyte, and the 1–gigabyte physical disk drives.

The “Mount Point” column shows the directory pathname of each logical disk’s file system.

Allocating Disk Space for Logical Disks

As described in “The Preloaded DG/UX Software” section previously, the DG/UX system allocates and views physical disk space in terms of logical disks. Thus, the physical disk space that is not yet allocated to logical disks is inaccessible to the system software. Further, the DG/UX system does not allow you to resize logical disks dynamically.

For these reasons, it is important to plan the use of your disk space before you begin to install your system.

Before you can plan your DG/UX server system’s disk space, you must know the following information.

- The names and sizes of the logical disks required by your DG/UX system and by the software you plan to add to this system.
- The size, in total number of disk blocks, of each hard disk on your AViiON computer.

The names and sizes of the logical disks required by your DG/UX system and by add-on software are described in the next sections.

To assist you with your planning, see the “System Planning Worksheets” section at the end of this chapter. This section contains worksheets for planning your logical disks and allocating your physical disk space. Table 1–5 in this chapter lists the model numbers and sizes of most DG/UX–supported disk drives.

While reading through the next few sections in this chapter, refer to the information in the “System Planning Worksheets” section and begin to fill out the worksheets. Later, as you install your new DG/UX system, you will find the completed worksheets useful.

DG/UX System Logical Disks

Table 1–3 supplies the names of the DG/UX system logical disks. In addition to these logical disks, you will create one or two other logical disks:

- **accounts**, a logical disk for the home directory of user accounts.
- **var_tmp**, an optional logical disk for temporary storage.

All these logical disks are described briefly below and, with the exception of **swap**, are shown in Figure 1–2. Logical disks for add-on software are discussed later in this chapter.

The root Logical Disk

The **root** logical disk is reserved for system-level programs and utilities. As shown in Figure 1–2, the / directory contains many subdirectories, some of which are located on separate logical disks.

If you are installing your DG/UX system from tape, the **root** logical disk must contain at least 40,000 blocks of physical disk space on your DG/UX system disk.

The swap Logical Disk

The **swap** logical disk supplies temporary storage space for pages of processes that are *swapped out* or *purged* from main memory. The DG/UX system swaps out a page when the following three conditions are present: (1) the page is eligible for swapping (some are not); (2) available main memory has reached a system-imposed *low water* mark (that is, a large percentage of main memory is in use); and (3) the page has not been referenced within a system-imposed time period.

For these reasons, the size of your **swap** logical disk depends on the following factors:

- The size of your computer’s physical main memory.
- The number and types of applications software, particularly those which are memory-intensive that you plan to run simultaneously on your system.

As a rule of thumb, the **swap** logical disk should be 1.5 times the size of its host computer’s main memory. Based on 2,048 disk blocks per megabyte (1,048,576 bytes per megabyte + 512 bytes per disk block), the formula for calculating **swap** space is as follows:

$$(1.5 \times \text{no. of megabytes of memory}) \times 2,048 = \text{size of } \mathbf{swap} \text{ (in disk blocks).}$$

For example, for an AViiON computer with 32 megabytes of memory, the calculation is as follows:

$$(1.5 \times 32) \times 2,048 = 98,304; \text{ or approximately } 98,300 \text{ disk blocks.}$$

If you are installing your DG/UX system from tape, you can specify the size of your **swap** logical disk during installation. If you are installing your DG/UX system using a preloaded disk, you can add **swap** space after your DG/UX system is installed. For information about adding **swap** space, see the file system management information in *Installing and Managing the DG/UX™ System*.

The **usr** Logical Disk

The **usr** logical disk also supplies disk space for system-level programs and utilities, as shown in Figure 1-2.

If you are installing your DG/UX system from tape, the **usr** logical disk must contain 160,000 blocks, minimum, of physical disk space on your DG/UX system disk. However, if you are adding other software that loads disk blocks into the **usr** logical disk, you may want to increase the size of the **usr** logical disk when completing your logical disk planning worksheet.

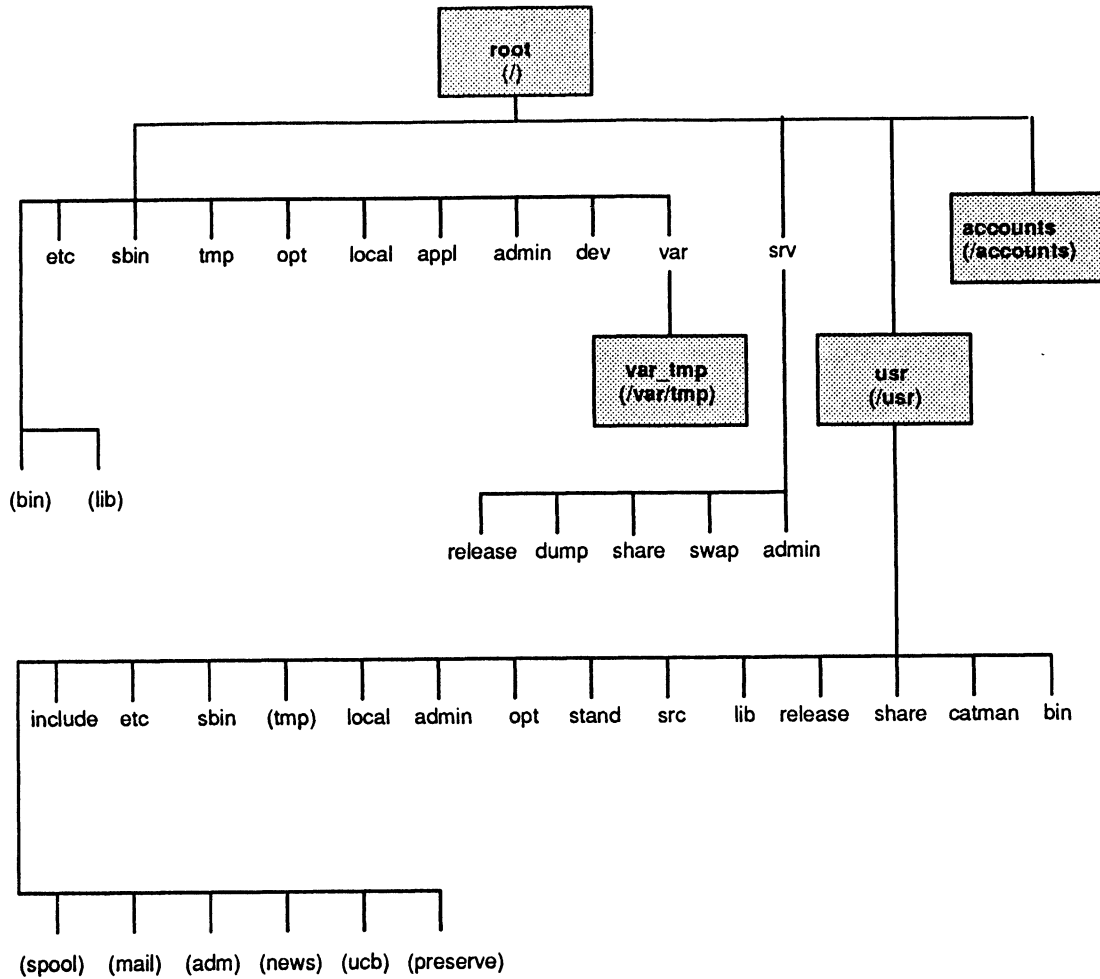
The Home Logical Disk (**accounts**)

The home logical disk contains the individual users' home directories. In these directories, users create and store their local data and program files. In this manual, we call this logical disk **accounts** and give it a directory pathname of **/accounts**. You can assign names of your choosing to this logical disk and its file system.

Each user requires a variable amount of home directory space, based on volume and type of system activity. Typically, allowing 20,000 to 30,000 blocks per user is adequate. Thus, if your DG/UX system has 30 users, your **accounts** logical disk might contain 900,000 blocks of physical disk space.

The Temporary Logical Disk (**var_tmp**)

Although the **root** logical disk supplies some temporary space (about 19 megabytes after **root** is loaded), the optional **var_tmp** logical disk is useful if your system will run large program compilations, and/or have intensive database I/O activity. If you want to create a logical disk for additional temporary space, give it a name of your choosing (for example, **var_tmp**) and mount it on the **/var/tmp** directory.



Rectangles indicate logical disks. Notice that each rectangle contains the name of a specific logical disk and, in parentheses, its full mount point directory name.

Parentheses outside of rectangles indicate a symbolic link to a directory. For example, (bin) is a symbolic link to the /usr/bin directory.

Figure 1-2 Sample DG/UX System Directory Tree

NOTE: Before proceeding to the next section, go to the Logical Disk Planning Worksheet 1, and fill in the information for the DG/UX system logical disks described above.

Logical Disks for Add-On Software

If you plan to install applications software packages as part of your initial DG/UX installation, you might have to create logical disks for this software as well.

NOTE: You can create additional logical disks and mount new file systems for add-on software at any time, providing there is a sufficient number of available disk blocks on your DG/UX computer's physical disks.

Software packages supplied by Data General Corporation, which are not part of the DG/UX system software, ship on separate tape media, and each package comes with a supporting product release notice. In addition to product information, each release notice contains installation procedures for the particular software package, including where to install the software on the DG/UX system.

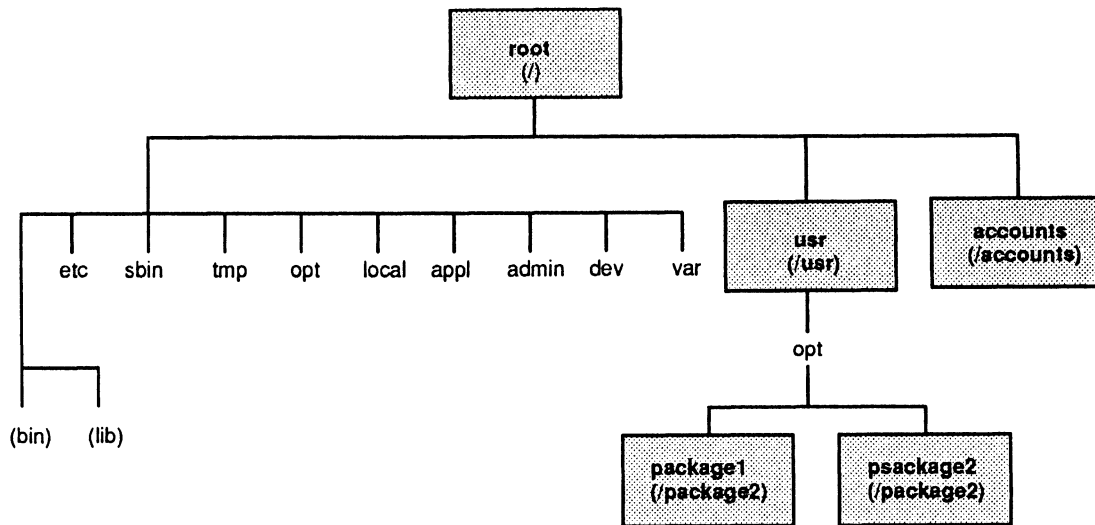
Some software packages require one or more dedicated logical disks of a suitable size for the application. In this case, you will need to follow the release notice instructions to create the logical disk(s). If your release notices do not specify dedicated logical disks, it is still good practice, in most cases, to create a logical disk for each software package. This allows you to make optimum use of your available disk space.

If you do not create a separate logical disk, some software packages will be installed automatically into the **usr** logical disk. If you are installing your DG/UX system from tape and prefer to install these software packages in this manner, be sure to increase the size of the **usr** logical disk to accommodate them. Otherwise, the software packages may fail to load properly, due to the lack of available disk blocks. Once you have initially created the **usr** logical disk with a default size of 160,000 blocks, and you have loaded its file system, it has approximately 36,000 available disk blocks.

Sample DG/UX Directory Tree

Figure 1-3 shows a sample directory tree with one logical disk added for two applications software packages, **package1** and **package2**.

If you are adding software to your DG/UX system during the initial installation, read the appropriate product release notice instructions for installing the software now. Then complete the Logical Disk Planning Worksheet 1.



Rectangles indicate logical disks. Notice that each rectangle contains the name of a specific logical disk and, in parentheses, its full mount point directory name.

Parentheses outside of rectangles indicate a symbolic link to a directory. For example, (bin) is a symbolic link to the /usr/bin directory.

Figure 1-3 DG/UX Directory Tree with Sample Logical Disks for Applications Software

Hints for Using the DG/UX System and the DG/UX sysadm Utility

The DG/UX system, like all versions of UNIX® software, is case sensitive. You will find that most DG/UX commands are invoked using lowercase letters. For example, the “make directory” command is **mkdir**, followed by an argument. If you enter the same command using uppercase or mixed case letters (for example, **MKDIR** or **MkDir**), the DG/UX system either does not recognize the command or it interprets it as a different command. You also will find that most DG/UX directory names and filenames use lowercase letters.

For more information about DG/UX commands, directories, and files, see *Using the DG/UX™ System* and *The User’s Reference for the DG/UX™ System*.

Data General’s implementation of **sysadm** provides DG/UX system administrators with a menu-oriented interface for setting up and managing the DG/UX system. To use **sysadm**, you must log in as **sysadm** or **root**. As **sysadm**, your home directory is **/admin**.

After logging in as **sysadm** (or **root**), you can enter the **sysadm** command with or without an argument. Without an argument, the command displays the SYSADM MAIN MENU shown in Figure 1-4.


```

                                SYSADM MAIN MENU

1 diskmgmt      Enter the Diskman program
2 sysmgmt      System configuration management menu
3 fsmgmt       File system management menu
4 fileinfo     File information menu
5 ttygmt       TTY management menu
6 lpmgmt       Line Printer management menu
7 usermgmt    User management menu
8 uucpmgmt     UUCP management menu
9 networkgmt   Network management menu
10 releasgmt   Software release management menu
11 clientgmt   Diskless and X terminal client management menu

Enter a number, a name, the initial part of a name, ? or <number>?
for HELP, q to QUIT.

```

*Figure 1-4 The Main Menu of the **sysadm** Utility*

With an argument, the **sysadm** command invokes a **sysadm** submenu or function. For example, the **sysadm usermgmt** command displays the “User management menu” highlighted in Figure 1-4 and shown in Figure 1-5. The **sysadm adduser** command invokes the “Create a user account” function associated with the User Management menu.

```

                                User Management

1 userdefaults  Set user account defaults
2 adduser    Create a user account
3 deluser      Delete a user account
4 moduser      Modify a user account
5 lsuser       List user account information
6 addgroup     Add group entries
7 delgroup     Delete group entries
8 modgroup     Modify group entries
9 lsgroup      List group entries
10 addalias    Add mail alias entries
11 delalias    Delete mail alias entries
12 modalias    Modify mail alias entries
13 lsalias     List mail alias entries

Enter a number, a name, the initial part of a name, ? or <number>?
for HELP, q to QUIT.

```

*Figure 1-5 The User Management Submenu of the **sysadm** Utility*

Hints For Recovering from Errors in the DG/UX Environment

Although few of us understand why or how we get “hung up” in software, it does happen. It’s also easy to make errors when installing or setting up new software. For these reasons, we have listed a few keystroke commands in Table 1–4 that will help you recover from most of the situations you might encounter while installing your DG/UX system.

Table 1–4 Key Sequences for Recovering from Operator and System Errors

Key Sequence	When to Use
q	Type q (for quit) to abort a “Diskman” or sysadm procedure, except sysadm newdgux . The latter command lets you edit the prototype system configuration file using an editor such as the vi editor. See the “vi editor Tutorial” in Chapter 2 of this manual.
Ctrl-C	If q doesn’t work and you are not in “Diskman”, type Ctrl-C , the DG/UX interrupt key sequence.
Ctrl-][][][]	Type this key sequence at the system console only when your system is hung and you are not in standalone “Diskman.” This is called the “hot-key” sequence. The symbols] [are close and open brackets. This key sequence creates a panic and shuts down the DG/UX system. After the system shuts down, you will be prompted to take a system dump. If you respond with a “no” answer, the SCM prompt appears. Then you can reboot your system.

The System Console

You use the system console, which is a display terminal, to install and set up the DG/UX system software. The system console must be set for the following terminal characteristics before you begin to install and set up your DG/UX server system:

- Mode: ANSI.
- Data bits: 8.
- Parity: none.

If you are unsure about how to set these characteristics, see the documentation for your particular display terminal.

Changing the Console Display Language

If your system console's display requires a language other than U.S. English, make the change before installing your DG/UX system. Instructions for changing the console display language appear in *Using the AViiON™ System Control Monitor*. For information about international character sets, see the *DG/UX System Release Notice*.

System Planning Worksheets

This section is intended to assist you in planning your DG/UX system. It contains following table and worksheets for logical disk planning:

- Table 1–5, Disk Capacities in Blocks of Available Space
- Logical Disk Planning Worksheet.
- Physical Disk Planning Worksheet.

Preceding worksheet 2 is a sample worksheet. (Appendix B also supplies duplicate copies of each worksheet.)

We encourage you to take the time to fill out the worksheets. You will find them useful when installing your DG/UX system.

First fill out Worksheet 1. Then you will be ready to complete Worksheet 2. Worksheet 2 is intended to assist you in allocating logical disks to physical disks when more than one disk is present on the AViiON computer.

Before completing Worksheet 2, see the sample Worksheet 2. And remember (with the exception of **root**, **usr**, and **swap**), the DG/UX system allows you to distribute logical disks in pieces (32 pieces, maximum) across one or more physical disks. For example, a logical disk (such as the one for **packag1** shown in the sample Logical Disk Planning Worksheet 2) containing 210,000 blocks might be distributed across three physical disks as follows:

- Piece 1: 75,000 blocks assigned to disk unit 0.
- Piece 2: 135,000 blocks assigned to disk unit 1.
- Piece 3: 100,000 blocks assigned to disk unit 2.

This feature allows you to achieve maximum utilization of your physical disk space. In addition, distributing a logical disk whose file system supports multiple users with a high level of I/O activity may enhance system performance.

Physical Disk Capacities

Table 1–5 lists the model numbers of most DG/UX–supported disk drives, as well as their sizes in megabytes and in disk blocks. Use this table to complete the disk capacities where indicated in Worksheet 2.

If you are unsure of the model numbers or the capacities (in megabytes) of the disks present on your AViiON computer, refer to your AViiON hardware documentation.

Table 1–5 Disk Capacities in Blocks of Available Space

Disk Model No.	Type	Size (Megabytes)	Approx. Capacity In 512-Byte Blocks
6442	ESDI	322	659,456
6491	SCSI	322	659,456
6539	SCSI	179	366,592
6541	SMD	1,066	2,183,168
6542	SMD	2,132	4,366,336
6554	SCSI	662	1,335,776
6555	ESDI	648	1,327,104
6660	ESDI	330	675,840
6661	ESDI	330	675,840
6662	SCSI	332	679,936
6685	SCSI	1,040	2,129,920
6740	SCSI	1,040	2,129,920

Logical Disk Planning Worksheet

DG/UX System Logical Disks			
Logical Disk Name	Formula for Calculating Logical Disk Size	Blocks Preloaded	Blocks When Tape-Loaded
swap	If preloaded, fixed size of 50,000 blocks, unless preloaded disk is a 179 megabyte disk, in which case swap is 32,768 bocks. If tape-loaded, (1.5 x main memory) + (optional blocks for memory-intensive applications software) = total disk blocks.	50,000	
root	Fixed size of 40,000 blocks.	40,000	40,000
usr	If preloaded, fixed size of 160,000 blocks. If tape-loaded, 160,000 (minimum) + optional usr blocks as required by add-on software = total disk blocks.	160,000	
accounts	Variable size, based on number of users and users' system activity.		
var_tmp	Optional logical disk; size is application-dependent.		
Total DG/UX System Disk Blocks			
Add-on Software Logical Disks			
Logical Disk Name	Name of Software Package		Blocks
Total Add-On Software Disk Blocks			
Total Disk Blocks			

Sample Physical Disk Planning Worksheet

Logical Disk Name	Mount Point	System Disk sd(cisc(),0) 1,040 Mbytes Pc. # Blocks	Optional Disk sd(cisc(),1) 662 Mbytes Pc. # Blocks	Optional Disk sd(cisc(),2) 1,040 Mbytes Pc. # Blocks
swap (on system disk)	-	1 50,000		
root (on system disk)	/	1 40,000		
usr (on system disk)	/usr	1 160,000		
accounts	/accounts		1 400,000	2 500,00
var_tmp	/var/tmp	1 50,000		
package1	/usr/opt/package1	1 75,000	2 35,000	3 100,00
package2	/usr/opt/package2		1 50,000	
Total Disk Blocks Used per Disk		375,000	485,000	600,00
Total Disk Block Capacity per Disk		2,129,920	1,335,776	2,129,920
Available Disk Blocks per Disk		1,754,920	850,776	1,529,920

SAMPLE

Physical Disk Planning Worksheet

Logical Disk Name	Mount Point	System Disk		Optional Disk		Optional Disk	
		No.	Mbytes Blocks	No.	Mbytes Blocks	No.	Mbytes Blocks
swap (on system disk)	-	1	50,000				
root (on system disk)	/	1	40,000				
usr (on system disk)	/usr	1	160,000				
accounts	/accounts						
var_tmp	/var/tmp						
Total Disk Blocks Used per Disk							
Total Disk Block Capacity per Disk							
Available Disk Blocks per Disk							

Where to Go Next

After completing the worksheets in the “System Planning” section, you are ready to install the DG/UX system. The installation procedures described in this manual are not difficult, but they do require your full attention. Allow a few *unhurried* hours to plan, install, and set up your DG/UX server system.

If you have a preloaded hard disk, go to Chapter 2. If you don't, go to Appendix A.

End of Chapter

Chapter 2

Installing the DG/UX System

This chapter describes how to install the DG/UX system on a stand-alone multiuser AViiON computer. If your DG/UX system is preloaded on a hard disk, use the procedures in this chapter to install your system. If your system is *not* preloaded, go to Appendix A to start installing your system from tape.

In this chapter you will perform the following tasks:

- Install the DG/UX starter system.
- Create and mount logical disks.
- Add software packages.
- Set up software packages.
- Create the kernel.
- Install the kernel.
- Change boot parameters using the SCM.

In this chapter, we provide step-by-step instructions for performing these tasks, together with many sample screens showing the relevant text that the system displays on your computer's system console as perform these tasks. As you proceed through the installation process, use your system console's keyboard to type the responses shown in **bold print** in the sample screens.

