Installing the
DG/UX® System

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093–701087–09

> *For the latest enhancements, cautions, documentation changes, and other information on this product, please see the Release Notice (085–series) and/or Update Notice (078–series) supplied with the software.*

Notice

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Preface

This manual describes how to install the DG/UX® Release 4.11 operating system and the optional DG/UX information security software. These products are available for both Intel-based and 88K-based systems. The software models are as follows.

- DG/UX System with X Window System™ (Model No. P001)

  Available on both Intel-based and 88K-based systems.

- DG/UX System (Model No. Q001)

  Available on 88K-based systems only.

- DG/UX DSO Information Security (Model No. Q061)

  Optional security software available on both Intel-based and 88K-based systems.

This manual also explains how to upgrade your system from DG/UX release 5.4R3.00 or later to one of the above DG/UX R4.11 models.

IMPORTANT   If you are running DG/UX 5.4R2.10 or earlier, you must install DG/UX 5.4R3.00 *before* you can upgrade to DG/UX R4.11.

Although this manual does not require expert knowledge of UNIX®, some system administration training or knowledge will help if you are making changes to the default DG/UX System configuration. If you need to review commonly used UNIX commands or the file system layout of the UNIX operating system, you can refer to *Using the DG/UX® System* for general information on these and other topics.

The DG/UX manuals for the DG/UX operating system are on the documentation CD-ROM. If you want, you can view the documentation CD-ROM on a PC *before* the DG/UX software is up and running. Or, after you complete your installation, you can view or set up the documentation CD-ROM on your system. For instructions on how to load, set up, and view the documentation CD-ROM, refer to the *Quick Start Guide for Viewing DG/UX® Documentation.*

IMPORTANT   The documentation for information security software is not included on the DG/UX documentation CD-ROM. Information security software ships with the necessary printed manuals.

How this manual is organized

This manual is the first in a set of documents that address DG/UX system administration tasks. After completing the tasks in this manual, you then go to one of the manuals listed in the "Related Documents" section, later in this Preface.

This manual contains the following chapters and appendixes:

Chapter 1   **Before you start**

Provides information you need before installing or upgrading your system. Helps you collect the information you supply during the installation or upgrade procedure and introduces concepts to help you plan disk resources.

Chapter 2   **Completing installation of your preloaded system**

For users whose computer system was preloaded at the factory with the DG/UX system software. Gives instructions for powering up your computer system, setting up software packages, and building and booting a kernel.

Chapter 3   **Performing a full installation of the DG/UX system from local release media**

For installing the DG/UX operating system on a clean or newly formatted system disk. Explains powering up the computer system, booting the release media to start the DG/UX installer program, completing package setup, and building and booting a kernel.

Chapter 4   **Upgrading your DG/UX System**

For installing the DG/UX R4.11 software on a 5.4R3.00 or later system.

Chapter 5   **Installing or upgrading from remotely mounted release media**

Explains steps required to install or upgrade the DG/UX software on a computer system whose hardware configuration does not include a local (physically attached) tape or CD-ROM drive.

Chapter 6   **Installing information security software**

For administrators of information security software. This chapter explains how to install the DG/UX R4.11 with information security, log in, and set required passwords.

Chapter 7   **Completing your installation**

Explains tasks necessary to complete installation, such as logging in, assigning passwords to the root and sysadm accounts, and documenting your configuration. Tells where to go for information about additional configuration tasks, and setting up the documentation CD-ROM.

Chapter 8   **Fixing problems**

Explains how to respond to installation or upgrade problems.

Appendix A   **Planning worksheets**

Supplies blank planning worksheets to record the information you provide during the installation procedure.

Appendix B   **Sample installation dialog for 88K-based systems**

Contains the screen dialog for a typical DG/UX installation on an 88K-based system using a local CD-ROM device.

Appendix C   **Sample installation dialog for Intel-based systems**

Contains the screen dialog for a typical DG/UX installation on an Intel-based system using a local CD-ROM device.

Appendix D   **Using the boot command**

Presents additional information on the DG/UX **boot** command, much of which is taken from the online man page and printed here for quick reference.

Related documents

The manuals listed in this section contain detailed information on topics that are introduced in this manual. For instructions on how to load, set up, and view the documentation CD-ROM, refer to the *Quick Start Guide for Viewing DG/UX® Documentation* (069–701129). One of the on-line documents lists all the DG/UX manuals. This section only lists the manuals referred to in the installation procedures.

If you require additional manuals, please contact your local Data General sales representative.

DG/UX system administrator manuals

Analyzing DG/UX® System Performance (093-701129).

Tells how to analyze DG/UX system performance and fine-tune a system. Explains how the DG/UX system uses the CPU, virtual memory, file systems, and I/O devices.

Configuring and Managing a CLARiiON® Disk-Array Storage System — DG/UX® Environment (014–002323).

For system operators, this manual explains how to configure and manage a Series 2000 or Series 1000 disk-array storage system with AViiON computers and the DG/UX operating system. It describes how to plan, configure, and manage the storage system, and complements the storage-system installing and maintaining manual and the DG/UX operating system manuals.

Installing and Managing Printers on the DG/UX® System (093–701132).

Describes how to install, configure, and manage printers on the DG/UX system. It provides instructions for connecting cables, selecting the proper **stty** options and emulation modes, and troubleshooting printer problems.

Legato NetWorker Administrator's Guide (069–100495).

Explains the setup and maintenance procedures for the NetWorker backup software. Tells how to set up the NetWorker server, its clients, and backup devices. Describes how to set up backup schedules, groups, levels, and policies, and how to prepare backup tapes, perform routine tasks, and recover from disk failures.

Managing Mass Storage Devices and DG/UX® File Systems (093–701136).

Explains how to manage disk and tape drives. Also explains DG/UX file systems, virtual disks, mirrors, and caching.

Managing the DG/UX® System (093–701088).

Discusses the concepts of DG/UX system management. Explains how to customize and manage a system using commands and the **sysadm** system management tool. Includes instructions for booting and shutting down the system, backing up and restoring files and file systems, and recovering from system failure. Tells how to manage users, system services and activity, application software, and accounting.

Preventing and Fixing Problems on the DG/UX® System (093–701140).

Presents tips and techniques for preventing and/or fixing typical problems you may have with your DG/UX system.

DG/UX security manuals

The DG/UX security manuals for information security are not included on the DG/UX documentation CD-ROM. They are shipped in printed form with the security product.

Managing Security on the DG/UX® System (093–701138).

Describes for the systems administrator the security features specific to information security software.

Managing Security Auditing on the DG/UX® System (093–701139).

Describes for the systems administrator the audit features specific to information security software.

Programming for Security Features on the DG/UX® System (093–701140).

Describes the programming features specific to information security software.

Using Security Features on the DG/UX® System (093–701137).

Describes for the user the security features specific to information security software.

Network administrator manuals

Managing ONC™ /NFS® and Its Facilities on the DG/UX® System (093–701049).

Explains how to manage and use the DG/UX ONC™/NFS® product. Contains information on the Network File System (NFS), the Network Information Service (NIS), Remote Procedure Calls (RPC), and External Data Representation (XDR).

Managing TCP/IP on the DG/UX® System (093–701051).

Explains how to prepare for the installation of Data General's TCP/IP (DG/UX) package on AViiON computer systems. Tells how to tailor the software for your site, use **sysadm** to manage the package and troubleshoot system problems.

Format conventions

We use the following format conventions in this manual:

Convention	Meaning
boldface	Indicates text (including punctuation) that you type verbatim.
	All DG/UX commands, pathnames, and names of files, directories, and manual pages appear in this typeface.
`monospace`	Represents a system response (such as a message or prompt), a file or program listing, or a menu path.
italic	Represents variables for which you supply values; for example, the name of a directory or file, your username or password, and explicit arguments to commands.
$ and %	Represent the system command prompts for the Bourne and C shells, respectively. Note that your system might use different symbols for the prompts.
{ }	Braces indicate a choice of arguments. You must enter one of the enclosed arguments. Do not type the braces; they only set off the choices.
[ ]	These brackets surround an optional argument. Don't type the brackets; they only set off what is optional.
[ ]	Boldface brackets are literal characters that you must type.
...	Means you can repeat the preceding argument as many times as appropriate.
↵	Represents the Enter key. (On some keyboards this key is called Return or New Line.)
< >	Angle brackets distinguish a command sequence or a keystroke (such as <**Ctrl-D**>, <**Esc**>, and <**3dw**>) from surrounding text. Don't type the angle brackets.

< , > , >> These boldface symbols are redirection operators, used for redirecting input and output. Boldface angle brackets are literal characters that you must type.

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, 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, telephone support is available with your hardware warranty and with Support Plus and Hotline Software Support service contracts. If you are within the United States or Canada, contact the Data General Customer Support Center (CSC) 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.

The Common Sense Connection

The Common Sense Connection^{SM} is Data General's comprehensive, interactive information library. It provides Internet users with access to virtually all of Data General's publicly available information and to a variety of feature articles and white papers on critical issues in computing. The Common Sense Connection also enables users to browse through product and service catalogs, our Solutions Directory, partner and customer profiles, and other publications.

Internet users can reach the Common Sense Connection through **http://www.dg.com** or **gopher.dg.com**. In addition, e-mail can be forwarded to us at **commonsense@dg.com**.

Joining our users group

NADGUG, the North American Data General Users Group, is a unique network of Data General users who wish to discover more about working computer environments and how to use them. As a professional, user–run organization, NADGUG enables members to make contacts with colleagues, share expertise and perspectives, and influence the companies that provide products and services. The Users Group is your connection to expert users of Data General products, including AViiON open systems, CLARiiON advanced storage solutions, PCs, and ECLIPSE MV/Family systems. Getting just one solution from a fellow member can more than pay for the cost of belonging to NADGUG. To join or for more information, call 1–800–253–3902, extension 1222, or 508–443–3330, extension 1222.

End of Preface

Contents

Chapter 1 – Before you start

Chapter 2 – Completing installation of your preloaded system

Chapter 3 – Performing a full installation of the DG/UX system from local release media

Chapter 4 –   Upgrading your DG/UX system

Chapter 5 – *Installing or upgrading from remotely mounted release media*

Chapter 6 – *Installing information security software*

Chapter 7 – *Completing your installation*

Chapter 8 – Fixing problems

Appendix A – Planning worksheets

Appendix B – Sample installation dialog for 88K-based systems

Appendix C – Sample installation dialog for Intel-based systems

Appendix D – Using the boot command

Tables

Table

Worksheet

Figures

Figure

1   *Before you start*

Use this chapter to collect information you need when installing the DG/UX® system. We recommend that you write down the information on the installation *Planning Worksheets* provided in Appendix A for use in the remaining chapters of this manual.

Sections of this chapter help you do the following:

- Understand the meaning of a preloaded installation, a full installation, a clean installation, and an upgrade.

- Ensure that your system meets prerequisites.

- Determine which DG/UX software packages to load from the release medium.

- Verify that you have the disk space you need for the packages you are installing.

- Identify the names of your boot, load, and system disk devices.

- Plan, if applicable, the layout of virtual disks on your system disk.

- Collect, if applicable, information required when installing or upgrading the Legato NetWorker™, ONC™, and TCP/IP packages.

This chapter also provides an overview of the installation process, and some conceptual information to help you plan for the best system performance.

Summary of installation or upgrade

You complete your installation or upgrade in the following four phases:

1. Preparing the system (root) disk.

2. Loading (copying) software packages from the DG/UX release medium onto the system disk.

3. Setting up (configuring) the software packages.

4. Building, and then booting, the configured kernel.

The stand-alone **sysadm** installer utility completes most tasks automatically. Within each phase, which steps you complete depends on your configuration.

There are four ways to install DG/UX Release 4.11:

- A *Preloaded Installation*—your computer system came from the factory with DG/UX Release 4.11 software loaded on the system disk. The first two phases of installation are already complete when you get your computer system. You still need to set up the packages and configure, build, and boot the kernel as explained in Chapter 2.

- A *Full Installation*—you load the contents of the R4.11 release medium on a newly formatted or blank system disk as described in Chapter 3.

- A *Clean Installation*—If you have an existing system, but need to load the contents of the R4.11 release medium on a clean system disk, you need to do a *clean installation*. In other words you must first clean the system disk, and then do a full installation. For example, this might be the case if you need to reload and restore from backups, or if you had an existing DG/UX system and wanted to install the DG/UX system with information security software.

  Chapter 3 describes how to clean an existing system disk before doing a full installation of DG/UX.

- An *Upgrade Installation*—you load the contents of the R4.11 release medium onto an existing DG/UX 5.4R3.00 or later system. Chapter 4 describes how to do an upgrade installation.

Table 1–1 summarizes the installation steps. You can use this table to review the major tasks and individual steps for each type of installation. The figure following the table lists which chapters of this manual to read for the type of installation you are performing.

> **IMPORTANT**   The Intel®-based systems come in two flavors: the models without a System Control Monitor (SCM), which require a boot floppy to install the DG/UX software, and the models with an SCM, which boot directly from the SCM prompt and do not require the boot floppy. If you are installing DG/UX R4.11 on an Intel-based system, and you did not purchase a preinstalled system, you then must check to see if your computer model requires the boot floppy to install the DG/UX software. Chapter 3 explains how to boot all model systems.

Table 1–1   Installing the DG/UX system: step summary

Installation Tasks	Type of Installation		
	Preload	Full	Upgrade
1: Insert medium			
Insert release medium in drive.		✓	✓
Insert boot floppy (if applicable; no SCM).		✓	
2: Prepare system disk			
Turn on your computer.	✓	✓	✓
Boot stand-alone **sysadm** from release medium.		✓	✓
Start the installer program.		✓	✓
Prepare physical disk(s).		✓	✓
Register physical disk(s).		✓	✓
Create required virtual disks.		✓	
Mount **swap**, **root**, and **usr** virtual disks.		✓	✓
3: Load software			
Specify load device.		✓	✓
Select packages to load.		✓	✓
Choose automatic or interactive build/boot.		✓	✓
Create virtual disks for optional packages.		✓	
Mount virtual disks for optional packages.		✓	✓
Verify available disk space.		✓	✓
Choose advance package setup or interactive load.		✓	✓
Copy (load) packages from release media.		✓	✓
3: Set up software packages	✓	✓	✓
4: Build and boot a new DG/UX kernel	✓	✓	✓
5: Log in and set passwords	✓	✓	
6: Perform additional or custom installation tasks	✓	✓	
7: Perform post-upgrade tasks	✓	✓	✓

The flowchart in Figure 1–1 summarizes the steps to complete your installation.
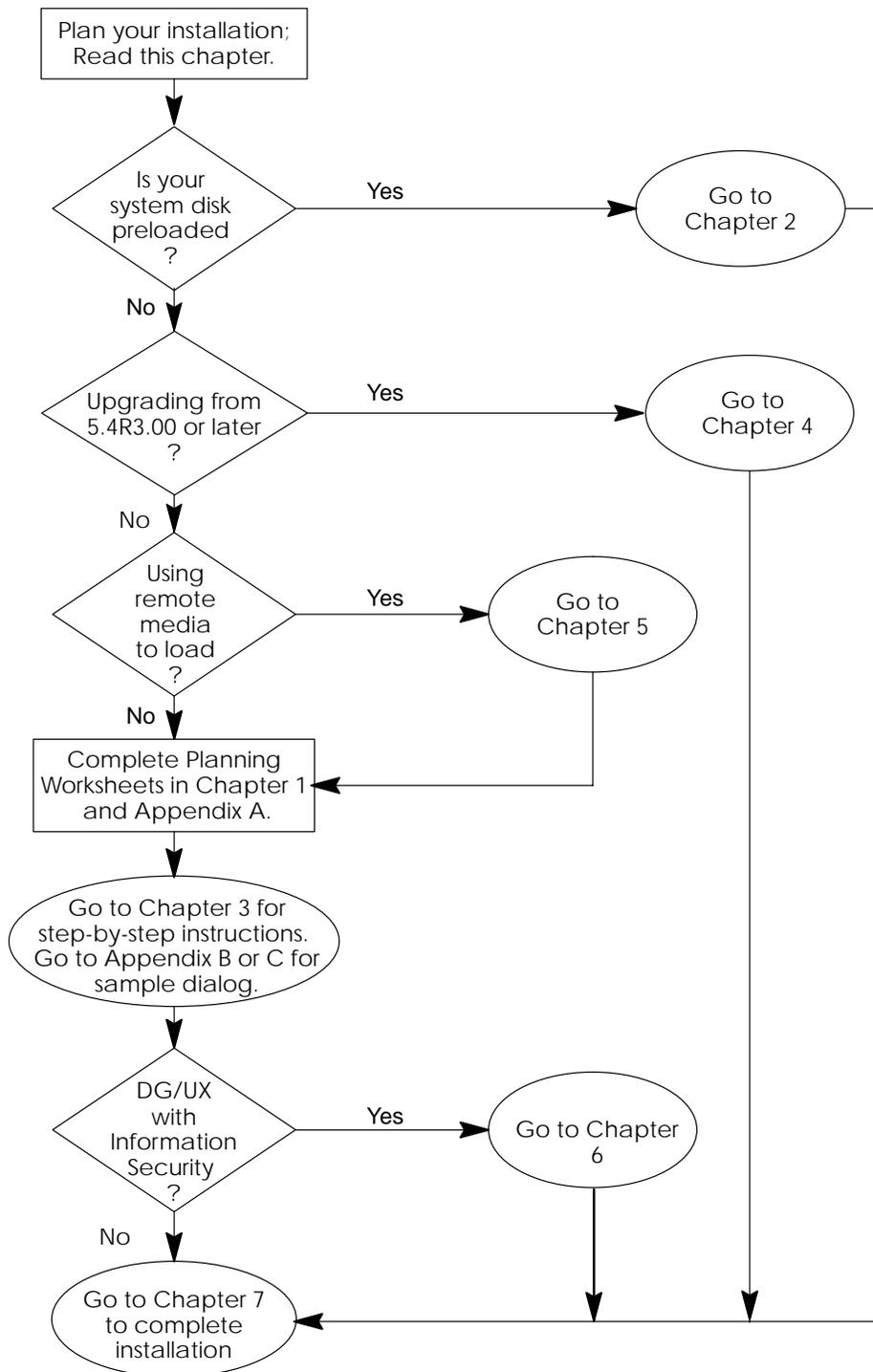
Figure 1–1   Reading path for installation tasks

Using the planning worksheets

Appendix A contains special tables, called ***Planning Worksheets***, for recording the information you need to install or upgrade your system. Sections of this chapter help you complete your Planning Worksheets.

Planning accelerates the installation or upgrade process.   If you don't have the required information on hand when prompted, it disrupts the installation procedure.

> **IMPORTANT**   Providing incorrect information during installation may force you to abort the process and begin again.

You may want to make copies of the Planning Worksheets in Appendix A to have on hand while collecting information and following installation steps.

It's a good idea to save your Planning Worksheets as a record of your system's configuration; they will be useful when or if you or someone else upgrades your DG/UX system in the future.

Verifying prerequisites

Take a moment to be sure you are ready to install the DG/UX Release 4.11 software on your computer system. This section helps you complete **Planning Worksheet 1** in Appendix A.

Does your system have an SCM?

For the initial loading of the DG/UX media, you need to know if your computer contains a System Control Monitor (SCM).

All 88K systems have SCMs.

If you are using an Intel system, refer to Table 1–2 to determine if your model computer comes with an SCM.

Table 1–2   System models for the Intel platform

System Models	SCM
AV 2000	No
AV 3000	No
AV 4700	Yes
AV 4800	Yes
AV 5800	Yes

▶ After you determine whether or not your computer has an SCM, **check the appropriate block on Worksheet 1** in Appendix A.

Are you installing or upgrading?

To perform an installation, your system disk must be newly formatted, or contain only files that can be overwritten. During a new installation:

- The release files overwrite any files of the same name currently on the system disk.

- You create the required virtual disks **swap**, **root**, and **usr**, and the optional virtual disk **dump**.

During an upgrade to DG/UX R4.11:

- You maintain customized operating system files.

- Your required virtual disks already exist; you create additional virtual disks optionally.

  IMPORTANT   For DG/UX 4.11, **root** requires 60,000 blocks. If you are upgrading (overloading) **sysadm** attempts to enlarge the **root** virtual disk to this size. If your disk does not have enough free blocks available to enlarge **root** sufficiently, you will need to move, delete, or shrink another file system on **root**'s disk, or move **root** to another physical disk with enough available space. The **root** virtual disk *must be on one physical disk.*

- Your system disk already contains a DG/UX 5.4R3.00 or later kernel configured for the device you'll use to load the release media. (When using a remote load device, the local device is your computer's LAN controller.)

▶ After you verify that your system satisfies either upgrade or install prerequisites, c**heck the appropriate block on Worksheet 1** in Appendix A.

Does your computer have sufficient physical memory?

Your system must be equipped with a minimum of physical memory to perform an installation or an upgrade. This amount of memory is necessary to accommodate all the software packages and to support stand-alone **sysadm**. Refer to Table1–3 for the minimum physical memory requirements necessary for your system.

Table 1–3   Minimum physical memory requirements

System platform	Physical memory (Mbytes)
Intel-based	32
88K-based	16

To find out your computer's physical memory size, check your screen at powerup. Powerup messages report the physical memory size.

▶ After you verify that your computer has sufficient main memory, **check the appropriate block on Worksheet 1** in Appendix A.

Do you have any disks in addition to your system disk?

If you have any physical disks you intend to use for user data in addition to those needed to install the DG/UX system, you should format them *after* you complete your installation. When you have set up the documentation CD-ROM, you can refer to *Managing Mass Storage Devices and DG/UX® File Systems* for the procedures to format those disks and create the necessary virtual disks and system files.

Intel-based systems only: Are you loading any operating systems in addition to DG/UX ?