Installing the DG/UX Starter System

To install the DG/UX starter system, proceed as follows.

1. Power up your system console and any other devices that are connected to your computer unit via cable, such as a peripheral housing unit containing mass storage devices. Be sure that all data terminal devices, such as terminals or printers, connected to your computer unit, to a VAC/16, and/or to the cluster controllers for a VDA host adapter are powered up and set for on-line mode.
2. Power up your computer by moving the computer unit's ac power switch to the ON position.

As the system hardware initializes and the computer's self-tests run, you will hear beeps and see the system display the following screen.

```
(c)Data General Corporation 1989, 1990
Model nnnn Series          nnnn means this information varies with the
                             particular AViiON series computer model.

[Single/Dual] Processor
Firmware Revision nn.nn
Keyboard Language is U.S.English
Local Ethernet address is 08:00:1B:nn:nn:nn This is not displayed on
                                             an AViiON 5000 or AViiON 6000 computer.

Initializing [n] Megabytes

Testing.....
    0123456789ABCDEFGHIJKLMNPOQRSTUVWXYZ
Passed
```

When your computer completes its self-test satisfactorily, you will see the message Passed displayed. Immediately the DG/UX starter system starts booting, and the beginning of the next sample screen appears.

NOTE If your computer displays error messages or does not complete the self-test satisfactorily, stop here. See the appropriate Setting Up and Starting manual for your computer; it provides troubleshooting instructions for your computer hardware.

If the DG/UX starter system does not boot on your preloaded system, call Data General Corporation for assistance before proceeding further. See the Preface of this manual for instructions on contacting Data General Corporation.

3. Type the device names for you system console, for all disks, and for the primary tape device exactly as they appear in the sample DG/UX Starter System screen. When the last Device Name? prompt (as shown in the sample screen) appears, just press the Enter key.

NOTE: If you make a typing error while entering a device name, simply press the Enter key, and retype the device name correctly. Using the Backspace or Delete key will not correct a typing error on this screen.

```
Booting sd(cisc(),0)root:dgux.starter
```

```
DG/UX Bootstrap Release 4.31
```

```
=====
DG/UX System Release 4.32, Version DG/UX 4.32 (starter)
Using [n] megabytes of physical memory
Found 1 processors(s)
Processor 0 running
```

DG/UX Starter System

Enter the names of the devices you will use in Common Device Specification Format, with one name per line. Enter just newline when done.

Examples: sd(insc(),0) st(insc(),4) cird() st(cisc(),4)

Include duart() for servers and kbd() and grfx() for computers.

Device Name? duart() <Enter>

Device Name? sd(cisc(),*) <Enter> *Substitute the device names shown above for the disks*

Device Name? st(cisc(),4) <Enter> *and cartridge tape drive according to your system*

Device Name? <Enter> *configuration. Notice that the asterisk in the device name sd(cisc(),*) means all disk drives connected to Ciprico SCSI controller 0. If you have more than one Ciprico SCSI controller in your computer, add the disk drives connected to these controllers as well; for example, sd(cisc(1),*).*

When you complete this step, the next screen begins to appear.

```
Using /dev/dsk/swap as swap file
```

```
** root
```

```
No check necessary for root
```

```
Mounted /dev/dsk/root as root file system.
```

```
INIT: Boot options are: init
```

```
INIT: Checking and mounting /usr...
```

```
INIT: /usr is now mounted
```

```
INIT: SINGLE USER MODE
```

```
#
```

4. At the # prompt, type

init 1

and press the Enter key.

The # sign is the Superuser prompt, which means you have system-wide privileges. The **init 1** command changes the DG/UX run level from level S (single-user mode) to level 1 (administrative mode).

NOTE: If you make a typing error when entering a command, use the Delete key to erase the error. Then retype the command correctly.

5. The system displays the current date and time, and asks if the information displayed is correct. As shown below in bold, type **y**, and then press the Enter key. (If this information is incorrect, we will show you how to correct it later in the installation procedure.)

Notice that the system displays time in a 24-hour format. For example, 08:15 means 8:15 a.m.; 14:30 means 2:30 p.m.; and so on.

```
chk.fsck:
chk.date:
  Current date/time: Wed April 1 08:15 EDT 1991
  Are the current date, time, and TIMEZONE correct?
    (y n) [n]: y <Enter>
Setting up package: dgux
Initializing system database files from the original .proto files:
```

As several screens scroll forward, you will see messages about initializing prototype files. Watch for the prompts that appear in the sample screen that follows.

6. Type the responses exactly as shown in bold.

```

.
.
.
.

The following file systems are now mounted:

/dev/dsk/root on / type dg/ux (rw)
/dev/dsk/usr on /usr type dg/ux (rw)

Starting rc.setup: check for packages that haven't been set up
All packages are setup.

Press <RETURN> to display prompt <Enter>

no-node
DG/UX Release 4.32
login: sysadm <Enter>
DG/UX Release 4.32 AViiON
no-node
=====
                        WARNING
ACCESS TO AND USE OF THIS SYSTEM IS RESTRICTED TO
AUTHORIZED INDIVIDUALS!
                Data General AViiON System  DG/UX Release 4.32
=====
#

```

Creating and Mounting Logical Disks

In this section, we will use the Diskman utility to format any additional disks your computer may have, and to create the following logical disks:

- The home (accounts) logical disk for your users' directories.
- Logical disks for optional add-on software.

After creating a logical disk, we will use a **sysadm** utility, called **addfsys**, to mount the logical disk.

NOTE: Before you can create a logical disk on a physical disk, the physical disk must be software-formatted. If you are installing a preloaded DG/UX system, only the system disk is software-formatted when shipped from the factory. If you have a preloaded DG/UX system on an AViiON computer with more than one disk, then continue on to the "Formatting Add-On Disk" section below. If your computer does not have any add-on disks, or you are installing your DG/UX system from tape, skip the next section, and go to the "Creating the Home Logical Disk (accounts)" section.

Formatting Add-On Disks

To format an add-on disk, proceed as follows:

1. At the # prompt, type
sysadm diskmgmt
and press the Enter key.
The Diskman Main Menu shown below appears.
2. Type 1 to select the “Physical Disk Management Menu,” and press the Enter key.

```
                Diskman Main Menu
1.  Physical Disk Management Menu
2.  Logical Disk Management Menu
3.  File System Management Menu
4.  Initial Installation Menu
5.  Update Installation Menu
Enter ? or <number>? for HELP, ^ to GO BACK, or q to QUIT
Enter choice: 1 <Enter>
```

The Physical Disk Management Menu shown below appears.

3. Type 5 to select the “Format a Physical Disk Menu,” and press the Enter key.

```
                Physical Disk Management Menu
1.  Register, Deregister or List Registered Physical Disks
2.  Add, Recover or Display Bad Blocks on a Physical Disk
3.  Display a Physical Disk's Layout
4.  Display a Physical Disk's Label
5.  Format a Physical Disk
6.  Copy a Physical Disk
Enter ? or <number>? for HELP, ^ to GO BACK, or q to QUIT
Enter choice: 5 <Enter>
```

The Physical Disk Formatting Menu shown below appears.

4. Type **6** to select "All of the Above," and press the Enter key.

```

Physical Disk Formatting Menu

1.  Install a Disk Label on a Physical Disk
2.  Perform Hardware Formatting on a Physical Disk
3.  Create DG/UX System Areas on Physical Disk
4.  Reinstall Bootstraps on a Physical Disk
5.  Perform Surface Analysis on a Physical Disk
6.  All of the Above

Enter ? or <number>? for HELP, ^ to GO BACK, or q to QUIT
Enter choice: 6 <Enter>

```

The system begins to display the screen for formatting a physical disk.

5. Type the responses shown in bold in the sample screen below, with exceptions as noted in the *comments*.

```

Enter the Physical Disk Specification in DG/UX common format:
sd(cisc(), 1) <Enter>           Substitute the DG/UX device name of the disk you are formatting if
different than sd(cisc(), 1).

Install a Disk Label on a Physical Disk
Do you want to run this step? [y] <Enter>
Disk label already exists on disk sd(cisc(), 1).
Do you want to reinstall disk label? [n] y <Enter>

What the system displays next depends on the type of disk you are formatting (initializing).
If you are formatting a SCSI-based disk, the system will display the following:

Installing generic SCSI label on SCSI device.
Disk Label has been reinstalled.

```

(continued)

If you are formatting an ESDI or SMD disk, the system will display the following:

```
=====
                        Disk Types
1.          6442          ESDI          322MB
2.          6555          ESDI          648MB
3.          6661          ESDI          322MB
4.          6541          SMD           1066MB
5.          None of the Above
=====
```

Enter the type of disk that you have: **4** <Enter> *Type the number for your disk type; for example, type 4. If you are formatting an unlisted disk, type 5 and respond to the DG/UX prompts relating to your disk drive.*

Disk label has been installed.

Perform Hardware Formatting on a Physical Disk

Do you want to run this step? [y] <Enter>

WARNING: this operation will DESTROY any data on the Physical Disk sd(cisc(),1).

Do you want to continue? [y] <Enter>

Create DG/UX System Areas on a Physical Disk

Do you want to run this step? [y] <Enter>

WARNING: this operation will DESTROY any data on the Physical Disk sd(cisc(),1).

Do you want to continue? [y] <Enter>

The Physical Disk sd(cisc(),1) is 631053 blocks in size *Based on the size of your disk, the number of blocks specified above may be different.*

Enter the number of blocks to allocate for the Remap Area: [189] <Enter>

Enter the pathname of the boot.aviion file: [/usr/stand/boot.aviion] <Enter>

Perform Surface Analysis on a Physical Disk

Do you want to run this step? [y] **y/n** <Enter> *Surface analysis builds a bad block table that specifies areas of the disk where the system should not store data. If you type y to this question, allow approximately 20 minutes per 100 megabytes of disk space for the system to perform this analysis.*

Press New Line when ready to continue . . . <Enter>

(concluded)

- The Physical Disk Formatting Menus reappears. At Enter Choice:, either type **6** to format another disk and press the Enter key, or type **q** to quit, and press the Enter key.

If you are formatting another disk, repeat Steps 5 and 6.

When you have finished formatting disks, continue to Step 7.

7. At Do you want to quit Diskman? [n], type
y
 and press the Enter key.

Creating the Home Logical Disk (accounts)

In the next steps, we will create a logical disk and file system for the home directory of your user account. In this manual, we call this logical disk **accounts**. You may give it another name of your choosing. In Chapter 4 of this manual, you will use the directory pathname for this logical disk (**/accounts**) when creating your user accounts. You should have your Physical Disk Planning Worksheet on hand.

To create and mount the home (accounts) logical disk, have your Physical Disk Planning Worksheet from Chapter 1 on hand, and proceed as follows.

- At the # prompt, type
sysadm diskmgmt
 and press the Enter key.
 The Diskman Main Menu shown below appears.
- Type **2** to select the "Logical Disk Management Menu," and press the Enter key.

```

                                Diskman Main Menu

1.  Physical Disk Management Menu
2.  Logical Disk Management Menu
3.  File System Management Menu
4.  Initial Installation Menu
5.  Update Installation Menu

Enter ? or <number>? for HELP, ^ to GO BACK, or q to QUIT
Enter choice: 2 <Enter>
  
```

The Logical Disk Management Menu shown below appears.

```
Logical Disk Management Menu
1. Create a Logical Disk
2. Delete a Logical Disk
3. Display Information About a Logical Disk
4. Copy a Logical Disk
5. Display Information About a Logical Disk Piece
6. Delete a Piece of a Damaged Logical Disk

Enter ? or <number>? for HELP, ^ to GO BACK, or q to QUIT
Enter choice: 1 <Enter>
```

3. Type 1 to select the “Create a Logical Disk,” and press the Enter key.

The system begins to display the “Create a Logical Disk” screen.

4. Type the responses shown in bold in the sample screen that follows, except for the options noted below.

Notice that we have given the **accounts** logical disk 50,000 blocks of physical disk space on your SCSI disk unit 0 [**sd(cisc(),0)** or **sd(insic(),0)**]. You may choose to allocate a greater or a lesser number of disk blocks to this logical disk. If you have more than one physical hard disk, you also may split the number of disk blocks between two physical disk units by creating a second “piece”. Or you may choose to allocate all of the **accounts** logical disk blocks (as one piece) to a second hard disk, if present on your computer. See the “Allocating Disk Space for Logical Disks” section in Chapter 1 of this manual for more information.

Create a Logical Disk

```

=====
Enter the Logical Disk Name: accounts <Enter>
Logical Disk Piece 1:
Enter the Physical Disk Specification in DG/UX Common Format: sd(cisc(), 0) <Enter>
On an AViiON 3000/4000 computer, type
sd(insic(), 0) instead of
                                sd(cisc(), 0).

Do you want to display the layout of this Physical Disk? [n] <Enter>
Enter the Physical Address of the starting block of Logical Disk
Piece 1: [nnnnnn] <Enter>
Enter the size in blocks of Logical Disk Piece 1: [nnnnnn] 50000 <Enter>
Do you want to specify any more Pieces for this Logical Disk? [n]
Press <Enter> if you will use only one physical disk. Otherwise, type
y,
                                and then press <Enter>. The program will prompt you for the size
                                of Logical Disk Piece 2.

The Logical Disk "accounts" has been created.
Do you want to make a file system on this Logical Disk? [y] <Enter>
No additional information is required, but you may specify mkfs flags
and options if you wish.

Enter the flags and options you want to specify: <Enter>

Making a file system on logical disk "accounts"

Press New Line when ready to continue ... <Enter>

```

When you complete this task, the Logical Disk Management Menu reappears.

5. At Enter Choice:, type
q
and press the Enter key.
6. At Do you want to quit Diskman? [n], type
y
and press the Enter key.
7. At the # prompt, type
sysadm addfsys
and press the Enter key.

The following sample screen begins to appear.

8. Type the responses shown in bold, except for the option noted below.

The **sysadm addfsys** command *mounts* a logical disk on a directory, thus making the files in the associated file system accessible for use. In the sample screen below, you *mount* the logical disk named **accounts** and give it a directory pathname (“Mount Directory Name”) of **/accounts**. Again you can supply a directory name of your choosing. We recommend that you use lowercase letters. And remember to prefix your directory name with the slash (/).

```
Mount Directory Name? /accounts <Enter>
Is this a local file system? [yes] <Enter>
Logical disk name? accounts <Enter>
Writeable? [yes] <Enter>
Dump Cycle? [d] <Enter>
fsck Pass? [1] <Enter>
Export the file system? [no] <Enter>

The entry for /accounts has been added.

The directory, /accounts, does not exist.
Create /accounts? [yes] <Enter>
Mount the file system? [yes] <Enter>
The file system has been mounted
#
```

You have completed the steps required to create and mount the home (accounts) logical disk.

Creating Logical Disks for Add-On Software

If your applications software require any logical disks, you must create and mount these disks before loading the applications software. To create and mount a logical disk for an application, use the procedure in the “Creating and Mounting the Home Logical Disk (accounts)” section above. If you have questions about allocating disk space to logical disks, go to the “Logical Disks for Add-On Software” section in Chapter 1 of this manual.

Adding Software Packages

In this section, we describe the basic procedures for adding software packages to your DG/UX system software. It is important to load and set up any add-on software before creating and installing the DG/UX kernel. Otherwise, you will probably have to recreate the kernel and install a new DG/UX system when adding software later.

Loading Software

Refer to your Disk Planning worksheets. The first step in preparing to load any software package is to read its associated release notice. Once you have the release notice, proceed as follows.

1. At the # prompt, type

```
sysadm makesrv
```

and press the Enter key.

The system creates the `/srv` directory tree so it can load add-on software packages. This does not mean that you are installing a *server* system.

2. Insert the cartridge tape for your software package in the cartridge tape drive with SCSI ID 4. The Common Device Specification for this tape drive is **st(cisc(),4)** for an AViiON 5000 series or AViiON 6000 series computer and **st(insic(),4)** for an AViiON 3000 series or AViiON 4000 series computer. You will notice in the following sample screen that the DG/UX system now refers to this drive as "Tape Drive 0".

If the release notice for your software package says to load the package with the **sysadm loadpackage** command, continue to Step 3; otherwise, follow the release notice's instructions for loading the package.

3. At the # prompt, type

```
sysadm loadpackage
```

and press the Enter key.

You will hear the tape drive loading the software, and a screen similar to the one shown below will begin to appear.

4. Type the responses indicated in the appropriate release notice and in the sample screen below.

```
Running subcommand 'loadpackage' from menu 'releasemgmt'
Software Release Management

Release Area? [PRIMARY] <Enter>
Tape Drive? [0] <Enter>
Is the tape mounted and ready? y <Enter>
.
.   The messages displayed here will vary with the particular software being loaded.
.
.
.
.
.
.
Loadpackage is finished.
#
```

5. When the # prompt appears, the software package is loaded. Remove the tape media and store it in a secure place.

If you have additional software packages to load, repeat Steps 2 through 5 now.

When you have loaded all software packages, continue with the “Setting Up Software Packages” section that follows.

Setting Up Software Packages

Although your DG/UX system software and add-on software packages are now loaded, some add-on software packages must be set up before you can use them. The Release Notice for an add-on package will tell if you need to set it up.

If the release notice for your software package says to setup the package with the **sysadm setupackage** command, continue to Step 1; otherwise, follow the release notice’s instructions.

To set up a software package, proceed as follows. You will repeat this procedure for each package that needs setting up.

1. At the # prompt, type
sysadm setupackage
and press the Enter key.

The beginning of the **setupackage** screen shown below appears.

NOTE: If you make an error in the **setuptools** script and want to exit the script and begin again, type the DG/UX interrupt key sequence, **Ctrl-C**. When the # prompt appears, type the **sysadm setuptools** command again, and press the Enter key.

2. Type the responses shown in bold in the sample screen. Notice that you select all packages in this example. The setup scripts for these packages will appear as well. Refer to the appropriate release notices for additional information about add-on software packages.

```

Running subcommand 'setuptools' from menu 'releasemgmt',
Software Release Management
Release Area? [PRIMARY] <Enter>
The following packages have setup scripts that have not been run:
  x          x stands for the acronym for an add-on software package that needs to be set
up.
                You will see acronyms for each such software package that you loaded.
Package Name? [all] <Enter>
Processing setup scripts for package x.
Setup package x in usr? [yes] <Enter>
    Setting up package: x
    .
    .   The message displayed here will vary with the particular software being set up.
    .
    .
Processing setup scripts for package x
Setup package x in usr? [yes] <Enter>
    .
    .   The message displayed here will vary with the particular software being set up.
    .
    .
Setup package x in MY_HOST root? [yes] <Enter>
    Setting up package: x
done
setuptools is finished.
#

```

When the # prompt appears on your screen, you have finished setting up software packages.

Creating the Kernel

Creating the kernel requires the use of the **vi** editor. If you are not familiar with this editor, a brief tutorial to help you to create a kernel appears below. For more information about the **vi** editor and its command set, see *Using the DG/UX™ Editors*. The command set described below is a small subset of the available **vi** commands.

vi Editor Tutorial

The **vi** editor, like UNIX, is case sensitive. It has three operating modes: input, command, and last line. This tutorial is concerned primarily with the command and the input modes.

To enter command mode, press the Esc (Escape) key.

In command mode, you can edit previously created text. **vi** interprets your keystrokes as commands. For example, you can move your cursor through the text using the following keystroke commands:

h moves the cursor one character position to the left.
l moves the cursor one character position to the right.
j moves the cursor down one line.
k moves the cursor up one line.

When the cursor is at the appropriate character position and **vi** is in command mode, you can insert, delete, or replace text using one of the following commands. Each of these commands puts you in input mode.

i enables you to insert text beginning at the cursor position.
a enables you to insert text beginning one character position to the right of the cursor.
x enables you to delete the character at the cursor position.
dd enables you to delete the current line.
R enables you to overwrite existing text, beginning at the cursor position, until you press the Esc key to return to command mode.

After you insert, delete, or replace one or more characters, you re-enter command mode by pressing the Esc key. Once in command mode, you can invoke sequences of commands without pressing the Esc key again.

To exit the **vi** editor in command mode, type **ZZ**. This command saves the file, including your changes, and returns you to the previous prompt or script.

To exit the **vi** editor without saving your changes, type **:q!**. The **q!** is a last-line mode command; the **:** invokes last-line mode.

Figure 2-1 vi Editor Tutorial

In the steps that follow, you will create a new DG/UX kernel for your particular computer by editing a prototype system configuration file. As you will see, this file supports multiple DG/UX configurations, and *tuneable* system parameters. Tuneable parameters are those which you can change.

The prototype system configuration file is large; you will find that it spans several screens. Within these screens, you will *comment out* configuration information that does not apply to your computer. You do this by using the vi editor to insert a # sign at the left margin of the particular lines shown in the sample screens that follow. Or, if you prefer, you may delete each description line that does not apply to your computer. In some cases you will have to add information about additional controllers in your computer. When you build and install your new kernel, the information in the prototype configuration file that is *commented out* or deleted will be ignored.

When you finish editing the prototype configuration file, you will be asked to record information about the file on the Terminal Line Controllers Worksheet at the end of Chapter 3, "Determining the tty Lines for Asynchronous Ports." You should have this worksheet on hand before continuing. (Appendix B contains a duplicate copy of this worksheet.)

Now proceed as follows.

At the # prompt, type

sysadm newdgux

and press the Enter key.

As the first screen of the prototype configuration file begins to appear, you select the vi editor by pressing the Enter key in response to Editor? [vi], as shown in the sample screen that follows. When the # signs appear (the # is the vi comment character) at the left margin of this screen, the vi editor is in command mode. As you read the contents of this file, use the j key to move down the screen one line at a time.

NOTE: If you make an error and have difficulty correcting it with the vi editor, you can exit the system configuration file by simply typing the following vi command: :q! This leaves the file unaltered by your editing, and allows you to begin again by re-entering the **sysadm newdgux** command.

```
Running subcommand 'newdgux' from menu 'sysmgmt',
System Configuration Management

System Name? [aviion] <Enter>
System file "/usr/src/uts/aviion/Build/system.aviion"
does not exist.
Create the system file [yes] <Enter>
Editor? [vi] <Enter>
#      Copyright (C) Data General Corporation 1990.
#      All Rights Reserved.
#      Licensed Material -- Property of Data General Corporation.
#      This software is made available solely pursuant to the
#      terms of a DGC license which governs its use.

#sccid = "@(#) 88K 1990 system.dgux.proto  94.7"
#-----
#
# Prototype fragment of system configuration for:
#
# (Product Name):          DG/UX
# (Release):              4.32
#
# This prototype is provided to assist you in creating your
# customized system configuration file.
# This file consists of system file entries pertaining to this
# product.  Include this fragment in your customized system file
# and edit it to reflect your system's configuration.
# See this product's master file (in /usr/etc/master.d) for more details.
#
#-----
#-----
# Devices:
#
# List all devices and pseudo-devices in this section, one entry per
# line.  Typical configurations for several typical configurations
# have been provided below; delete entries that do not apply to your
# system and add to the list any devices your system has that are not
# already listed.
```

Continue to move down through the file using the j key until the following screen appears:

```

#### Typical AViiON 200 or 300 series workstation configuration:

# Note that your system can have a second duart() or an lp()
# controller, but not both.

kbd()          # -- keyboard
grfx()         # -- graphics display
sd(insc(),*)   # -- all SCSI disks on integrated SCSI adapter
st(insc(),*)   # -- all SCSI tapes on integrated SCSI adapter
inen()        # -- integrated Ethernet controller
duart()        # -- integrated Duart terminal line controller
duart(1)       # -- second Duart (if present in system)
lp()           # -- integrated line printer controller (if present)

ptc()          # -- pseudo-terminal controller device
pts()          # -- pseudo-terminal slave device
pmt()          # -- pseudo-magtape device
log()          # -- Streams logger pseudo-device
prf()          # -- profiler pseudo-device

```

This is the first of four AViiON system hardware configuration descriptions in this section of the file; the others are as follows:

- Typical AViiON 400 series workstation configuration.
- Typical AViiON 4000 series server configuration.

Notice that the AViiON 4000 series configuration description applies to the AViiON 3000 series system as well.

- Typical AViiON 5000 or 6000 series server configuration.

To build a DG/UX kernel for your particular AViiON system, you must retain (and edit, if required) the “Typical AViiON...configuration” screen that describes your particular AViiON system; for example, a “Typical AViiON 4000 series server configuration”. And you must comment out or delete the “Typical” configuration descriptions for all other systems.

Editing the AViiON Configuration Descriptions

To edit the AViiON configuration descriptions in the system configuration file, go to either the “For AViiON 3000 Series or AViiON 4000 Series Computers” section or the “For AViiON 5000 Series or AViiON 6000 Series Computers” section, depending on the type of computer you have.

For AViiON 3000 Series or AViiON 4000 Series Computers

Editing this portion of the configuration file for an AViiON 3000 series or AViiON 4000 series computer consists of the following steps:

- Commenting out or deleting the device information in all “Typical AViiON...configuration” screens, except the one that describes the AViiON 3000 series and AViiON 4000 series computer.
- Editing the device information appearing in the “Typical AViiON 4000 series server configuration” screen, as required, to match the configuration of your particular computer.

To edit the configuration file for an AViiON 3000 series or AViiON 4000 series computer, proceed as follows.

1. In the “Typical AViiON 200 or 300 series workstation configuration” screen, use the **vi** insert command (**i**) to insert a comment sign (**#**) at the beginning of each line in this screen. Or, if you prefer, delete each line, using the **vi** delete-line command (**dd**). See the sample that follows.

```
#### Typical AViiON 200 or 300 series workstation configuration:

# Note that your system can have a second duart() or an lp()
# controller, but not both.

# kbd()          # -- keyboard
# grfx()         # -- graphics display
# sd(incsc(),*)  # -- all SCSI disks on integrated SCSI adapter
# st(incsc(),*)  # -- all SCSI tapes on integrated SCSI adapter
# inen()         # -- integrated Ethernet controller
# duart()        # -- integrated Duart terminal line controller
# duart(1)       # -- second Duart (if present in system)
# lp()           # -- integrated line printer controller (if present)

# ptc()          # -- pseudo-terminal controller device
# pts()          # -- pseudo-terminal slave device
# pmt()          # -- pseudo-magtape device
# log()          # -- Streams logger pseudo-device
# prf()          # -- profiler pseudo-device
```

2. After completing this task, continue using the **j** key to move the cursor down the screen until the heading “Typical AViiON 400 series workstation configuration” appears.
3. In the “Typical AViiON 400 series workstation configuration” screen, use the **vi** insert command (**i**) to insert a comment sign (**#**) at the beginning of each line in this screen. Or, if you prefer, delete each line, using the **vi** delete-line command (**dd**). See the sample screen that follows.

```

#### Typical AViiON 400 series workstation configuration:

# kbd()          # -- keyboard
# grfx()         # -- graphics display
# sd(isc(),*)   # -- all SCSI disks on integrated SCSI adapter
# st(isc(),*)   # -- all SCSI tapes on integrated SCSI adapter
# inen()        # -- integrated Ethernet controller
# duart()       # -- integrated Duart terminal line controller
# duart(1)      # -- second Duart
# lp()          # -- integrated line printer controller

# ptc()         # -- pseudo-terminal controller device
# pts()        # -- pseudo-terminal slave device
# pmt()        # -- pseudo-magtape device
# log()        # -- Streams logger pseudo-device
# prf()        # -- profiler pseudo-device

```

4. After completing this task, continue using the **j** key to move the cursor down the screen until the heading “Typical AViiON 4000 series server configuration” appears. See the sample screen that follows.
5. In the “Typical AViiON 4000 series server configuration” screen, use the **j** key to move down the screen until the cursor is on the first of the following lines:

```

sd(cisc(),*) # -- all SCSI disk drives on Ciprico SCSI adapter
st(cisc(),*) # -- all SCSI tape drives on Ciprico SCSI adapter
cird()      # -- Ciproco Rimfire or SMD disk controller

```

Use the **vi** insert command (**i**) to insert a **#** sign at the beginning of these lines, as shown in the sample screen that follows, or delete these lines. These adapters and controllers are not available on the AViiON 3000 series or AViiON 4000 series computers.

6. Use the **j** key to move the cursor down to the following line:

```

hken()      # -- Interphase VME Ethernet controller

```

Since this manual is for a stand-alone computer that is not connected to a network, we assume that your computer does not have this optional controller. So either use the **vi** insert command (**i**) to insert a **#** sign at the beginning of this line, or use the **vi** delete-line command (**dd**) to delete the line.

7. Use the **j** key to move the cursor down to the following line:

```

syac()      # -- Interphase VME Ethernet controller

```

For ease in setting up the DG/UX system for devices on the RS-232/422 ports on the computer unit, you should delete this line, and then reinsert it *between* the descriptions of the **lp()** and the **ptc()**, as described below.

Type **dd** to delete the line. Then use the **j** key to move the cursor down to the following line:

```

ptc()      # -- pseudp-terminal controller device

```

You need to reinsert the description of the `syac()` *before* this `ptc()` line. If your computer has a second Systech terminal line controller, you also need to insert the description this controller. Use the `i` command to insert the descriptions listed below for the Systech terminal line controllers in your computer.

```
syac()      # -- Systech terminal line controller
syac(1)    # -- Second Systech terminal line controller
```

NOTE: If your AViiON 3000 series or AViiON 4000 series computer contains a VME-based synchronous controller (**sdep**), do not insert the device name for this controller in the configuration file. Synchronous controllers are configured with the communications software packages they support.

```
#### Typical AViiON 4000 Series server configuration:
```

This configuration description also applies to AViiON 3000 series computers.)

```
sd(isc(),*) # -- all SCSI disk drives on integrated SCSI adapter
st(isc(),*) # -- all SCSI tape drives on integrated SCSI adapter
```

“Comment out” the next three lines, as shown below, because the Ciprico adapter, and Rimfire and SMD controllers are not available on the AViiON 3000/4000 series computers. If you prefer, you can delete these lines.)

```
# sd(cisc(),*) # -- all SCSI disk drives on Ciprico SCSI adapter
# st(cisc(),*) # -- all SCSI tape drives on Ciprico SCSI adapter
# cird()       # -- Ciprico Rimfire or SMD disk controller
# inen()       # -- integrated Ethernet controller
```

“Comment out” the next line for the optional Interphase controller, as shown below, because this manual assumes that your stand-alone computer is not connected to a network.

```
# hken()      # -- Interphase VME Ethernet controller
```

Delete the line for the `syac()`, which is the next entry in the file you are editing. You will reinsert it after the `duart()` and `duart(1)` description lines to simplify how DG/UX assigns `tty` lines to the `duart` parts.

```
duart()      # -- integrated Duart terminal line controller
duart(1)     # -- second Duart
lp()         # -- integrated line printer controller
```

Reinsert the `syac()` description line next.

```
syac()      # -- Systech terminal line controller
```

If your computer has a second Systech terminal line controller, insert the following description line.

```
syac(1)     # -- Second Systech terminal line controller
ptc()        # -- pseudo-terminal controller device
pts()        # -- pseudo-terminal slave device
pmt()        # -- pseudo-magtape device
log()        # -- Streams logger pseudo-device
prf()        # -- profiler pseudo-device
```

Note the relative order in which the duart and syac device names appear in your edited version of your system's configuration file. For example, in the sample screen above, the relative order of these device names is as follows:

```
duart()    position 1
duart(1)   position 2
syac()     position 3
syac(1)    position 4
```

8. Record these relative positions on the Terminal Line Worksheet at the end of Chapter 3, "Determining the tty Lines for Asynchronous Ports." (You will finish filling out this worksheet in Chapter 3.)
9. After editing the above file, continue moving down through this file using the j key. When the "Typical AViiON 5000 or 6000 series server configuration" screen appears, comment out or delete all configuration descriptions in this file, as shown below.

```
#### Typical AViiON 5000 or 6000 series server configuration:

#  cird()          # -- Ciprico Rimfire or SMD disk controller
#  sd(cisc(),*)    # -- all SCSI disk drives on Ciprico SCSI adapter
#  st(cisc(),*)    # -- all SCSI tape drives on Ciprico SCSI adapter
#  syac()          # -- Systech terminal line controller
#  duart()         # -- integrated Duart terminal line controller
#  lp()           # -- integrated line printer controller
#  hken(0)        # -- 1st Interphase VME Ethernet controller
#  hken(1)        # -- 2nd Interphase VME Ethernet controller

#  ptc()          # -- pseudo-terminal controller device
#  pts()          # -- pseudo-terminal slave device
#  pmt()          # -- pseudo-magnetic device
#  log()          # -- Streams logger pseudo-device
#  prf()          # -- profiler pseudo-device

#-----
#-----
```

- 10 After commenting out or deleting the information in the above screen, continue to move the cursor down through this file until you see the heading "Tuneable Configuration Parameters." Now go to the "Editing Tuneable Configuration Parameters" section later in this chapter.

For AViiON 5000 Series or AViiON 6000 Series Computers

Editing this portion of the configuration file for an AViiON 5000 series or AViiON 6000 series computer consists of the following steps:

- Commenting out or deleting the device information in all “Typical AViiON...configuration” screens, except the one that describes the AViiON 5000 or 6000 series server.
- Editing the device information appearing in the “Typical AViiON 5000 or 6000 series server configuration” screen, as required, to match the configuration of your particular computer.

To edit the configuration file for an AViiON 5000 series or AViiON 6000 series computer, proceed as follows.

1. In the “Typical AViiON 200 or 300 series workstation configuration” screen, use the **vi** insert command (**i**) to insert a comment sign (**#**) at the beginning of each line in this screen. Or, if you prefer, delete each line, using the **vi** delete-line command (**dd**). See the sample screen that follows.

```
#### Typical AViiON 200 or 300 series workstation configuration:

# Note that your system can have a second duart() or an lp()
# controller, but not both.

# kbd()          # -- keyboard
# grfx()         # -- graphics display
# sd(inc(),*)    # -- all SCSI disks on integrated SCSI adapter
# st(inc(),*)    # -- all SCSI tapes on integrated SCSI adapter
# inen()         # -- integrated Ethernet controller
# duart()        # -- integrated Duart terminal line controller
# duart(1)       # -- second Duart (if present in system)
# lp()           # -- integrated line printer controller (if present)

# ptc()          # -- pseudo-terminal controller device
# pts()          # -- pseudo-terminal slave device
# pmt()          # -- pseudo-magtape device
# log()          # -- Streams logger pseudo-device
# prf()          # -- profiler pseudo-device
```

2. After completing this task, use the **j** key to move the cursor down the screen until the heading “Typical AViiON 400 series workstation configuration” appears.
3. In the “Typical AViiON 400 series workstation configuration” screen, use the **vi** insert command (**i**) to insert a comment sign (**#**) at the beginning of each line in this screen. Or, if you prefer, delete each line, using the **vi** delete-line command (**dd**). See the sample screen that follows.


```

#### Typical AViiON 400 series workstation configuration:

# kbd()          # -- keyboard
# grfx()         # -- graphics display
# sd(incsc(),*)  # -- all SCSI disks on integrated SCSI adapter
# st(incsc(),*)  # -- all SCSI tapes on integrated SCSI adapter
# inen()         # -- integrated Ethernet controller
# duart()        # -- integrated Duart terminal line controller
# duart(1)       # -- second Duart
# lp()           # -- integrated line printer controller

# ptc()          # -- pseudo-terminal controller device
# pts()          # -- pseudo-terminal slave device
# pmt()          # -- pseudo-magtape device
# log()          # -- Streams logger pseudo-device
# prf()          # -- profiler pseudo-device

```

4. After completing this task, continue using the **j** key to move the cursor down the screen until the heading “Typical AViiON 4000 series server configuration” appears.
5. In the “Typical AViiON 4000 series workstation configuration” screen, use the **vi** insert command (**i**) to insert a comment sign (**#**) at the beginning of each line in this screen. Or, if you prefer, delete each line, using the **vi** delete-line command (**dd**). See the sample that follows.

```

#### Typical AViiON 4000 Series server configuration:

# sd(incsc(),*)  # -- all SCSI disk drives on integrated SCSI adapter
# st(incsc(),*)  # -- all SCSI tape drives on integrated SCSI adapter
# sd(cisc(),*)   # -- all SCSI disk drives on Ciprico SCSI adapter
# st(cisc(),*)   # -- all SCSI tape drives on Ciprico SCSI adapter
# cird()         # -- Ciprico Rimfire or SMD disk controller

# inen()         # -- integrated Ethernet controller
# hken()         # -- Interphase VME Ethernet controller
# syac()         # -- Systech terminal line controller
# duart()        # -- integrated Duart terminal line controller
# duart(1)       # -- second Duart
# lp()           # -- integrated line printer controller

# ptc()          # -- pseudo-terminal controller device
# pts()          # -- pseudo-terminal slave device
# pmt()          # -- pseudo-magtape device
# log()          # -- Streams logger pseudo-device
# prf()          # -- profiler pseudo-device

```

6. After completing this task, continue using the **j** key to move the cursor down the screen until the heading “Typical AViiON 5000 or 6000 series server configuration” appears. See the sample screen that follows.

7. In the “Typical AViiON 5000 or 6000 series server configuration” screen, use the **j** key to move down the screen until the cursor is on the first of the following lines:

```
cird()      # -- Ciproco Rimfire or SMD disk controller
```

If your computer does not have any ESDI or SMD disks, then either use the **vi** insert command (**i**) to insert a **#** sign at the beginning of this line, as shown in the sample screen that follows, or use the **vi** delete line command (**dd**) to delete this line. If your computer has any ESDI or SMD disk, leave this line unchanged.

8. Use the **j** key to move the cursor down to the following line:

```
syac()      # -- Interphase VME Ethernet controller
```

For ease in setting up the DG/UX system for devices on the RS-232 ports on the computer unit, you should delete this line, and then reinsert it *between* the descriptions of the `lp()` and the `hken(0)` as described below.

Type **dd** to delete the line. Then use the **j** key to move the cursor down to the following line:

```
hken(0)     # -- 1st Interphase VME Ethernet controller
```

You need to reinsert the description of the `syac()` before this `hken(0)` line. If your computer has more than one Systech terminal line controller, you also need to insert descriptions for them. Use the **vi** insert command (**i**) to insert the descriptions listed below for the Systech terminal line controllers in your computer. (An AViiON 5000 series computer can support four such controllers, maximum.)

```
syac()      # -- Systech terminal line controller
syac(1)     # -- Second Systech terminal line controller
syac(2)     # -- Third Systech terminal line controller
syac(3)     # -- Fourth Systech terminal line controller
syac(4)     # -- Fifth Systech terminal line controller
```

9. Use the **j** key to move the cursor down to the first of the following lines:

```
hken(0)     # -- 1st Interphase VME Ethernet controller
hken(1)     # -- 2nd Interphase VME Ethernet controller
```

Since this manual is for a stand-alone computer, we assume that your computer does not have these optional controllers. So use the **vi** editor to either insert a **#** sign as the beginning of each of these lines or delete the lines.

NOTE: If your AViiON 5000 series or AViiON 6000 series computer contains a VME-based synchronous controller (**sdcp**), do not insert the device name for this controller in the configuration file. Synchronous controllers are configured with the communications software packages they support.

```

#### Typical AViiON 5000 or 6000 Series server configuration:

    If your computer does not have any ESDI or SMD disks, "comment out" the next line as shown below;
    otherwise, leave the line unchanged.

# cird() # -- Ciprico Rimfire or SMD disk controller

sd(cisc(),*) # -- all SCSI disk drives on Ciprico SCSI adapter
st(cisc(),*) # -- all SCSI tape drives on Ciprico SCSI adapter

    Delete the line for the syac(), which is the next entry in the file you are editing. You will reinsert it
    after the duart() and duart(1) description lines to simplify how DG/UX assigns tty lines to the duart
    parts.

duart() # -- integrated Duart terminal line controller
lp() # -- integrated line printer controller

    Reinsert the syac() description line next.

syac() # -- Systech terminal line controller

    If your computer has additional Systech terminal line controllers, insert a description line for each
    one as shown below. An AViiON 5000 can have a four such controllers, maximum.

syac(1) # -- Second Systech terminal line controller
syac(2) # -- Third Systech terminal line controller
syac(3) # -- Fourth Systech terminal line controller
syac(4) # -- Fifth Systech terminal line controller

    "Comment out" the next two lines for the Interphase controllers, as shown below, because this
    manual assumes that your stand-alone computer is not connected to a network.

# hken(0) # -- 1st Interphase VME Ethernet controller
# hken(1) # -- 2nd Interphase VME Ethernet controller
ptc() # -- pseudo-terminal controller device
pts() # -- pseudo-terminal slave device
pmt() # -- pseudo-magtape device
log() # -- Streams logger pseudo-device
prf() # -- profiler pseudo-device

#-----
#-----

```

Note the relative order in which the duart and syac device names appear in your edited version of your system's configuration file. For example, in the sample screen above, the relative order of these device names is as follows:

```

duart()    position 1
syac()     position 2
syac(1)   position 3
syac(2)   position 4
syac(3)   position 5
syac(4)   position 6

```

10. Record these relative positions on the Terminal Line Worksheet at the end of Chapter 3, "Determining the tty Lines for Asynchronous Ports." (You will finish filling out this worksheet in Chapter 3.)
11. Continue to move the cursor down through this file until you see the heading "Tuneable Configuration Parameters".

Editing the Tuneable Configuration Parameters

Under the heading "Tuneable Configuration Parameters," you will find a list of items under the subheadings "Parameter Name" and "Value." Before using the **vi** editor to change any value in this group of parameters, read the parameter descriptions below. Notice that the **NPROC** parameter described below does not appear in the DG/UX configuration file. If it is appropriate for your system, you must be insert it as part of the editing task associated with creating a DG/UX kernel.

TZ (TIMEZONE) is represented as the number of minutes by which your time zone follows Greenwich Mean Time (GMT). In the configuration file, **TZ** is set for the Eastern Time Zone, which is 300 minutes behind GMT. Unless you know the number of minutes that your time zone follows GMT, leave this line untouched. We will make any required changes to the date and time in Chapter 4, "Setting Up the DG/UX System."

MAXUP refers to the maximum number of processes that any user will be able to have at one time. Accept the default for this value, 64; that is, leave this number untouched.

NODE is the hostname of your particular system. It is used by certain software packages, such as the asynchronous file transfer package called **UUCP**. Additionally, this hostname appears as part of the login banner when you log in to your DG/UX system. You can take the default (`my_node`), but we recommend that you use the **vi** editor to replace `my_node` with a short name (eight characters or less) of your choosing.

`DUMP "st (in sc () , 4)"` selects the cartridge tape drive with SCSI ID number 4 as the dump device for your computer in the event of an emergency. In this context, dump refers to a dump of physical memory to a mass-storage medium in the event of a DG/UX panic. These dumps are used to diagnose problems, and, therefore, should not be confused with system backups. If you have another tape drive that you will be using for emergency dumps, replace `st (in sc () , 4)` with the device name (in Common Device Specification Format) of your emergency dump device. *Be sure to delete the # signs at beginning of this line.*

`DUMP inen ()` selects the AViiON computer's Ethernet port as the emergency dump device for your system. Since this book is written for a stand-alone computer, *be sure that a # sign is inserted at the beginning of this line.*

NPROC specifies the maximum number of processes that can exist at one time. The default value for this parameter is 256. As a rule of thumb, you can expect the average terminal user to have three active processes running simultaneously.

Further, users running CPU-intensive software may have as many as ten active processes running simultaneously. For this reason, if your system is supporting large terminal counts via VDA/128 and/or VDA/255 host adapters, you should add NPROC to your list of tuneable configuration parameters, and increase its value according to your estimate of concurrent active processes. Although increasing the value of NPROC may result in a slight degradation of system performance, an NPROC value that is too small will result in a process-table overflow, which will effectively suspend system services.

PERCENTNFS, NETBOOTDEV, ROOTFSTYPE, and SWAPDEVTYPE apply only to diskless DG/UX systems; therefore, they are commented out in this configuration file. See the next sample screen.

Edit the Tuneable Configuration Parameters appearing in the next sample screen according to your system's requirements.