If you are installing DG/UX on an Intel-based system and intend to load any other operating systems (like MS-DOS®), you should do so first, *before* installing the DG/UX software. Refer to your third-party software documentation to install other operating systems. Be careful not to allow the third-party software to expand and take up the whole disk.

▶ If you are using an Intel-based system, verify that you have completed installation of any operating systems other than DG/UX on the system disk and that enough space remains to install the DG/UX system software, and then **check the appropriate block on Worksheet 1** in Appendix A.

Do you have a dual-initiator disk configuration?

To set up a dual-initiator disk configuration (in which two or more host computers share a single SCSI bus), you must set SCSI bus operating parameters *before* you boot the DG/UX system on the local host. For instructions on how to set these parameters, **refer to the 014–series operating manual for your hardware model**.

Be sure to check the SCSI bus parameters every time you install or upgrade the DG/UX software. Note that you must set the parameters *before* booting a DG/UX installer kernel or autoconfigured DG/UX custom kernel. If for some reason you cannot set the parameters first, you may have to shut down the remote host or disconnect the shared SCSI bus from the local host before booting such a kernel.

> **IMPORTANT**   Do not boot a DG/UX installer kernel or autoconfigured DG/UX custom kernel in an active dual-initiator configuration before setting the SCSI bus operating parameters. Unset or improperly set parameters will cause a system halt on the DG/UX system on the remote host.

Examples of common dual-initiator disk configurations are *DG/UX Cluster* configurations. If you plan to install the DG/UX Cluster Software product, you will generally need to modify the default configuration. Refer to your DG/UX Cluster documentation.

▶ After you verify that your system satisfies either upgrade or install prerequisites, **check the appropriate block on Worksheet 1** in Appendix A.

If you do not intend to use the default configuration

In the DG/UX R4.11 release, the **/etc/utmp** and **/etc/wtmp** files have been moved to **/var/adm**, and the **/etc/utmp** and **/etc/wtmp** files are now symbolic links.

If you do not use the default configuration and set up the **/var** file system separate from the / (root) file system, you will not be able to boot to init 3. This is because the init process will attempt to make **/var/adm/utmp** entries before the **/var** file system is mounted. You will receive a write error and the system will stop at run level s, even if you specified booting to run level 3.

You can correct this problem by adding the following entry to your **/etc/inittab** file to mount the independent **/var** file system.

```
mnt::sysinit:/sbin/mount /var </dev/syscon >/dev/syscon 2>&1
```

You can edit the **/etc/inittab** file from init level s, after which you should halt the system and reboot.

Identifying boot, load, and system disk devices

This section helps you complete **Planning Worksheet 2** in Appendix A.

To install or upgrade the DG/UX system, you'll need to know the name of:

- The device from which you will start the installer program (the *boot device*).

    IMPORTANT   If you are loading the DG/UX system on an Intel-based machine that doesn't include an SCM, you may need to use a boot floppy to load the DG/UX release medium.

- The device from which you will load the contents of the release medium (the *load device*).

- The disk to which the contents of the release medium will be loaded (the *system disk*).

You can use any of the devices listed in Table 1–4 to boot stand-alone **sysadm** and load DG/UX release software.

Table 1–4   Device names required for installation or upgrade

Boot Device	Description
Local tape	Tape drive attached to the local host
Local CD	CD-ROM drive attached to a local host
Bootable Ethernet LAN controller	Network device through which you access a remote load device

> **IMPORTANT**   If you are installing or upgrading over a network, complete the steps in Chapter 4, or **Planning Worksheet 3** in Appendix A.

▶ Record the names of your boot, load, and system disk devices on **Planning Worksheet 2** in Appendix A.

The device names for your installation will vary depending on the platform and model computer you are using. For information on these device names, refer to the subsection appropriate for your system.

Device names for Intel-based systems

Table 1–5 lists typical local boot device and system disk names for Intel-based systems. If you don't see your model computer listed, refer to your *Release Notice* for the correct device names for your system.

Table 1–5   Local boot device and system disk names on Intel-based AViiON systems

AViiON Systems for Intel	CD-ROM	Tape Drive*	System Disk
AV 2000	sd(apsc(pci(0),b),4)	st(apsc(pci(0),b),2)	sd(apsc(pci(0),b),0)
AV 3000	sd(apsc(pci(1),d),4)	st(apsc(pci(1),d),2)	sd(apsc(pci(1),d),0)
AV 4700, AV 4800, AV 5800	sd(npsc(cpci(0),2),4)	st(npsc(cpci(0),2),2)	sd(npsc(cpci(0),3),0) *

* The system disk is always external in these systems.

> **IMPORTANT**   For early shipments of AV 2000 and AV 3000 systems, the SCSI ID for the first tape drive may be 6 instead of 2.

Device syntax begins with a mnemonic that describes the type of device (**dev**). Examples are **sd** (SCSI disk) and **st** (SCSI tape). Parameters for the device SCSI controller name (**ctrl**), type PCI host bridge (**pci***)*, primary or secondary PCI host bridge number (**pci_no***)*, PCI device slot number (**slot**), PCI function number (**func_no**), controller SCSI ID (**ctrl_SCSI_id**), device SCSI ID number (**dev_id***)*, and logical unit number (**LUN**) are included inside parentheses, according to the following syntax. Note that optional parameters are in italic enclosed in square brackets, [ ].

```
dev(ctrl(pci([pci_no]),slot[,func_no[,ctrl_SCSI_id]]))[,dev_id[,LUN]])
```

For example, **sd(apsc(pci(0),b),0,7),0,0)** specifies in full the first (system) disk in a typical AViiON computer for a AV 2000 Intel-based system:

sd(apsc(pci(0),b,0,7),0,0)

Device
sd = disk
st = tape

SCSI controller
apsc
npsc

PCI host bridge
pci
cpci

PCI host bridge No.
0 = primary
1 = secondary

PCI slot No.
0 – 1F

PCI function No.
0 – 7

Controller SCSI ID
0 – F

Device SCSI ID
0 = disk
*2 = tape **
4 = CD-ROM

Logical unit No. (LUN)
0 – 1F
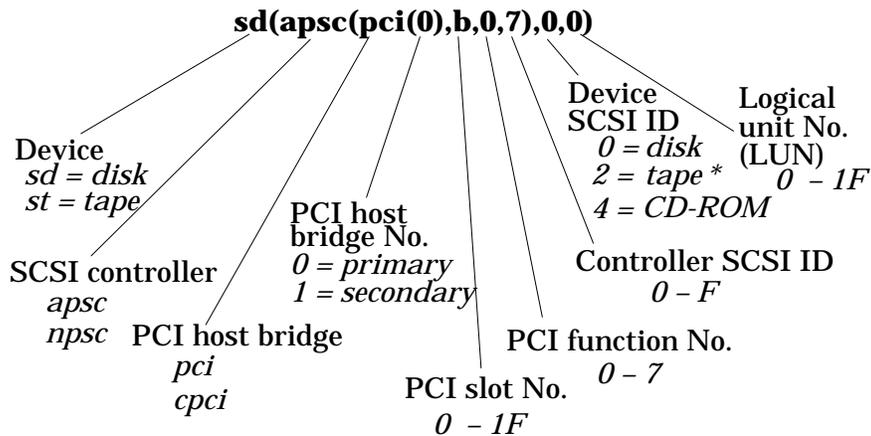
* Early shipments of AV 2000 and AV 3000 systems, may have a SCSI ID of 6 for the first tape drive.

You do not need to specify all the fields, but can assume the defaults for the bus, PCI function, device identifier, and LUN. Also you do not need to specify the controller identifier unless the specified SCSI bus is shared by more than one host (dual-initiated) and you have not set SCSI bus operating parameters before booting. Thus, the above system disk device syntax may be simplified to **sd(apsc(pci(0),b),0)** — or even **sd(apsc(pci(),b))**.

IMPORTANT   For AV 4700, 4800, and 5800 Intel-based systems, internal devices are attached to the controller in PCI slot No. 2; for example, CD-ROM (device ID 4), and QIC tape (device ID 2). The controller SCSI ID of the host adapter in PCI slot No. 2 is always 7. The controller in PCI slot No. 3 manages your system disk(s) and other differential devices like CLARiiON and other mass storage devices. The SCSI ID of the controller in PCI slot 3 is user-definable through the SCM menu system.

Device names for 88K-based systems

Table 1–6 lists common local boot device and system disk names for 88K-based computer systems. If you don't see your model computer listed, refer to your *014–series* hardware manual and/or the *Release Notice* for the correct device names for your system.

Table 1–6   Example names for local boot device and system disk on 88K-based AViiON systems

AViiON Systems for 88K	CD-ROM	Tape Drive	System Disk
450, 500, 530, 550, 4500, 4600, 5500, 7400, 8400, 8500, 9500	`sd(ncsc(),3)`	`st(ncsc(),4)`	`sd(ncsc(),0)`
5000, 6000, 7000, 8000	`sd(dgsc(),3)`	`st(dgsc(),4)`	`sd(dgsc(),0)`
100, 200, 300, 400, 3000, 4000, and 4300	`sd(insc(),3)`	`st(insc(),4)`	`sd(insc(),0)`

Device syntax includes a mnemonic that describes the type of device. Examples are **sd** (SCSI disk) and **st** (SCSI tape). Parameters for the device controller name (**ctrl**), controller number (**ctrl_no**), controller SCSI ID (**ctlr_id**), device SCSI ID (**device_id**) and logical unit number (**LUN**) are included inside parentheses, according to the following syntax. Note that optional parameters are in italic enclosed in square brackets, [ ].

```
device(ctrl([ctrl_no[,ctrlr_id]]))[,device_id[,LUN]])
```

For example, **sd(ncsc(0,7),0,0)** specifies in full the first (system) disk in many 88K computers, as shown below:

sd(ncsc(0,7),0,0)

Logical
unit No.
(LUN)
0 – 1F

Device
sd = disk
st = tape

Controller
name
(see Table 1–6)

Controller
number

Controller
SCSI ID
0 – F

Device
SCSI ID
disk = 0
CD-ROM=3
tape =4
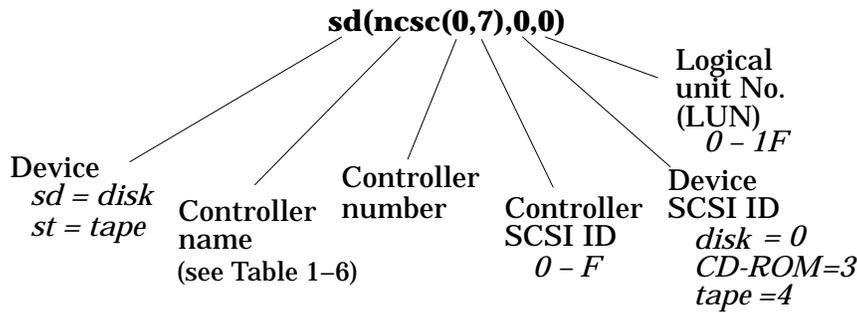
> **IMPORTANT**   You do not need to specify all the fields, but can
> assume the defaults for the controller number, device identifier, and
> LUN. Also you do not need to specify the controller identifier
> unless the specified SCSI bus is shared by more than one host
> (dual-initiated) and you have not set SCSI bus operating
> parameters before booting. Thus, the above system disk device
> syntax may be simplified to **sd(ncsc(),0)** — or even **sd(ncsc())**.

About the DG/UX System release software

This section briefly describes the contents of the DG/UX R4.11 release
medium. Use it to help you complete **Planning Worksheet 7** in
Appendix A.

Manual pages

Most software components include formatted, online manual pages. A
manual page describes the attributes for each command, system call,
library function, or special file for each software component.

Data General does not provide manual pages in a bound, hard-copy
form; you must load the software packages that end with the extension
.man to view manual pages.

Software packages

dgux   The DG/UX operating system. Contains system-level programs, facilities, and commands.

dgux.aco   *Intel-based systems only.* Application Capture Option package. Contains commands, files, and libraries needed to run UnixWare® or SCO applications on DG/UX for Intel-based systems.

dso   The DSO Information Security software. Contains system-level programs, facilities, and commands. (Separately orderable only on Q061 tape.)

networker   Legato NetWorker product for DG/UX, a disk backup application. This version of the product allows you to back up local disks to local tape drives. You also can order a license that enables backing up remote (NetWorker client) disks to the NetWorker server's tape drives. *Not available with the security software.*

nfs   A service that allows many users to share file systems over a network. Data General has ported SunOS® version 4.0 ONC™/NFS® to its family of AViiON computers. In addition to NFS, this service includes the Lock Manager and Status Manager. If you install **nfs**, you also must install **tcpip**.

onc   The ONC (Open Network Computing) programming platform, Remote Procedure Call (RPC), and External Data Representation (XDR), for writing heterogeneous distributed applications. This package also contains applications level services based on RPC/XDR. Network Information Service (NIS) is one such service. If you install **onc**, you also must install **tcpip**.

sdk   Software Development Kit. A necessary component for virtually all software development on the DG/UX system. It includes many important components, miscellaneous programming tools, and most system headers.

sdk.X11   Software development tools and components for development on the X Window™ System.

tcpip   A package of communications software that implements the TCP/IP family of networking protocols on the DG/UX system.

X11   The X Window System, a networked window management system that allows your AViiON computer to operate in a networked environment with workstations from other vendors. It includes OSF/Motif®.

X11.aco   *Intel-based systems only.* The X11 portion of the Application Capture Option package. Contains libraries and links needed to run GUI UnixWare or SCO applications on DG/UX for Intel-based systems.

Package space requirements

This subsection presents in tabular form the approximate disk space required to load each software package on the release medium. We list totals for loading *all* packages, and an estimated number of disk blocks used within each virtual disk.

> **IMPORTANT**   When estimating space for your system, it is a good idea to look to the future and try to plan for growth as well. Some file systems will need to grow; for example, files for mail, crontabs, host files, password files, and other tailored files need to be expandable.

Table 1–7 summarizes software package sizes for Intel-based systems.

Table 1–8 summarize software package sizes for 88K-based systems.

Package sizes are accurate to within the nearest 100 blocks. The DG/UX System measures virtual disks in 512-byte disk blocks where 1 Mbyte is roughly 2,000 disk blocks.

▶ **Refer to the package size table for your platform, and check the names of the packages you will install or upgrade on Worksheet 5 in Appendix A.**

Package space requirements will vary depending on your system platform. Refer to the table that pertains to your system. If space is an issue, you can choose to load only the packages you need. The only package that you *must* load is **dgux**.

> **IMPORTANT**   Since the values in Tables 1–7 and 1–8 are accurate to within 100 blocks, they are intended as close estimates, provided for planning purposes only. Your Release Notice may include additional information about packages sizes.

For your convenience, the software packages on the DG/UX R4.11 medium are grouped in the following suites.

development   Contains all the DG/UX software packages, including the man-page packages, plus the Software Development Kit **sdk** packages.

production   Contains only the DG/UX software packages, including the man-page packages.

sdk_all   Contains only the Software Development Kit packages. Users can load this package by itself to add the SDK to an existing system previously loaded without the SDK.

aco   *Intel-based systems only.* Contains only the Application Capture Option packages. Users should load this suite along with either the development or the production suites to provide ACO features.

You can select one or more package suites and/or individual software packages. The installation procedures explain this clearly.

Package sizes for Intel-based systems

Table 1–7   Summary of package sizes for Intel-based systems*

Package	Virtual disk					Total Blocks	Total Mbytes
	root	usr	X11	net-worker	sdk		
dgux	11935	115584	0	0	0	127519	64
dgux.man		6759	0	0	0	6759	3
dgux.aco	112	708	0	0	0	820	>1
dgux.aco.man	0	58	0	0	0	58	>1
dso	2263	6018	0	0	0	8281	4
dso.man	0	1144	0	0	0	1144	<1
networker	18	34	0	20554	0	20606	10
networker.man	0	0	0	826	0	826	<1
nfs	66	1378	0	0	0	1444	<1
nfs.man	0	136	0	0	0	136	<1
onc	28	1322	0	0	0	1350	1
onc.man	0	170	0	0	0	170	<1
sdk	0	0	0	0	32661	32661	16
sdk.man	0	942	0	0	7170	8112	4
sdk.X11	0	8	5076	0	0	5084	3
sdk..X11.man	0	328	4848	0	0	5176	3
tcpip	752	10538	0	0	0	11290	6
tcpip.man	0	952	0	0	0	952	<1
X11	504	126	58853	0	0	59483	30
X11.man	0	42	822	0	0	864	<1
X11.aco	0	104	7186	0	0	7290	4
All packages (including dso)	15,678	146,351	76,785	21,380	39,831	300,025	<157

* All numbers in this table are accurate to within 100 blocks. The total Mbyte numbers are rounded off.

Package sizes for 88K-based systems

Table 1–8   Summary of package sizes for 88K-based systems*

Package	Virtual disk					Total Blocks	Total ~ Mbytes
	root	usr	X11	net-worker	sdk		
dgux	15699	148243	0	0	0	163942	82
dgux.man	0	6751	0	0	0	6751	3
dso	2711	7954	0	0	0	10665	5
dso.man	0	1144	0	0	0	1144	1
networker	18	34	0	26762	0	26814	13
networker.man	0	0	0	826	0	826	<1
nfs	66	1738	0	0	0	1804	1
nfs.man	0	136	0	0	0	136	<1
onc	28	1786	0	0	0	1814	1
onc.man	0	170	0	0	0	170	<1
sdk	0	0	0	0	44839	44839	22
sdk.man	0	942	0	0	7170	8112	4
sdk.X11	0	8	11180	0	0	11188	6
sdk..X11.man	0	328	4848	0	0	5176	3
tcpip	752	13218	0	0	0	13970	7
tcpip.man	0	952	0	0	0	952	<1
X11	60	12	57567	0	0	57639	29
X11.man	0	42	822	0	0	864	<1
All packages (including dso)	19,334	183,458	74,417	27,588	52,009	356,806	<182

* All block numbers in this table are accurate to within 100 blocks. The total Mbyte
  numbers are rounded off.

DG/UX documentation CD-ROM

With your order, Data General Corporation ships a documentation CD-ROM that contains DG/UX manuals and WorldView Viewer® software for viewing those manuals. The security manuals for the DG/UX system with information security are shipped with that product in hardcopy only. They are not on the DG/UX documentation CD-ROM.

Also included with your order are the *DG/UX® Documentation Release Notice, Preventing and Fixing Problems on the DG/UX® System*, and the *Quick Start Guide for Viewing DG/UX® Documentation.* The latter contains instructions on how to load, set up, and view the documentation CD-ROM.

If you want to access the documentation *before* you install your system, you can view it on a PC. For more information, refer to the *Quick Start Guide for Viewing DG/UX® Documentation.*

Planning your system disk layout

Read this section for an introduction to concepts you need to understand when allocating disk resources. Sections that follow help you complete **Planning Worksheets 5** and **6** in Appendix A.

About physical and virtual disks

When installing the DG/UX system, you create areas on a physical disk (*partitions*) to contain the software packages copied from the release medium. Data General's term for a named area of one or more disk partitions is *virtual disk*. (Note that earlier releases of DG/UX used the term *logical disks*).

The *system disk* is the physical disk (or disks) that contain(s) the DG/UX required virtual disks.

> **IMPORTANT**   *Intel-based systems—* Although the DG/UX system recognizes many PC partition styles, it offers its own style PC partition over which the virtual disk layout is superimposed. If Intel users are installing other operating systems in addition to the DG/UX software, they should use their third-party documentation and software to create the necessary PC partitions and load these operating systems *before* attempting to install the DG/UX system.

Required virtual disks

The DG/UX system requires the **swap**, **root**, and **usr** virtual disks to operate. You create the three required virtual disks at the beginning of the installation process.

IMPORTANT   For DG/UX 4.11, **root** requires 60,000 blocks. If you are upgrading (overloading) **sysadm** attempts to enlarge the **root** virtual disk to this size. If your disk does not have enough free blocks available to enlarge **root** sufficiently, you will need to move, delete, or shrink another file system on **root**'s disk, or move **root** to another physical disk with enough available space. The **root** virtual disk *must be on one physical disk.*

If you install optional software packages that ship with the DG/UX System, the installer program creates additional standard virtual disks, listed in Table 1–9. You create the additional virtual disks during the package load phase of installation.

Although it is optional, we recommend you also create a virtual disk for a specific dump-to-disk area. This dump-to-disk area may be created on any available SCSI system disk, and should be called **dump.**

IMPORTANT   The DG/UX R4.11 operating system for Intel-based systems does not support dumping over the network.

The Installer utility will ask you if you want to create this virtual disk for dumps and will recommend a size based on your system memory.

Table 1–9   Virtual disks for optional packages

You create this virtual disk	If you install this DG/UX product
usr_opt_networker	Legato NetWorker for AViiON Computers
var_opt_networker	Legato NetWorker for AViiON Computers (only if your host is a NetWorker server)
usr_opt_sdk	Software Development Kit, **sdk** and **sdk.X11** packages.
usr_opt_X11	X Window System

IMPORTANT   For details about the standard virtual disks required for installation, see the section on changing virtual disk defaults later in this chapter, and **refer to the release notice(s) for your DG/UX product(s).**

After installing the DG/UX system, you may create other virtual disks to accommodate your applications. For detailed information on virtual disks and customizing your installation, refer to *Managing Mass Storage Devices and DG/UX® File Systems* on the documentation CD-ROM.

> **IMPORTANT**   If you intend to add OS clients to your configuration, you need to create an **srv** virtual disk after installation, as described in *Managing the DG/UX® System* on the documentation CD-ROM.

Partitioned and aggregated virtual disks

The DG/UX system measures virtual disks in 512-byte disk blocks. You create a virtual disk partition by selecting a contiguous stretch of blocks on a physical disk.