NOTE: As you read through the remaining sections of the configuration file displayed on your system console's monitor, you will notice that some sections of the file are omitted from the sample screens in this manual. This is done intentionally for the sake of brevity. The omitted sections do not require editing.

```
# Tuneable Configuration Parameters:
#
# List all configuration parameters you wish to override in this
# section, one entry per line.
.
.
.
# You should set the TZ variable to accurately reflect your timezone
# (300 minutes west of GMT is USA Eastern time.)

# You should set the MAXUMP variable to maximum number of processes
# that each user will be allowed to run simultaneously. This number
# should be at least 64 for workstations.
#
# You should set the NODE variable to control your nodename for uname (1)
# and uucp(1), but not more than 255 characters.
.
.
.
#
#
```

Parameter Name	Value
TZ	300
MAXUP	64
NODE	"ray_node" <i>This is the hostname of your system. Use the vi replace command (R) to overwrite the hostname within the quotation marks with a name of your choosing; for example "sales."</i>

(continued)

```

DUMP          "st( insc(), 4)"  Be sure to delete the # appearing at the
                    beginning of this line.

####DUMP     "inen()"  Leave this line untouched.

NPROC        nnn          The default value for this parameter is 256. If your
                    computer includes a VDA/128 or a VDA/255 host adapter, you may
                    want to add the NPROC parameter to this file and increase its value.
                    See the description of NPROC under the heading "Editing Tuneable
                    Configuration Parameters."

### DUMP     "inen()"
### PERCENTNFS 100
### NETBOOTDEV "inen(0)"
### ROOTFSTYPE NETWORK_ROOT
### SWAPDEVTYPE NETWORK_SWAP
#
#-----

```

(concluded)

You are at the end of the system configuration file.

Exiting the System Configuration File

To exit the system configuration file and the vi editor, press the Esc key, and then type **ZZ**.

Immediately after exiting the vi editor, the system displays the following message:

```
Ready to Configure a Kernel? [yes]
```

You are now ready to install the new kernel. Continue on to the "Configuring and Building the Kernel" section.

Configuring and Building the Kernel

In this section, you will configure and build a kernel by responding to the system prompts shown in the sample screen that follows. Then you will shut down the system to build the new kernel.

1. Type the responses shown in bold.

CAUTION: Read Step 2 before you follow the instructions shown in this screen to shut down and to reboot; otherwise, you may attempt to halt the system too quickly.

```

Ready to Configure a Kernel? [yes] <Enter>
sysadm will now run config on /usr/src/uts/aviion/Build/system.aviion.
Config succeeded.

sysadm will now attempt to build a kernel.
Building...
The build succeeded.

Install the New Kernel? [no] y <Enter>
For a diskless client of this Host? [no] <Enter>
Kernel Pathname? [/dgux.aviion] <Enter>

The new kernel has been copied to /dgux.aviion.
Link /dgux to the New Kernel? [yes] <Enter>

The new kernel will not take effect until you shutdown and reboot.
To do this, quit from sysadm, and say:
    cd /
    /etc/shutdown
    /etc/halt -q

Until you do this, a few commands which depend on the symbol table
in /dgux (such as the kernel profiler and netstat) may not work
correctly
This should not cause any serious difficulties.
#

```

If the configuration or build fails, the system will display several messages followed by the prompt `Print the Build Error File? [yes]`. If this occurs, press the Enter key to get the printout.

Since no printers are enabled yet, the DG/UX system will use the default output device, which is your system console's display screen. Next you should call Data General Corporation for help. See the Preface for instructions.

If the system has successfully configured and built the kernel, you must now shut down the system to complete the installation of the new kernel.

2. At the # prompt, type

```
cd /
```

and press the Enter key.

You are now in the **root (/)** directory.

3. At the # prompt, type

```
/etc/shutdown
```

and press the Enter key.

The system displays the message **Shutdown started**.

In about one minute, you will hear warning beeps and see warning messages displayed.

Next you will be prompted with the **Do you want to continue? [y or n]**. Type **y** to continue, and press the Enter key.

In about 30 seconds the system displays the following message:

```
#  
INIT: New run level: S  
INIT: SINGLE USER MODE  
#
```

4. At the last # prompt, type

```
/etc/halt -q
```

and press the Enter key.

When the **SCM>** prompt appears, the system is shut down.

Changing Boot Parameters Using the SCM

When the DG/UX system halts, the System Control Monitor (SCM) takes control, and the `SCM>` prompt appears. The SCM is the hardware interface to AViiON computers. It is a firmware monitor program that tests and manages the system at powerup, and it maintains control until the DG/UX kernel or other system software takes over.

For more information about the SCM, see *Using the AViiON® System Control Monitor (SCM)*.

You will use the SCM to change your system's boot path so that your DG/UX system will boot automatically when the computer powers up.

Change the boot parameters as follows.

1. At the `SCM>` prompt, type **F**, and press the Enter key. The SCM View or Change System Configuration menu appears.
2. Type **1** to select "Change boot parameters," and press the Enter key.

```
View or Change System Configuration
1      Change boot parameters
2      Change console parameters
3      Change mouse parameters
4      Change printer parameters
5      View memory configuration
6      Change testing parameters
7      Return to the previous screen
Enter choice(s) -> 1 <Enter>
```

The Change boot parameters menu shown below appears.

3. Type **1** to select “Change system boot path,” and press the Enter key.

```
Change boot parameters
1      Change system boot path
2      Change diagnostic boot path
3      Change data transfer mode [block]
4      Return to previous screen
Enter choice(s) -> 1 <Enter>
```

The next screen begins to appear.

4. Type the responses shown in bold in the screen below, with the options as noted.

```
System boot path = xxxxxxxx
Do you want to modify the system boot path? [N] y <Enter>
Enter new system boot path -> sd(cisc(),0)root:/dgux -2 <Enter>
                                For an AViiON 3000 series or AViiON 4000 series computer, type
                                sd(insc(),0)root:/dgux -2 instead of
                                sd(cisc(),0)root:/dgux -2.
System boot path = [sd(cisc(),0)root:/dgux -2]
                                If you typed sd(insc(),0)root:/dgux -2
                                at the previous prompt, the default system boot path is
                                sd(insc(),0)root:/dgux -2.
Do you want to modify the system boot path? n <Enter>
Do you want to boot now? [N] <Enter>
```

5. In the Change boot parameters menu, type **4** to select “Return to previous screen,” and press the Enter key.

The SCM View or Change System Configuration menu reappears.

Select the appropriate number on each SCM screen to “Return to the previous screen.” When the SCM> prompt appears on your monitor’s screen, go to Chapter 3, “Determining tty Numbers for Asynchronous Ports.”

End of Chapter

Chapter 3

Determining tty Lines for Asynchronous Ports

You can add your computer's user terminals and printers to your DG/UX system all at once or one at a time. If you add them all at once, you assign the same characteristics to all asynchronous ports on your computer. In other words, the RS-232/422 port(s) on the computer unit, the ports on any Systech asynchronous controllers (VAC/16 controllers), and the ports on the cluster controllers for any Systech asynchronous distributed host adapters (VDA/128 and VDA/255 host adapters) would all have the same characteristics. If you add terminals or printers one at a time, you may assign different characteristics to different ports.

NOTE: For simplicity's sake we will refer to the RS-232/422 interface(s) for the port(s) on the computer unit, the VAC/16 controller, and the VDA/128 and VDA/255 host adapters as *terminal line controllers*. This is the terminology that the DG/UX system uses when it lists these devices in the system configuration file. When we refer to ports on a VDA host adapter, we are actually referring to the ports on the cluster controllers connected to the host adapter.

To add a terminal or printer to your DG/UX system, you need the following information:

- The tty line number that DG/UX assigned to the terminal line controller port where the terminal or printer is connected. A terminal may be connected either *directly* to the port or *indirectly* through a modem and dial-up telephone line to a modem connected to the port.
- The type of terminal or printer (for example, VT100 terminal or 2400 baud printer).

In this chapter we will get this information by performing the following tasks:

- Determine the position in the system configuration file of DG/UX device names for terminal line controllers.
- Use the AViiON System Diagnostics to get information about terminal line controllers.
- Determine the tty line number for each device on a terminal line controller.

Like Chapter 2, “Installing the DG/UX System,” this chapter has step-by-step instructions with many sample screens.

Determining the Relative Position of DG/UX Device Names for Terminal Line Controllers

You will need to know the relative position of the terminal line controller device names in your DG/UX system’s configuration file. This section tells how to find this information. To help you keep track of this information, we have provided a Terminal Line Controllers Worksheet, together with a sample completed worksheet, in the “Worksheets” section at the end of this chapter. Appendix B contains an extra copy of this worksheet.

The DG/UX device names for the terminal line controllers start with *duart* for the RS-232/422 ports on the computer unit, or *syac* for the Systech VAC/16 controllers or VDA host adapters. When you edited the prototype system configuration file during the installation of your DG/UX system, you should have noted the position of each of these device names relative to each other, and recorded this position on the Terminal Line Controllers Worksheet in the “Configuration File Position” column for the device name.

NOTE: If *syac()* is the first terminal line controller device name to appear in the configuration file, then the position of this device name is 1 relative to the positions of the other terminal line controller device names. If the next terminal line controller device name to appear in the file is *syac(1)*, then *syac(1)* is in position 2.

If you did not record the position of these device names, then you will have to boot your DG/UX system and view the list of the devices configured in the kernel as described in the next section, “Listing the Devices Configured In Your DG/UX Kernel.”

Listing the Devices Configured In Your DG/UX Kernel

To list the devices configured in your DG/UX system kernel, proceed as follows:

1. Boot your DG/UX system as described in the section “Booting Your New DG/UX System” in the beginning of Chapter 4. If this is not the first time you booted your system, then log in as **sysadm** or **root**.
2. At the # prompt, type

```
sysdef /dgux |more
```

and press the Enter key.

A list of the devices configured in the kernel begins appearing on the screen.

3. Scroll through the list file by pressing the space bar after each -- More -- prompt until you reach the first device name for a terminal line controller, that is, the first `duart` or `syac` entry.

The sample screen below shows part of this list for an AViiON 5000 series or AViiON 6000 series computer.

```

.
.
.
sd(cisc(),*)
st(cisc(),*)
duart()
lp()
syac()
syac(1)
syac(2)
.
.
.

```

In the screen above, the position of the terminal line controller device names relative to each other is as follows:

```

duart()    position 1
syac()     position 2
syac(1)    position 3

```

This is also the relative order of these device names in the system configuration file. Note that `duart()` appears first, which means that the default AViiON 5000 or 6000 series server configuration description was edited, as described in Chapter 2, to move the `duart()` entry *ahead* of the `syac()` and `syac(1)` entries.

4. On the Terminal Line Controllers Worksheet, record the relative position in which each terminal line controller device name appears.

Using the AViiON System Diagnostics to Get Information About Terminal Line Controllers

This sections describes how to use your AViiON System Diagnostics to help you get the following information:

- Board type (VAC/16, VDA/128, or VDA/255) for the syac terminal line controller device name.
- Cluster controller type (8–line, 16–line) for each controller connected to a VDA host adapter.
- VAC/16 or cluster controller port to which a specific terminal or printer is connected.

NOTE: The person installing your computer hardware should have recorded this information on Device Worksheets that were supplied in the manual *Setting Up and Installing VMEbus Options in AViiON® Systems*. If these worksheets are available from the hardware installer and they have all the information listed above, then go to the section “Determining the tty Line for Each Terminal Line Controller Port” later in this chapter. If these worksheets are not available or they are missing information, continue with this section. We provide sample and blank copies of these worksheets in the “Worksheets” section at the end of this chapter. Appendix B contains extra copies of these worksheets.

If your computer came with the DG/UX system software preloaded on disk, the system diagnostics is on the system disk, and you can boot the diagnostics as a stand-alone program. If your computer came with the DG/UX system software on tape, you can boot the diagnostics from the AViiON System Diagnostics cartridge tape that came with your computer.

To boot the system diagnostics, you must first shut down the DG/UX system. If the `SCM>` prompt appears on the screen, the DG/UX system is shut down and you should go to the appropriate section below for booting the diagnostics from disk or tape. If the DG/UX system is running, shut it down as follows:

1. If you are logged as a user, log out, and then log in as **sysadm** or **root**.
2. At the # prompt, type

```
cd /
```

and press the Enter key.

3. At the # prompt, type

```
shutdown -g0 -y
```

and press the Enter key.

Now wait a few seconds for the following message to appear:

```
#  
INIT: New run level: S  
INIT: SINGLE USER MODE  
#
```

4. At the last # prompt, type

```
halt -q
```

and press the Enter key.

Go to the appropriate section that follows for booting the diagnostics from disk or tape.

Booting System Diagnostics from Disk

To boot the system diagnostics from disk, proceed as follows:

At the SCM> prompt, type the following for an AViiON 5000 series or AViiON 6000 series computer:

```
b sd(cisc(),0)usr:/stand/diags
```

and press the Enter key.

For an AViiON 3000 series or AViiON 4000 series computer, type the following command instead of the above command:

```
b sd(insc(),0)usr:/stand/diags
```

and then press the Enter key.

Go to the section “Determining the Terminal Line Controller Type and Cluster Controller Type” below.

Booting System Diagnostics from Tape

To boot the system diagnostics from tape, proceed as follows:

1. Insert the AViiON System Diagnostics tape in your cartridge tape drive jumpered for SCSI ID 4.
2. At the `SCM>` prompt, type the following for an AViiON 5000 series or AViiON 6000 series computer:

```
b st (cisc () , 4)
```

and press the Enter key.

For an AViiON 3000 series or AViiON 4000 series computer, type the following command instead of the above command:

```
b st (insc () , 4)
```

and press the Enter key.

Go to the section “Determining the Terminal Line Controller Type and Cluster Controller Type” below.

Determining the Terminal Line Controller Type and Cluster Controller Type

When you boot the system diagnostics program, information about the licensing of the diagnostics appears. When you are ready to continue, proceed as follows:

1. Press the Enter key to clear the screen.

The system diagnostics program looks for (sizes) components in your computer, and displays information about each component that it finds, as shown in the sample screen that follows.
2. Press the Enter key as shown in bold in the sample screen that follows.

System Diagnostics

Revision *xx.xx mm/dd/yy hh:mm:ss*

Initializing Operating System for System Diagnostics

Sizing host adapters on VME Bus:

Checking for VME ESDI Boards at addresses:

ffffef00 (hex)	Not found
fffff100 (hex)	Not found
fffffb00 (hex)	Not found
fffffd00 (hex)	Not found

Checking for VME SCSI Boards at addresses:

fffff300 (hex)	Found
fffff500 (hex)	Not found
fffff700 (hex)	Not found
fffff900 (hex)	Not found

Checking for VME LAN Boards at addresses:

ffff4000 (hex)	Not found
ffff5000 (hex)	Not found

Press New Line to Proceed **<Enter>**

Checking for VME Synchronous I/O Boards at addresses:

55b00000 (hex)	Not found
55b10000 (hex)	Not found
55b20000 (hex)	Not found
55b30000 (hex)	Not found
55b40000 (hex)	Not found
55b50000 (hex)	Not found
55b60000 (hex)	Not found
55b70000 (hex)	Not found

Checking for VME Asynchronous I/O Boards at addresses:

60000000 (hex)	Found
60020000 (hex)	Found
60040000 (hex)	Not found
60060000 (hex)	Not found
60080000 (hex)	Not found

Press New Line to Proceed **<Enter>**

Next, the diagnostics initializes the components that it found, and displays the beginning of the sample screen below.

3. Enter the responses shown in bold in the sample screen.

```
16384 Kbytes system memory
15109 Kbytes memory available for test
PROM revision xx.xx
Dual CPU System (Motorola 88100 CPU Rev x)
2 Instruction Caches (Motorola 88200 CMMU Rev x)
2 Data Caches (Motorola 88200 CMMU Rev x)
Initializing Virtual Console
Initializing Real Time Clock
Initializing VME Async I/O Board 0
Initializing VME Async I/O Board 1
Initializing VME SCSI Board 0
Initializing Parallel Printer
Initializing Duart 0
Initializing Duart 1

Run with instruction caches on (Y/N) [Y]? <Enter>
Enable Parity Checking for instructions (Y/N) [Y]? <Enter>
Run with data caches on (Y/N) [Y]? <Enter>
Enable Parity Checking for data (Y/N) [Y]? <Enter>
Current time is 16:15 Monday, April 1, 1991. Is this correct ((Y/N) [Y]? <Enter>)

(If the time and/or date are incorrect, you will have a chance to correct them when you boot your DG/UX
system in Chapter 4.)
```

Next, the system diagnostics lists the peripherals connected to initialized controllers, as shown in the sample screen that follows.

```

Sizing Peripherals....

VME SCSI Board 0:
  Unit 0: Microp 1578-15 UPDG02 Disk Drive found
  Unit 1: Microp 1578-15 UPDG02 Disk Drive found
  Unit 3: TEAC 5.25 Floppy (LUN 2) Disk Drive found
  Unit 4: Archive Viper 150 21247-045 Tape Drive found

VME Async Board 0:
  16-line VME Async Board
  Model = HPS-6236
  Firmware P/N = 90-070408-8-01A

VME Async Board 1:
  128-line VME Host Adapter 0
  Model = HPS-6945
  Firmware P/N = 90-070154-6-05A

Sizing Cluster Controller Network
-----
Net ID = 01(hex): HPS-7082-020 (Ready)
Net ID = 02(hex): HPS-7088-020 (Ready)
Net ID = 03(hex): HPS-7088-020 (Ready)
Net ID = 04(hex): HPS-7088-020 (Ready)
Net ID = 05(hex): HPS-7088-020 (Ready)
Net ID = 06(hex): HPS-7088-020 (Ready)
Net ID = 07(hex): HPS-7088-020 (Ready)
Net ID = 08(hex): HPS-7088-020 (Ready)

Press New Line to Proceed <Enter>

```

4. On the Terminal Line Controllers Worksheet, record each VME async board type listed under “Sizing Peripherals....” The names that the diagnostics system uses for the different terminal line controller boards are as follows:

16-Line Async Board	VAC/16
128-line VME Host Adapter	VDA/128
255-line VME Host Adapter	VDA/255

For example, using the sample screen above, you would write “VDA/128” in the Board or Port Type column for Board No. 0, and “VAC/16” in the Board or Port Type column for Board No. 1.

On the Terminal Line Controllers Worksheet, record the number of lines for each cluster controller address (Net ID) listed under a VME host adapter. The model numbers for the 8-line and 16-line cluster controllers are as follows:

HPS-7082	8-line cluster controller
HPS-7088	16-line cluster controller

For example, using the sample screen above, for Board 0, you would write “8” in the Cluster Controller No. Lines columns for Cluster Controller Address 01, and write “16” in the Cluster Controller No. Lines column for Cluster Controller Addresses 02 and 08.

When you have finished recording this information, press the Enter key. If more sizing information appears, repeat Step 4. Continue this process of viewing and recording sizing information until the Main Menu appears.

Before continuing, you should transfer information from the Terminal Line Controllers Worksheet to the tty worksheets as described below. If you do not do this, you will have difficulty determining the tty line assigned to each port on these terminal line controllers.

For each VAC/16 controller in your computer, record the board number and its device name on a Device Worksheet for a VAC/16 Controller.

For each VDA host adapter in your computer, record its board number, device name, and device type (VDA/128 or VDA/255) on a Device Worksheet for a VDA Host Adapter. For each cluster controller connected to the host adapter, record the cluster address. If the cluster controller is an 8–line controller, draw a vertical arrow from the cluster address you entered down to the dashed line. This indicates that only nine ports are available on this controller. If the controller is a 16–line controller, draw the vertical line through the dashed line all the way down to the bottom of the column to indicate that 16 ports are available.

You now have enough information to determine which tty line your DG/UX system assigns to a specific port on any of the terminal line controllers in your computer. In addition, if you know what type of terminal or printer is connected to each terminal line controller port, you can add these devices to your DG/UX system without having to complete the following section. In this case, you should record the device type for each port on the appropriate tty worksheet. Next, exit to the SCM by selecting choice 4 on the Main Menu, and go to the “Determining the tty Line for Each Terminal Line Controller Port” section later in this chapter.

If you do not know which type of terminal or printer is connected to each terminal line controller port, continue on to the next section. Otherwise, go to the “Determining the tty Line for Each Terminal Line Controller Port” section.

Determining the Port Where a Specific Device Is Connected

While you do not need to know the port to which a specific device is connected to determine the tty line for that port, you will need this information when you add a terminal or printer to your DG/UX system, or if you need to troubleshoot problems with a terminal line controller. This section will help you obtain that information.

The system diagnostics’ Main Menu shown below appears on the system console.

1. At the Main Menu, type **2** to select "View Tools Menu," and press the Enter key.

```
System Diagnostics
Revision: xx.xx

Data General Corporation
Proprietary Use Only

Main Menu

1. Run Acceptance test
2. View Tools Menu
3. Display help screen
4. Exit to SCM

Enter choice [1]: 2 <Enter>
```

The Tools Menu shown below appears.

2. Type **7** to select "View Terminal Test menu," and then press the Enter key.

```
Tools Menu

1. Format diskettes
2. Run tape adjustment utility
3. View Graphics Tools Menu
4. Test network connection (TDR)
5. Run keyboard test
6. Run mouse test
7. View Terminal Test Menu
8. Display help screen
9. Return to main menu

Enter choice [9]: 7 <Enter>
```

The Terminal Test Menu shown below appears.

3. Type 4 to select "Start port ID message test," and then press the Enter key.

```
Terminal Test Menu

1. Start scrolling characters set test
2. Start lines of characters test
3. Start keyboard echo test
4. Start port ID message test
5. Auto port identification
6. Terminate a test
7. Show executing tests
8. Display help screen
9. Return to Tools menu

Enter choice [9]: 4 <Enter>
```

The system begins to display the following sample screen.

4. Press the Enter key as shown in bold in the sample screen.

```
Board number (0,1, [ALL])? <Enter>

Running selftest on VME Host Adapter 0 (approximately 30 seconds),
please wait....                               (This message occurs the first time you select a
                                              host adapter for testing.)
```

On each terminal or printer connected to a port on a VAC/16 controller or VDA host adapter in your computer, you will see a port ID message similar to the one below. This message lists the board number, cluster address (VDA host adapter only), and the port number for the device displaying the message.

```
128-line VME Host Adapter 0, Cluster address: 01, port: 0
```

NOTE: If you have an 8-line cluster controller without a parallel printer connected to port 8, or the printer is not on line and ready, a message appears telling you this. If such a message appears, simply press the ESC key to skip the test on that port.

5. Look at the message displayed on each device for which you do not know the port number, and determine the board number, cluster address, and port number for the device. On the appropriate Device Worksheet under the specified board number, cluster address (if applicable), and port number, record the type of device (e.g. D460 terminal or Model 6640 parallel laser printer) displaying the message. Also record a description that locates the device (e.g. office 3B, connector #1356).

While the port ID messages are being displayed on the devices, the Terminal Test Menu appears on the system console screen.

6. When you have finished recording the information for each terminal or printer, type **6** to select "Terminate a test," and then press the Enter key.

```
Terminal Test Menu

1. Start scrolling characters set test
2. Start lines of characters test
3. Start keyboard echo test
4. Start port ID message test
5. Auto port identification
6. Terminate a test
7. Show executing tests
8. Display help screen
9. Return to Tools menu

Enter choice [9]: 6 <Enter>
```

7. When the the system displays the following prompt :
Board number (0,1, [ALL])?
Press the Enter key.
8. When the Terminal Test Menu appears, press the Enter key to select "Return to Tools menu."
9. When the Tools Menu appears, press the Enter key to select "Return to main menu."
10. When the Main Menu appears, type **4** and press the Enter key to select "Exit to SCM."

Determining the tty Line for Terminal Line Controller Ports

In this section we will discuss how the DG/UX system allocates tty lines to asynchronous terminal line controller ports, and then we will determine the tty lines that your DG/UX system assigns to each such port on your computer.

How the DG/UX System Allocates tty Lines

When you installed the DG/UX system, it automatically assigned a specific tty line to each port on each terminal line controller in your computer. Table 3-1 lists the number of tty lines that DG/UX allocates to each type of terminal line controller.

Table 3-1 Number of tty Lines Allocated to Terminal Line Controllers

Terminal Line Controller	Number of tty Lines Allocated
RS-232/422 ports on computer unit	1
VAC/16 controller	16
VDA/128 or VDA/255 host adapter	256

Notice in Table 3-1 that the DG/UX system allocates 256 tty lines to a VDA/128 host adapter. Since a VDA/128 host adapter has only 128 ports, this means that only the first 128 tty lines are actually assigned to specific ports on a VDA/128; the remaining 128 tty lines are unused.

The DG/UX system assigns a specific tty line to each port sequentially in the order in which the names of the terminal line controllers are listed in your system's configuration file. It starts with **tty00** for a computer with a nongraphics console or **tty01** for an AViiON 400 series workstation. On an AViiON 400 series workstation, the DG/UX system assigns **tty00** to the mouse. For this reason, if you want to use windowing software on your workstation, do NOT specify **00** as the tty line for a device using the `sysadm addtty` utility to add a tty entry. If you do, the X Windows software will hang when you try to start it.

Let's look at an example of how the DG/UX system assigns tty lines. Suppose that your computer has a nongraphics console, and the system configuration file lists the following terminal line controllers in the order shown below:

```
duart ()      # -- integrated Duart terminal line controller
syac ()      # -- first Systech terminal line controller
syac (1)     # -- second Systech terminal line controller
```


Further suppose that syac() is a VAC/16 controller and syac(1) is a VDA/128 host adapter. For this configuration, the DG/UX system assigns tty lines as follows:

tty00 to the RS-232/422 port on the duart
tty01 through **tty16** to the VAC/16 controller
tty17 through **tty272** to the VDA/128 host adapter

If the duart was listed *after* the syacs, the tty line assignment would be as follows:

tty00 through **tty15** to the VAC/16 controller
tty16 through **tty271** to the VDA/128 host adapter
tty272 to the RS-232/422 port on the duart

The DG/UX system assigns each of the 16 tty lines that it allocates to a VAC/16 host adapter to its 16 ports in sequential order. In other words, in the example above where **tty01** through **tty16** are allocated to the VAC/16 controller, **tty01** is assigned to port 0, **tty02** is assigned to port 1, **tty03** is assigned to port 2, and so on.

Since devices connect to a VDA host adapter through ports on cluster controllers, the DG/UX system allocates specific tty lines to those ports. It allocates 16 tty lines to each cluster controller address, 01 through 10 hexadecimal (16 decimal), as shown in Table 3-2. This means that DG/UX allocates 16 tty lines to an 8-line cluster controller with one of these addresses. Since an 8-line cluster controller has eight asynchronous ports (ports 0 through 7) and one parallel printer port (port 8), the last seven tty lines allocated to this controller's address are unused. The DG/UX system assigns the 16 tty lines that it allocates to a cluster controller address as follows: the tty line with the lowest number (call it n) to port 0; the next tty line with the next highest number ($n+1$) to port 1; the one with the next highest number ($n+2$) to port 2, and so on.

Continuing with this example, let's assume that the VDA/128 host adapter allocated tty lines **tty16** through **tty271** has only one 8-line cluster controller and one 16-line cluster controller. If the 8-line cluster controller has address 01 and the 16-line cluster controller has address 02, then the tty lines for the ports on the controllers are as follows:

8-line cluster controller (address 01):
tty16 through **tty24** for ports 0 through 8 (port 8 is the parallel printer port);
tty25 through **tty31** are unused.

16-line cluster controller (address 02):
tty32 through **tty47** for ports 0 through 15.

tty48 through **tty271** are unused.

Table 3-2 tty Lines Allocated to Cluster Controller Addresses

Cluster Controller Address ¹	tty Lines Allocated
01	tty(n) through tty(n+15)
02	tty(n+16) through tty(n+31)
03	tty(n+32) through tty(n+47)
04	tty(n+48) through tty(n+63)
05	tty(n+64) through tty(n+79)
06	tty(n+80) through tty(n+95)
07	tty(n+96) through tty(n+111)
08	tty(n+112) through tty(n+127)
09	tty(n+128) through tty(n+143)
0A	tty(n+144) through tty(n+159)
0B	tty(n+160) through tty(n+175)
0C	tty(n+176) through tty(n+191)
0D	tty(n+192) through tty(n+207)
0E	tty(n+208) through tty(n+223)
0F	tty(n+224) through tty(n+239)
10	tty(n+240) through tty(n+255)²

n = the lowest tty line number allocated to the VDA host adapter

¹ This address is also called the *node address*. For more information on these addresses refer to the *HPS Downloadable Cluster Controller Installation Guide*.

² The last tty line, **tty(n+255)**, allocated to the cluster controller with address 10 is not used. If this cluster controller is a 16-line controller, this tty line is assigned port 15, so port 15 cannot be used. If it is an 8-line cluster box, this tty line is one of the seven unused tty lines allocated to the controller.

Determining the tty Line for Each Port in Your Computer

You should now have enough information on your Terminal Line Controller Worksheet and your tty worksheets to determine the specific tty line that your DG/UX system assigned to each port on a terminal line controller. Using these worksheets, proceed as follows:

1. Using the Terminal Line Controller Worksheet, find the device name with Configuration File Position 1, then get the tty worksheet that has that device name written on it.
2. Determine the tty line or range of tty lines assigned to this device name using the procedure below for your type of computer: computer with a nongraphics system console, or AViiON 400 series workstation.

For a computer with a nongraphics system console

If the device name is **duart()** or **duart(1)**, write "00" in the tty Line column on the tty worksheet for that device name. If the device name is **syac()**, **syac(1)**, **syac(2)**, **syac(3)** or **syac(4)**, use the formula in Table 3-3 for the board type of that device name to calculate the range of tty lines assigned to that board (where $n = 00$), and record this range on the tty worksheet for the board.

NOTE: On an AViiON 3000 series or AViiON 4000 series computer, the tty line assigned to **duart()** is reserved, and thus does not correspond to a useable port.

For an AViiON 400 series workstation

If the device name is **duart()** or **duart(1)**, write "01" in the tty Line column on the tty worksheet for that device name. If the device name is **syac()** or **syac(1)**, use the formula given in Table 3-3 for the board type of that device name to calculate the range of tty lines assigned to that board (where $n = 01$), and record this range on the tty worksheet for the board.

3. Using the Terminal Line Controller Worksheet, find the device name with next higher Configuration File Position, and get the tty worksheet that has that device name written on it.
4. Determine the tty line or range of tty lines assigned to this device as described below. Use the following value for n :

$n = 1 + [\text{highest tty line number you calculated for previous device name}]$

If the device name is **duart()** or **duart(1)**, write the value for n in the tty Line column on the tty worksheet for that device name. If the device name is **syac()**, **syac(1)**, **syac(2)**, **syac(3)** or **syac(4)**, use the formula in Table 3-3 for the board type of that device name to calculate the range of tty lines assigned to that board, and record this range on the tty worksheet for the board.

Table 3-3 Range of tty Lines Allocated by DG/UX to Systech Terminal Line Controllers and Cluster Controllers

Board Type	Range of tty Lines Allocated
VAC/16	tty(n) through tty(n+15)
VDA/128 or VDA/255	tty(n) through tty(n+255)
Cluster controller with address:	
01	tty(n) through tty(n+15)
02	tty(n+16) through tty(n+31)
03	tty(n+32) through tty(n+47)
04	tty(n+48) through tty(n+63)
05	tty(n+64) through tty(n+79)
06	tty(n+80) through tty(n+95)
07	tty(n+96) through tty(n+111)
08	tty(n+112) through tty(n+127)
09	tty(n+128) through tty(n+143)
0A	tty(n+144) through tty(n+159)
0B	tty(n+160) through tty(n+175)
0C	tty(n+176) through tty(n+191)
0D	tty(n+192) through tty(n+207)
0E	tty(n+208) through tty(n+223)
0F	tty(n+224) through tty(n+239)
10	tty(n+240) through tty(n+255)
n = the lowest tty line number assigned to the board type	

- Repeat Steps 3 and 4 to determine the tty line or range of tty lines assigned to any other terminal line controllers in your computer.

If your computer contains a VAC/16 controller, continue to Step 6; otherwise, go to Step 7.

- On the tty worksheet for each VAC/16 controller, write the appropriate tty line in the tty Line column for each port number. The lowest numbered tty line allocated to the controller is the one for port 0, the next higher numbered tty line allocated is the one for port 1, and so on.

If your computer contains a VDA host adapter, continue to Step 7; if not, then you have finished determining the specific tty line that DG/UX assigns to each terminal line controller port in your system. You are now ready to set up the DG/UX system as described in Chapter 4.

7. On the tty worksheet for each VDA host adapter, write the appropriate tty line number in the tty Line column for each port number for each cluster address. The lowest numbered tty line allocated to the controller is the one for port 0 on the cluster controller with address 01, and the next higher numbered tty line allocated is the one for port 1 on the same cluster controller, and so on. Since DG/UX assigns 16 tty lines to each cluster controller regardless of the number of ports it has, the seven highest tty lines assigned to an 8-line cluster controller are not used. To determine the tty line for port 0 on successive cluster controllers, use the formulas in Table 3-3.

You have finished determining the specific tty line that DG/UX assigns to each terminal line controller port in your system. You are now ready to set up the DG/UX system as described in Chapter 4.

Worksheets

This section contains the following worksheets referred to earlier in this chapter:

- Terminal Line Controllers Worksheet
- Device Worksheet for RS/232/422 Ports on the Computer Unit
- Device Worksheet for a VAC/16 Controller
- Device Worksheet for a VDA Host Adapter

Appendix B contains additional copies of these worksheets. Each of the two sheets of the Device Worksheet for a VDA Host Adapter contains space for recording information about 32 ports. So, if you have a VDA host adapter, you will need two additional sheets for a VDA/128 host adapter and six additional sheets for a VDA/255 host adapter.

Preceding each worksheet is a sample worksheet that has been filled out for an AViiON 5000 computer with three terminal line controllers: RS-232/422 terminal/modem port on the computer unit, one VAC/16 controller, and one VDA/128 host adapter. The host adapter has one 8-line cluster controller and seven 16-line cluster controllers, providing ports for a maximum of 120 serial devices and one parallel printer. These terminal line controllers have the device names given below, and these device names are listed in your DG/UX system configuration file in the relative order shown below:

duart()	terminal/modem port on computer unit
syac()	VAC/16
syac(1)	VDA/128

Sample Terminal Line Controllers Worksheet

Board No.	Device Name	Configuration File Position	Board or Port Type	Cluster Controllers			
				Address	No. Lines	Address	No. Lines
	duart()	1					
	duart(1)						
0	syac()	2	VAC/16	01		09	
				02		0A	
				03		0B	
				04		0C	
				05		0D	
				06		0E	
				07		0F	
				08		10	
1	syac(1)	3	VDA/128	01	8	09	
				02	16	0A	
				03	16	0B	
				04	16	0C	
				05	16	0D	
				06	16	0E	
				07	16	0F	
				08	16	10	
2	syac(2)			01		09	
				02		0A	
				03		0B	
				04		0C	
				05		0D	
				06		0E	
				07		0F	
				08		10	
3	syac(3)			01		09	
				02		0A	
				03		0B	
				04		0C	
				05		0D	
				06		0E	
				07		0F	
				08		10	
4	syac(4)			01		09	
				02		0A	
				03		0B	
				04		0C	
				05		0D	
				06		0E	
				07		0F	
				08		10	

SAMPLE

Terminal Line Controllers Worksheet

Board No.	Device Name	Configuration File Position	Board or Port Type	Cluster Controllers			
				Address	No. Lines	Address	No. Lines
	duart()						
	duart(1)						
0	syac()			01		09	
				02		0A	
				03		0B	
				04		0C	
				05		0D	
				06		0E	
				07		0F	
				08		10	
1	syac(1)			01		09	
				02		0A	
				03		0B	
				04		0C	
				05		0D	
				06		0E	
				07		0F	
				08		10	
2	syac(2)			01		09	
				02		0A	
				03		0B	
				04		0C	
				05		0D	
				06		0E	
				07		0F	
				08		10	
3	syac(3)			01		09	
				02		0A	
				03		0B	
				04		0C	
				05		0D	
				06		0E	
				07		0F	
				08		10	
4	syac(4)			01		09	
				02		0A	
				03		0B	
				04		0C	
				05		0D	
				06		0E	
				07		0F	
				08		10	

Sample Device Worksheet for RS-232/422 Ports On Computer Unit

Port type: terminal/modem Device name: duart()		
tty Line	Device Type	Description
00	modem to VT100	lab B2, conn 2203
Port type: Device name: duart(1)		
tty Line	Device Type	Description

SAMPLE

Device Worksheet for RS-232/422 Ports On Computer Unit

Port type: Device name: duart()		
tty Line	Device Type	Description
Port type: Device name: duart(1)		
tty Line	Device Type	Description

Sample Device Worksheet for a VAC/16 Controller

Board no: 0		Device name: syac()		Range of tty lines: 01 - 16			
Port No.	tty Line	Device Type	Description	Port No.	tty Line	Device Type	Description
0	01	serial printer	officeA1 conn 1100	8	09	D216+	officeA10 conn 1118
1	02	serial printer	officeA2 conn 1102	9	10	VT100	officeA11 conn 1120
2	03	D216+	officeA3 con 1104	10	11	D462+	officeA12 conn 1122
3	04	D462+	officeA4 conn 1106	11	12	D462+	officeA14 conn 1124
4	05	VT100	officeA5 conn 1108	12	13	D462+	officeA14 conn 1124
5	06	VT100	officeA6 conn 1110	13	14	D216+	officeA18 conn 1128
6	07	D216+	officeA8 conn 1114	14	15	D413	officeA20 conn 1130
7	08	D462+	officeA9 conn 1116	15	16	D413	officeA21 conn 1132

Device Worksheet for a VAC/16 Controller

Board no:		Device name:		Range of tty lines:			
Port No.	tty Line	Device Type	Description	Port No.	tty Line	Device Type	Description
0				8			
1				9			
2				10			
3				11			
4				12			
5				13			
6				14			
7				15			

Sample Device Worksheet for a VDA Host Adapter

Sheet 1 of 4

Board type: VDA/128 Board no: 1 Device name: syac(1) Range of tty lines: 17 - 271									
Cluster Address	Port No.	tty Line	Device Type	Description	Cluster Address	Port No.	tty Line	Device Type	Description
01	0	17	D216+	office B1 conn 1200	02	0	33	VT100	office B9 conn 1216
	1	18	D216+	office B2 conn 1202		1	34	VT100	office B10 conn 1218
	2	19	D462+	office B3 conn 1204		2	35	D216+	office B11 conn 1220
	3	20	VT100	office B4 conn 1206		3	36	D462+	office B12 conn 1222
	4	21	VT100	office B5 conn 1208		4	37	D462+	office B13 conn 1224
	5	22	VT100	office B6 conn 1210		5	38	VT100	office B14 conn 1226
	6	23	D216+	office B7 conn 1212		6	39	VT100	office B15 conn 1228
	7	24					40	D462+	office B16 conn 1230
	8	25	6640 printer	lab B2 conn 2204	8	41	D462+	office B17 conn 1232	
	9				9	42	D462+	office B18 conn 1234	
	10				10	43	D462+	office B19 conn 1236	
	11				11	44	D462+	office B20 conn 1238	
	12				12	45	D462+	office B21 conn 1240	
	13				13	46	D413	office B22 conn 1242	
	14				14	47			
	15				15	48			

Device Worksheet for a VDA Host Adapter

Sheet 1 of _____

Board type:		Board no:		Device name:		Range of tty lines:			
Cluster Address	Port No.	tty Line	Device Type	Description	Cluster Address	Port No.	tty Line	Device Type	Description
01	0				02	0			
	1					1			
	2					2			
	3					3			
	4					4			
	5					5			
	6					6			
	7					7			
	8					8			
	9					9			
	10					10			
	11					11			
	12					12			
	13					13			
	14					14			
	15					15			

Device Worksheet for a VDA Host Adapter

Sheet ___ of ___

Board type:					Board no:				
Cluster Address	Port No.	tty Line	Device Type	Description	Cluster Address	Port No.	tty Line	Device Type	Description
	0					0			
	1					1			
	2					2			
	3					3			
	4					4			
	5					5			
	6					6			
	7					7			
	8					8			
	9					9			
	10					10			
	11					11			
	12					12			
	13					13			
	14					14			
	15					15			

End of Chapter

Chapter 4

Setting Up the DG/UX System

This chapter describes how to set up your DG/UX system so that you can perform useful work. You will perform the following tasks:

- Boot your new DG/UX system.
- Change the date and time.
- Add terminals and printers to your DG/UX system.
- Create user accounts.
- Create and change passwords.
- Change the run levels of your DG/UX system.
- Log in and out of your DG/UX system.
- Shut down your DG/UX system.
- Power down your computer.

Like the previous two chapters, “Installing the DG/UX System” and “Determining tty Numbers for Asynchronous Ports,” this chapter has step-by-step instructions and many sample screens.

For more detailed information about any of the topics discussed in this chapter, see the relevant chapters in *Installing and Managing the DG/UX™ System*.

Booting Your New DG/UX System

If you returned to the `SCM>` prompt at the end of the last chapter, type **b** and press the Enter key. Your DG/UX system will begin to boot and display initializing messages. After about five minutes, you will see the login message shown in the first three lines of the sample screen below.

To log in to the system, type **sysadm** at the `login:` prompt below, and then press the Enter key as shown in the sample screen below. Since you have not yet defined a password, the Superuser prompt (**#**) appears immediately.

```
my_node           (This will vary if you changed your hostname when building your
                  DG/UX kernel.)
DG/UX Operating System Release 4.32
login: sysadm <Enter>
#
```

NOTE: Instruction for setting passwords appear in the “Creating and Changing a Password” section later in this chapter.

Congratulations! Your new DG/UX system is installed.

If you need to correct the system’s date and time, continue to the next section, “Changing the Date and Time.” Otherwise, go to the “Adding Terminals to Your DG/Ux System” section.

Changing the Date and Time

Previously we instructed you to ignore the system’s queries about the correct date and time that your system displays. In this section, we will correct the date and time.

If you are not in administrative mode (run-level 1), then get into administrative mode as described in the previous section, “Invoking Administrative Mode,” before continuing.

To change the date and/or time, proceed as follows.

1. At the **#** prompt, type the following:

```
sysadm datetime
```

Then press the Enter key.

The following screen begins to appear. Enter the responses shown in bold in the sample screen below.

```

The current timezone is EST. Daylight savings time is used.

The current date and time are: April/15/91 13:30
Time Zone [3] ? <Enter>
    The timezone is specified by entering the number beside
    the desired timezone:
    1      Greenwich      (GMT)
    2      Atlantic       (AST & ADT)
    3      Eastern        (EST & EDT)
    4      Central        (CST & CDT)
    5      Mountain       (MST & MDT)
    6      Pacific        (PST & PDT)
    7      Yukon          (YST & YDT)
    8      Alaska         (AST & ADT)
    9      Bering         (BST & BDT)
    10     Hawaii         (HST)
    11     Japan          (JST)
The default is the current time zone.
Timezone? [3] 2 <Enter>      Type the timezone number for your geographical region;
                                e.g., 2, and then press <Enter>.

Does your area use Daylight Savings Time ? [y] If you use Daylight Savings Time in
your area, press <Enter>. If you do not, type n, and then
press <Enter>.

Month? [05] 6 <Enter>      Type the appropriate month; e.g., 6, and then press
<Enter>.

Day of the month? [10] 12 <Enter>
                                Type the appropriate day; e.g., 12, and then press
                                <Enter>.

Year? [91] <Enter>          Just press <Enter> if the year is 1991; otherwise, type
the last two digits of the current year, and then press
<Enter>.

Hour? [15] 14 <Enter>      Type the current hour; e.g., 14 (which means 2 p.m.),
and then press <Enter>.

Minute? [32] 15 <Enter>    Type the current minute; e.g., 15, and then press
<Enter>.

#

```

Your DG/UX system's date and time are now updated.

Adding Terminals to Your DG/UX System

Before you can use a terminal (other than your system console) that is connected to your computer either directly or indirectly through a modem and a dial-up line, you must first add information to your DG/UX system that tells how the terminal operates. In this section, we determine the operating information that DG/UX requires for a terminal, and we add this information to your DG/UX system.

Operating Values for Terminals

The operating values that your DG/UX system requires you to specify for a terminal include the *lineset* and the *TERM* variable.

About Linesets

The *lineset* establishes the speed and other line characteristics of the port to which the terminal or the modem for a terminal is connected. Further, the port line characteristics and the corresponding terminal or modem line characteristics must match. Table 4-1 lists the lineset name that the DG/UX system supports, together with their line characteristics. The DG/UX system uses **9600** as the default lineset name. For more information on linesets, refer to *Installing and Managing the DG/UX™ System*. For information about setting the line characteristics of terminals and/or modems, see the documentation for the specific device(s).

Table 4-1 Lineset Names for Terminals and Modems

Lineset Name	Baud Rate	Parity	Bits	Mode
Terminal				
9600	9600	None	8	ANSI
9600EP	9600	Even	7	ANSI
19200	19200	None	8	ANSI
19200EP	19200	Even	7	ANSI
Modem				
M300	300	None	8	—
M1200	1200	None	8	—
M2400	2400	None	8	—
M4800	4800	None	8	—
M9600	9600	None	8	—

NOTE: Appendix C, "Setting Up a Microcom AX Series Modem," explains one way of setting up this modem to operate on a cluster controller port for a VDA host adapter. For information on setting up any other modem or terminal, refer to the documentation for that device.