You create an aggregated virtual disk (*aggregation*) by combining partitions (located on the same physical disk, or different physical disks) in a single virtual disk.

You may expand **root** and **usr** using additional *noncontiguous* partitions as long as they reside on the same physical disk. A virtual disk used for swapping may span multiple physical disks.

> **IMPORTANT**   You cannot boot stand-alone programs such as the DG/UX kernel and/or stand-alone **sysadm** from a virtual disk that spans multiple physical disks.

After you complete the installation, refer to *Managing Mass Storage Devices and DG/UX® File Systems* on the documentation CD-ROM for information on using virtual disk partitions.

About local file systems and mount points

A *file system* organizes virtual disk space into a hierarchical structure containing the DG/UX system software. With the exception of the **swap** and optional **dump** virtual disks, the installer utility automatically creates a file system structure within a required virtual disk.

A *mount point* identifies an absolute location within the DG/UX file system for a particular virtual disk's file system. You specify a directory location (mount point) at which to mount the file system that resides on a particular virtual disk.

Figure 1–2 shows a typical DG/UX file system with standard virtual disks and their mount points.
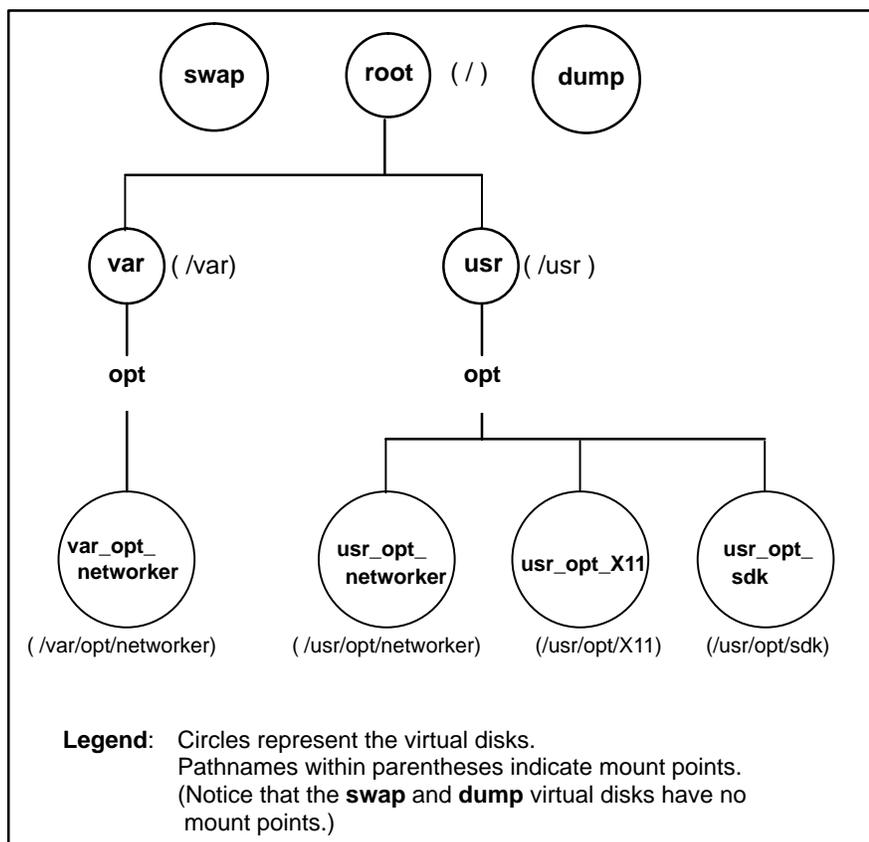
Figure 1–2   Sample virtual disks and mount points on the DG/UX file system

Viewing the layout of a physical disk

You can view a physical disk's layout before you take the system down for an upgrade, or after you install the DG/UX system.

You view the layout of virtual disks on a physical disk through the **sysadm** operation `Device -> Disk -> Physical -> List`. After you complete the installation, refer to *Managing Mass Storage Devices and DG/UX® File Systems* on the documentation CD-ROM for information on options.

Sample disk layout for an Intel-based system

To maintain compatibility with other Intel-based operating systems and to support BIOS boot operations, disks on Intel-based systems are divided using PC partitions. The hard disk has a Master Boot Block on the first block, which contains a table that can define up to four PC partitions on the disk. Each PC partition created has a partition type. Some examples of PC Partition types are DOS4.x, DOS_ext, OS2_hpfs, and DGUX_vdm.

In the following example from an AV 2000 system, we use the command **admpdisk –o list –P sd(apsc(pci(0),b),0,0)** to show a DOS4.x bootable partition starting at block 32 and a DGUX_vdm partition starting a block 512000.

```
Disk name                     State   Reg?   Format Total blocks   Free blocks
sd(apsc(pci(0),b),0,0)        avail    y     vdisks    2055035          484563


PC Partition ID                     Boot State      Address          Size
.Reserved                             n/a              1                31
DOS4.x                              Non-Boot           32           511968
DGUX_vdm                              Boot           512000         1543008
.Reserved                             n/a           2055008             27
```

The DG/UX R4.11 software creates all of its virtual disks within the PC partition DGUX_vdm.

In the next example from an AV 2000 system, we use the command **admpdisk –o list –a sd(apsc(pci(0),b),0,0)** to show the Master Boot Block on the first block of the disk, the DOS4.x partition from block 32 through 511968. The rest of the disk with the exception of `.Reserved,00000004` and `.Reserved,00000007` are DG/UX virtual disks and <free space> all contained in the DGUX_vdm PC partition. Note that the **admpdisk** command automatically created `.Reserved,00000004` and `.Reserved,00000007` virtual disks to satisfy the requirement that PC partitions start on a cylinder boundary.

```
Disk name                   State    Reg?  Format  Total blocks   Free blocks
sd(apsc(pci(0),b),0,0)      avail     y    vdisks    2051000         491839


Name                        Role              Address         Size
.Master_Boot_block,00000003                         0            1
.Reserved,00000004                                  1           31
PC_Partition_DOS4.x                                32       511968
.Bootstrap_3                                   512000            1
.Primary_Vdit                                  512001           16
.Primary_Bad_Block_Table                       512017            2
.Remap_Area                                    512019          100
.Secondary_Bad_Block_Table                     512119            2
Part of swap              Piece 1 of 2         512121        50000
root                                           562121        60000
usr                                            622121       280000
usr_opt_X11                                    902121        90000
usr_opt_networker                              992121        30000
usr_opt_sdk                                   1022121        50000
var_opt_networker                             1072121        10000
.NDB                                          1082121        50000
.Bootstrap_4                                  1132121        40000
.Bootstrap_5                                  1172121       280000
Part of swap              Piece 2 of 2        1452121        50000
dump                                          1502121        57000
<free space>                                  1559121       491839
.Secondary_Vdit,00000009                      2050920           16
.Reserved,00000007                            2050936           24
```

Sample disk layout for an 88K-based system

In the following example, we use the command **admpdisk –o list –P sd(ncsc(0),0,0)** to show a typical disk layout for an 88K server.

```
Disk name                   State    Reg?  Format  Total blocks   Free blocks
sd(ncsc(0,7),0,0)           avail     y    vdisks    1295922         676389


Partition name              Role              Address         Size
<Various system partitions>                         0          517
swap                                              517        50000
root                                            50517        60000
usr                                            110517       280000
dump                                           390517        29000
usr_opt_X11                                    419517        90000
usr_opt_networker                              509517        40000
usr_opt_sdk                                    549517        60000
var_opt_networker                              609517        10000
<free space>                                   619517       676389
<Various system partitions>                   1295906           16
```

Preparing physical disks

This section helps you complete **Planning Worksheet 5** in Appendix A.

At the beginning of the installation process, **sysadm** prompts you to prepare the physical disk drives in your configuration for installation.

Preparing a physical disk verifies or installs the following:

- A disk label (*88K-based systems only*).

- A DG/UX PC partition (*Intel-based systems only*).

- Virtual disk information tables.

- An up-to-date bootstrap.

- Bad block remapping.

- A non-volatile RAM (NVRAM) database (*Intel-based systems only*).

You *must* prepare any physical disks that contain the DG/UX operating system.

Do not prepare read-only physical devices such as CD-ROM or WORM (Write-Once Read-Many) drives; these devices remain in logical disk format (*compatibility mode*).

> **IMPORTANT**   You can prepare all physical disk devices *unless* you have read-only devices in your configuration, or you have virtual disks that are compatible with a revision of DG/UX prior to DG/UX 5.4 Release 3.00.

▶ **Record device names of the physical disks to prepare during installation on Worksheet 5 in Appendix A.**

Changing virtual disk defaults

This section helps you complete **Planning Worksheet 6** in Appendix A.

Table 1–10 shows the default sizes and mount points for generic DG/UX virtual disks for Intel-based systems.

Table 1–11 shows the default sizes and mount points for generic DG/UX virtual disks for 88K-based systems.

You may need to change these defaults to suit your system's configuration, but you must adhere to the minimum requirements described in this section.

Before beginning an upgrade, you can expand the size of any existing virtual disk simply by adding contiguous space or noncontiguous partitions. You can add noncontiguous partitions to **root** and **usr** as long as they reside on the same physical disk. A virtual disk used for swapping can span multiple physical disks.

> **IMPORTANT**   For both Intel- and 88K-based systems, the default size (blocks) for the **root** virtual disk increased by 20,000 blocks in DG/UX R4.11. Thus, **root** now requires 60,000 blocks. If you are upgrading (overloading) **sysadm** attempts to enlarge the **root** virtual disk to this size. If your disk does not have enough free blocks available to enlarge **root** sufficiently, you will need to move, delete, or shrink another file system on **root**'s disk, or move **root** to another physical disk with enough available space. The **root** virtual disk *must be on one physical disk.*

Intel-based systems— Virtual disk default sizes and mount points

Table 1–10   Default sizes and mount points for standard DG/UX virtual disks for an Intel server

Virtual Disk	Mount Point Directory	Default size (blocks)
swap	–none–	100,000
root	**/**	60,000
usr	**/usr**	280,000
usr_opt_X11	**/usr/opt/X11**	90,000*
usr_opt_networker	**/usr/opt/networker**	30,000
usr_opt_sdk	**/usr/opt/sdk**	50,000
var_opt_networker	**/var/opt/networker**	10,000

* If you do *not* load the **sdk** package, then the **X11** block size is 80,000.

88K-based systems—
Virtual disk default sizes and mount points

> **IMPORTANT**   For 88K-based systems, the default size of **usr** increased by 40,000 blocks from DG/UX 5.4R3.00 to 3.10. When upgrading directly from 3.00 to 4.11, you will need to make sure /**usr** has at least 40,000 additional free blocks.

Table 1–11   Default sizes and mount points for standard DG/UX virtual disks for an 88K server

Virtual Disk	Mount Point Directory	Default size (blocks)
swap	–none–	50,000
root	**/**	60,000
usr	**/usr**	280,000
usr_opt_X11	**/usr/opt/X11**	90,000*
usr_opt_networker	**/usr/opt/networker**	40,000
usr_opt_sdk	**/usr/opt/sdk**	60,000
var_opt_networker	**/var/opt/networker**	10,000

* If you do *not* load the **sdk** package, then the **X11** block size is 80,000.

▶ **Use the information in the following subsections to decide if the default virtual disk sizes are appropriate for your installation. The last subsection provides information on renaming virtual disks.**

Sizing a virtual disk for swap space

The DG/UX system needs at least one virtual disk used as swap space. A swap area's virtual disk differs from others in that it does not have a file system.

The amount of swap space you require depends on your platform, the amount of physical memory in your computer, the nature and number of the applications you intend to run, and the number of users on the system. If your programs allocate large portions of memory, you may need more swap space.

A typical 88K server operates comfortably with swap space that is 1.5 times the size of physical memory. Thus, a computer with 16 Mbytes of memory requires at least 24 Mbytes of swap space.

Calculate the required number of blocks using the following formula:

`(1.5 ×` (*physical-memory-in-Mbytes ×   bytes-per-Mbyte*)) / *bytes-per-block = blocks*

For example:

`(1.5 ×  (16` **Mbytes** `× 1048576))/512` **bytes/block** `= 49152` **blocks**

Thus, an 88K server with 16 Mbytes of memory requires roughly 50,000 blocks of swap space.

Similarly, an Intel-based server with 32 Mbytes of memory requires roughly 100,000 blocks of swap space.

`(1.5 ×  (32` **Mbytes** `× 1048576))/512` **bytes/block** `= 98304` **blocks**

Bear in mind that this estimate for swap space is a recommendation for a new system. Calculating the precise swap space is a function of the demands presented by your particular configuration—software applications and number of OS clients, for example. After your system is fully functioning, you may need to recalculate swap space using additional advice given in *Managing the DG/UX® System*.

You may create an aggregated virtual disk, which spans multiple physical disks, or you may create multiple swap area virtual disks, such as **swap1** and **swap2**, to supplement existing **swap** virtual disk space. See *Managing the DG/UX® System* for more information on adding swap space.

> **IMPORTANT**   The *default* size for **swap** is likely to be sufficient for a system with the minimum memory configuration (32 Mbytes for Intel servers or 16 Mbytes for 88K servers) only. The *minimum* size of the **swap** virtual disk is 50,000 blocks for 88K servers and 100,000 blocks for Intel servers, regardless of the amount of memory your computer has.

▶ **If the default size for swap is insufficient, record the size of the swap virtual disk on Worksheet 6 in Appendix A.**

Sizing the virtual disk for the / (root) file system

The / file system is reserved for system-level programs and facilities. The / directory holds subdirectories that contain information and configuration files, system commands, temporary system files, spool files, and symbolic links to other subdirectories.

The **root** virtual disk must be at least 60,000 blocks, the default size. Sites with adequate disk space will benefit from increasing the size of root by 10,000 blocks or more.

> **IMPORTANT**   If you are upgrading (overloading) your DG/UX system, **sysadm** attempts to enlarge the **root** virtual disk to 60,000 blocks. If your disk does not have enough free blocks available to enlarge **root** sufficiently, you will need to move, delete, or shrink another file system on **root**'s disk, or move **root** to another physical disk with enough available space. The **root** virtual disk *must be on one physical disk.*

▶ **If the default size for root is insufficient, record the new size of the root virtual disk on Worksheet 6 in Appendix A.**

Sizing the virtual disk for the /usr file system (usr)

The **/usr** file system is reserved for system-level programs, facilities, and software packages. The **/usr** directory holds subdirectories that contain database and configuration files, administrative commands, stand-alone utilities and bootstraps, and user commands. You create the **usr** virtual disk and load the appropriate file system.

> **IMPORTANT**   If you are upgrading directly from DG/UX 5.4R3.00, the R4.11 release requires an additional 40,000 blocks for **/usr**. The installation utility prompts you to make this change; or you can expand the **/usr** virtual disk before upgrading.

You cannot boot stand-alone programs from a virtual disk that spans multiple physical disks. Creating the **usr** virtual disk in two or more partitions on different physical disks means you cannot boot any bootable image (such as stand-alone **sysadm**) or diagnostics from **usr**.

The **usr** virtual disk must be at least 280,000 blocks. Sites with adequate disk space will benefit from increasing the size of **usr** by 10,000 blocks or more.

▶ **If the default size for usr is insufficient, record the new size of the usr virtual disk on Worksheet 6 in Appendix A.**

Sizing the virtual disk for the dump-to-disk area (dump)

The Installer utility uses an algorithm to determine how much space to allocate to the dump-to-disk area as a default value. The algorithm is based on your memory configuration as follows:

Mbytes	Allocation
<= 32	Up to 28 Mbytes to allow for 90% backup.
> 32 or <= 256	Up to 128 Mbytes to allow for 50% backup, with a guaranteed minimum of 61,000 blocks.
> 256	Allows for 25% backup, with a minimum of 262,000 blocks and a maximum of 400,000 blocks.

The Installer utility will ask you if you want to create a **dump** virtual disk and will offer a default value appropriate for your system. Since this virtual disk is optional and the utility does the sizing for you, you don't need to record anything at this time.

> **IMPORTANT**   The DG/UX R4.11 operating system for Intel-based systems does not support dumping over the network.

Sizing the virtual disk for the /usr/opt/X11 file system (usr_opt_X11)

The **/usr/opt/X11** file system is reserved for the DG/UX X Window System package, which includes X11, the OSF/Motif window manager, and online documentation. This **usr_opt_X11** virtual disk is required only if you intend to install the DG/UX X Window System.

> **IMPORTANT**   The **usr_opt_X11** virtual disk must be at least 90,000 blocks. If, however, you do not load the **sdk** package suite, the usr_opt_X11 virtual disk only requires 80,000 blocks.

▶ **If the default size for usr_opt_X11 is insufficient, record the new size of the virtual disk on Worksheet 6 in Appendix A.**

Sizing the virtual disk for the /usr/opt/sdk file system (usr_opt_sdk)

The **/usr/opt/sdk** file system is reserved for the Software Development Kit package, which includes many important components, miscellaneous programming tools, and most system headers. This **usr_opt_sdk** virtual disk is a necessary component for virtually all software development on the DG/UX system.

The **usr_opt_sdk** virtual disk must be at least 50,000 blocks for Intel-based systems and 60,000 blocks for 88K-based systems.

Sizing the virtual disk for the /usr/opt/networker file system (usr_opt_networker)

The **/usr/opt/networker** file system is reserved for the Legato NetWorker product for DG/UX, which is an application for disk backup. This product enables the backup of NetWorker client disks to the NetWorker server's tape drives.

The **usr_opt_networker** virtual disk must be at least 30,000 blocks for Intel-based systems and 40,000 blocks for 88K-based systems.

▶ **If the default size for usr_opt_networker is insufficient, record the new size of the virtual disk on Worksheet 6 in Appendix A.**

Sizing the virtual disk for the /var/opt/networker file system (var_opt_networker)

If you intend to use your system as a client to a remote NetWorker server, you do not need to create the **var_opt_networker** virtual disk. In this case, skip this section.

If your host is designated as a NetWorker server, you create a virtual disk (**var_opt_networker**) to accommodate the online index of backed-up files and logfiles.

Calculate the size of the **var_opt_networker** virtual disk according to these factors:

- The number of files to be backed up.

- The browse period (how long you keep online the indexes for each backup.)

- The number of full backups performed during the browse period.

- The number and average size of incremental backups performed during the browse period.

NetWorker requires approximately one block of online index space for every two files it backs up. Different versions of backed-up files count as separate files. For example, if two given files are backed up on a monthly full backup, and also on each of four weekly full backups, five blocks are required for those two files.

By default, online indexes for backed-up files are recycled (discarded and reused) after one month. If you choose a longer browse period (for example, quarterly), you will need more disk space. You can decrease the index space requirements by shortening the browse period, by reducing the number of backups within the browse period, or by replacing full backups with incremental backups.

A rule of thumb for determining index space is to estimate the total number of files in all file systems you plan to back up, and allow two blocks for each file. This is enough space for four distinct backup versions of each file. You may need to experiment over time to determine the best index size for your site.

The default size for the **var_opt_networker** virtual disk is 10,000 blocks; there is no minimum size.

▶ **If the default size for var_opt_networker is insufficient, record the new size of the virtual disk on Worksheet 6 in Appendix A.**

Changing the name of a virtual disk

We recommend that you adopt a naming scheme that identifies the mount point of the file system contained on a virtual disk. (The mount point identifies a location for placing the virtual disk's file system.) For example, the virtual disk name **usr_opt_X11** implies the mount point for its contents, **/usr/opt/X11**.

> **IMPORTANT** Data General recommends that you *do not* rename the virtual disks for software on a DG/UX release medium. If you do, each time you boot the DG/UX system you are prompted for the names of the virtual disks containing **swap** and the / file system. See the **admpdisk**(1M) manual page for information on permanently changing the default name for these virtual disks.

You name virtual disks using a combination of as many as 31 alphabetic characters, numbers, and various punctuation characters and symbols.

Table 1–12 lists the ISO–8859 characters you *cannot* include in a virtual disk name.

Table 1–12   Illegal characters in virtual disk names

ISO–8859 Character	Description
\000 through \037	ASCII control characters
	space
”	double quote
’	single quote
(	left parenthesis
)	right parenthesis
,	comma
/	slash
:	colon
@	at sign
\177	ASCII DEL
\200 through \237	undefined characters

After you complete the installation, you can refer to *Managing Mass Storage Devices and DG/UX® File Systems* on the documentation CD-ROM for more information on virtual-disk names.

Collecting package information

This section helps you complete **Planning Worksheet 9** in Appendix A.

You must provide configuration information to set up the NetWorker, ONC, and TCP/IP packages. (Setting up other DG/UX packages is not interactive.)

In the next sections, you collect package setup information for the **networker**, **onc**, and **tcpip** packages.

NetWorker package information

How you set up the Legato NetWorker product for DG/UX depends on whether you are installing your system as a local-only NetWorker server (your system backs up its own files), or as a client to a remote NetWorker server that runs the multi-server version of NetWorker.

Your release medium includes the single-server version, which allows you to back up only local file systems to local tape drives. If you ordered a license for the multi-server version of NetWorker, you will receive a token that enables multi-server NetWorker, and which will allow you to back up remote systems' file systems to the NetWorker server's tape drives. See the *Release Notice for the Legato NetWorker for AViiON®* *Computers* and the NetWorker documentation on the CD-ROM for more details.

Regardless of your NetWorker version, you must answer the following question during package setup:

Configure system as a client of a remote NetWorker server?

Answer **no** unless your system is a client of a remote NetWorker server. The **no** response sets up the single-server version and configures your system as a NetWorker single client.

Answer **yes** if the multi-server version of NetWorker runs on a remote NetWorker server, and you want to configure this system as a NetWorker client to be backed up by that system.