About TERM Variables

The *TERM* variable is an environmental variable that identifies the device type of a terminal connected to the computer directly, or indirectly through a modem. Programs, such as the vi Editor, use the TERM variable to determine the type of terminal used by a person invoking the program.

The DG/UX system uses **vt00** as the default TERM variable. If you have terminals that can operate in VT100 mode, you will find it easiest to set up these terminals to operate in this mode and use **vt100** as their TERM variable. If you have other types of terminals, you can use other TERM variables.

If you want to see a description of the TERM variables, type the following command at the # prompt:

```
man term |more -f
```

Then press the Enter key.

The **man** command invokes a man (manual) page; **term** is the name of the man page you want to view; **more** allows you to scroll through the man-page file each time you press your keyboard's space bar. You can use this command format later to view any electronic man page. For more information about man pages, refer to the *User's Reference for the DG/UX™ System* manual.

If you want a complete list of all the TERM variables that your DG/UX system currently supports, type the following command at the # prompt:

```
ls -C /usr/lib/terminfo/? |more.
```

Then press the Enter key, and use the space bar to scroll through the list. You can return to the # prompt at any time by typing **q**.

If you want to display the operating values defined by a particular TERM variable, type the following command at the # prompt:

```
infocmp TERM-variable
```

with the particular TERM variable substituted for *TERM-variable*.

Then press the Enter key.

Before adding a terminal to your DG/UX system, you should first determine its lineset and TERM variable. For a terminal connected through a modem, you need the lineset for the modem and the TERM variable for the terminal. For more information on the operating values of a terminal or modem, refer to the documentation for the device. If you cannot determine a TERM variable for a terminal, use the default value of **vt100**.

You also need to know which tty line your DG/UX system assigned to the terminal line controller port for the terminal because the system associates the operating values with this tty line. In the DG/UX system terminology, you add information about the operating values of a terminal by "adding a tty entry."

The Device Worksheets that you filled out in Chapter 3, “Determining the tty Lines for Asynchronous Ports,” should tell you what type of device is associated with each tty line.

Filling Out the tty Lines Worksheet

To help you keep track of the lineset names and TERM variables for terminals and their associated tty lines, we have included a tty Lines Worksheet, along with a sample, on the next two pages. (The sample worksheet is filled out using the tty line information on the sample Device Worksheets in Chapter 3.) Appendix B also contains a copy of this worksheet. You will also use this worksheet to keep track of any printer information that your DG/UX system requires.

Using the information from the Device Worksheets in Chapter 3, you should fill out the tty Lines Worksheets for each tty line as follows.

- If a Device Worksheet lists a terminal for a tty line, then on the tty Lines Worksheet, record the tty line, the device type for the terminal, the lineset for the terminal or the modem it uses, and the TERM variable for the terminal.
- If a Device Worksheet lists a printer for the tty line, then on the tty Lines Worksheet, record the tty line and the device type for the printer. You will record the rest of the information for the printer in the “Adding Printers to Your DG/UX System” section further on in this chapter.
- If a Device Worksheet does not list a device for a tty line, then on the tty Lines Worksheet, record the tty line and write “UNUSED” beside it.

Specifying the Operating Values for Terminals

The DG/UX system lets you specify the operating values for terminals individually using the **sysadm addtty** command, or all together using the **sysadm installtty** command. These commands associate the operating values with tty lines. When you use the **sysadm installtty** command, you associate the same set of operating values with *every* tty line that does not already have operating values associated with it, regardless of whether or not the tty line corresponds to an actual terminal line controller port. If you have many terminals with the same operating values, we recommend that you use this command, and then modify the values associated with individual tty lines as needed. However, you can use the **sysadm addtty** command to specify the operating values that are different before using the **sysadm installtty** command. The **sysadm installtty** command does not affect the operating values for a tty line that you have already specified with the **sysadm addtty** command.

To use the **sysadm addtty** command to specify operating values, continue on to the “Specifying the Operating Values for One Terminal” section. To use the **sysadm installtty** command, skip the next section, and go to the “Specifying the Operating Values for Multiple Terminals” section.

Sample tty Lines Worksheet

Sheet ___ of ___

tty Line	Device Type	Lineset or Model	TERM Variable or Printer Name	tty Line	Device Type	Lineset or Model	TERM Variable or Printer Name
00	modem	M2400	vt100	24	UNUSED		
01	serial printer	async_9600	lp1	25	6640 printer	parallel	async_9600
02	serial printer	async_9600	lp2	33	VT100	9600	vt100
03	D216+	9600	vt100	34	VT100	9600	vt100
04	D462+	9600	vt100	35	D216+	9600	vt100
05	VT100	9600	vt100	36	D462+	9600	vt100
06	VT100	9600	vt100	37	D462+	9600	vt100
07	D216+	9600	vt100	38	VT100	9600	vt100
08	D462+	9600	vt100	39	VT100	9600	vt100
09	D216+	9600	vt100	40	D462+	9600	vt100
10	VT100	9600	vt100	41	D462+	9600	vt100
11	D462+	9600	vt100	42	D462+	9600	vt100
12	D462+	9600	vt100	43	D462+	9600	vt100
13	D462+	9600	vt100	44	D462+	9600	vt100
14	D413	9600	vt100	45	D462+	9600	vt100
15	D413	9600	vt100	46	D413	9600	vt100
16	D413	9600	vt100	47	UNUSED		
17	D216+	9600	vt100	48	UNUSED		
18	D216+	9600	vt100				
19	D462+	9600	vt100				
20	VT100	9600	vt100				
21	VT100	9600	vt100				
22	VT100	9600	vt100				
23	D216+	9600	vt100				

tty Lines Worksheet

Sheet ___ of ___

tty Line	Device Type	Lineset or Model	TERM Variable or Printer Name	tty Line	Device Type	Lineset or Model	TERM Variable or Printer Name

Specifying the Operating Values for One Terminal

To specify the operating values for a single terminal, proceed as follows.

1. At the # prompt, type

sysadm

and press the Enter key.

The SYSADM MAIN MENU appears.

2. Type **5** to select the "TTY management menu," and press the Enter key.

```

                                SYSADM MAIN MENU

1 diskmgmt      Enter the Diskman program
2 sysmgmt      System configuration management menu
3 fsmgmt       File system management menu
4 fileinfo     File information menu
5 ttygmt       TTY management menu
6 lpmgmt       Line Printer management menu
7 usermgmt     User management menu
8 uucpmgmt     UUCP management menu
9 networkgmt   Network management menu
10 releasemgmt Software release management menu
11 clientgmt   Diskless and X terminal client management menu

Enter a number, a name, the initial part of a name, ? or <number>?
for HELP, q to QUIT. 5 <Enter>

```

The TTY Management menu shown below appears.

3. Type **2** to select "Add a single tty entry," and press the Enter key.

```

                                TTY Management

1 ttydefaults  Define tty default settings
2 addtty      Add a single tty entry
3 deltty      Delete a tty entry
4 modtty      Modify a tty entry
5 lstty       List tty entries
6 installtty  Add multiple tty entries

Enter a number, a name, the initial part of a name, ? or <number>?
for HELP, q to QUIT 2 <Enter>

```

The following sample screen begins to appear.

4. Type the responses shown in bold, with the exceptions as noted in the *comments*. If you want to quit for some reason before finishing, type **q** at any prompt.

TTY Number? n <Enter>	<i>n is the number of the tty line for the device you are specifying. If you have an AViiON 400 series workstation, DO NOT type 00 because tty00 is reserved for your workstation's mouse.</i>
Login State? [on] <Enter>	
Lineset Name? [9600] <Enter>	<i>Enter the lineset that you recorded on the tty Worksheet for the tty line number specified above. If you didn't record a lineset on the worksheet, just press <Enter>.</i>
Hangup Delay (in seconds)? [0] <Enter>	<i>The hangup delay specifies the time that your DG/UX system will wait for a user to enter the login name on the terminal. For a terminal connected directly to a terminal line controller port, just press <Enter> so that your system will wait forever. For a terminal connected through modems, enter a value between 60 and 120 seconds, and then press <Enter> to avoid wasting telephone connect time.</i>
TERM Variable? [vt100] <Enter>	<i>Enter the TERM variable that you recorded on the tty Worksheet for the tty line number you entered above. If you didn't record a TERM variable, just press <Enter>.</i>
Available in Init Administrative State? [no] <Enter>	
Description? <Enter>	<i>You can enter any type of description here that you want, such as the terminal line controller type, board number, cluster address, and port for the tty line from the appropriate Device Worksheet in Chapter 3.</i>
TTY n has been added	
Press the NEWLINE key to see the ttygmt menu: <Enter>	<i>If you need to specify the operating values for more terminals or modems, press <Enter>. When you have finished, type q to quit, and then press <Enter>.</i>

NOTE: If you get the following error message, then tty line *n* does not correspond to an actual terminal line controller port. You should delete the entry for the tty line as described below.

```
getty: cannot open "ttyn".  errno: 6
```

To delete a tty line entry, enter **sysadm deltty** at the # prompt, and then press the Enter key. When prompted, enter the number of the tty line you want to delete.

For more information on tty lines, see Chapter 3, "Determining tty Lines for Asynchronous Ports."

Specifying the Operating Values for Multiple Terminals

When you add operating values for multiple terminals at once, your DG/UX system associates these operating values with all tty lines that it allocated to the terminal line controllers in your computer and that you have not already specified with a **sysadm addtty** command. This means any tty lines that do not correspond to actual terminal line controller ports, such as the last 128 tty lines allocated to a VDA/128 host adapter, will also have these operating values associated with them. If you specify a Login State of “on” when you use this command, you will get error messages for such tty lines. For this reason, we recommend that when you use this command, you specify a Login State of “off,” and later change the Login State to “on” for tty lines that identify actual ports with terminals connected directly or indirectly. We will change the Login State in the “Displaying and Modifying Operating Values for tty Lines” section further on in this chapter.

To specify the operating values for multiple terminals, proceed as follows.

1. At the # prompt, type

init 1

and press the Enter key.

2. At the # prompt, type

sysadm

and press the Enter key.

The SYSADM MAIN MENU appears.

3. Type **5** to select the "TTY management menu," and press the Enter key.

```

                                SYSADM MAIN MENU

1 diskmgmt      Enter the Diskman program
2 sysmgmt      System configuration management menu
3 fsmgmt       File system management menu
4 fileinfo     File information menu
5 ttygmt       TTY management menu
6 lpmgmt       Line Printer management menu
7 usergmt      User management menu
8 uucpgmt      UUCP management menu
9 networkgmt   Network management menu
10 releasgmt   Software release management menu
11 clientgmt   Diskless and X terminal client management menu

Enter a number, a name, the initial part of a name, ? or <number>?
for HELP, q to QUIT. 5 <Enter>
```

The TTY Management menu shown below appears.

4. Type **6** to select "Add multiple tty entries," and press the Enter key.

```

                                TTY Management

1. ttydefaults  Define tty default settings
2  addtty      Add a single tty entry
3  deltty      Delete a tty entry
4  modtty      Modify a tty entry
5  lstty       List tty entries
6  installtty  Add multiple tty entries

Enter a number, a name, the initial part of a name, ? or <number>?
for HELP, q to QUIT 6 <Enter>
```

The following sample screen begins to appear.

5. Type the responses shown in bold, with the exceptions as noted in the *comments*. If you want to quit for some reason before finishing, type **q** at any prompt.

If your DG/UX system has allocated any tty lines to terminal line controllers that **DO NOT** correspond to an actual ports on the terminal line controllers, then at the Login State? prompt below you should type **off**, and then press **<Enter>**. If your computer has any VDA/255 host adapters without sixteen 16-line cluster controllers attached or it has any VDA/128 host adapters, then your DG/UX system has allocated tty lines that do not correspond to actual ports on these host adapters.

If all the tty lines allocated by your DG/UX, correspond to actual terminal line controller ports, then at the Login State? prompt, you can just press **<Enter>** to accept the default of on.

Login State? [on] **off <Enter>**

Lineset Name? [9600] **<Enter>**

Enter the lineset that you want associated with all the remaining tty lines, or just press **<Enter>** to accept the default value of 9600.

Hangup Delay (in seconds)? [0] **<Enter>**

The hangup delay specifies the time that your DG/UX system will wait for a user to enter the login name on the terminals. For terminals connected directly to terminal line controller ports, just press **<Enter>** so that your system will wait forever. For terminals connected through modems, enter a value between 60 and 120 seconds, and then press **<Enter>** to avoid wasting telephone connect time.

TERM Variable? [vt100] **<Enter>**

Enter the TERM variable that you want associated with all the remaining tty lines, or just press **<Enter>** to accept the default value of vt100.

Available in Init Administrative State? [no] **<Enter>**

Description? **<Enter>**

You can enter any type of description that you want.

Ready to install ttys? [yes] **<Enter>**

sysadm will now create the tty entries...

n new ttys have been added. n is number of tty entries created.

Press the NEWLINE key to see the ttygmt menu [?, ^, q]: **q <Enter>**

#

NOTE: If you specified a Login State of "on" and any error messages similar to the one below appear, you have associated operating values with a tty line that does not correspond to an actual port on a terminal line controller:

```
getty: cannot open "tty255".  errno: 6
```

You can stop such error messages from appearing by deleting the entry for the tty line using the **sysadm deltty** command (option 3 on the **TTY Management** menu) as described next. If you have these error messages for many tty lines, you may find it easier to use the **vi** Editor to remove the entries for these tty lines from the **/etc/inittab** file. We will do this in the "Displaying and Modifying Operating Values Associates with tty Lines" section later in this chapter.

To delete a tty line entry, enter **sysadm deltty** at the # prompt, and then press the Enter key. When prompted, enter the number of the tty line you want to delete.

CAUTION: *If you specified operating values for any tty line that is assigned to a terminal line controller port with a printer connected to it, then before you add the printer to your DG/UX system, you should make sure that the Login State for that tty line is off. We will do this in the “Displaying and Modifying Operating Values for tty Lines” section below.*

If you want to display or modify the operating values associated with any tty line, continue to the next section, “Displaying and Modifying the Operating Values Associated With tty Lines.” If you have finished specifying the operating values for the tty lines for terminals, skip the next section, and go to the “Adding Printers to Your DG/UX System” section.

Displaying or Modifying Operating Values for tty Lines

In this section, we will display the operating values for one or all tty lines, and modify these values for one or more tty lines.

Displaying Operating Values

To display the operating values for one or all tty lines, proceed as follows.

1. At the # prompt, type
sysadm lstty
and press the Enter key.
The following sample screen begins to appear.
2. Type the response shown in bold with the exception as noted in the *comments*.

TTY Numbers? [all] <Enter>					<i>To display the operating values for a single tty line, type the number of the line, and then press <Enter>. You cannot specify a range of tty line numbers.</i>
TTY	State	Hangup Delay	Line Set	TERM	Description
01	off		9600	vt100	
02	off		9600	vt100	
03	off		9600	vt100	
04	off		9600	vt100	
05	on		9600	vt100	
.					
.					
.					
#					

NOTE: The “State” column gives the value of the login state, and the “TERM” column gives the value of the TERM variable.

Modifying Operating Values

You can modify the operating values for a tty line either by using the **sysadm modtty** command or by editing the entry for a tty line in the **/etc/inittab** file. The **sysadm modtty** command lets you modify the operating values for a single line at a time. If you edit the **/etc/inittab** file, you can modify the operating values for one or more tty lines.

To modify the operating values for one tty line using the **sysadm modtty**, proceed as follows.

1. At the # prompt, type

```
sysadm modtty
```

and press the Enter key.

You will see the same prompts that you did when you specified the operating values for the tty line previously, except that the value that you specified for each prompt is the default value shown in brackets [].

2. Either accept these defaults by pressing the Enter key, or type in the new value and press the Enter key.

To modify the operating values for one or more tty lines by editing the **/etc/inittab** file using the vi Editor, proceed as follows. You may want to refer to the Figure 2–1, “vi editor Tutorial,” in Chapter 2, “Installing the DG/UX System.”

1. At the # prompt, type
vi /etc/inittab
and press the Enter key.

The **/etc/inittab** file begins to appear.

2. Type
: set nu
and press the Enter key.

A line number appears at the beginning of each line as shown in the sample screen below. In the screen below lines 51 through 55 are the entries for tty lines 01 through 05. Notice that all these entries, except the last one, specify the following operating values:

```
Login State      off
Lineset          9600
TERM Variable    vt100
```

The last entry specifies a Login State of “respawn” which is the value stored in the **/etc/inittab** file when you specify a Login State of “on” with either the **sysadm addtty** or **installtty** command.

```
.
.
.
48 # the getty is more secure than su since su is always on console
49 con::respawn:/usr/sbin/getty console console
50 50sec::off:#!/sbin/su - 1 </dev/console >/dev/console 2>&1 #

51 01:234:off:/etc/getty tty01 9600 vt100 #
52 02:234:off:/etc/getty tty02 9600 vt100 #
53 03:234:off:/etc/getty tty03 9600 vt100 #
54 04:234:off:/etc/getty tty04 9600 vt100 #
55 05:234:respawn:/etc/getty tty05 9600 vt100 #

.
.
.
```

3. Move down the lines using the j key until you find the entry for the first tty line that you want to modify. The examples below show you how to change the value of the Login State for one or more tty entries and how to delete a tty entry.

To change the Login State from “off” to “respawn” (on) for the entry on line 52 in the sample screen, type the following command:

```
:52,s/off/respawn
```

Then press the Enter key.

To change the Login State from “off” to “respawn” (on) for the entries on lines 52 through 54, type the following command:

```
:52,54s/off/respawn
```

Then press the Enter key.

To change the Login State from “respawn” (on) to “off” for the entry on line 55, type the following command:

```
:55,s/respawn/off
```

Then press the Enter key.

To delete a tty entry, move the cursor onto the line you want to delete, and type **dd**.

4. When you have finished editing the file, type **ZZ** to save your changes.
5. At the # prompt, type the following command:

```
init q
```

Then press the Enter key for the changes you made to the **/etc/inittab** file to take effect.

Continue to the next section, “Adding Printers to Your DG/UX System.”

Adding Printers to Your DG/UX System

Before you can use a printer that is connected to your computer, you must first add information to your DG/UX system that tells how the printer operates. In this section, you will determine the information that DG/UX requires you to specify, and we will add this information to your DG/UX system.

Operating Information for Printers

The information that your DG/UX system requires you to specify for a printer includes a name, model, and device file.

About Printer Names

The name is the string of letters, numbers, and underscores that you will use to identify the printer. Your DG/UX system will not let you use the same name for more than one printer.

About Printer Models

The DG/UX system currently supports the printer models listed in Table 4–2.

NOTE: You must specify **async_9600** as the printer model for any printer on the parallel printer port of an 8–line cluster controller.

Table 4–2 Current Printer Models Supported By DG/UX for Local Printers

Printer Model	Description
async_300	300 baud asynchronous line printer
async_600	600 baud asynchronous line printer
async_1200	1200 baud asynchronous line printer
async_2400	2400 baud asynchronous line printer
async_4800	4800 baud asynchronous line printer
async_9600	9600 baud asynchronous line printer, or any printer on the parallel printer port of an 8–line cluster controller
dumb	Dumb asynchronous line printer; no baud rate
dg455x	Data General laser printer models 4557 and 4558
lpj	Data general LPJ line printer
parallel	Generic parallel line printer
parallel–2	Generic parallel line printer; maps nl to cr–nl

About Printer Device Files

The device file for a parallel printer on your computer’s integrated parallel printer port is **lp**. The printer device file for a printer on a terminal line controller port is the entry in the **/dev** directory for the tty line that your DG/UX system assigned to that port. For example, **/dev/tty01** is the device file for a printer on the port assigned **tty01**.

Specifying Operating Information for Printers

Before adding a printer to your DG/UX system, you should first determine its name, model, and device file. To help you keep track of this information, we included a tty Lines Worksheet in the “Adding Terminals to Your DG/UX System” section. Appendix B also contains a copy of this worksheet. If you recorded the printers connected to terminal line controller ports on this worksheet when you added terminals, then it should tell you the printer’s device type and the tty line for the printer’s device file. If you didn’t record printer information on this worksheet, then the Device Worksheets that you filled out in Chapter 3, “Determining the tty Lines for Asynchronous Ports,” should tell you the tty lines for printers and the device type of each printer. On the tty Lines Worksheet, you should record each printer’s device type (if you have not done so already), name, and model for the appropriate tty line.

To specify the operating values for a printer, proceed as follows.

1. At the # prompt, type
sysadm
and press the Enter key.

The SYSADM MAIN MENU appears.

2. Type **6** to select "Line Printer management menu," and press the Enter key.

```

                                SYSADM MAIN MENU

1 diskmgmt      Enter the Diskman program
2 sysmgmt      System configuration management menu
3 fsmgmt       File system management menu
4 fileinfo     File information menu
5 ttygmt       TTY management menu
6 lpmgmt       Line Printer management menu
7 usermgmt     User management menu
8 uucpmgmt     UUCP management menu
9 networkgmt   Network management menu
10 releasemgmt Software release management menu
11 clientmgmt  Diskless and X terminal client management menu

Enter a number, a name, the initial part of a name, ? or <number>?
for HELP, q to QUIT. 6 <Enter>

```

The Line Printer Management screen appears.

3. Type **1** to select "Define a new printer," and press the Enter key.

```

                                Line Printer Management

1  addlp       Define a new printer
2  dellp       Delete a printer
3  modlp       Modify an existing printer
4  lslp        List printers
5  defaultlp   Define the default printer
6  acceptlp    Set a printer to accept print requests
7  rejectlp    Set a printer to reject print requests
8  enablelp    Enable a printer
9  disablelp   Disable a printer
10 queuelp     Display the printer queue of a printer
11 cancellp    Cancel print requests
12 movelp      Move print requests from one printer to another
13 startlp     Start the lp scheduler
14 stoplp      Stop the lp scheduler

Enter a number, a name, the initial part of a name, ? or <number>?
for HELP,q to QUIT: 1 <Enter>

```

The beginning of the next sample screen appears.

4. Type the responses shown in bold, with the exceptions as noted in the *comments*.

```
Stop the Scheduler Now? [yes] <Enter>
Scheduler has been shut down.
Printer name? lp1 <Enter> Type the name you want to use for the printer.
Is this a local printer? [yes] <Enter>
Printer Model? [dumb] async_1200 <Enter> Type the printer's model. You should
have recorded the model on the tty Lines Worksheet. For a list of the
printer models, type list, and then press <Enter>. For a printer
on the parallel printer port of an 8-line cluster controller, type
async_9600.
Printer Device File: /dev/tty01 <Enter> If the printer is connected to a terminal line
controller port, then type the port's tty line number. If your computer
is an AViiON 400 series workstation, DO NOT type /dev/tty00
because tty00 is reserved for your workstation's mouse. If the printer
is connected to the integrated parallel printer port, type /dev/lp.
lp1 has been added.
Accept and Enable lp1? [yes] <Enter>
lp1 has been set to accept requests.
Restart the Scheduler Now? [yes] <Enter>
The scheduler has been restarted.
Press the NEWLINE key to see the lpmgmt menu [?, ^, q): <Enter>
```

Next the Line Printer Management screen reappears.

Before continuing on to Step 5, repeat Step 4 for each printer connected to your computer. In Steps 5 and 6 we will specify the default printer, which is the printer that will be used when anyone issues an **lp** print command without specifying a printer name.

5. In the Line Printer Management menu, type **5** to select "Define the default printer," and press the Enter key.

Line Printer Management

1	addlp	Define a new printer
2	dellp	Delete a printer
3	modlp	Modify an existing printer
4	lslp	List printers
5	defaultlp	Define the default printer
6	acceptlp	Set a printer to accept print requests
7	rejectlp	Set a printer to reject print requests
8	enablelp	Enable a printer
9	disablelp	Disable a printer
10	queuelp	Display the printer queue of a printer
11	cancellp	Cancel print requests
12	movelp	Move print requests from one printer to another
13	startlp	Start the lp scheduler
14	stoplp	Stop the lp scheduler

Enter a number, a name, the initial part of a name, ? or <number>?
for HELP,q to QUIT: 5 <Enter>

The system displays the beginning of the next sample screen.

6. At the New Default Printer? prompt, type the name of the printer you want for the default printer. In the sample screen below, we entered **lp1** as the default printer name.

There is no current default.
New Default Printer? **lp1** <Enter>

The new default printer is: lp1.

Press the NEWLINE key to see the lpmgmt menu [?, ^ , q] **q** <Enter>
#

Creating User Accounts

In this section, you will create your DG/UX system's user accounts. First we will set the default characteristics for all user accounts; then we will create individual user accounts. Later users can customize their individual accounts to suit their applications.

To create user accounts, proceed as follows.

1. At the # prompt, type

sysadm

and press the Enter key.

The following SYSADM MAIN MENU appears.

2. Type **7** to select "User management menu," and press the Enter key.

```

                                SYSADM MAIN MENU
1 diskmgmt      Enter the Diskman program
2 sysmgmt      System configuration management menu
3 fsmgmt       File system management menu
4 fileinfo     File information menu
5 ttygmt       TTY management menu
6 lpmgmt       Line Printer management menu
7 usermgmt     User management menu
8 uucpgmt     UUCP management menu
9 networkgmt   Network management menu
10 releasgmt   Software release management menu
11 clientgmt   Diskless and X terminal client management menu

Enter a number, a name, the initial part of a name, ? or <number>?
for HELP, q to QUIT. 7 <Enter>
```

The User management menu appears.

3. Type **1** to select "Set user account defaults," and press the Enter key.

```

                                User Management

1 userdefaults   Set user account defaults
2 adduser        Create a user account
3 deluser        Delete a user account
4 moduser        Modify a user account
5 lsuser         List user account information
6 addgroup       Add group entries
7 delgroup       Delete group entries
8 modgroup       Modify group entries
9 lsgroup        List group entries
10 addalias      Add mail alias entries
11 delalias      Delete mail alias entries
12 modalias      Modify mail alias entries
13 lsalias       List mail alias entries

Enter a number, a name, the initial part of a name, ? or <number>?
for HELP, q to QUIT. 1 <Enter>

```

The system begins to display the following screen.

4. Enter the responses shown in bold, with the options as noted below.

NOTE: Unless you are familiar with UNIX-based systems, we recommend that you take the defaults in the following example. When you are better acquainted with your DG/UX system, you can come back and modify the defaults. For information about user account management, including system security, see *Installing and Managing the DG/UX™ System*. For information about the Bourne and/or C shells, see *Using the DG/UX™ System*.

```

Enable Password Aging? [no] <Enter>
Group Name? [general] <Enter>
Parent directory of login directory? /accounts <Enter>   If you gave your user
home directory pathname a different name, substitute this name for
/accounts.

Initial Program? [/bin/sh] <Enter>   If you are familiar with shells and want to select the C
shell, type /bin/csh, and then press <Enter>. If you just press
<Enter>, you select the Bourne shell.

Press the NEWLINE key to see the usermgmt menu [?, q] <Enter>

```

Next the User Management menu reappears.

5. Type **2** to select "Create a user account," and press the Enter key.

The system begins to display the next sample screen.

6. Enter your responses as shown in bold.

NOTE: In the next sample screen, you can elect to use the reiterative capability built into this script to create numbers of user accounts in a single session.

```
User Login Name? cindy <Enter> Enter your first name or some other name of your choosing;
for example, cindy. Then press <Enter>.

Full User Name? Cindy James Enter your full name, and then press <Enter>.

User ID? [100] <Enter> Notice that the system increments the User ID number as additional
users are created.

Group Name? [general] <Enter>

Parent directory of login directory? [/accounts] <Enter>

Initial program? [/bin/sh] <Enter> Press <Enter> for the Bourne shell, or type /bin/csh
for the C shell. Then press <Enter>.

The password is currently clear.
Password Operation? [set] <Enter>

Password? july_67 <Enter> If you are creating a password for yourself, type a password name
that contains at least 6 characters, 1 of which must be a numeric or
special character; for example, july_67. Then press <Enter>. You
will need your password to log in to the DG/UX system later in this
chapter. If this account is for a user other than yourself, simply press
<Enter>. In this manner, users can create their individual passwords
as each logs in to the DG/UX system for the first time.

Do you want to edit, skip or install this user entry?
[install] <Enter>

User cindy has been added.
Do you want to add another user? [yes] <Enter> Press <Enter> if you want to add
another user, and the above prompts will be repeated. Otherwise
type n and press <Enter>.

Press the NEWLINE key to see the usermgmt menu [?, ^, q]: q <Enter>
```

You have created your user account(s).

Creating and Changing a Password

In this section, you will create a password for **root** and for **sysadm**. You can create or change a user password in the same manner.

CAUTION: Because it is easy for a novice user (or anyone) to corrupt the DG/UX kernel files when logged in as **root**, be sure to protect these files now by creating a password for **root**.

To create a password for **root**, proceed as follows.

1. At the # prompt, type
passwd root
 and press the Enter key.
 The system displays Changing password for root. Then it displays New password:
2. Type the **root** password name of your choosing, and press the Enter key. Notice that the system does not echo the password name as you type it.
 Next the system displays Re-enter new password.
3. Type the **root** password again, and press the Enter key.
 When the # prompt appears, the **root** password is set until you change it.

To create a password for **sysadm**, proceed as follows.

1. At the # prompt, type
passwd sysadm
 and press the Enter key.
 The system displays New password:
2. Type the **sysadm** password of your choosing, and press the Enter key.
 Next the system displays Re-enter new password.
3. Type the **sysadm** password again, and press the Enter key.
 When the # prompt appears, the **sysadm** password is set until you change it.

You will now need the **root** and the **sysadm** passwords to log in to these important accounts.

When you have finished creating these passwords, continue on to the next section, "Adding Terminals to Your DG/UX System."

Changing the DG/UX Run Levels

Your DG/UX system can operate in one of the several run levels described in Table 4–3.

Table 4–3 DG/UX Run Levels

Run Level	Description
S	Single user mode. The system default file systems (root and usr) are mounted.
1	Administrative mode. This mode is used to install and remove software, and to perform administrative tasks, such as checking file systems, doing backups, and so on.
2	Multiuser mode. This is the mode with the most services for those who are not operating in a network environment. All local file systems are mounted.
3	Multiuser mode with remote file system sharing (NFS) and networking. This is the mode with the most services for those who are operating in a network environment.
4	User-defined level. Used mainly for applications.
5 and 6	Undefined levels.

Normally your systems operates at run-level 2, since you do not require network services. For this reason, we used the SCM in Chapter 2 to set your system's boot path to include booting to run level 2.

Determining the DG/UX Run Level

To determine the run level of your DG/UX system, type **who -r** and press the Enter key. The DG/UX system will display the run level in a message similar to the following:

```
run-level 2          <the current date and time>      2      1
```

Moving Up and Down Run Levels

When you are operating at run level 2 and want to change to a lower run level, we recommend that you *shut down* the system as described in the “Shutting Down Your DG/UX System” section, which appears next. When the system shuts down to run-level S (single user mode), you can move to a higher run level by using the **init** command. For example, to change to run-level 1, type **init 1**, and then press the Enter key. Similarly, to change to run-level 3, type **init 2**, and then press the Enter key.

Logging In and Out of Your DG/UX System

To log into your DG/UX system as a user, proceed as follows:

1. If you are not at run-level 2, then at the # prompt, type

```
init 2
```

and press the Enter key.

The system displays messages about mounting file systems and Starting rc.xxx. When the system displays the message Press <RETURN> to display prompt, press the Enter key.

2. At the # prompt, type

```
exit
```

and press the Enter key.

The login banner shown in the sample screen below appears.

3. Type your user login name and password as shown in bold in the sample screen.

Be sure to type your login name and password exactly as you entered them when creating your user account. If you inadvertently type an incorrect name and/or password, the system will respond with a Login incorrect message, and display the login banner again. If this happens, simply re-enter you login name and password.

```

my_node                                     Your system will have a different name if you changed
                                           this "tunable parameter."
DG/UX Release 4.32
login: james <Enter>                       Type your user login name.
password: February_3                       Type your password. Notice that the system does not
                                           echo the password as you type it.

DG/UX Release 4.32 AViiON
my_node
Copyright (c) Data General Corporation, 1984-1989
All Rights Reserved

#=====
#                                     WARNING                                     #
#                                     #                                     #
# ACCESS TO AND USE OF THIS SYSTEM IS RESTRICTED TO AUTHORIZED INDIVIDUALS #
#                                     #                                     #
#                                     Data General AViiON DG/UX System         #
#                                     #                                     #
#=====
$

```

To log out of your DG/UX system, proceed as follows:

If you are in the Bourne shell, then while pressing and holding the Ctrl key, type **D**.

If you are in the C shell, then type **logout** or **exit**, and press the Enter key.

Shutting Down Your DG/UX System

To shut down your system, you must be logged in as **sysadm** or **root** and be in the **root (/)** directory. If you are logged in as a user, log out as described in the previous section, and then log in as **sysadm**. The Superuser prompt **#** will appear.

To shut down your DG/UX system, proceed as follows:

1. At the **#** prompt, type
cd /
and press the Enter key.

2. At the **#** prompt, type
shutdown -y
and press the Enter key.

NOTE: This command warns users that the system will shutdown, and gives them 60 second to exit from whatever they are doing before it starts the shutdown process. If you want to start the shutdown process immediately, use the following command instead: **shutdown -g0 -y**.

Now wait about a few seconds to a minute, depending on the command you used, for the following message to be displayed:

```
#  
INIT: New run level: S  
INIT: SINGLE USER MODE  
#
```

3. At the last **#** prompt, type
halt -q
and press the Enter key.

When the **SCM>** prompt appears, the DG/UX system is shut down.

Rebooting Your DG/UX System

When your system is shut down, you can boot the DG/UX system as follows:

At the `SCM>` prompt, type

b

and press the Enter key.

Powering Down Your Computer

If you want to power down your computer after you have shut down your DG/UX system, proceed as follows.

When the `SCM>` prompt is displayed (indicating that your system is shut down), move the ac power switch on your computer's computer unit to the OFF position. Then power down your monitor and all I/O devices connected to the computer unit, such as a peripheral housing unit and any data terminal devices, such as terminals and printers.

After your computer is shut down and powered down, your DG/UX system will automatically boot the next time you power up your computer in the following sequence: first power up any peripheral devices; then power up the computer unit.

What to Do and Where to Go Next

What you do and where you go next in the documentation set depends whether your multiuser DG/UX system will function as a stand-alone system, or as a DG/UX server or client system. If your system is a stand-alone DG/UX system, then you have finished installing it. If your system is a DG/UX server or client system, then you should go to the *Initially Installing and Setting Up the DG/UX™ System on AViiON® Servers with Clients* manual to complete the installation. In that manual, go to either Chapter 4, "Setting Up the DG/UX Server to Support Clients," or Chapter 5, "Booting and Setting Up a Diskless OS Client Workstation," depending on your system.

End of Chapter

Appendix A

Starting the Installation with DG/UX Release Tapes

This appendix describes the initial part of the DG/UX installation on AViiON computers that do not have a preloaded DG/UX system disk. In this appendix, you will perform the following tasks:

- Boot the stand-alone Diskman utility.
- Use Diskman to initialize and register physical disks, and to create **root**, **usr**, and **swap**.
- Load DG/UX 4.30 software into the **root** and **usr** file systems.
- Update the **root** and **usr** filesystems with DG/UX 4.32 software.
- Boot the DG/UX 4.32 Starter System.
- Load DG/UX 4.30 and DG/UX 4.32 system software packages.

To perform the above tasks, you must have the DG/UX 4.30 release tape and the DG/UX 4.32 update tape.

When you complete the procedures outlined in this appendix, your system will closely parallel a preloaded DG/UX system shipped from the factory. Then you will be ready to proceed with the remainder of the DG/UX installation described in Chapter 2 of this manual.

Booting Stand-Alone Diskman from Tape

To boot stand-alone Diskman from tape, proceed as follows.

1. Power up your system console and any other devices that are connected to your computer unit via cable; for example, a peripheral housing unit containing mass storage devices, and the terminals and printers connected to your computer. Be sure that the terminals and printers are also set for on-line mode.
2. Power up your computer unit.

As the system hardware initializes and the computer's self-tests run, you will hear beeps and see the system display the following screen.

```
(c)Data General Corporation 1989, 1990
Model nnnn Series          nnnn means this information varies with the
                             particular AViiON computer model.

[Single/Dual] Processor
Firmware Revision nnnnnn
Keyboard Language is U.S.English
Local Ethernet address is 08:00:1B:nn:nn:nn This may not be
                                         displayed for your computer.

Initializing [n] Megabytes

Testing.....
    0123456789ABCDEFGHIJKLMNPOQRSTUVWXYZ
Passed

SCM>
```

When your computer completes its self-test satisfactorily, you will see the message Passed displayed on your system console. Then the SCM> prompt appears.

CAUTION: If your computer displays error messages or does not complete the self-test satisfactorily, stop here. See the appropriate Setting Up and Starting manual for your computer. It provides troubleshooting instructions.

3. Insert the DG/UX 4.32 update tape in your cartridge tape drive with SCSI ID number 4.
4. At the SCM> prompt, type
b st(cisc(),4)
and press the Enter key.

The DG/UX device name used in the command above refers to the SCSI-based cartridge tape unit, jumpered for SCSI ID 4 and connected to an integrated SCSI controller. If your computer is an AViiON 3000 series or AViiON 4000 series, substitute **st(isc(),4)** for **st(cisc(),4)**.

The DG/UX bootstrap program starts loading Diskman, and the beginning of the next sample screen appears.

5. Type the device name(s) shown in bold exactly as they appear in the sample DG/UX Starter System screen shown below. When the last Device Name? prompt appears, just press the Enter key.

NOTE: If you make a typing error while entering a device name, simply press the Enter key, and retype the device name correctly when the next Device Name? prompt appears. Using the Backspace or Delete key will not correct a typing error in this screen.

```

Booting st(cisc(),4)

DG/UX Bootstrap Release 4.31
Skipping tape file 1.

=====

DG/UX System Release 4.32, Version Diskman
Using [n] megabytes of physical memory
Found 1 processor(s)
Processor 0 running

                DG/UX Starter System

Enter the names of the devices you will use in Common Device Specification
Format, with one name per line. Enter just newline when done.
Examples: sd(insc(),0) st(insc(),4) cird() st(cisc(),4)

Include duart() for servers and kbd() and grfx() for workstations.

Device Name?  duart() <Enter>
Device Name?  <Enter>

```

Using Diskman to Perform the Initial Installation

After the bootstrap program displays a few messages, the Diskman Main Menu appears, and item 4, "Initial Installation Menu," is displayed in reverse-video format, as shown in the sample screen that follows.

1. Type 4 to select the "Initial Installation Menu," and press the Enter key.

```

                                Diskman Main Menu

1.  Physical Disk Management Menu
2.  Logical Disk Management Menu
3.  File System Management Menu
4.  Initial Installation Menu
5.  Update Installation Menu

Enter ? or <number>? for HELP, ^ to GO BACK, or q to QUIT
Enter choice:  4 <Enter>
```

The Initial Installation Menu appears, and item 7, "All Installation Steps," appears in reverse-video format, as shown in the sample screen below.

2. Type 7 to select "All Installation Steps," and press the Enter key.

```

                                Initial Installation Menu

1.  Initialize Physical Disks
2.  Create the Root Logical Disk and File System
3.  Create the Swap Logical Disk
4.  Create the /usr Logical Disk and File System
5.  Load the Root File System
6.  Load the /usr File System
7.  All Installation Steps

Enter ? or <number>? for HELP, ^ to GO BACK, or q to QUIT
Enter choice:  7 <Enter>
```

The beginning of several sample Initial Installation screens appears. Each sample screen leads you through one or more of the six installation steps listed in the Initial Installation Menu shown above. Be sure to type the responses shown in bold with the exceptions as noted. Also watch for the comments that tell you to remove the DG/UX 4.32 update tape and insert the DG/UX 4.30 release tape.

All Installation Steps

1. Initialize Physical Disks

Do you want to run this step? [y] **<Enter>**

Enter the Physical Disk Specification in DG/UX common format:

sd(cisc(), 0) **<Enter>** *Substitute the DG/UX device name of the disk you are using as the system disk if different than sd(cisc(), 0).*

Install a Disk Label on a Physical Disk

Do you want to run this step? [y] **<Enter>**

Disk label already exists on disk sd(cisc(), 0).

Do you want to reinstall disk label? [n] **y **<Enter>****

*What the system displays next depends on the type of disk you are formatting (initializing).
If you are formatting a SCSI-based disk, the system will display the following:*

Installing generic SCSI label on SCSI device.

Disk Label has been reinstalled.

If you are formatting an ESDI or SMD disk, the system will display the following:

Disk Types			
1.	6442	ESDI	322MB
2.	6555	ESDI	648MB
3.	6661	ESDI	322MB
4.	6541	SMD	1066MB
5.	None of the Above		

Enter the type of disk that you have: **4 **<Enter>**** *Type the number for your disk type; for example, type 4. If you are formatting an unlisted disk, type 5 and respond to the DG/UX prompts relating to your disk drive.*

Disk label has been installed.

Perform Hardware Formatting on a Physical Disk

Do you want to run this step? [y] **<Enter>**

WARNING: this operation will DESTROY any data on the Physical Disk sd(cisc(), 0).

Do you want to continue? [y] **<Enter>**

Create DG/UX System Areas on a Physical Disk

Do you want to run this step? [y] **<Enter>**

WARNING: this operation will DESTROY any data on the Physical Disk sd(cisc(), 0).

Do you want to continue? [y] **<Enter>**

The Physical Disk sd(cisc(), 0) is 631053 blocks in size *Based on the size of your disk, the number of blocks specified above may be different.*

Enter the number of blocks to allocate for the Remap Area: [189] **<Enter>**

Enter the pathname of the boot.aviion file: [/usr/stand/boot.aviion]

<Enter>

(continued)

All Installation Steps (continued)

=====

1. Initialize Physical Disks (continued)

Perform Surface Analysis on a Physical Disk

Do you want to run this step? [y] **y/n** **<Enter>** *Surface analysis builds a bad block table that specifies areas of the disk where the system should not store data. If you type y to this question, allow approximately 20 minutes per 100 megabytes of disk space for the system to perform this analysis.*

Do you want to format another Physical Disk? [n] **y/n** **<Enter>** *If you have a computer with a single hard disk, just press <Enter>. If you have additional hard disks, type y and then press <Enter>. Diskman will repeat the steps described above. After all hard disks are initialized, just press <Enter> to exit this procedure.*

2. Create the Root Logical Disk and File System

Do you want to run this step?[y] **<Enter>**

Enter the Logical Disk Name: [root] **<Enter>**

Enter the Physical Disk specification in DG/UX common format:

[sd(cisc(),0)] **<Enter>** *This is the DG/UX device name of the disk you specified as your system disk. Thus, the name displayed here may be different on your system.*

The Physical Disk must be registered for this operation.

Do you want to register it? [y] **<Enter>**

Physical Disk sd(cisc(),0) has been registered.

Do you want to display the layout of this Physical Disk? [n] **<Enter>**

Enter the Physical Disk Address of the starting block of the Logical Disk Piece: [729] **<Enter>**

Enter the size in blocks of the Logical Disk Piece: [40000] **<Enter>**

The Logical Disk 'root' has been created.

Making a file system on logical disk 'root' . . .

Made a File System on the Logical Disk 'root'.

3. Create the Swap Logical Disk

Do you want to run this step?[y] **<Enter>**

Enter the Logical Disk Name: [swap] **<Enter>**

Enter the Physical Disk specification in DG/UX common format:

[sd(cisc(),0)] **<Enter>**

Do you want to display the layout of this Physical Disk? [n] **<Enter>**

Enter the Physical Disk Address of the starting block of the Logical Disk Piece: [40729] **<Enter>** *Take the default by pressing <Enter>.*

Enter the size in blocks of the Logical Disk Piece: [50000] *Pressing <Enter> here selects the default size of the swap logical disk. If the physical disk you specified above is a 179-megabyte disk, the default size is 32,768 blocks instead of 50,000 blocks. If you want to increase its size, type the new number of disk blocks; for example, 75000. Then press <Enter>.*

The Logical Disk 'swap' has been created.