▶ **Record the NetWorker information on Worksheet 9 in Appendix A.**

ONC package information

If you plan to install the ONC package, you must supply the Network Information Service (NIS) domain name during the installation process:

NIS domain name

By default, the directory **/etc/yp/***domain-name* contains a named set of NIS maps. Hosts with this directory as their default NIS domain share the information found in its maps.

If you are installing a new computer in an existing network, use the **domainname** command to find out the network's NIS domain name.

▶ **Record the NIS domain name on Worksheet 9 in Appendix A.**

Refer to *Managing ONC/NFS and Its Facilities on the DG/UX® System* on the documentation CD-ROM for more information on ONC parameters.

TCP/IP package information

When you install the TCP/IP package, you must supply your host's name, Internet address with subnet mask (if applicable), and the Ethernet controller device name.

▶ **Record TCP/IP information on Worksheet 9 in Appendix A.**

Follow the next subsections to collect the required information. After you complete the installation, you can refer to *Managing TCP/IP on the DG/UX® System* on the documentation CD-ROM for more detailed information about TCP/IP parameters.

Hostname

Chose a unique name for your computer hardware that contains no more than 63 alphabetic and numeric characters. Hostnames that relate to the use or location of the system are particularly helpful in networked environments where hosts may share file systems.

Do not use the capitalized names **MY_HOST** or **PRIMARY**; these names are reserved by the system. Examples of hostnames are **fred**, **jamaica**, and **cad1**.

If you are upgrading, use the **hostname** command at each host to determine current hostnames.

Internet address

Your network's system administrator can supply the Internet address of the host being set up. An example of an Internet address is **128.222.2.1**. After you complete the installation, you can refer to *Managing TCP/IP on the DG/UX® System* on the documentation CD-ROM for more information.

If you are upgrading, you can determine your host's Internet address using one of the following methods:

- View the **/etc/hosts** file.

- Use the **ypcat** command:

  % **ypcat hosts | grep** *hostname* ↵

- Use the **arp** command:

  % **arp** *hostname* ↵

Do you subnet?

Using a subnet allows you to associate multiple physical networks with a single logical network. Answer **yes** if your network uses subnetting; answer **no** if you do not subnet.

Network mask

A network mask is required only when your network is subnetted.

Specify the hexadecimal bit pattern that identifies the network portion of an Internet address in your network.

Examples of network masks are **0xff000000** and **0xffff0000**.

Controller device name

When your computer contains two or more Ethernet LAN controllers, you must specify a device that connects your computer to a TCP/IP LAN.

You identify controllers by the controller type and controller number, using the form *controller-type controller-num.* For the Ethernet LAN controller device names for your system refer to the subsection below for the platform you are using.

> **IMPORTANT** DG/UX also supports non-Ethernet controllers. You set up token ring or FDDI controllers after installation, as described in *Managing the DG/UX® System*.

Intel-based systems — Table 1–13 lists Ethernet controllers currently supported by the Intel platform and their device name components.

Table 1–13   Ethernet LAN controller device names for Intel-based systems

Controller description	Name	Device name example
DEC PCI LAN controller/10 for 10-Mbit Ethernet.	**dpen**	**dpen(pci(0),d)**
DEC PCI LAN controller/100 for 100-Mbit Ethernet.	**dpen**	**dpen(cpci(1),2)**
3Com PCI 10/100 BASET controller for 10- or 100-Mbit Ethernet.	**tcen**	**tcen(pci(0),d)**

88K -based systems — Table 1–14 lists Ethernet controllers currently supported by the 88K platform and their device name components.

Table 1–14   Ethernet LAN controller device names for 88K-based systems

Controller description	Name	Device name example
Data General second generation integrated Ethernet controller	**dgen**	**dgen(1)**
Integrated Ethernet controller (AViiON 100, 200, 300, 400, 3000, 4000, and 4300 series only)	**inen**	**inen(0)**
Interphase VME Ethernet controller	**hken**	**hken(3)**
CMC VME Ethernet controller	**cien**	**cien(0)**

Where to go next

If you are	Go to
Completing installation of a preloaded system.	Chapter 2
Installing DG/UX from a local tape or CD-ROM device.	Chapter 3
Upgrading from DG/UX 5.4R3.00 or later to DG/UX R4.11 using a local tape or CD-ROM device.	Chapter 4
Installing or upgrading from a remote load device.	Chapter 5
Installing DG/UX information security software.	Chapter 6

End of Chapter

2 *Completing installation of your preloaded system*

Your computer is *preloaded* if it came from the factory with the DG/UX System Release 4.11 software loaded on the system disk. See Chapter 1 for information about the contents of your preloaded disk. Most preloaded systems can be up and running in 30 minutes or less.

The DG/UX manuals are on the documentation CD-ROM. If you want, you can view the documentation CD-ROM on a PC *before* the DG/UX software is up and running. Or, after you complete your installation, set up the documentation CD-ROM as described in the *Quick Start Guide to Viewing DG/UX® Documentation*.

> **IMPORTANT**   If your system is *not* preloaded, refer to Chapter 3 to do a full or clean installation, or Chapter 4 to do an upgrade or overload installation.

This chapter includes the following major sections:

- Collecting installation parameters
- Setting SCSI bus parameters for a dual-initiator configuration
- Powering on your hardware computer system
- Selecting packages
- Setting up selected packages
- Building and booting a configured kernel
- Where to go next

In this chapter, you follow the sequence of tasks shown in the flowchart in Figure 2–1.

```
        ┌─────────────┐
        │  Connected  │   Yes    ┌──────────────────┐
        │   to LAN ?  │─────────▶│ Collect network  │
        └─────────────┘          │  information     │
               │                 │ (see Chapter 1)  │
              No                 └──────────────────┘
               │                          │
               ▼                          │
        ┌──────────────────┐              │
        │ Power on hardware │◀────────────┘
        │ computer system   │
        └──────────────────┘
               │
               ▼
        ┌──────────────────┐
        │ Select and set up │
        │ software packages │
        └──────────────────┘
               │
               ▼
        ┌──────────────────┐
        │ Build and boot    │
        │ a configured kernel│
        └──────────────────┘
               │
               ▼
        ┌──────────────────┐
        │ Go to Chapter 7 to│
        │ complete your     │
        │ installation and per-│
        │ form post-installation│
        │ tasks.            │
        └──────────────────┘
```
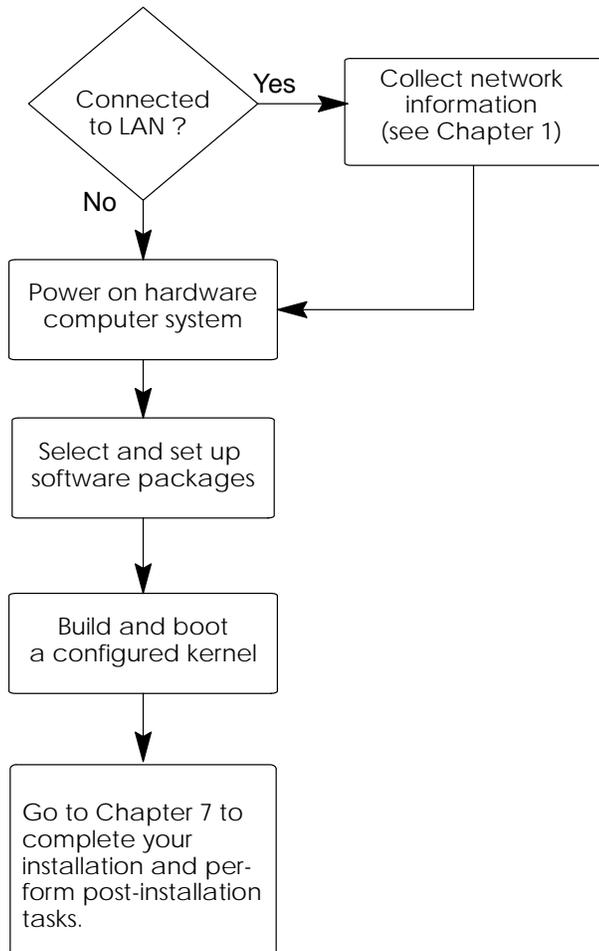
Figure 2–1   Installation procedure for a preloaded system

IMPORTANT   For dual-initiator disk configurations (in which two or more host computers share a single SCSI bus), make sure SCSI bus operating parameters are set properly *before* you begin the installation. For more information see the section on setting SCSI bus parameters for a dual-initiator configuration, later in this chapter.

Collecting installation parameters

If you will install the Legato NetWorker, ONC, or TCP/IP packages, you need the information in Table 2–1. Go to Chapter 1 if you need help collecting this information.

Table 2–1   Installation parameters

DG/UX Installer prompt	Example Response	Actual
Client for remote NetWorker server?	no	
(For NetWorker server only) Size of **/var/opt/networker**	10000	
NIS domain name	worknet	
Hostname	moe	
Host Internet address	123.222.2.1	
Do you subnet?	yes	
Network mask	0xffffff00	
Controller device name (if computer has more than one Ethernet controller)	Intel: alen(), dpen(), tcen() 88K: dgen0, inen(), hken(), cien()	

Setting SCSI bus parameters for a dual-initiator configuration

IMPORTANT   This section does not apply to systems without a System Control Monitor (SCM).

When you add a preloaded system to a dual-initiator configuration, you need to perform some special preparation before installing the DG/UX system on that host. We refer to the host on which you boot or install the DG/UX system as the "local" host. We will call the other host(s) in the local host's dual-initiator configuration, the "remote" host(s).

The SCSI bus operating parameters should be set *before* you boot the DG/UX system on the local host. For instructions on how to set these parameters, **refer to the 014–series operating manual for your hardware model**.

Note that in a dual-initiator disk configuration, one SCSI bus cable connects two computer systems, either directly or (more commonly) daisy-chained through one or more SCSI disk devices such as a CLARiiON™ disk array.

For example, common dual-initiator disk configurations are *DG/UX Cluster* configurations.

To set the SCSI bus operating parameters, your system *must* be equipped with a System Control Monitor (SCM). If you are not sure if you have an SCM, refer to the section on verifying prerequisites in Chapter 1.

To set the SCSI bus operating parameters you must interrupt the boot process *before* the DG/UX installer kernel starts.

To do this, you can enter **Ctrl–C** any time after the powerup diagnostics have completed and the DG/UX bootstrap is running. This will bring you to the SCM prompt.

The powerup diagnostics are complete when the system displays the following self-test information:

```
Testing...
     0123456789ABCDEFGHIJKLMNOPQRSTUVWXYZ
Passed
```

> **IMPORTANT**   If your server does not complete the self test or displays error messages, do not attempt to complete the installation. Refer to your hardware manual for troubleshooting information.

Once the powerup diagnostics are complete, the system displays the following DG/UX bootstrap message:

```
DG/UX System Release R4.11 Bootstrap
Loading image ................................
```

You may enter **Ctrl–C** any time after the DG/UX bootstrap displays the first line of the message. However, you must interrupt the bootstrap *before* the system completes this operation. If the system displays the following message, the bootstrap is complete and you can no longer interrupt the system boot:

```
Configuring devices ...
```

Once you are at the SCM prompt, you can check your system's SCSI bus operating parameters.

> **IMPORTANT**   If you fail to interrupt the bootstrap before it completes, turn off your computer immediately. Since the DG/UX system does not begin writing to disk devices until after it has finished configuring all devices, you will not corrupt any data on your disks. Wait a few seconds until your computer has reset, and then try again.

Powering on your hardware computer system

If you have an Intel-based system and also want to run a third-party operating system (e.g., MS-DOS$^{®)}$ in addition to the DG/UX software, we recommend you first complete the installation of your preinstalled software, and then follow the directions for adding a third-party operating system in the post-installation tasks of Chapter 7.

STOP   **Applying power to the computer begins a process that you cannot interrupt gracefully! If you plan to install Legato NetWorker, ONC, or TCP/IP, don't continue until you have collected the information in Table 2–1 (or Planning Worksheet 7 in Appendix A).**

▶ To begin installation, follow these steps:

1. **Turn on power to the system console and any other devices that are connected to your computer.**

   A printer, modem, or peripheral housing unit (PHU) are all examples of such devices. For diskette, optical disk, or other devices that require a removable recording medium, be sure the drive contains media and is ready.

   > **IMPORTANT**   If you have a WORM (Write-Once Read-Many) device in your configuration, power *down* the device to prevent the installation utility from preparing (writing) that disk. A write operation to a WORM disk could inadvertently destroy its contents.

2. **Turn on the computer unit's power switch.**

   Your computer executes self-tests and displays information similar to the following example from an **88K**-based system :

```
(C) DATA GENERAL CORPORATION 1989 ...  1995
40 MHz AV Series Computer
Dual Processor
Firmware Revision xx.xx
Keyboard Language is U.S. English
Local Ethernet address is 08:00:1B:1F:03:77
Initializing [32 Megabytes]

Testing.....
    0123456789ABCDEFGHIJKLMNOPQRSTUVWXYZ
Passed
```

> **IMPORTANT**   If your computer displays error messages or
> does not complete the self-tests satisfactorily, do not continue
> the installation. Go to your computer hardware operating
> manual for troubleshooting procedures.

Once self-tests pass successfully, your computer boots the installer
utility (a DG/UX System kernel configured with standard devices),
displaying information similar to the following.

> **IMPORTANT**   The physical disk names may vary slightly
> depending on the type of medium and the platform you are
> using. The physical disk for a typical Intel-based system might
> be named something like sd(apsc(pci(0),B,0,7),0,0) or
> sd(npsc(cpci(0),2,0,6),0,0). In this chapter the sample
> dialogs reflect a typical 88K-based system.

```
Booting sd(ncsc(0,7),0,0) root -f /dgux.installer -i
DG/UX System Release R4.11 Bootstrap
Loading image ....................................
DG/UX System Release R4.11, Version Installer
Using 32 megabytes of physical memory
Found 2 processor(s)
Configuring devices .....................
Registering disks ..
Using vdm(swap,2ccc0e1e,373a2f18,0) as swap disk
No check necessary for vdm(root,2ccc0e1e,373a2718,0)
Mounting vdm(root,2ccc0e1e,373a2718,0) as root file system
Creating /dev ....

INIT: RUN LEVEL I
```

Read the next section to select software packages.

Selecting packages

The DG/UX installer program prompts you to select the software
packages to set up. (See Chapter 1 for a description of each package.)

```
Set up packages? [all]  ↵
```

3. **Decide whether to set up all packages or to specify them
    individually.**

    IMPORTANT   If you set up the **networker**, **nfs**, or **onc**
    packages, you must also set up the **tcpip** package.

▶ **To set up all the packages that were loaded, press Enter
    and go to the next step.**

```
Package Name(s):  [all] ↵
```

▶ **To set up packages individually, list them by entering a
    question mark (?). For example:**

```
Package Name(s): [all] ? ↵
```

A screen similar to the following appears.

```
Select the package(s) you want to set up.  If you want
to set up all packages select 'all,' do not select any
individual package names.

Choices are
         1   all
         2   dgux
         3   networker
         4   nfs
         5   onc
         6   sdk
         7   sdk.X11
         8   tcpip
         9   X11


Enter a number, a range of numbers (n-m, where m can
be '$' to indicate the last item), a name, the initial
part of a name, <NL> to take the default, ? for help,
^ to return to the previous query, < to restart the
operation, or q to quit.

Package Name(s): [all]
```

IMPORTANT   Intel-based systems also include the Application
Capture Option (**aco**) packages. Therefore, your choices on an
Intel-based system would be as follows:

```
Choices are
         1   all
         2   dgux
         3   dgux.aco
         4   networker
         5   nfs
         6   onc
         7   sdk
         8   sdk.X11
         9   tcpip
        10   X11
        11   X11.aco
```

Next specify the individual packages you want to set up, using the full names or corresponding numbers of the packages in the list. Separate each name or number by commas and/or spaces. You also may use a dash to specify a range of package numbers. For example, on an 88K system, you might select the following if you did not need the SDK environment:

```
Package Name(s): [all] 2–5, 8,9 ↵
```

The system will list the selected packages and ask you to verify your selection. For example:

```
You selected the following packages:

   dgux
   networker
   nfs
   onc
   tcpip
   X11


Correct? [yes] ↵

OK to perform operation? [yes]
```

4. To start the setup scripts for selected packages, press Enter. If you wish to modify your selection, answer no and repeat the process. When you are satisfied with your selections, press enter as shown below:

```
OK to perform operation? [yes] ↵
```

Status messages are displayed during setup; a message appears when setup has been completed successfully. Packages are set up in alphabetical order.

Although the setup of DG/UX is not interactive, the system displays status messages during setup and reports successful completion.

If the setup of a particular package fails, the utility informs you with a warning message. Write down the message, and refer to Chapter 8 for troubleshooting help.

Setting up selected packages

For most packages, the setup process is not interactive. However, if you selected NetWorker, ONC, or TCP/IP, you must provide information when prompted.

A detailed account of each package's setup is logged in a file whose name is expressed in the general form **/var/setup.d/log/**_package_**.root** or **/var/setup.d/log/**_package_**.usr**.

CAUTION   _Providing incorrect answers to configuration queries may force you to abort the remaining installation procedures._

5. **Read system-generated messages during package setup, especially those labeled NOTE and WARNING.**

    Setting up the DG/UX packages only (no network) takes about 8 minutes. It takes a bit longer to set up all the packages.

6. **Determine how to proceed by reviewing this step carefully.**

    ▶ If you did not select any of the three optional packages **networker**, **onc**, or **tcpip**, go to the section on building and booting a configured kernel (later in this chapter), and proceed with **step 19.**

    ▶ If you selected the Legato NetWorker package for DG/UX, go to the following section and proceed with **step 7.**

    ▶ If you did not select NetWorker, but selected ONC, go to the section on answering ONC questions, and proceed with **step 16.**

    ▶ If you selected TCP/IP, but neither NetWorker nor ONC, go to the section on answering TCP/IP questions, and proceed with **step 18.**

Answering NetWorker questions

IMPORTANT   If you load the **networker** package, you must also load the **tcpip** package.

How the installer program sets up NetWorker depends on whether you are setting up your system as a local-only NetWorker server (your system backs up its own files) or as a client that will back up its files to a remote NetWorker server.

7. **Decide if this host backs up its files to a remote NetWorker server or if it is a local-only server that backs up its own files.**

   ▶ If this host backs up files to a remote NetWorker server, type **yes** and press Enter. For example:

   ```
   Configure system as a client for a remote NetWorker
   server? [no] yes ↵
   ```

   If you answer **yes**, there are no more NetWorker questions.

   - If you are setting up the ONC package, go to **step 16.**

   - If you are setting up TCP/IP but *not* the ONC package, go to **step 18.**

   ▶ If this host will back up its own files locally, accept the **no** default by pressing Enter**.** For example:

   > **IMPORTANT** When you answer **no,** you need to allocate space for NetWorker index and log files.

   ```
   Configure system as a client for a remote NetWorker
   server? [no] ↵
   Will this system be running as a node within a
   cluster? [no]
   ```

8. **Decide if this host will run as part of a cluster.**

   ▶ If this is a standalone system and not part of a cluster, accept the **no** default by pressing Enter. For example:

   ```
   Will this system be running as a node within a
   cluster? [no] ↵
   ```

   ▶ If this system will be a node in a cluster, type **yes** and press Enter. For example:

   ```
   Will this system be running as a node within a
   cluster? [no] yes ↵
   ```

9. **Read the screen note about virtual disk requirements carefully. Refer to Chapter 1 in this manual for more information.**

   ```
   You now have the opportunity to create or adjust the size
   of the /var/opt/networker file system.  This file system
   is needed to store the NetWorker online index and log
   files.  The default size of 10000 blocks is enough space
   to store index information for multiple versions of
   several thousand files — about enough for a small
   workstation with a single disk drive.  THIS IS NOT ENOUGH
   ```

The side note next to step 7 reads:

Use the answer you recorded in Table 2–1 or **Planning Worksheet 9**

```
SPACE FOR A SERVER WITH REMOTE CLIENTS!  If your system
has more than one disk drive, or if it will be acting as a
NetWorker server for remote clients, you probably need to
allocate additional space for the online index.  See the
installing manual for instructions on estimating the space
requirements for the online index.
```

The installation utility presents a table of default requirements for creating, sizing, and mounting the file system for online index and log files. The physical disk names and block requirements may vary slightly depending on the type of media and the platform you are using. The samples in this section are for an 88K-based system.

```
/var/opt/networker file system:

File System          Virtual            Current Action   Blocks    Physical
Mount Point          Disk               Blocks  Required To Add     Disk
------------         --------           ------  ------   -----   ---------------
/var/opt/networker var_opt_networker  -       Create   10000   sd(ncsc(0,7),0,0)

Modify this information? [no]
```

10. **Decide if you need to modify the default values presented in the table.**

   ▶ To accept the default values presented in the table, press Enter. For example:

   ```
   Modify this information? [no] ↵
   ```

   - If you are setting up the ONC package, go to **step 16.**

   - If you are setting up TCP/IP but *not* the ONC package, go to **step 18.**

   ▶ To modify any of the information in the table, enter **yes.** For example:

   ```
   Modify this information? [no] yes ↵
   ```

   The installation utility presents a series of prompts similar to the following:

   ```
   Mount a virtual disk at /var/opt/networker?  [yes]
   ```

11. **To accept the default mount point, press Enter as shown below; otherwise, enter an alternate mount point.**

   IMPORTANT   Do not change the mount point if you might upgrade your operating system to the next release at some future date. The installation utility has no way of locating the correct virtual disk to upgrade if you change the mount point.

```
Mount a virtual disk at /var/opt/networker?  [yes] ↵
Virtual disk to mount at /var/opt/networker:
   [var_opt_networker]
```

12. Type the desired virtual disk name, or to accept the default name, press Enter.

```
Virtual disk to mount at /var/opt/networker:
   [var_opt_networker] ↵
Size (in blocks) for var_opt_networker: [10000]
```

13. Type the desired block size, or to accept the default block size, press Enter.

```
Size (in blocks) for var_opt_networker: [10000] 50000 ↵
Physical disk for var_opt_networker: [sd(ncsc(0,7),0,0)]
```

Use the answers you recorded in Table 2–1 or **Planning Worksheet 7**

14. Type the name of the physical disk that holds the virtual disk. (Press Enter to accept the default drive name, type an alternate physical disk name, or type ? to list the choices for the physical disk name.)

```
Physical disk for var_opt_networker: [sd(ncsc(0,7),0,0)] ↵
```

When you have completed the desired changes for the virtual disk, the installation utility displays a table listing your modifications.

```
var/opt/networker file system:

File System          Virtual              Current Action   Blocks    Physical
Mount Point          Disk                 Blocks  Required To Add    Disk
------------         --------             ------  ------   -----  --------------
/var/opt/networker   var_opt_networker    -       Create   10000  sd(ncsc(0,7),0,0)

Modify this information? [no]
```

You may modify this information again, if desired.