(continued)

All Installation Steps (continued)

4. Create the /usr Logical Disk and File System

Do you want to run this step?[y] **<Enter>**
 Enter the Logical Disk Name: [usr] **<Enter>**
 Logical Disk Piece 1:
 Enter the Physical Disk specification in DG/UX common format:
 [sd(cisc(),0)] **<Enter>**
 Do you want to display the layout of this Physical Disk? [n] **<Enter>**
 Enter the Physical Disk Address of the starting block of Logical
 Disk Piece 1: [90729] **<Enter>**
 Enter the size in blocks of Logical Disk Piece 1: [160000] *Pressing **<Enter>**
 here selects the default size of the **usr** logical disk. If you want to
 increase the size of **usr**, type the new number of disk blocks; for
 example, 200000. Then press **<Enter>**.*

Do you want to specify any more Pieces for this Logical Disk? [n] **<Enter>**
 The Logical Disk 'usr' has been created.

Making a file system on logical disk 'usr' ...

Made a File System on the Logical Disk 'usr'.

5. Load the Root File System

Do you want to run this step? [y] **<Enter>**

Do you want to see the names of the files being loaded? [y] **n <Enter>**
*We recommend that you answer no (n) to this prompt. "Yes" extends
 the load time and makes it difficult to read error messages, if present.*

Enter the Logical Disk Unit Name: [root] **<Enter>**
 Enter the tape drive specification in DG/UX common format:
st(cisc(),4) <Enter> *Substitute the DG/UX device name of your cartridge tape drive, as
 required; for example, st(insc(),0)*

Ready to load the Root File System.

Mount the first release tape on the tape drive st(cisc(),4).

*REMOVE THE DG/UX 4.32 UPDATE TAPE NOW. Then insert the DG/UX 4.30 release tape.
 When this is done, continue on. (In this manner, you first load the DG/UX 4.30 software into root
 and usr. Later in this appendix, you will update root and usr by loading the DG/UX 4.32 software.*

Press New Line when ready to continue . . . **<Enter>**

Loading . . .
 Loading . . . *Allow several minutes for the loading process to complete.*
 Loading . . .

.

.

The Root File System has been loaded.

(continued)

All Installation Steps (continued)

=====

6. Load the /usr File System

Do you want to run this step? [y] **<Enter>**

Do you want to see the names of the files being loaded? [y] **n <Enter>**

We recommend that you answer no (n) to this prompt. "Yes" extends the load time and makes it difficult to read error messages, if present.

Enter the Logical Disk Unit Name: [usr] **<Enter>**

Enter the tape drive specification in DG/UX common format:

st(cisc(),4) <Enter>

Ready to load the /usr File System.

Mount the first release tape on the tape drive st(cisc(),4).

Press New Line when ready to continue . . . **<Enter>**

Loading . . .

Loading . . .

Allow about 20 minutes for the software loading process to complete.

Loading . . .

.

.

The /usr File System has been loaded.

Your starter system has been installed.

Press New Line when ready to continue **<Enter>**

(concluded)

The system again displays the Initial Installation Menu.

The DG/UX release 4.30 **root** and **usr** software is now installed.

3. At Enter choice:, type

^

and press the Enter key.

The Diskman Main Menu shown below appears.

4. Remove the DG/UX release 4.30 tape from your cartridge tape drive, and again insert the DG/UX 4.32 update tape.

In the next few steps, you will update the 4.30 **root** and **usr** software with the 4.32 software.

5. Type **5** to select the "Update Installation Menu," and press the Enter key.

```

                                Diskman Main Menu

1.  Physical Disk Management Menu
2.  Logical Disk Management Menu
3.  File System Management Menu
4.  Initial Installation Menu
5.  Update Installation Menu

Enter ? or <number>? for HELP, ^ to GO BACK, or q to QUIT
Enter choice:  5 <Enter>
```

6. Type **3** to select "All Update Steps," and press the Enter key.

```

                                Update Installation Menu

1.  Update the Root File System
2.  Update the /usr File System
3.  All Update Steps

Enter ? or <number>? for HELP, ^ to GO BACK, or q to QUIT
Enter choice:  3 <Enter>
```

When you perform all the update steps, you load the DG/UX 4.32 update software over the DG/UX 4.30 **root** and **usr** software.

7. Type the responses shown in bold in the sample screen below.

All Update Steps

=====

1. Update the Root File System

Do you want to run this step? [y] <Enter>

Do you want to see the names of the files being loaded? [y] n <Enter>

Enter the Logical Disk Unit Name: [root] <Enter>

Enter the tape drive specification in DG/UX common format: st(cisc(),4) <Enter>

Substitute the DG/UX device name of your cartridge tape drive, as required.

Ready to load the Root File System.

Mount the first release tape on the tape drive st(cisc(),4).

Press New Line when ready to continue . . . <Enter>

Loading . . .

.
. .
.

The Root File System has been loaded.

Press New Line when ready to continue . . . <Enter>

2. Update the /usr File System

Do you want to run this step [y] <Enter>

Do you want to see the names of the files being loaded? [y] n <Enter>

Enter the Logical Disk Unit Name: [usr] <Enter>

Enter the tape drive specification in DG/UX common format: {st(cisc(),4)} <Enter>

Ready to load the /usr File System.

Mount the first release tape on the tape drive st(cisc(),4).

Press New Line when ready to continue . . . <Enter>

Loading . . .

.
. .
.

The /usr File System has been loaded.

Your system has been updated.

You can now boot a kernel from disk.

Do you want to return to the SCP-CLI? [y] <Enter> *The SCP-CLI in this context refers to the SCM, that is the System Control Monitor.*

When the SCM> prompt appears, the DG/UX Release 4.32 update is installed.

You are now ready to boot the DG/UX Release 4.32 Starter System.

8. Remove your DG/UX 4.32 tape from the cartridge tape drive, and put it and the DG/UX 4.30 tape aside. You will need them again to load DG/UX software packages.

Booting the DG/UX Starter System

Proceed to boot the DG/UX Starter System as follows.

1. At the SCM> prompt, type the following (substituting the DG/UX device name of your system disk, as required):

b sd(cisc(),0)root:/dgux.starter

and press the Enter key.

Immediately the DG/UX starter system begins to boot, and the beginning of the next sample screen appears.

2. Respond to the Device Name? prompts in the next sample screen, based on the following:

- The system console you are using.
- The DG/UX device names of the physical disks present in your system.
- The DG/UX device name of the cartridge tape drive you are using to load software.

See your Logical Disk Planning Worksheet 2 (or the appropriate I/O device table for your computer or workstation in Chapter 1) for the DG/UX device names of the physical disk drives on your system.

```
Booting sd(cisc(),0)root:/dgux.starter
```

```
DG/UX Bootstrap Release 4.31
```

```
=====
DG/UX System Release 4.32, Version (starter)
Using [n] megabytes of physical memory
Found 1 processors(s)
Processor 0 running
```

```
DG/UX Starter System
```

```
Enter the names of the devices you will use in Common Device Specification
Format, with one name per line. Enter just newline when done.
```

```
Examples: sd(inc(),0) st(inc(),4) cird() st(cisc(),4)
```

```
Include duart() for servers and kbd() and grfx() for workstations.
```

```
Device Name? duart() <Enter>
```

```
Device Name? sd(cisc(),*) <Enter>
```

```
Device Name? st(cisc(),4) <Enter>
```

```
Device Name? <Enter>
```

Substitute the device names shown above for the disks and cartridge tape drive according to your system configuration. Notice that the asterisk in the device name sd(cisc(),) means all disk drives connected to Ciprico SCSI controller 0. If you have more than one Ciprico SCSI controller in your computer, add the disk drives connected to these controllers as well; for example, sd(cisc(1),*).*

When you complete this step, the system displays the following messages.

```
Using /dev/dsk/swap as swap file

** root:
No check necessary for root

Mounting /dev/dsk/root as root file system

INIT:   Boot options are:  init
INIT:   Cannot open /etc/TIMEZONE. Environment not
        initialized.

INIT:   /etc/inittab file created from
        /etc/inittab.prototype

INIT:   Checking and mounting /usr...

INIT:   /usr is now mounted

INIT:   SINGLE USER MODE
su:     unable to access /etc/passwd

#
```

Ignore the comments about `TIMEZONE` and `passwd`.

3. At the `#` prompt, type

`init 1`

and press the Enter key.

The `#` sign is the superuser prompt, which means you have system-wide privileges. The `init 1` command changes the DG/UX run level from level S (single-user mode) to level 1 (administrative mode).

NOTE: If you make a typing error when entering a command, such as `init 1`, use the Delete key to erase the error. Then retype the command correctly.

4. The system displays the current date and time, and asks if the information displayed is correct. Type `y`, and then press the Enter key. If this information is incorrect, we will correct it in the “Changing the Date and Time” section in Chapter 4 of this manual.

Notice that the system displays time in a 24-hour format; for example, 08:15 means 8:15 a.m. while 14:30 means 2:30 p.m.

```

chk.fsck:

chk.date:
  Current date/time: Wed April 17 08:15 EDT 1991
  Are the current date, time, and TIMEZONE correct?
    (y n) [n]: y <Enter>

Setting up package: dgux

Initializing system database files from .proto files:

```

As several screens scroll forward, you will see messages about initializing prototype files. Watch for the prompt that appears in the sample screen below.

5. Type the responses exactly as shown in bold.

```

initialize /etc/passwd
.
.
.initialize /etc/sysadm/uucp
.
.
The following file systems are now mounted:

/dev/dsk/root on / type dg/ux (rw)
/dev/dsk/usr on /usr type dg/ux (rw)
.
.
Press <RETURN> to display prompt

no_node
DG/UX Release 4.32
login: sysadm <Enter>
DG/UX Release 4.32 AViION
no-node
.
.
=====
                          WARNING
ACCESS TO AND USE OF THIS SYSTEM IS RESTRICTED TO
AUTHORIZED INDIVIDUALS!
      Data General AViION System  DG/UX Release 4.32
=====
#

```

You are now logged in as **sysadm**.

Loading System Software Packages

In this section, you load the DG/UX system software packages in two steps: first, you load the packages on your DG/UX release 4.30 tape; second, you load the update software packages on your DG/UX 4.32 update tape.

You will notice in the following two sample screens that many software packages are loaded twice, and others are loaded once. Those loaded a second time are receiving update software.

To load the DG/UX system software packages, proceed as follows.

1. Insert your DG/UX release 4.30 tape in your cartridge tape drive with SCSI ID 4; for example, **st(cisc(),4)**.

2. At the # prompt, type
sysadm makesrv
and press the Enter key.

The system creates the **/srv** directory tree, which must exist for the system to load a software package.

3. At the # prompt, type
sysadm loadpackage
and press the Enter key.

The beginning of the sample screen shown below appears.

4. Type the responses shown in bold, with the exceptions as noted by the *comments*.

NOTE: In the following sample screen, the DG/UX system now refers to the cartridge tape drive (**st(cisc(),4)** or **st(insic(),4)**, depending on your system) as **Tape Drive 0**.

If you are loading the DG/UX Client/Server User's Package instead of the Operating System User's Package, you will see prompts for the following additional packages that are not shown in the sample screen below: **X11.lg**, **X11.man**, **X11**, **nfs.man**, **nfs**, **tcpip.man**, **tcpip**. **DO NOT** load these additional packages.


```

Running subcommand 'loadpackage' from menu 'releasemgmt',
Software Release Management

Release Area? [PRIMARY] <Enter>
Tape Drive? [0] <Enter>
Is the tape mounted and ready? y <Enter>

Load Package dgux.man?[yes] <Enter>      This contains the DG/UX manual pages.
Load Package dtk.man?[yes] <Enter>      This contains the Documenter's Tool Kit
                                          manual pages.
Load Package dtk?[yes] <Enter>          This contains the Documenter's Tool Kit software.
Load Package gcc.man?[yes] <Enter>      This contains the GNU C manual pages.
Load Package gcc?[yes] <Enter>          This contains the GNU C compiler.

List file names while loading?[yes] <Enter>
Mount Volume 1
Is the tape mounted and ready? y <Enter>

Skipping tape files 0 to 49              Allow 20 to 30 minutes for this software to load.
.
.
.
.
.
loadpackage is finished
#

```

When the # prompt appears on your screen, your DG/UX 4.30 software packages are loaded.

5. Remove your DG/UX release 4.30 tape. Then insert your DG/UX 4.32 update tape in your cartridge tape drive with SCSI ID 4; for example, **st(cisc(),4)**.

6. At the # prompt, type
sysadm loadpackage
and press the Enter key.

The beginning of the next sample screen appears.

7. Type the responses shown in bold with the exceptions as noted by the *comments*.

NOTE: If you are loading the DG/UX Client/Server User's Package instead of the Operating System User's Package, you will prompts for the following additional packages that are not shown in the sample screen below: **X.11.doc**, **X11.lg**, **X11.man**, **X11**, **Xserv.sde**, **nfs.man**, **nfs**, **tcpip.man**, **tcpip**, **XPG3.dgux**, and **XPG3.man3**. **DO NOT** load these additional packages.

```
Running subcommand 'loadpackage' from menu 'releasemgmt',
Software Release Management

Release Area? [PRIMARY] <Enter>
Tape Drive? [0] <Enter>
Is the tape mounted and ready? y <Enter>

Load Package dgux.man?[yes] <Enter>    This contains the DG/UX manual pages.
Load Package dgux.patch?[yes] <Enter>  This contains a patch for DG/UX 4.32.
Load Package gcc?[yes] <Enter>        This contains the GNU C compiler.

List file names while loading?[yes] <Enter>
Mount Volume 1
Is the tape mounted and ready? y <Enter>

Skipping tape files 0 to 12           Allow 20 to 30 minutes for this software to load.
.
.
.
.
loadpackage is finished
#
```

When the # prompt appears on your screen, your DG/UX 4.32 update software packages are loaded.

You can remove your DG/UX 4.32 update tape from the cartridge tape drive. Be sure to store the DG/UX Release 4.30 tape and the DG/UX 4.32 update tape in a secure place so they will be available if you need them in the future.

Where to Go Next

Your system is partially installed and closely parallels the state of a new preloaded DG/UX system.

Now go to the "Creating a Logical Disk" section in Chapter 2.

End of Appendix

Appendix B

Worksheets

This appendix contains copies of the following worksheets from Chapters 1, 3, and 4:

- Logical Disk Planning Worksheet
- Physical Disk Planning Worksheet
- Terminal Line Controllers Worksheet
- Device Worksheet for RS/232/422 Ports on the Computer Unit
- Device Worksheet for a VAC/16 Controller
- Device Worksheet for a VDA Host Adapter
- tty Lines Worksheet

Logical Disk Planning Worksheet

DG/UX Server Logical Disks			
Logical Disk Name	Formula for Calculating Logical Disk Size	Blocks Preloaded	Blocks When Tape-Loaded
swap	If preloaded, fixed size of 50,000 blocks. If tape-loaded, (1.5 x main memory) + (optional blocks for memory-intensive applications software) = total disk blocks.	50,000	
root	Fixed size of 40,000 blocks.	40,000	40,000
usr	If preloaded, fixed size of 160,000 blocks. If tape-loaded, 160,000 (minimum) + optional usr blocks as required by add-on software = total disk blocks.	160,000	
accounts	Variable size, based on number of users and users' system activity.		
var_tmp	Optional logical disk; size is application-dependent.		
	Disk Blocks Subtotal		
Add-on Software Logical Disks			
Logical Disk Name	Name of Software Package	Blocks	Blocks
	Disk Blocks Subtotal		
DG/UX System Logical Disk Blocks		Total	

Physical Disk Planning Worksheet

Logical Disk Name	Mount Point	System Disk		Optional Disk		Optional Disk	
		No.	Mbytes Blocks	No.	Mbytes Blocks	No.	Mbytes Blocks
swap (on system disk)	-	1	50,000				
root (on system disk)	/	1	40,000				
usr (on system disk)	/usr	1	160,000				
accounts	/accounts						
var_tmp	/var/tmp						
Total Disk Blocks Used per Disk							
Total Disk Block Capacity per Disk							
Available Disk Blocks per Disk							

Terminal Line Controllers Worksheet

Board No.	Device Name	Configuration File Position	Board or Port Type	Cluster Controllers			
				Address	No. Lines	Address	No. Lines
	duart()						
	duart(1)						
0	syac()			01		09	
				02		0A	
				03		0B	
				04		0C	
				05		0D	
				06		0E	
				07		0F	
				08		10	
1	syac(1)			01		09	
				02		0A	
				03		0B	
				04		0C	
				05		0D	
				06		0E	
				07		0F	
				08		10	
2	syac(2)			01		09	
				02		0A	
				03		0B	
				04		0C	
				05		0D	
				06		0E	
				07		0F	
				08		10	
3	syac(3)			01		09	
				02		0A	
				03		0B	
				04		0C	
				05		0D	
				06		0E	
				07		0F	
				08		10	
4	syac(4)			01		09	
				02		0A	
				03		0B	
				04		0C	
				05		0D	
				06		0E	
				07		0F	
				08		10	

Device Worksheet for RS-232/422 Ports On Computer Unit

Port type:		Device name: duart()
tty Line	Device Type	Description
Port type:		Device name: duart(1)
tty Line	Device Type	Description

Device Worksheet for a VAC/16 Controller

Board no:		Device name:		Range of tty lines:			
Port No.	tty Line	Device Type	Description	Port No.	tty Line	Device Type	Description
0				8			
1				9			
2				10			
3				11			
4				12			
5				13			
6				14			
7				15			

Device Worksheet for a VDA Host Adapter

Sheet 1 of ____

Board type:		Board no:		Device name:		Range of tty lines:			
Cluster Address	Port No.	tty Line	Device Type	Description	Cluster Address	Port No.	tty Line	Device Type	Description
01	0				02	0			
	1					1			
	2					2			
	3					3			
	4					4			
	5					5			
	6					6			
	7					7			
	8					8			
9	9				10	9			
	10					10			
	11					11			
	12					12			
	13					13			
	14					14			
	15					15			

Device Worksheet for a VDA Host Adapter

Sheet ___ of ___

Board type:					Board no:				
Cluster Address	Port No.	tty Line	Device Type	Description	Cluster Address	Port No.	tty Line	Device Type	Description
	0					0			
	1					1			
	2					2			
	3					3			
	4					4			
	5					5			
	6					6			
	7					7			
	8					8			
	9					9			
	10					10			
	11					11			
	12					12			
	13					13			
	14					14			
	15					15			

Appendix C

Setting Up a Microcom AX Series Modem

To connect an asynchronous terminal to a Systech terminal line controller over a dial-up telephone line, you need two modems: one that connects the asynchronous terminal to a dial-up line, and another that connects a dial-up line to the terminal line controller port. In this appendix, we will set up two Microcom AX/2400 modems to make these connections.

A Microcom AX/2400 modem has two sets of configuration switches that you must set for it to operate properly. One set is located on the rear of the modem, and the other set is located behind the plastic label on the front of the modem. The front switch settings will be the same for both the modems, and the back switch settings will be slightly different .

Set the front configuration switches on *both* modems to the settings listed in Table C-1.

C-1 Both Modems: Front Switch Settings

Switch	Position	Function
1	Up	On initialize, go off the hook and wait for the 4 5 sequence to be entered on the terminal. (This sequence configures the serial port speed and parity.) When the T/D button is pressed, go off hook in originate mode.
2	Up	Select SX mode, the mode to use for an asynchronous terminal.
3	Down	Ignore Request To Send (RTS).
4	Down	Ignore test mode signal.
5	Up	On initialize, disable the inactivity timer, which determines how long the modem waits before hanging up when no data is sent or received.
6	Up	Disable the automatic adjustment of the serial port speed.
7	Down	Data Send Request (DSR) and Clear To Send (CTS) follow Carrier Detect (CD).
8	Down	Initialize the modem on RESET or power up.
9, 10	Up	

Set the *rear* configuration switches for the terminal line controller port's modem to the settings listed in Table C-2.

C-2 Modem Connected to Terminal Line Controller Port: Rear Switch Settings

Switch	Position		Function
1, 2	Up	Up	Enable bidirectional XON/XOFF flow control for serial port, and set modem port flow control to XON/XOFF.
3, 4	Up	Down	Select auto-answer and auto-reliable modes.
5	Down		Carrier Detect (CD) always on, except for a few seconds at disconnect.
6, 7, 8	Down	Up Down	Set serial port speed to 2400 bps, 8 bits, no parity.

Set the *rear* configuration switches for the terminal's modem to the settings listed in Table C-3.

C-3 Modem Connected to Terminal: Rear Switch Settings

Switch	Position		Function
1, 2	Up	Up	Enable bidirectional XON/XOFF flow control for serial port, and set modem port flow control to XON/XOFF.
3, 4	Up	Up	Disable auto-answering, and select normal operating mode (no error correction.)
5	Up		No effect.
6, 7, 8	Down	Up Down	Set serial port speed to 2400 bps, 8 bits, no parity.

For more information on the either set of switches, refer to the owner's manual for the modem.

End of Appendix

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 Items	\$5.00
5-10 Items	\$8.00
11-40 Items	\$10.00
41-200 Items	\$30.00
Over 200 Items	\$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
\$0-\$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.

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 _____	ATTN: _____	COMPANY NAME _____	ATTN: _____
ADDRESS _____		ADDRESS (NO PO BOXES) _____	
CITY _____		CITY _____	
STATE _____	ZIP _____	STATE _____	ZIP _____

Priority Code _____ (See label on back of catalog)

Authorized Signature of Buyer _____ Title _____ Date _____ Phone (Area Code) _____ Ext. _____
 (Agrees to terms & conditions on reverse side)

ORDER #	QTY	DESCRIPTION	UNIT PRICE	TOTAL PRICE

A SHIPPING & HANDLING
<input type="checkbox"/> UPS ADD
1-4 Items \$5.00
5-10 Items \$8.0
11-40 Items \$10.00
41-200 Items \$30.00
200+ Items \$100.00
Check for faster delivery
<small>Additional charge to be determined at time of shipment and added to your bill.</small>
<input type="checkbox"/> UPS Blue Label (2 day shipping)
<input type="checkbox"/> 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																															
<input type="checkbox"/> Purchase Order Attached (\$50 minimum) P.O. number is _____ (Include hardcopy P.O.)																															
<input type="checkbox"/> Check or Money Order Enclosed																															
<input type="checkbox"/> Visa <input type="checkbox"/> MasterCard (\$20 minimum on credit cards)																															
Account Number	Expiration Date																														
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Authorized Signature _____																															
<small>(Credit card orders without signature and expiration date cannot be processed.)</small>																															

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.

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Customer understands that information and material presented in the AOS/VIS 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.

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