15. **To make further changes, type yes and repeat steps 10 through 14, as prompted. To accept the values presented in the table, press Enter.**

```
Modify this information? [no] ↵
```

The system displays the following messages while setting up NetWorker:

```
Creating /dev/dsk/var_opt_networker (10000 blocks) on
    sd(ncsc(0,7),0,0).
Virtual disk "var_opt_networker" created.
Virtual disk "var_opt_networker" made a volume.
Making file system on /dev/dsk/var_opt_networker
Mounting /dev/dsk/var_opt_networker.
```

▶ If you are setting up the ONC package, go to **step 16.**

▶ If you are setting up TCP/IP but *not* the ONC package, go to **step 18.**

Answering ONC questions

To set up ONC (Open Network Computing), you supply the host's NIS domain name.

> **IMPORTANT**   If you set up the **onc** package, you must also set up the **tcpip** package.

16. **Type the NIS domain name for your installation ("worknet" in this example) and press Enter.**

```
Enter the NIS Domain name: worknet ↵
```

17. **Confirm the NIS domain name, or correct it by answering no and responding again.**

```
[worknet] Correct? [yes] ↵
```

A completion message appears when ONC has been set up successfully.

Notes on ONC and NFS®

Initially, your computer runs as an NIS client. ONC and NFS may require further setup (such as changing your host from an NIS client to either an NIS master or NIS server). For more information on additional setup, refer to *Managing ONC™ /NFS® and Its Facilities on the DG/UX® System* on the documentation CD-ROM.

You can find a detailed account of the ONC and NFS root setup in **onc.root** and **nfs.root** log files located in the directory **/var/setup.d/log**.

Answering TCP/IP questions

When setting up TCP/IP, you enter the hostname and its Internet address you recorded in Table 2–1 (or **Planning Worksheet 9** in Appendix A).

The exact text of your screen dialog depends on whether your computer has Ethernet LAN controller(s).

> **IMPORTANT**   You set up a token ring or FDDI controller *after* the DG/UX System installation is complete. Follow this **sysadm** path: `Networking -> TCP/IP -> Interface`. After you set up your documentation CD-ROM, refer to the section on maintaining network interfaces in *Managing TCP/IP on the DG/UX® System* for details.

18. **Enter the network configuration information that you recorded in Table 2–1 (or Planning Worksheet 9 in Appendix A).**

    Refer to whichever of the following samples for this step is appropriate for your system's Ethernet LAN configuration. The Ethernet LAN device names may vary slightly depending on your platform and model. (Note that the values **moe**, **128.222.2.1**, **0xffffff00**, and the Ethernet controller device configurations in the sample dialogs are examples only.)

    Single Ethernet LAN controller

```
The following queries refer to the primary network
interface:

Enter host name: moe ↵
[moe] Correct? [yes] ↵
Enter host Internet address: 128.222.2.1 ↵
[128.222.2.1] Correct? [yes] ↵
Is your local network subnetted? [no] yes ↵
Enter the network mask: 0xffffff00 ↵
[0xffffff00] Correct? [yes] ↵

NOTE:  Using "dgen0" as the primary network interface
       controller.
```

Multiple Ethernet LAN controllers

```
The following queries refer to the primary network
interface:

Enter host name: moe ↵
[moe] Correct? [yes] ↵
Enter host Internet address: 128.222.2.1 ↵
[128.222.2.1] Correct? [yes] ↵
Is your local network subnetted? [no] yes ↵
Enter the network mask: 0xffffff00 ↵
[0xffffff00] Correct? [yes] ↵


The following Ethernet controller devices are configured
on this system

    dgen0 cien0 cien1

Enter controller device name: [dgen0] ↵
```

No Ethernet LAN controller

```
The following queries refer to the primary network
interface:

Enter host name: moe ↵
[moe] Correct? [yes] ↵
Enter host Internet address: 128.222.2.1 ↵
[128.222.2.1] Correct? [yes] ↵

WARNING:   No Ethernet controllers are configured on
           this system.  A primary network interface
           will not be added at this time.  You can
           add TCP/IP network interfaces later
           through sysadm(1M).
```

Notes on TCP/IP

The files **tcpip.root** and **tcpip.usr** located in the directory
/var/setup.d/log contain a verbose description of the **tcpip** package
setup process.

Additional TCP/IP setup may be required depending on your network
and site configuration. Consult *Managing TCP/IP on the DG/UX®
System* on the documentation CD-ROM for information on the following
additional TCP/IP features: routing, Domain Name System (DNS),
Daemon management, SNMP, sendmail, and network databases.

▶ When you have completed all the setup questions, proceed to the next
section to build and boot your configuration.

Building and booting a configured kernel

With the DG/UX packages set up, you are ready to build a DG/UX
kernel for your configuration. The installer program builds a default
kernel for your system using configuration data about devices, device
drivers, streams modules, socket protocols, and tunable parameters for
the DG/UX system and software packages.

> **IMPORTANT**   Stand-alone **sysadm** uses default values for general
> configuration variables to build your configured kernel. After you
> complete this installation, you may need to reconfigure your kernel,
> setting these variables to different values. For information on these
> procedures, refer to *Managing the DG/UX^r System* on the
> documentation CD-ROM.

Files in the directory **/usr/etc/master.d** list the configuration variables
and default values for kernel builds. The kernel is located in the file
/dgux on the **root** virtual disk.

Building a kernel

After package setup completes, the DG/UX installer program prompts
you to build a kernel for your system.

19. **To configure and build the kernel, press Enter at the initial
     prompt.**

```
Configure and Build kernel: [yes] ↵
System configuration identifier: [moe]
```

20. **Assign a new name to your kernel configuration or accept
     the default name.**

```
System configuration identifier [moe] ↵
[moe] Correct? (yes):
```

The default (in brackets) is the hostname supplied during **tcpip** package setup. If you did not perform **tcpip** package setup, the generic filename, **aviion**, is the default. We recommend selecting a unique name for your system configuration.

21. Confirm the name by pressing Enter.

```
[moe] Correct? (yes):  ↵
Operating system client? [no]
```

22. To signify that you are not installing an OS client, press Enter. Then, to proceed, press Enter again.

```
Operating system client? [no]  ↵
Is this information correct? [yes]
```

An OS client is a computer that may not have its own disk, thereby relying on the OS server for some or all of its operating system software and file service.

Since you are installing the DG/UX system on a host, the host must have its own disks for the operating system. Therefore, you should accept the default for this prompt.

> **IMPORTANT**   The DG/UX R4.11 operating system for Intel-based systems does not support diskless workstations.

For information on adding OS clients, refer to *Managing the DG/UX® System* on the documentation CD-ROM.

23. Verify that the information is correct.

```
Is this information correct? [yes]  ↵
```

Status messages appear while the installer utility configures the system and builds the kernel. This will take between 10 and 20 minutes, depending on your configuration. This is a good time to take a break if you like.

If an error occurs during the kernel build, write down the error message and follow any screen instructions. Contact Data General (as described in the Preface) if you are unable to resolve the problem.

Booting the kernel

After the kernel builds successfully, the DG/UX installer program
prompts you to boot the kernel you just built.

> **IMPORTANT**   Note that the sample dialog in this section reflects
> an 88K-based system. The physical disk names may vary slightly
> depending on the type of media and the platform you are using.

24. To boot the kernel, press Enter at the initial prompt.

```
Reboot now? [yes] ↵
Boot path: [sd(ncsc(0,7),0,0) root −f /dgux −i 3]
```

> **IMPORTANT**   *Intel-based systems*: If instead of rebooting, your
> system displays the `Boot command:` prompt, you must enter the
> **boot** command for your system. For example, to boot to init
> level 3, you might type
>
> ```
> Boot command: sd(npsc(cpci(),3),0) root −f /dgux −i
> 3 ↵
> ```
>
> You can use the command above, substituting the device name
> for your system in place of **npsc(cpci(),3**. (See the sample
> dialog in Appendix C.) When you see the login screen, proceed
> to Chapter 7 to complete your installation.
>
> For more information on using the **boot** command, refer to
> Appendix D. If you are not sure of the device name for your
> system, refer to the section on identifying boot, load, and
> system disk devices in Chapter 1. If in the future you want to
> set up your system to boot automatically, refer to the
> **admnvram** (1M) man page after you complete your
> installation.

25. To confirm the boot path and run level, press Enter.

Note that, as this example illustrates, you boot the new kernel to a
run level of 3 (multiuser mode).

```
Boot path: [sd(ncsc(0,7),0,0) root −f /dgux −i 3] ↵

All currently running processes will be killed.
Are you sure you want to reboot the system? [yes]
```

26. To reboot the system now, press Enter.

```
Are you sure you want to reboot the system? [yes] ↵
```

The screen clears and the new kernel boots, displaying startup and
other informative messages similar to the following. Remember
that the physical disk names will vary slightly depending on the
type of media and the platform you are using. A typical example for
an 88K-based system follows.

```
Booting sd(ncsc(0,7),0,0) root -f /dgux -i 3
DG/UX System Release R4.11 Bootstrap
Loading image .........................................
DG/UX System Release R4.11, Version generic
Using 32 Megabytes of physical memory
Found 2 processor(s)
Configuring devices .................................
Registering disks ..
Using vdm(swap,2D039A43,0C027700,0) as swap disk.
No check necessary for vdm(root,2D1F019E,0C027700,0).

Mounting vdm(root,2D1F019E,0C027700,0) as root file
system.

Creating /dev .... .
```

.   **<additional messages>**
.
.

```
    NOTE:  The run level change is complete.
           See /etc/log/init.log for a verbose
           description of the system initialization
           process.
```

IMPORTANT   If you receive an error message indicating that a
package has not been set up, after you complete installation,
perform package setup using **sysadm**, as necessary.

If the kernel encounters a device it cannot configure, it displays an
error message and resumes configuration of the remaining devices.
Depending on the circumstances, you may choose either to investigate
and correct the problem on the spot, or postpone investigation until
your DG/UX system is operational. If, for example, a particular device
requires repair, it might be prudent to complete your installation and
work temporarily without that device.

When the DG/UX system has finished booting, the login prompt
appears.

```
           Press New Line to continue.  ↵
moe
DG/UX Operating System    R4.11
Console Login:
```

If you are using a graphics monitor, don't log in at the login prompt.
Within a few seconds, a login screen will appear. Chapter 7 explains
how to log in and complete your installation.

Where to go next

**Go now to Chapter 7 to log in and finish your DG/UX installation.
Chapter 7 also provides information on post-installation tasks.**

End of Chapter

3 Performing a full installation of the DG/UX system from local release media

This chapter explains how to install the DG/UX System Release 4.11 software on a computer configured with a new, newly formatted, or blank system disk. To upgrade a DG/UX 5.4R3.00 or later system to DG/UX R4.11, refer instead to Chapter 4.

> **IMPORTANT**   If you change the default configuration and set up a separate /**var** file system, you will need to add an entry to your /**etc/inittab** file to mount /**var**. For instructions, be sure to read the information on changing your configuration in the "Before you start" section of this chapter.

To install DG/UX R4.11 with information security, begin here with this chapter, and then go to Chapter 6 when directed.

> **IMPORTANT**   The instructions in this chapter also apply if you are *re*installing DG/UX system R4.11 because an initial attempt at installation failed or because a key operating-system component was corrupted, or if you are loading DG/UX information security software. This is referred to as a *clean installation.*

This chapter includes the following major sections:

- Summary of installation tasks
- Performing a clean installation
- Before you start
- Loading the DG/UX software
- Booting the installation utility
- Preparing physical disk drives
- Preparing required virtual disks (**swap**, **root**, and **usr**)
- Preparing a dump-to-disk area
- Loading the software packages
- Setting up software packages
- Building and booting a configured kernel
- Where to go next

Summary of installation tasks

For a full installation, you perform the steps shown in Figure 3–1.

> **IMPORTANT** For dual-initiator disk configurations (in which two or more host computers share a single SCSI bus), make sure SCSI bus operating parameters are set properly *before* you begin the installation. For instructions, refer to the 014–series operating manual for your computer hardware model.

Plan your installation. Read Chapter 1.

Performing a *clean* installation ?

Yes → Follow the instructions in this chapter for preparing the disk for a clean installation

No

CD-ROM or tape drive attached ?

No → Go to Chapter 5

Yes

Boot stand-alone sysadm

Prepare physical and virtual disks

Load software

Connected to LAN ?

Yes → Complete planning worksheets (Appendix A or Chapter 1)

No

Set up packages

Build and boot configured kernel

Go to Chapter 7 to log in and set up the new DG/UX system

Figure 3–1   Full DG/UX system installation roadmap

Performing a clean installation

If you have an existing DG/UX system and are unable or don't want to *upgrade* as explained in Chapter 4, you can load the contents of the 4.11 release medium on a clean system disk. This is called a *clean installation.*

If you do *not* have an existing DG/UX system, then you are performing a *full* installation and can skip the procedure for cleaning the system disk. A full installation assumes a clean disk.

You need to clean the system disk before installing the DG/UX software if any of the following conditions exist:

- You are reinstalling the DG/UX System R4.11 because an initial attempt at installation failed, or a key operating system component was corrupted.

    IMPORTANT   If you are performing an upgrade and it fails, it is *not* necessary to do a clean installation (although you may). Just adhere to any advice given by the system, and then restart the upgrade.

- You are installing information security software.

- Your system dies and you need to reinstall the operating system.

If you do need to perform a clean installation, you can clean the system disk after you boot the installation utility as soon as the Standalone Sysadm Main Menu appears. Just follow the instructions for cleaning the system disk in the subsection under booting the installation utility.

CAUTION   *You will have to reinstall any software packages that were built into your previous system. For kernel packages that aren't included on the DG/UX medium (Netware, OSI/P, PICK, SNA, X.25, etc.), you must refer to the individual Release Notices for these products for information on how to keep your parameters.*

Before you start

Please read this section carefully and verify that you are ready before beginning your installation.

Do you have the information you need?

If you have not yet planned for this installation, read Chapter 1 and return to this chapter after you complete the **Planning Worksheets**.

Preparing attached peripheral devices

Before you begin the installation procedure, power on all attached peripheral devices. The DG/UX installer program examines your system for standard devices to configure, but can size them only if power is on.

> **IMPORTANT** If you have a WORM (Write-Once Read-Many) device in your configuration, power *down* the device to prevent the installation utility from preparing (writing to) that disk. A write operation to a WORM disk could inadvertently destroy its contents.

For diskette, optical disk, or other devices that require a removable recording medium, be sure the drive contains media and is on line.

Changing your configuration

If you are changing any network parameters, virtual disk sizes, selection of packages, or have other configuration changes, complete the Planning Worksheets as described in Chapter 1 before proceeding. To use the DG/UX default configuration, you simply accept defaults at most installer program prompts.

> **IMPORTANT** If you want to set up the **/var** file system independent from the / (root) file system, read the following instructions:

▶ In the DG/UX R4.11 release, the **/etc/utmp** and **/etc/wtmp** files have been moved to **/var/adm**, and the **/etc/utmp** and **/etc/wtmp** files are now symbolic links.

If you do not use the default configuration and set up the **/var** file system separate from the / (root) file system, you will not be able to boot to init 3. This is because the init process will attempt to make **/var/adm/utmp** entries before the **/var** file system is mounted. You will receive a write error and the system will stop at run level s, even if you specified booting to run level 3.

You can correct this problem by adding the following entry to your **/etc/inittab** file to mount the independent **/var** file system.

```
mnt::sysinit:/sbin/mount /var </dev/syscon >/dev/syscon 2>&1
```

You can edit the **/etc/inittab** file from init level s, after which you should halt the system and reboot.

Installing a dual-initiator configuration

For dual-initiator disk configurations (in which two or more host computers share a single SCSI bus), make sure SCSI bus operating parameters are set properly *before* you begin the installation.

For example, common dual-initiator disk configurations are *DG/UX Cluster* configurations.

For instructions on setting your SCSI bus parameters, refer to the 014–series operating manual for your computer hardware model.

Be sure to check the SCSI bus parameters every time you install or upgrade the DG/UX software. Note that you must set the parameters *before* booting a DG/UX installer kernel or autoconfigured DG/UX custom kernel. If for some reason you cannot set the parameters first, you may have to shut down the remote host or disconnect the shared SCSI bus from the local host before booting such a kernel.

> **IMPORTANT**   Do not boot a DG/UX installer kernel or autoconfigured DG/UX custom kernel in an active dual-initiator configuration before setting the SCSI bus operating parameters. Unset or improperly set parameters will cause a serious DG/UX system error on the remote host.

Note that in a dual-initiator disk configuration, one SCSI bus cable connects two computer systems, either directly or (more commonly) daisy-chained through one or more SCSI disk devices such as a CLARiiON™ disk array.

Loading security software

If you are loading the DG/UX system with information security software, start with the steps in this chapter; then go to Chapter 6 when indicated for further instructions specific to your installation. If you already have an existing DG/UX system, you must prepare for a clean installation as mentioned earlier in this chapter.

A clean installation means cleaning the system disk before you install the DG/UX R4.11 software. You can clean the system disk after you boot the installation utility as soon as the Standalone Sysadm Main Menu appears. Just follow the instructions for cleaning the system disk in the subsection under booting the installation utility.

Loading from a remote tape or file system

If you are loading the release media from a remote file system or from a tape drive attached to a remote host, go to Chapter 5 for instructions before proceeding. Then, return to the section on preparing physical disks later in this chapter.

Sample installation dialogs

Appendix B contains the installation dialog for a typical 88K-based system using a local CD-ROM device.

Appendix C contains the installation dialog for a typical Intel-based system using a local CD-ROM device.

You may want to refer to the dialog appropriate for your system as a guide. If you are familiar with installing a DG/UX system, you can follow the dialog rather than the step-by-step instructions in this chapter.

Loading the DG/UX software

Initially the booting procedure for the DG/UX system varies slightly depending on your platform and model computer. Follow the instructions in this section for the platform and model computer you are using. For additional information on using the **boot** command, see Appendix D.

Intel-based systems

Worksheet 1

For the initial loading of the DG/UX software, you need to know if your Intel model computer contains a System Control Monitor (SCM). If you are not sure, refer to the section on verifying prerequisites in Chapter 1 or **Planning Worksheet 1** in Appendix A.

The following subsections contain instructions for

- Creating PC partitions on an Intel system.

- Loading the installation utility without an SCM.

- Loading the installation utility with an SCM.

Creating PC partitions on an Intel system

On the Intel platform, you should create PC partitions for third-party software *before* installing the DG/UX software. Therefore, if you intend to install any other operating systems (like MS-DOS software) on your hard disk, you should do so now.

Refer to your third-party software documentation to install operating systems other than the DG/UX system. Be careful to use only the space you need and do not allow the third-party software to expand and take up the whole disk.

Loading the installation utility on systems without an SCM

Follow the instructions in this subsection if you are installing the DG/UX R4.11 software on an Intel system that is *not* preinstalled and does *not* have an SCM.

> **IMPORTANT**   Model AV 2000 and AV 3000 computers do not include an SCM. All other Intel-based systems do contain an SCM.

You will notice that your DG/UX system shipped with a boot floppy in addition to the DG/UX medium. This boot floppy contains the bootstrap software necessary to load the DG/UX R4.11 software.

Before you begin the boot process, make sure your system is powered off.

▶ Insert the DG/UX 4.11 medium (CD-ROM) and the boot floppy (diskette) in their respective drives.

▶ Power on your system. The system will reset, boot the installation floppy, and display the following prompt:

```
Boot command:
```

▶ Enter the name of the boot device (CD or tape device) at the prompt. Enter *only* the name of the device. Consult **Planning Worksheet 2** for the name of your boot device, or refer to the instructions in Chapter 1. For example:

Worksheet 2

```
Boot command: sd(apsc(pci(),b),4) ↵
```

> **IMPORTANT**   Do NOT type: **b** *device_name*.

▶ You can remove the boot floppy from the diskette drive at any time now. The boot floppy provides the `Boot command:` prompt. You may choose to leave it in the drive until you are sure that you don't need to start over, but you must remove the boot floppy from the drive before you reboot the configured kernel.

Now proceed to the section on booting the installation utility. If you are loading remotely, go to the booting instructions in Chapter 5.

Loading the installation utility on systems with an SCM

Follow the instructions in this subsection if you are installing the DG/UX R4.11 software on an Intel system that is *not* preinstalled and *does* have an SCM.

> **IMPORTANT**   Model AV 4700, AV 4800, and AV 5800 computers include an SCM, but if you receive an early model, a boot floppy may still be required. If you do not see an SCM prompt, you can boot from the floppy by following the instructions in the previous section on loading the installation utility without an SCM.

If your system is powered off, you must turn it on and wait for the SCM prompt before you can begin the boot process. If you are already running the DG/UX software, you must initiate an orderly system shutdown using the **halt** or **shutdown** commands. The system then will reset and bring up the SCM prompt.

▶ Insert the DG/UX 4.11 medium in the CD-ROM drive.

Worksheet 2

▶ Boot the medium by typing the appropriate boot command at the SCM prompt, followed by Enter. Consult **Planning Worksheet 2** in Appendix A for the name of your boot device. In the following example, **2** is the slot number and **4** is the CD-ROM device number:

```
SCM86> b sd(npsc(cpci(),2),4) ↵
```

Now proceed to the section on booting the installation utility. If you are loading remotely, go to the booting instructions in Chapter 5.

88K-based systems

In this subsection you begin the installation process by booting the installation utility from the system console.

If your system is powered off, you must turn it on and wait for the SCM prompt before you can begin the boot process. If you are already running the DG/UX software, you must initiate an orderly system shutdown using the **halt** or **shutdown** commands. The system then will reset and bring up the SCM prompt.

Loading the installation utility

Before you begin the boot process, make sure your system is displaying the SCM prompt.

▶ Insert the DG/UX 4.11 medium in the appropriate CD or tape drive.

> **IMPORTANT**   If you are using cartridge tape, make sure the tape is write-protected: the arrow should point to the SAFE position.

Worksheet 2

▶ Boot the medium by typing the appropriate boot command at the SCM prompt, and press Enter. Consult **Planning Worksheet 2** in Appendix A for the name of your boot device. For example

```
SCM/JP0> b sd(ncsc(),3) ↵
```

Now proceed to boot the installation utility.

Booting the installation utility

The actual booting of the installation utility is basically the same for all platforms. (If you are loading from a remote system, go to the booting instructions in Chapter 5.)

IMPORTANT   The examples in this section show message output typical for an 88K-based system using a local CD-ROM device. The dialog is slightly different when installing from a local SCSI tape drive.

Note also that the device and disk names will vary slightly depending on the type of media, the platform, and the model system you are using. For example, typical device names are listed below.

Intel-based systems:

```
sd(apsc(pci(0),b),4)                CD-ROM device (AV 2000)
sd(apsc(pci(1),d),4)                CD-ROM device (AV 3000)
sd(npsc(cpci(0),2),4)               CD-ROM device (AV 4700)
```

88K-based systems:

```
sd(ncsc(0),3,0)                     CD-ROM device (AV 9500)
st(ncsc(0),4,0)                     Tape device (AV 9500)
sd(insc(0),3,0)                     CD-ROM device (AV 4000)
st(insc(0),4,0)                     Tape device (AV 4000)
```

If you don't remember the device names for your system, refer to your *Release Notice* for Intel-based systems and your hardware operating manual for 88K-based systems.

The installation utility creates virtual disks on the physical disks it prepares, makes file systems, and loads files from the release medium onto these file systems. It also sets up the system software and builds and boots a custom kernel, one configured with all attached standard devices.

You have already entered the necessary command to load the installation utility. While it starts, a process that takes several minutes, you will see the initial bootstrap messages similar to the following 88K system example.

```
Booting sd(ncsc(0),3,0)
DG/UX System Release R4.11 Bootstrap
Loading image ....................................
DG/UX System Release R4.11, Version Standalone sysadm
Using 32 Megabytes of physical memory
Found 2 processor(s)
Configuring devices ...........
```

The installation utility automatically configures all standard devices attached to your system. A standard device is one that is recognized by the installation utility and the DG/UX system. Periods (.) written to the screen indicate that the utility is configuring your system's devices. The number of devices attached to your system determines the duration of the configuration process.

IMPORTANT   A significant delay in the writing of periods to the screen means that the installation utility cannot locate all of the devices that are specified in the utility's built-in list of standard devices. Because your system is unlikely to include all standard devices, this delay is normal.

The initialization process continues as follows:

```
Registering disks ..
Running with no swap area.
Using memory-resident root file system
Creating /dev ....

 INIT: SINGLE USER MODE
```

Periods (.) written to the screen at regular intervals indicate that the installation utility is loading.

After the installation utility has finished loading, you see the standalone **sysadm** main menu.

```
            Standalone Sysadm Main Menu

1 Physical Disk    ->  Manage physical disks
2 Virtual Disk     ->  Manage virtual disks
3 File System      ->  Manage file systems
4 Install Software ->  Install system software

Enter a number, a name, ? or <number>? for help, <NL> to take
the default, or q to quit: [Install Software]:
```

Cleaning the system disk

To prepare your disk for a clean installation, use the following **sysadm** procedure before installing the DG/UX R4.11 software. If you are installing DG/UX for the first time, you already have a clean disk and can skip to the next section to begin the installation process.

CAUTION   Performing a clean installation involves removing the following virtual disks: ***root***, ***usr***, ***usr_opt_networker*** *(if running),* ***usr_opt_X11*** *(if running), and* ***usr_opt_sdk*** *(if running).*

▶ Ensure that you have a current backup of all your disks.

▶ Use the **shutdown** command to bring down your existing DG/UX system. For example, enter

shutdown -g0 -y ↵

> **IMPORTANT** The **shutdown** command above brings down the system immediately (0-second grace period). If there are other users on your system, you may want to notify them that you are shutting down the system, and then give a 3 to 10 minute grace period depending on what's appropriate for your site.

▶ Reboot standalone sysadm. For example, for an 88K system you might enter

```
b sd(ncsc(0),0,3) usr -f /stand/sysadm ↵
```

▶ At the Sysadm Main Menu, make the following menu choices:

```
Virtual Disks -> Remove
```

▶ At the `Virtual Disks:` prompt, enter a question mark and press Enter; for example:

```
Virtual Disks: ?
```

▶ From the list displayed, choose **root**, **usr**, **usr_opt_networker** (if you are running NetWorker), **usr_opt_sdk** (if you are running the Software Development Kit) and **usr_opt_X11** (if you are running X11). For example:

```
Virtual Disks: 1-5 ↵
```

▶ When the Virtual Disks Menu returns, you can either type a colon (**:**) to return to the Standalone Sysadm Main Menu, or you can press ^ to step back up through the menus until you reach the main menu.

Now you are ready to begin the installation procedure for the DG/UX R4.11 software. Proceed with the full installation of the DG/UX R4.11 system as described in the rest of this chapter.

> **IMPORTANT** When you have completed your DG/UX software installation and set up the documentation CD-ROM, you will need to go back and reconstruct your previous file system structure. For more information on this refer to *Managing Mass Storage Devices and DG/UX® File Systems* on the documentation CD-ROM.

Beginning the installation process

Now you are ready to enter into the interactive process of installing the DG/UX software. Follow the steps outlined in the remainder of this chapter starting from the Standalone Sysadm Main Menu (shown below).

```
            Standalone Sysadm Main Menu

1 Physical Disk    ->  Manage physical disks
2 Virtual Disk     ->  Manage virtual disks
3 File System      ->  Manage file systems
4 Install Software ->  Install system software

Enter a number, a name, ? or <number>? for help, <NL> to take
the default, or q to quit: [Install Software]:
```

1. **Press Enter to display the Install System Software menu. For example:**

    ```
    Enter a number, a name, ? or <number>? for help, <NL> to
    take the default, ^ to return to the previous menu, or q
    to quit: [Install Software]: ↵

                Install System Software Menu

    1 Prepare physical disks
    2 Prepare virtual disks
    3 Load software
    4 Set up software
    5 Configure and build kernel
    6 Reboot kernel
    7 All steps

    Enter a number, a name, ? or <number>? for help, <NL> to
    take the default, ^ to return to the previous menu, or q
    to quit: [All steps]:
    ```

2. **Press Enter to begin installation. For example:**

    ```
    Enter a number, a name, ? or <number>? for help, <NL> to
    take the default, ^ to return to the previous menu, or q
    to quit: [All steps]: ↵
    ```

    Now the installation begins and first you are prompted for information concerning the preparation of the physical disks.

Preparing physical disk drives

```
1.  Prepare physical disks
Run this step now?  [yes]
```

This phase of the installation process ensures that all writable physical disks have labels, contain the virtual disk information table, are registered, have an up-to-date bootstrap installed, and have bad block remapping established.

Intel-based systems will also create a Non-volatile RAM (NVRAM) database.

If you have any other disks in addition to the system disk, you can format them and create the necessary virtual disks and file systems later after you complete this installation. For more information, refer to *Managing Mass Storage Devices and DG/UX® File Systems* on the documentation CD-ROM.

3. **Press Enter to begin preparing the physical disks. For example:**

```
1.  Prepare physical disks

Run this step now?  [yes] ↵
Physical disk(s) to prepare:  [all]
```

4. **Select physical disks to prepare.**

   To prepare all your configured disks, press Enter and proceed with **step 5.** For example:

```
Physical disk(s) to prepare:  [all] ↵
```

   To display a list of configured physical devices, enter a question mark (?). For example:

```
Physical disk(s) to prepare:  [all] ? ↵
```

   Enter the name of each device as prompted.

   > **IMPORTANT**   To expedite the installation process, prepare only the system disk (the physical disk that contains the root, swap, and usr virtual disks) now, and prepare the remaining physical disks after the system is installed.

   Informational messages appear as the system prepares each physical disk. You'll see messages similar to the following when all disks have been prepared.

```
Bootstrap installed in existing partition on
    sd(ncsc(0,7),0,0)
Physical disk sd(ncsc(0,7),0,0) prepared.
```

You will also see messages similar to the following on Intel-based systems.

```
NvRAM database installed in existing partition on
    sd(apsc(pci(0),B,0,7),0,0)
Physical disk prepared.
```

Now you are ready to prepare the required virtual disks.

Preparing required virtual disks (swap, root, and usr)

```
2.  Prepare required virtual disks
Run this step now?  [yes]
```

In this part of the installation you create the virtual disks for **swap**, **root**, and **usr**. (Other packages require virtual disks too, but you do not create them until later.)

> **IMPORTANT**   Screen displays in this section represent typical installations; your screen display reflects your system configuration.

5. **Press Enter to begin. For example:**

```
Run this step now?  [yes] ↵
Register all standard physical disks?  [yes]
```

A *standard physical disk* is one that the installation utility recognizes. The file **/usr/etc/probedevtab** lists the standard device names. If you have nonstandard devices, you may configure them following installation, as described in *Managing the DG/UX®️ System* on the documentation CD-ROM.

> **IMPORTANT**   If you are installing from tape and not CD-ROM, you will receive a warning if your system has a CD-ROM drive and there is nothing in it. This is not significant and you can ignore the warning.

Registering physical disks enables the operating system to recognize virtual disks. A physical disk must have been prepared before it can be registered (see the section on preparing physical disk drives). A disk drive that does not contain a virtual disk information table cannot be registered.

6. **Register all standard physical disks by pressing Enter. For example:**

```
Register all standard physical disks?  [yes] ↵
```

The time required to register all disk drives depends on the size of your hardware configuration.

After physical disks are registered, the installation utility presents a table and prompt. This table shows the requirements for creating, sizing, and mounting the required virtual disks. (Refer to Chapter 1 for an explanation of sizing requirements.)

> **IMPORTANT**   The physical disk names and the minimum required block sizes vary slightly depending on the type of medium, the platform, and size of system you are using. For example, for a typical Intel-based system, the physical disk might be named `sd(apsc(pci(0),B,0,7),0,0)` or `sd(npsc(cpci(0),3,0,7),0,0)`, and would require a minimum of 100,000 blocks for **swap** (1.5 times the physical memory in Mbytes).

The following is a typical example from an 88K-based system.

```
Required File System Mount Points:


File System    Virtual    Current    Action      Blocks    Physical
Mount Point    Disk       Blocks     Required    To Add    Disk
------------   --------   -------    --------    ------    --------------
-none-         swap       -          Create      50000     sd(ncsc(0,7),0,0)
/              root       -          Create      60000     sd(ncsc(0,7),0,0)
/usr           usr        -          Create      280000    sd(ncsc(0,7),0,0)


Modify this information? [no] ↵
```

7. **Accept or change the values presented in the table.**

To accept the default values, press Enter as shown below; after the verification messages, skip to the section on preparing a dump-to-disk area and **step 12.**

```
Modify this information? [no] ↵

Creating /dev/dsk/swap...
```

... (verification messages similar to those shown in **step 11.**)

> **IMPORTANT**   Do *not reduce* the size of any virtual disk.

If you choose to modify any of the information in the table, type **yes.** For example:

```
Modify this information? [no] yes ↵
```

> **IMPORTANT**   If you plan to install the DG/UX Cluster Software product, you will generally need to modify the default configuration. By default, the DG/UX installation utility creates the **swap**, **root**, and **usr** virtual disks on your computer's private internal physical disk. However, the DG/UX Cluster option requires that **root** and **usr** reside on a dual-initiator physical disk, so they will be accessible to all computers in the cluster.

The next section provides a general procedure for modifying the default configuration.

Modifying the default virtual disk configuration

This section outlines a general procedure for modifying default configurations for the **swap**, **root**, or **usr** virtual disks.

The installation utility presents you with a series of queries about each file system mount point. Consult **Planning Worksheet 6** in Appendix A for the information necessary to customize your configuration.

> **IMPORTANT**   If you have no compelling need to change the default virtual disk names, you are advised against doing so. If you do change the name of a virtual disk, record the name. You must supply new virtual disk names during an upgrade to your operating system.

You may increase the sizes of virtual disks, but do not reduce their default sizes. You see the following prompt:

```
Virtual disk to use for swapping: [swap]
```

> **IMPORTANT**   The swap space virtual disk is not mounted at a location since it contains no file system. For **swap**, you are asked for the virtual disk to be used for swapping. For **root** and **usr** you are asked for the mount point.

In the following steps, we modify the virtual disk **swap**.

8. Type the desired virtual disk name, or press Enter to accept the default name. For example:

Worksheet 6
```
Virtual disk to use for swapping: [swap] ↵
Size (in blocks) for swap: [50000]
```

9. Type the desired block size, or to accept the default block size, press Enter. For example:

Worksheet 6
```
Size (in blocks) for swap: [50000] 100000 ↵
Physical disk for swap: [sd(ncsc(0,7),0,0)]
```

10. Type the alternate physical disk name, or to accept the default drive name press Enter. For example:

Worksheet 5
```
Physical disk for swap: [sd(ncsc(0,7),0,0)] ↵
```

After you complete the information for **swap**, you will be asked to provide similar information for the other virtual disks. Thus, you repeat **steps 8** through **10** for **root** and **usr.**

> **IMPORTANT** If you plan to install the DG/UX Cluster Software product, specify a dual-initiator physical disk for the **root** and **usr** virtual disks. You can specify any physical disk for the **swap** virtual disk, but cluster administration will be easier if you specify a dual-initiator disk for **swap**, too.

When you have completed the desired changes for each of the virtual disks, the installation utility presents a table listing your modifications. A sample modification follows. Remember that the physical disk names and size allocations will vary slightly depending on the type of media and the platform you are using.

```
Required File System Mount Points:

File System    Virtual   Current   Action     Blocks    Physical
Mount Point    Disk      Blocks    Required   To Add    Disk
------------   --------  -------   --------   ------    ---------------
-none-         swap      -         Create     100000    sd(ncsc(0,7),0,0)
/              root      -         Create      60000    sd(ncsc(0,7),0,0)
/usr           usr       -         Create     280000    sd(ncsc(0,7),0,0)


  Modify this information? [no]
```

You may modify this information again, if desired.

11. **To continue modifying, continue to repeat steps 7 though 10. To accept the values presented in the table, press Enter. For example**

```
Modify this information? [no] ↵
```

The following messages confirm your modified values. Remember that the physical disk names will vary slightly depending on the type of media and the platform you are using.

```
Creating /dev/dsk/swap (100000 blocks) on
    sd(ncsc(0,7),0,0).
Virtual disk "swap" created.
Virtual disk "swap" made a volume.
Beginning swapping on /dev/dsk/swap.
Creating /dev/dsk/root (60000 blocks) on
    sd(ncsc(0,7),0,0).
Virtual disk "root" created.
Virtual disk "root" made a volume.
Making file system on /dev/dsk/root
Mounting /dev/dsk/root.
Creating /dev/dsk/usr (280000 blocks) on
    sd(ncsc(0,7),0,0).
Virtual disk "usr" created.
Virtual disk "usr" made a volume.
Making file system on /dev/dsk/usr
Mounting /dev/dsk/usr.
```

Preparing a dump-to-disk area

You should set up a default dump destination so your system knows where to direct a memory dump under a halt condition. Typically, if the system goes down (halts), it is necessary to take a system dump (copy memory to a designated device) to send to the Customer Support Center for analysis.

If you do create the optional dump-to-disk area, you can configure your system to automatically take a memory dump and reboot the system in the event of a system halt.

In any case, if you do not define a default dump destination, your system will not be able to create a dump. The lack of a system dump can be a serious obstacle to finding and fixing system problems.

The next few prompts involve the option to create a virtual disk for a specific dump-to-disk area. This dump-to-disk area may be created on any available SCSI system disk, and will be called **dump.**

The Installer utility uses an algorithm to determine how much space to allocate to the dump-to-disk area as a default value. The algorithm is based on your memory configuration as follows:

Mbytes	Allocation
32 or under	To allow for 90% memory dump, up to 28 Mbytes.
over 32 to 256	To allow for 50% memory dump, up to 128 Mbytes, with a guaranteed minimum of 61,000 blocks.
Over 256	To allow for 25% memory dump, with a minimum of 262,000 blocks and a maximum of 400,000 blocks.

IMPORTANT   The DG/UX R4.11 operating system for Intel-based systems does not support dumping over the network.

12. **Decide which of the following scenarios applies to your system and proceed as instructed.**

   ▶   If a **dump** virtual disk does *no*t exist and you do not have enough contiguous free space to create the recommended dump-to-disk area, you will see the following message:

```
Warning: There are no registered physical disks with
         adequate contiguous free space to allocate
         the recommended nnn block area for
         halt dumps. If you wish to allocate an area
         for halt dumps, you must abort the
         installation, correctly attach one or more
         physical disks to your system, and try again.
```

If you see this warning and do *not* want to create a virtual disk for halt dumps, skip the rest of this section and proceed to the section on loading the DG/UX software, **step 19.**

If you see this warning and *do* want to create a virtual disk for halt dumps, abort the installation and add one or more physical disks (or otherwise free up sufficient contiguous space) before trying again.

> **IMPORTANT**   To abort your installation, use the ^ key to return to the beginning of an operation; then type **q** (quit) and press Enter.

▶ If a **dump** virtual disk does *no*t exist and you do not see any warning, the system will display a screen similar to the following example. Note that the physical disk names will vary slightly depending on the type of media and the platform you are using.

```
No existing 'halt dump' disk found. Current free disk
pieces (contiguous free space regions specified in
blocks):

Physical Disk      Free Pieces
-------------      -----------
sd(ncsc(0,7),0,0)     130116
sd(ncsc(0,7),1,0)       5000

Create a virtual disk for halt dumps? [yes]
```

Decide if you want to create a virtual disk for halt dumps and proceed to **step 13.**

▶ If a dump-area virtual disk already exists, but is *not* called **dump**, the system will not automatically recognize it, and may prompt you to create another virtual disk called **dump.**

▶ If a **dump** virtual disk already exists, is called **dump**, and is equal to the recommended size or is larger, you will not receive any message. The system will proceed with the loading of the DG/UX software as described in **step 19.**

▶ If a **dump** virtual disk already exists, is called **dump**, and is smaller than the recommended size, but no more free space is available, you will not receive any message. The system will proceed with the loading of the DG/UX software as described in **step 19.**

▶ If a **dump** virtual disk already exists, is called **dump**, is smaller than the recommended size, and free space *is* available, you are asked if you want to replace the existing dump disk with a larger partition. For example:

```
The existing dump partition is 1000 blocks. The
recommended dump partition size(based on the current
memory configuration) is 57000.

Replace existing dump disk with a larger
partition? [yes]
```

If you do not want to increase the size of your dump disk, answer **no,** press Enter, and proceed to **step 19.**

If you do want to increase the size of your dump disk, answer **yes** by pressing Enter. For example:

```
Replace existing dump disk with a larger
partition? [yes] ↵

Virtual dump disk removed.
```

Now go to **step 14.**

13. **Answer if you want to create a virtual disk for halt dumps.**

Although creating the **dump** virtual disk is optional, we do recommend that you create one.

▶ If you do *not* want to allocate space for a dump-to-disk area, type **no** and press Enter. For example:

```
Create a virtual disk for halt dumps? [yes] no ↵
```

Now skip the rest of this section and proceed to the section on loading the DG/UX software, **step 19.**

▶ If you *do* want to allocate space for a dump-to-disk area, press Enter to answer **yes**. For example:

```
Create a virtual disk for halt dumps? [yes] ↵
```

Continue with **step 14.**

14. **The system will display the default space recommended to create the dump virtual disk. Accept or change the values presented in the table.**

    You will see a table similar to the following 88K platform example. Physical disk names and size allocations will vary slightly depending on the type of media and the platform you are using.

```
Recommended Virtual Disks:

File System    Virtual   Current   Action     Blocks   Physical
Mount Point    Disk      Blocks    Required   To Add   Disk
------------   --------  -------   --------   ------   ---------------
-none-         dump      -         Create     57000    sd(ncsc(0,7),0,0)

Modify this information? [no]
```

▶ To accept the default values, press Enter as shown below; then go to **step 19.**

```
Modify this information? [no] ↵
```

▶ If you choose to modify any of the information in the table, type **yes** and press Enter. For example:

```
Modify this information? [no] yes ↵
```

The next section provides a general procedure for modifying the default configuration.

Modifying the default dump virtual disk

This section outlines a general procedure for modifying the default configuration for the optional **dump** virtual disk.

The installation utility presents you with a series of queries about the **dump** virtual disk.

You may increase or decrease the size of the **dump** virtual disk. After you answer that you want to modify the default size, you see the following prompt:

```
Virtual disk to use for dumping: [dump]
```

IMPORTANT   The **dump** virtual disk is not mounted at a location since it contains no file system. You are asked for the virtual disk to be used for halt dumps.

In the following examples, we modify the virtual disk **dump**, using the example of available disk space displayed at the beginning of this section in the free disk pieces table.

15. **Type the desired virtual disk name, or press Enter to accept the default name. For example:**

Worksheet 6
```
Virtual disk to use for dumping: [dump]  ↵
Size (in blocks) for dump: [57000]
```

> **IMPORTANT**   If you have no compelling need to change the default virtual disk name, you are advised against doing so. If you do change the name of a virtual disk, record the name. You must supply new virtual disk names during an upgrade to your operating system.

16. **Type the desired block size, or to accept the default block size, press Enter. For example:**

Worksheet 6
```
Size (in blocks) for dump: [57000] 60000 ↵
Physical disk for dumping: [sd(ncsc(0,7),0,0)]
```

17. **Type the alternate physical disk name, or to accept the default drive name press Enter. For example:**

Worksheet 5
```
Physical disk for dumping: [sd(ncsc(0,7),0,0)] ↵
```

> **IMPORTANT**   The physical disk you use for halt dumps *must* be a SCSI physical disk. If you plan to install the DG/UX Cluster Software product, note that you can specify either an internal physical disk or a dual-initiator physical disk. We recommend a dual-initiator physical disk for the dump-to-disk area because it allows a halt dump to be copied or analyzed even when the machine that produced the dump is down.

When you have completed the desired changes for the virtual disk, the installation utility presents a table listing your modifications. A sample modification follows. The physical disk names will vary slightly depending on the type of media and the platform you are using.

```
Physical disk for dump: [sd(ncsc(0,7),0,0)] ↵
Recommended Virtual Disks:

Required File System Mount Points:

File System    Virtual   Current   Action     Blocks    Physical
Mount Point    Disk      Blocks    Required   To Add    Disk
------------   -------   -------   --------   ------    -------------
-none-         dump         -      Create      60000    sd(ncsc(0,7),0,0)

Modify this information? [no]
```

You may modify this information again, if desired.

18. **To continue modifying, type yes and repeat steps 15 though 17. To accept the values presented in the table, press Enter. For example:**

    ```
    Modify this information? [no] ↵
    ```

    The following messages confirm your modified values.

    ```
    Creating /dev/dsk/dump (60000 blocks) on
        sd(ncsc(0,7),0,0).
    Virtual disk "dump" created.
    Virtual disk "dump" made a volume.
    Making vdm_dump(sd(ncsc(0,7),0,0),dump) the default dump
        device.
    ```

Now that you have prepared the required **swap**, **root**, **usr,** and **dump** (optional) virtual disks, you are ready to load the DG/UX software packages.

Loading the software packages

In this section you load the selected software packages. Your screen displays the following prompt:

```
3.  Load software
Run this step now? [yes]
```

If you are installing remotely, go to Chapter 5 to identify the remote tape or file system as the DG/UX software load device.

19. **To load the system software, press Enter. For example:**

    ```
    Run this step now? [yes] ↵
    Type of release medium: [CD-ROM]
    ```

20. **Specify the device that contains the release media.**

    > **IMPORTANT**   If you are loading from either a remote tape drive or a remote file system, go to Chapter 5 for instructions. Then, return to this chapter to the section on selecting the packages to load, and proceed with **step 22.**

    ▶ If you are installing from CD-ROM, press Enter to accept the default.

    ```
    Type of release medium: [CD-ROM] ↵
    Release name: [DG/UX R4.11]
    ```

    ▶ If you want to see a list of supported devices, type a question mark and press Enter. For example:

```
Type of release medium: [CD-ROM] ? ↵

1. CD-ROM
2. Local tape device
3. Remote tape device
4. Remote file system

Enter a number, a name, the initial part of a name,
<NL> to take the default, ? for help. ^ to return to
the previous query, < to restart the operation, or q
to quit: 1 ↵

Type of release medium: [CD-ROM] ↵

Release name: [DG/UX R4.11]
```

▶ **If you are loading from tape you will be asked if the tape device is ready. Make sure your tape is properly loaded and press Enter. There will be a slight pause while the tape rewinds. For example:**

```
Type of release medium: [local tape device] ↵
Setting up st(ncsc(0,7),4,0) as /dev/rmt/0
Release Medium: [/dev/rmt/0] ↵
Is /dev/rmt/0 ready? [yes] ↵
```

(pause while tape rewinds)

```
DG/UX Operating System with X Window System R4.11 of
<month/date/year> from Data General Corporation
```

You will not be asked to verify the release name; go to the next section to select packages to load and proceed with **step 22.**

21. Verify the release name by pressing Enter. For example:

```
Release name: [DG/UX R4.11] ↵
```

> **IMPORTANT** You will not be asked to verify the release name if you are loading from a local tape drive.

You may hear a whirring sound, which indicates that the drive is seeking and reading the medium. You see a message similar to the following:

```
DG/UX Operating System with X Window System R4.11 of
<month/date/year> from Data General Corporation
```

Next, you select the packages for loading.

Selecting the packages to load

Table 1–7 in Chapter 1 lists the approximate disk space required for the Intel platform to load each release package, with totals for loading *all* packages.

Table 1–8 lists the approximate disk space required for the 88K platform to load each release package, with totals for loading *all* packages.

These tables also include an estimated number of disk blocks used within each virtual disk.

If space is an issue, you can choose to load only the packages you need. The only package that you *must* load is **dgux**. To save space, you may choose not to load some of the manual pages. These are the software packages that end with the **.man** extension. However, we strongly recommend that you do load the **dgux.man** package.

STOP SECURITY

IMPORTANT   If you are installing security software, stop here and go to the section on selecting security software packages in Chapter 6 to select the security packages to load. When you complete this, return to this chapter to load the packages in **step 25.**

Your screen displays the following prompt:

```
Package Name(s): [development]
```

22. **Decide which software packages you want to load by carefully considering the options listed below**

    Each software package is supplemented by manual pages, indicated by a filename that ends with the **.man** extension. Manual page packages are optional, but we do recommend that you install them if you have adequate disk space, as they are not offered in printed form. It is particularly important to install the **dgux.man** package.

    ▶ To select the recommended DG/UX software packages, press Enter to accept the default development suite as shown below; then go to **step 25.**

    ```
    Package Name(s): [development] ↵
    ```

    Only press Enter if you are *sure* you want to accept the default and load only the *development suite* software packages, and not any other suites or packages. If you do *not* want to load *only the development suite*, or if you are not sure, continue reading the options explained in this step.

IMPORTANT   If you are upgrading and you did not create all the recommended virtual disks, do *not* accept the default to load the development suite software packages. If you accidentally do so, the space required for the packages will exceed the space you reserved for them.

▶ To load selected packages and/or package suites, type a question mark (?). This lists the available suites and packages for your system. For example:

```
Package Name(s): [development] ? ↵
```

```
As a convenience, package suites have been defined for
this release. Suites are collections of packages.
Selecting a suite causes all packages associated with
that suite to be loaded from the release medium. The
following list shows all suites and the packages
associated with them, as well as the individual
package selections.
```

```
If there are specific suites and/or packages you want
to load, you may select the suite or package by name
or number. Separate the names or numbers with commas.
A combination of multiple suites and/or packages may
be selected. Note that this results in the
installation of the union of the selected suites
and/or packages.
```

23. **Select package suites(s) and/or individual packages by name or number, separated by commas and/or spaces. You may also use a dash to specify a range of package numbers.**

    IMPORTANT   If you load the **networker**, **nfs**, or **onc** packages, you must also load the **tcpip** package.

    The list of available software packages that follows will vary slightly depending on the platform you are using. You may prefer to load only essential packages now, and then add others later. For information on using stand-among **sysadm** to load additional software packages, refer to the instructions on loading and setting up application software in *Managing the DG/UX® System*.

    IMPORTANT   The following example is from an Intel-based system, which includes the Application Capture Option (**aco**) package suite. Note that there is no **aco** package suite for 88K-based systems.

```
The available suites and packages are:

The suite 'development' contains the packages:

  dgux
  networker
  nfs
  onc
  sdk
  sdk.X11
  .... next page? (? for help) [yes] ↵

  tcpip
  X11
  dgux.man
  networker.man
  nfs.man
  onc.man
  sdk.man
  sdk.X11.man
  tcpip.man
  X11.man

  This suite contains the base DG/UX
  Operating System and Software Development
  Kit packages.

The suite 'production' contains the packages:

  dgux
  networker
  nfs
  onc
  tcpip
  X11
  dgux.man
  .... next page? (? for help) [yes] ↵

  networker.man
  nfs.man
  onc.man
  tcpip.man
  X11.man

  This suite contains the base DG/UX
  Operating System packages.
```

Press Enter
at the Pager
prompt to
display the
full screen.

Press Enter
at the Pager
prompt to
display the
full screen.

```
The suite 'sdk_all' contains the packages:

  sdk
  sdk.X11
  sdk.man
  sdk.X11.man

  This suite contains the Software Development Kit
  packages.The base DG/UX Operating System packages
  must already be loaded.


The suite 'aco' contains the packages:

  dgux.aco
  X11.aco
  dgux.aco.man

  This suite only contains the Application Capture
  Option. The base DG/UX Operating System packages
  must already be loaded.


Choices are

  1  development
  2  production
  3  sdk_all
  4  aco
  5  dgux
  6  dgux.aco
  7  networker
  8  nfs
  9  onc
 10  sdk
 11  sdk.X11
 12  tcpip
 13  X11
 14  X11.aco
 15  dgux.man
    .... next page? (? for help) [yes] ↵
 16  dgux.aco.man
 17  networker.man
 18  nfs.man
 19  onc.man
 20  sdk.man
 21  sdk.X11.man
 22  tcpip.man
 23  X11.man
```

Press Enter
at the Pager
prompt to
display the
full screen.

```
Enter a number, a range of numbers (n-m, where m can
be '$' to indicate the last item), a name, the initial
part of a name, <NL> to take the default, ? for help,
^ to return to the previous query, < to restart the
operation, or q to quit.

...end pager? (? for help) [yes] ↵

Package Name(s): [development]
```

Worksheet 7

After you enter the packages you want to load, the system will list the selected packages and ask for verification. In the following example for an Intel-based system, we choose to load *both* the **development** and **aco** suites. These are the first and fourth items in the choice list.

> **IMPORTANT**   If you are installing on an 88K-based system, the numbers of your choices will vary from our example because there are no **aco** packages.

```
Package Name(s): [development] 1,4 ↵

You selected the following packages:

  dgux
  networker
  nfs
  onc
  sdk
  sdk.X11
  tcpip
  X11
  dgux.man
  networker.man
  nfs.man
  onc.man
  sdk.man
  sdk.X11.man
  tcpip.man
  X11.man
  dgux.aco
  X11.aco
  dgux.aco.man

Correct? [yes]
```

24. Press Enter to load the packages selected as shown below. To change the package selection, answer no and repeat step 23.

```
Correct? [yes] ↵
List file names while loading? [no]
```

START SECURITY (If you are installing security software and have completed the selection of your software packages in Chapter 6, continue here to load those packages in **step 25.**)

25. To forgo the listing of filenames during loading, press Enter as shown below. To see the names of files as they load, type yes followed by Enter.

```
List file names while loading? [no] ↵
Answer kernel build questions before loading? [yes]
```

> **IMPORTANT**   We recommend that you not list the names of the files as they load because doing so can obscure any error messages that might occur during the loading phase of installation.

Pre-answering kernel build questions

26. Decide whether or not to answer the kernel build questions now before the packages are loaded. (To expedite the installation process take the default.)

▶ If you prefer to wait and answer the kernel build questions later during the kernel build process, type **no** after the prompt and press Enter. Then skip to **step 30.**

```
Answer kernel build questions before loading?[yes] no↵
Checking for recommended file system mount points.....
```

▶ If you accept the **yes** default response by pressing Enter, it directs the installer utility to prompt you now for information needed later for the kernel build. This enables you to leave more of the installation process unattended, if you choose. For example:

```
Answer kernel build questions before loading? [yes] ↵
System configuration identifier [aviion]
```

27. Verify your system configuration filename by pressing Enter, or type the correct name and press Enter. For example:

```
System configuration identifier [aviion] moe ↵
[moe] Correct? [yes] ↵
Operating system client? [no]
```

28. **Answer if you are building for this host or for an operating system client.**

    ▶ If this host will be using a local disk for its **root**, **usr**, and **swap** areas, answer **no**. For example:

    ```
    Operating system client? [no] ↵
    Automatically reboot after building kernel? [yes]
    ```

    ▶ If this host is an operating system client of another host answer **yes**. This will be the case for operating system (OS) clients that do not have their own disk, or who have their **swap** on a local disk and their **root** and **usr** logical disks on a remote server. For example:

    ```
    Operating system client? [no] yes ↵
    ```

    > **IMPORTANT**   The DG/UX R4.11 operating system for Intel-based systems does not support diskless workstations.

    An OS client relies on the OS server for some or all of its operating system software and file service. For information on adding OS clients, refer to *Managing the DG/UX® System* on the documentation CD-ROM. If you want, you can view the documentation CD-ROM on a PC *before* the DG/UX software is up and running.

    If you are not sure if your host is an operating system client, take the default **no.**

29. **Decide whether or not to reboot automatically after building the kernel.**

    ▶ If you prefer to pause between kernel building and booting (for example, to verify a successful kernel build or the boot path), answer **no** after the prompt and press Enter. For example:

    ```
    Automatically reboot after building kernel? [yes] no ↵
    Checking for recommended file system mount points....
    ```

    ▶ To expedite installation, accepting the default **yes** response causes the kernel to boot automatically after it is built. For example:

    ```
    Automatically reboot after building kernel? [yes] ↵
    Checking for recommended file system mount points....
    ```

    > **IMPORTANT**   If you used a boot floppy and have not already removed it from the diskette drive, remember that you must do so before the system tries to reboot.

Preparing virtual disks for optional packages

30. Prepare to create virtual disks for optional packages.

▶ If you are not installing the **networker**, **sdk**, or **X11** packages, go to the section on preparing to load packages, and proceed with **step 38.**

▶ If you are loading **networker**, **sdk**, or **X11**, continue with **step 31.**

31. Wait while the installation utility verifies the file system requirements of optional packages you selected (NetWorker, SDK, or X11). After a few moments you see the following message:

```
Checking for recommended file system mount points ........
```

Note that periods written to the screen indicate that the process is ongoing. A pause between the display of periods is normal.

After a few minutes, the installation utility presents a table similar to the following, showing the requirements for creating, sizing, and mounting the virtual disks. Note that the physical disk names and block sizes will vary slightly depending on the model computer and the platform you are using. The samples in this section are for an 88K-based system.

```
 Recommended File System Mount Points:

 File System       Virtual         Current  Action    Blocks    Physical
 Mount Point       Disk            Blocks   Required  To Add    Disk
 -----------       --------        ------   ------    -----  ------------

/usr/opt/X11       usr_opt_X11        -     Create    90000 sd(ncsc(0,7),0,0)
/usr/opt/networker usr_opt_networker  -     Create    40000 sd(ncsc(0,7),0,0)
/usr/opt/sdk       usr_opt_sdk        -     Create    60000 sd(ncsc(0,7),0,0)

Modify this information? [no]
```

32. To accept the default values presented in the table, press Enter as shown below and go to the section on preparing to load packages, step 38.

```
Modify this information? [no] ↵
```

> **IMPORTANT** If you plan to install the DG/UX Cluster Software product, you will generally need to modify the default configuration. By default, the DG/UX installation utility creates the virtual disks on your computer's internal physical disk. However, the DG/UX Cluster option requires that **usr_opt_X11**, **usr_opt_networker**, and **usr_opt_sdk** reside on a dual-initiator physical disk, so they will be accessible to all computers in the cluster.

To modify any of the information in the table, enter **yes** as shown below and continue with the section that follows.

```
Modify this information? [no] yes ↵
```

Modifying the default virtual disks for optional software packages

This section outlines a general procedure for modifying the default values for the software packages on the **usr_opt_networker**, **usr_opt_sdk,** and **usr_opt_X11** virtual disks. Note that in the sample dialog that the physical disk names will vary slightly depending on the type of media and the platform you are using. The samples in this section are for an **88K**-based system.

Consult **Planning Worksheet 6** in Appendix A for the information necessary to customize your configuration.

The installation utility asks about each file system's configuration. The virtual disk, **usr_opt_X11**, is used in the following example. Therefore, you see a prompt similar to the following:

```
Mount a virtual disk at /usr/opt/X11? [yes]
```

33. To accept the default mount point, press Enter. For example:

```
Mount a virtual disk at /usr/opt/X11? [yes] ↵
Virtual disk to mount at /usr/opt/X11:[usr_opt_X11]
```
Worksheet 6

> **IMPORTANT** Answering **no** to this prompt does not give you the option to select an alternate mount point. It causes the **X11** files to be loaded into **/usr**. This could create a space problem and make the **X11** package unusable. You are strongly urged to accept a separate mount point for **/usr/opt/X11**.

34. Type the desired virtual disk name, or accept the default name by pressing Enter. For example:

```
Virtual disk to mount at /usr/opt/X11:[usr_opt_X11] ↵
Size (in blocks) for usr_opt_X11: [90000]
```
Worksheet 6

35. **Type the desired block size, or press Enter to accept the default block size.**

> **IMPORTANT**   Do *not reduce* the size of virtual disks. (The only exception would be if you were not installing the SDK packages, then you could reduce the size of **usr_opt_X11** by 10,000 blocks.)

Worksheet 6
```
Size (in blocks) for usr_opt_X11: [90000] 100000 ↵
Physical disk for usr_opt_X11: [sd(ncsc(0,7),0,0)]
```

36. **Type the alternate physical disk name, or to accept the default drive name, press Enter. For example:**

```
Physical disk for usr_opt_X11: [sd(ncsc(0,7),0,0)] ↵
```

> **IMPORTANT**   If you plan to install the DG/UX Cluster Software product, you must specify a dual-initiator physical disk.

After you have made the desired changes for each of the virtual disks, the installation utility presents a table listing your modifications. The example modification for the 88K-based system follows:

```
Recommended File System Mount Points:


File System         Virtual         Current Action    Blocks   Physical
Mount Point         Disk            Blocks  Required  To Add   Disk
------------        --------        ------  ------    -----    --------------
/usr/opt/X11        usr_opt_X11       -     Create    100000   sd(ncsc(0,7),0,0)
/usr/opt/networker  usr_opt_networker -     Create     40000   sd(ncsc(0,7),0,0)
/usr/opt/sdk        usr_opt_sdk       -     Create     60000   sd(ncsc(0,7),0,0)

Modify this information? [no]
```

37. **To accept the values presented in the table, press Enter. If you want to modify the information again, type yes, press Enter, and modify the information as prompted. When you are satisfied with the values presented in the table, press Enter as shown below.**

```
Modify this information? [no] ↵
```

Now the installation utility needs to prepare for loading the software packages.

Preparing to load packages

You may see messages similar to the following as the installation utility creates and mounts the virtual disks for **networker**, **sdk**, and **X11**. Note that the physical disk names will vary slightly depending on the type of media and the platform you are using.

```
Creating /dev/dsk/usr_opt_X11 (100000 blocks) on sd(ncsc(0,7),0,0).
Virtual disk "usr_opt_X11" created.
Virtual disk "usr_opt_X11" made a volume.
Making file system on /dev/dsk/usr_opt_X11
Mounting /dev/dsk/usr_opt_X11.
Creating /dev/dsk/usr_opt_networker (40000 blocks) on sd(ncsc(0,7),0,0).
Virtual disk "usr_opt_networker" created.
Virtual disk "usr_opt_networker" made a volume.
Making file system on /dev/dsk/usr_opt_networker
Mounting /dev/dsk/usr_opt_networker.
Creating /dev/dsk/usr_opt_sdk (60000 blocks) on sd(ncsc(0,7),0,0).
Virtual disk "usr_opt_sdk" created.
Virtual disk "usr_opt_sdk" made a volume.
Making file system on /dev/dsk/usr_opt_sdk.
Mounting /dev/dsk/usr_opt_sdk.
```

Before package loading and setup begins, the installation utility checks the sizes of the mounted file systems.

38. **Wait while the installation utility verifies that there is sufficient file system space to contain the packages you selected. You see messages similar to the following:**

```
Validating capacity of the mounted file systems..........
.....................................................
.......................................
```

Validation takes between 10 and 20 minutes.

If there is not enough space on your system disk, the system notifies you with a message like the following:

```
Warning:  There is not enough space in /mnt/root to
          load nnnnn blocks, as only nnnnn blocks are
          available.

To make space available now, you can clean up the system
before loading packages. The cleanup scripts will list
pathnames and files that you may want to remove.

NOTE: No file will be removed without your explicit
      confirmation.

Clean up the system before loading packages? [yes]
```

CAUTION   *If you see such a message, you may want to go to Chapter 8, "Fixing Problems," for information before proceeding. You can select different packages, resize virtual disks, escape to the shell to do manual file cleanup, or you can run the assisted cleanup program by answering* **yes** *to the clean-up prompt.*

Assuming that your system disk has enough space, you see the following note.

```
NOTE:   The installation utility will now start the
        package loading phase of the installation
        procedure. Once this phase begins, you cannot
        interrupt it.

Continue with the installation? [yes]
```

39. Press Enter to begin installing the selected packages. For example:

```
Continue with the installation? [yes] ↵
```

The installation utility displays another message while it locates the relevant package setup queries to present to you.

```
NOTE:   If the packages you have selected require
        setup (e.g. onc, tcpip, networker, etc.)
        then please wait until the next prompt
        appears. The delay may take up to 5 minutes
        depending on the number of packages you have
        chosen to load.

Loading DG/UX Operating System with X Window System R4.11
of 11/30/95 from Data General Corporation.
```

40. Decide whether or not to answer package setup questions in advance of package loading.

   IMPORTANT   Be sure to read *all* the information about this step *very carefully* before making a decision.

The installation utility displays the following note and prompt:

```
NOTE:   To expedite the package loading and setup
        steps, you can answer package setup questions
        in advance of package loading by pressing
        Enter at the prompt.  If, instead, you prefer
        to continue the package loading and setup
        steps interactively and at your own pace,
        type "no" before you press Enter.

Do you want to answer, in advance, package setup questions
before package loading is complete? [yes]
```

Yes, expedite installation

Answering **yes** to the question expedites the remaining installation steps. After you supply configuration information that you recorded in **Planning Worksheet 9** in Appendix A, the remaining installation steps are not interactive. If you are installing the DG/UX system with information security, you also will be prompted to assign security account passwords.

If you expedite installation, it's possible to leave your computer after answering questions about package setup; the installation utility completes the installation unattended. If you chose to answer the kernel build questions before the packages were loaded and you chose to automatically boot the kernel, the entire process will complete without interaction.

▶ If you are installing security software and answer **yes** to expedite installation, go to Chapter 6 to the section on setting up network packages. (If you answer **no** continue here.)

▶ If you are *not* installing security software, answer **yes** to expedite installation, and go to **step 45.**

IMPORTANT   After you answer setup questions, you can leave the computer for approximately 2 hours while the software packages load.

No, do not expedite installation

▶ Answering **no** to the question to setup packages in advance selects interactive installation, which may be preferable if time is not critical and you want to monitor the installation procedure. Interactive installation presents prompts and messages that allow you to build and boot the kernel at your own pace.

If you answer **no** to the prompt, proceed with the next section on loading onto virtual disks.

Loading onto virtual disks

The installation utility presents the following message.

```
Preparing to load the packages .................
```

This procedure runs scripts that remove obsolete files and libraries, freeing up physical disk space to accommodate the software load.

Note that it can take up to 20 minutes for the installation to prepare to load.

41. Take a break if you'd like. Packages load for about 2 hours.

Periods (.) are written to the screen at regular intervals to indicate that the packages are being loaded.

> **IMPORTANT**   If you have a problem that prevents a successful software load, refer to Chapter 8 for more information.

The following output is similar to what you will see after loading the default development suite of software packages.

```
Loading package dgux .............
Package dgux has been loaded.

Loading package networker ..........
Package networker has been loaded.

Loading package nfs ....
Package nfs has been loaded..

Loading package onc ....
Package onc has been loaded.

Loading package sdk ....
Package sdk has been loaded.

Loading package sdk.X11 ....
Package sdk.X11 has been loaded.

Loading package tcpip ....
Package tcpip has been loaded.

Loading package X11 .............
Package X11 has been loaded.

Loading package dgux.man .............
Package dgux.man has been loaded.

Loading package networker.man ............
Package networker.man has been loaded.

Loading package nfs.man ....
Package nfs.man has been loaded.

Loading package onc.man ....
Package onc.man has been loaded.

Loading package sdk.man ....
Package sdk.man has been loaded.
```

```
Loading package sdk.X11.man ....
Package sdk.X11.man has been loaded.

Loading package tcpip.man ....
Package tcpip.man has been loaded.

Loading package X11.man .............
Package X11.man has been loaded.

Package load is finished.
The selected packages have been loaded.
```

Now the installation utility is ready to set up the software packages.

Setting up software packages

For most packages, the setup process is not interactive. However, if you selected any of the information security, NetWorker, ONC, or TCP/IP packages, you must provide information when prompted.

> **IMPORTANT**   If you are doing an upgrade installation, you first will be asked if you want to keep the current values of your TCP/IP parameters (i.e., primary hostname, Internet address, controller name).

SECURITY

▶   If you are installing security software, go to the section on setting up network packages in Chapter 6.

A detailed account of each package's setup is logged in a file that is named in one of the following general forms:
/var/setup.d/log/_package_**.root** or **/var/setup.d/log/**_package_**.usr**.

Once package loading completes, you see the following message:

```
Package load is finished.
The selected packages have been loaded.

4.  Set up software
Run this step now?  [yes]
```

42.   To set up packages, press Enter. For example:

```
Run this step now?  [yes] ↵
```

The system pauses while the installation utility checks for packages that need to be set up, and then returns the following prompt.

```
Package Name(s):  [all]
```

43. Decide whether to set up all packages or to specify them individually.

▶ **To set up all the packages that were loaded, press Enter and go to the next step. For example:**

```
Package Name(s):  [all] ↵
OK to perform operation? [yes]
```

▶ **To set up packages individually, list them by entering a question mark (?). For example:**

```
Package Name(s): [all] ? ↵
```

A screen similar to the following appears.

```
Select the package(s) you want to set up.  If you want
to set up all packages select 'all,' do not select any
individual package names.

Choices are
        1  all
        2  dgux
        3  networker
        4  nfs
        5  onc
        6  sdk
        7  sdk.X11
        8  tcpip
        9  X11


Enter a number, a range of numbers (n–m, where m can
be '$' to indicate the last item), a name, the initial
part of a name, <NL> to take the default, ? for help,
^ to return to the previous query, < to restart the
operation, or q to quit.

Package Name(s): [all]
```

IMPORTANT   Intel-based systems also include the Application Capture Option (**aco**) packages. Therefore, your choices on an Intel-based system would be as follows:

```
Choices are
        1   all
        2   dgux
        3   dgux.aco
        4   networker
        5   nfs
        6   onc
        7   sdk
        8   sdk.X11
        9   tcpip
       10   X11
       11   X11.aco
```

Next specify the individual packages you want to set up, using the full names or corresponding numbers of the packages in the list. Separate each name or number by commas and/or spaces. You also may use a dash to specify a range of package numbers. For example, on an 88K-based system, you might select the following if you did not want to set up the X11 packages:

```
Package Name(s): [all] 2–6,8 ↵
OK to perform operation? [yes]
```

44. To start the setup scripts for selected packages, press Enter. If you want to modify your selection, answer no and repeat the process. When you are satisfied with your selections, press enter as shown below:

```
OK to perform operation? [yes] ↵
```

Status messages are displayed during setup; a message appears when setup has been completed successfully. Packages are set up in alphabetical order.

> **IMPORTANT**   Read system-generated messages during package setup, especially those labeled NOTE and WARNING.

If the setup of a particular package fails, the utility informs you with a warning message. Write down the message, and refer to Chapter 8 for troubleshooting help.

45. Determine how to proceed by reviewing the options of this step carefully.

▶ If you did not select any of the three optional packages (**networker**, **onc**, **tcpip**) go to the section on building and booting a configured kernel (after the sections on answering setup questions), and proceed with **step 59.**

▶ If you selected the **networker** package, go to the following section and proceed with **step 46.**

▶ If you selected **onc**, but did *not* select **networker,** go to the section on answering ONC package setup questions and proceed with **step 56.**

▶ If you selected **tcpip**, but did *not* select **networker** or **onc**, go to the section on answering TCP/IP package setup questions and proceed with **step 58.**

Answering NetWorker package setup questions

IMPORTANT   If you set up the **networker** package, you must also set up the **tcpip** package.

How the installer program sets up the Legato NetWorker package depends on whether you are setting up your system as a client that will back up its files to a remote NetWorker server, or as a local-only NetWorker server (your system backs up its own files).

You see the following prompt:

```
Configure system as a client for a remote NetWorker server?[no]
```

46. Decide if this host backs up its files to a remote NetWorker server or if it is a local-only server that backs up its own files.

▶ If this host backs up files to a remote NetWorker server, type **yes** and press Enter. For example:

Worksheet 9
```
Configure system as a client for a remote NetWorker
server? [no] yes ↵
```

If you answer **yes**, there are no more NetWorker questions. Go to **step 55.**

▶ If this host will back up its own files locally, accept the **no** default by pressing Enter. For example

IMPORTANT   When you answer **no,** you need to allocate space for NetWorker index and log files.

```
Configure system as a client for a remote NetWorker
server? [no]  ↵
Will this system be running as a node within a
cluster? [no]
```

47. **Decide if this host will run as part of a cluster.**

   ▶ If this is a standalone system and not part of a cluster, accept the **no** default by pressing Enter. For example:

   ```
   Will this system be running as a node within a
   cluster? [no] ↵
   ```

   ▶ If this system will be a node in a cluster, type **yes** and press Enter. For example:

   ```
   Will this system be running as a node within a
   cluster? [no] yes ↵
   ```

48. **Read the screen note about virtual disk requirements carefully. Refer to Chapter 1 in this manual for more information.**

   ```
   You now have the opportunity to create or adjust the size
   of the /var/opt/networker file system.  This file system
   is needed to store the NetWorker online index and log
   files.  The default size of 10000 blocks is enough space
   to store index information for multiple versions of
   several thousand files — about enough for a small
   workstation with a single disk drive.  THIS IS NOT ENOUGH
   SPACE FOR A SERVER WITH REMOTE CLIENTS!  If your system
   has more than one disk drive, or if it will be acting as a
   NetWorker server for remote clients, you probably need to
   allocate additional space for the online index.  See the
   installing manual for instructions on estimating the space
   requirements for the online index.
   ```

   The installation utility presents a table of default requirements for creating, sizing, and mounting the online index. The physical disk names may vary slightly depending on the type of media and the platform you are using. The samples in this section are for an 88K-based system.

   ```
   /var/opt/networker file system:

   File System       Virtual          Current Action  Blocks   Physical
   Mount Point       Disk             Blocks  Required To Add    Disk
   ------------      --------         ------  ------   -----   ---------------
   /var/opt/networker var_opt_networker  -    Create   10000  sd(ncsc(0,7),0,0)

   Modify this information? [no]
   ```

49. **Decide if you need to modify the default values presented in the table.**

▶ To accept the default values presented in the table, press Enter. For example:

```
Modify this information? [no] ↵
```

- If you are setting up the **onc** package, go to **step 56.**

- If you are setting up the **tcpip** package, but *not* the **onc** package, go to **step 58.**

▶ To modify any of the information in the table, enter **yes.** For example:

```
Modify this information? [no] yes ↵
```

The installation utility presents a series of prompts similar to the following:

```
Mount a virtual disk at /var/opt/networker?  [yes]
```

50. **To accept the default mount point, press Enter as shown below; otherwise, select another mount point.**

    IMPORTANT   Do not change the mount point if you might upgrade your operating system to the next release at some future date. The installation utility has no way of locating the correct virtual disk to upgrade if you change the mount point.

```
Mount a virtual disk at /var/opt/networker?  [yes] ↵
Virtual disk to mount at /var/opt/networker: [var_opt_networker]
```

51. **Type the desired virtual disk name, or to accept the default name, press Enter. For example:**

```
Virtual disk to mount at /var/opt/networker: [var_opt_networker] ↵
Size (in blocks) for var_opt_networker: [10000]
```

    IMPORTANT   If you changed the default mount point, you must also change the virtual disk name.

52. **Type the desired block size, or to accept the default block size, press Enter. For example:**

Worksheet 9
```
Size (in blocks) for var_opt_networker: [10000] 50000 ↵
Physical disk for var_opt_networker: [sd(ncsc(0,7),0,0)]
```

53. **Type the alternative physical disk name, or to accept the default drive name, press Enter. For example:**

Worksheet 9
```
Physical disk for var_opt_networker:[sd(ncsc(0),0,0)] ↵
```

> **IMPORTANT**   If you plan to install the DG/UX Cluster Software product, you must specify a dual-initiator physical disk.

When you have completed the desired changes for the virtual disk, the installation utility presents a table listing your modifications. A sample modification follows. The physical disk names may vary slightly depending on the type of media and the platform you are using. The samples in this section are for an 88K-based system.

```
/var/opt/networker file system:

File System        Virtual          Current Action  Blocks   Physical
Mount Point        Disk             Blocks  Required To Add   Disk
------------       --------         ------  ------   -----    --------------
/var/opt/networker var_opt_networker  -     Create   50000   sd(ncsc(0,7),0,0)

Modify this information? [no]
```

54. **To make further changes, type yes and repeat the steps 50 through 53 as prompted. To accept the values presented in the table, press Enter. For example:**

```
Modify this information? [no] ↵
```

The system displays the following messages while setting up NetWorker:

```
Creating /dev/dsk/var_opt_networker (50000 blocks) on
    sd(ncsc(0,7),0,0).
Virtual disk "var_opt_networker" created.
Virtual disk "var_opt_networker" made a volume.
Making file system on /dev/dsk/var_opt_networker
Mounting /dev/dsk/var_opt_networker.
```

55. **Continue with package setup questions.**

▶   If you are setting up the **onc** package, continue with **step 56.**

▶   If you are setting up the **tcpip** package, but *not* the **onc** package, go to **step 58.**

Answering ONC package setup questions

> **IMPORTANT**   If you set up the **onc** package, you must also set up the **tcpip** package.

To set up ONC (Open Network Computing), you must supply the NIS domain name that you recorded in **Planning Worksheet 9** in Appendix A.

56. Type the NIS domain name for your installation ("worknet" in this example) and press Enter. For example:

Worksheet 9
```
Enter the NIS Domain name: worknet ↵
[worknet] Correct? [yes]
```

57. Confirm the NIS domain name, or correct it by answering no and responding again. For example:

```
[worknet] Correct? [yes] ↵
```

Notes on ONC and NFS

Initially, your computer runs as an NIS client. ONC and NFS may require further setup (such as changing your host from an NIS client to either an NIS master or NIS server). For more information on additional setup, refer to *Managing ONC™/NFS® and Its Facilities on the DG/UX® System* on the documentation CD-ROM.

You can find a detailed account of the ONC and NFS root setup in **onc.root** and **nfs.root** log files located in the directory **/var/setup.d/log**.

Answering TCP/IP package setup questions

To set up TCP/IP, you supply information that you recorded in
Planning Worksheet 9 from Appendix A (see Chapter 1).

If you are doing an upgrade installation, you first will be asked if you
want to keep the current values of your TCP/IP parameters (i.e.,
primary hostname, Internet address, controller name).

The exact text of your screen dialog depends on whether your computer
has one or more Ethernet LAN controllers.

> **IMPORTANT**   You set up a token ring or FDDI controller *after* the
> DG/UX system installation is complete. Follow this **sysadm** path:
> `Networking -> TCP/IP -> Interface`. For details, refer to
> the section on maintaining network interfaces in *Managing
> TCP/IP on the DG/UX® System* on the documentation CD-ROM.

58. **Enter the network configuration information recorded in
    Planning Worksheet 9 from Appendix A (see Chapter 1).**

    Refer to whichever of the following samples for this step is
    appropriate for your system's Ethernet LAN configuration. The
    Ethernet LAN device names may vary slightly depending on your
    platform and model. (Note that the values **moe**, **128.222.2.1**,
    0xffffff00, and the Ethernet controller device configurations in the
    sample dialogs are examples only.)

    Single Ethernet LAN controller

```
The following queries refer to the primary network
interface:

Enter host name: moe ↵
[moe] Correct? [yes] ↵
Enter host Internet address: 128.222.2.1 ↵
[128.222.2.1] Correct? [yes] ↵
Is your local network subnetted? [no] yes ↵
Enter the network mask: 0xffffff00 ↵
[0xffffff00] Correct? [yes] ↵

NOTE:  Using "dgen0" as the primary network interface
       controller.
```

Multiple Ethernet LAN controllers

```
The following queries refer to the primary network
interface:

Enter host name: moe ↵
[moe] Correct? [yes] ↵
Enter host Internet address: 128.222.2.1 ↵
[128.222.2.1] Correct? [yes] ↵
Is your local network subnetted? [no] yes ↵
Enter the network mask: 0xffffff00 ↵
[0xffffff00] Correct? [yes] ↵


The following Ethernet controller devices are configured
on this system

    dgen0 cien0 cien1

Enter controller device name: [dgen0] ↵
```

No Ethernet LAN controller

```
The following queries refer to the primary network
interface:

Enter host name: moe ↵
[moe] Correct? [yes] ↵
Enter host Internet address: 128.222.2.1 ↵
[128.222.2.1] Correct? [yes] ↵

WARNING:   No Ethernet controllers are configured on
           this system.  A primary network interface
           will not be added at this time.  You can
           add TCP/IP network interfaces later
           through sysadm(1M).
```

Notes on TCP/IP

The files **tcpip.root** and **tcpip.usr**, located in the directory **/var/setup.d/log**, contain a verbose description of the **tcpip** package setup process.

Additional TCP/IP setup may be required depending on your network and site configuration. Consult *Managing TCP/IP on the DG/UX® System* on the documentation CD-ROM for information on the following additional TCP/IP features: routing, Domain Name System (DNS), Daemon management, SNMP, sendmail, and network databases.

After answering the setup questions

59. **Determine how to proceed by carefully reviewing the options of this step.**

    IMPORTANT   If you previously answered **yes** to the expedite installation query, at this point it will take the installer utility about 2 hours to load the packages. Take a long break if you'd like. Periods (.) are written to the screen at regular intervals to indicate that the packages are being loaded. If you want to review sample output similar to what you will see after the entire contents of the release medium has been loaded, refer back to **step 41.**

    ▶ If you answered the kernel build questions before loading and answered **yes** to the automatic boot query, you will see the following message when the installer utility completes:

    ```
    DG/UX System Release R4.11
    Console login:
    ```

    At this point, you should go to Chapter 7 to complete the installation.

    ▶ If you did not answer kernel build questions before loading, proceed with the rest of this chapter to build and boot a kernel.

    ▶ If you answered kernel build questions before loading, but answered **no** to the automatic boot query, go to the section on booting a kernel and proceed with **step 63.**

Building and booting a configured kernel

With the DG/UX packages set up, you are ready to build the DG/UX R4.11 kernel for your configuration.

SECURITY If you are installing security software and did *not* choose to answer the kernel build questions before loading and/or automatically boot the kernel, proceed with the appropriate procedure(s) in the subsections that follow.

The installer program builds a kernel using configuration data about devices, device drivers, streams modules, and socket protocols for the DG/UX system and software packages.

> **IMPORTANT**   Stand-alone **sysadm** uses default values for general configuration variables to build your configured kernel. After you complete this installation, you may need to reconfigure your kernel, setting selected variables to different values. For information on tunable variables, refer to *Managing the DG/UX® System* on the documentation CD-ROM.

Files in the directory **/usr/etc/master.d** list the configuration variables and default values for kernel builds. The kernel is located in the file **/dgux** on the **root** virtual disk.

Building a kernel

After package setup completes, the DG/UX installer program prompts you to build a custom kernel for your system.

```
5. Configure and Build kernel

Run this step now?: [yes] ↵
System configuration file name: [aviion]
```

60. Assign a name for your system configuration file or accept the default name. For example:

```
System configuration identifier: [aviion] ↵
[aviion] Correct? (yes)
```

The default (in brackets) is the hostname supplied during **tcpip** package setup. If you did not perform **tcpip** package setup, the generic filename, **aviion**, is the default. We recommend selecting a unique name for your system configuration file. For example:

```
System configuration identifier [aviion] moe ↵
[moe] Correct? (yes)
```

61. **Confirm the name by pressing Enter. For example:**

    ```
    [moe] Correct? (yes) ↵
    Operating system client? [no]
    ```

62. **Answer if you are building for this host or for an operating system client.**

    ▶ If this host will be using a local disk for its **root**, **usr**, and **swap** areas, answer **no**. For example:

    ```
    Operating system client? [no] ↵
    Automatically reboot after building kernel? [yes]
    ```

    ▶ If this host is an operating system client of another host answer **yes**. This will be the case for operating system (OS) clients that do not have their own disk, or who have their **swap** on a local disk and their **root** and **usr** logical disks on a remote server. For example:

    ```
    Operating system client? [no] **yes** ↵
    ```

    IMPORTANT   An OS client relies on the OS server for some or all of its operating system software and file service. For information on adding OS clients, refer to *Managing the DG/UX® System* on the documentation CD-ROM. If you want, you can view the documentation CD-ROM on a PC *before* the DG/UX software is up and running.

    ```
    Automatically reboot after building kernel? [yes]
    ```

    When the kernel is built, continue with the next section below to boot the new kernel.

Booting the kernel

Note that the sample dialog in this section reflects an 88K-based system. The physical disk names may vary slightly depending on the type of media and the platform you are using.

After the kernel builds successfully, the installer utility prompts you to boot the kernel you just built.

CAUTION   *If you used a boot floppy and have not already removed it from the diskette drive, you must do so before rebooting the kernel.*

```
6. Reboot kernel

Run this step now? [yes] ↵
Boot path: [sd(ncsc(0),0,0)root:/dgux −3]
```

63. To confirm the boot path and run level, press Enter. For example:

```
Boot path: [sd(ncsc(0),0,0)root:/dgux -3] ↵
All currently running processes will be killed.
Are you sure you want to reboot the system? [yes]
```

Note that, as this example illustrates, you boot the new kernel to a run level of 3 (multiuser mode).

> **IMPORTANT**   If your system has a System Control Monitor (SCM) and the boot path default is empty or not accurate, refer to your hardware operating manual for instructions on setting the SCM boot path. If you are not sure if your system has an SCM, refer to the section on verifying prerequisites in Chapter 1.
>
> If your system does *not* have an SCM, you can store a default system boot path on a disk-resident database and manipulate it with the new **admnvram** command.

64. To reboot the system now, press Enter. For example:

```
Are you sure you want to reboot the system? [yes] ↵
```

The screen clears and the new kernel boots, displaying startup and other informative messages similar to the following. Remember that the physical disk names will vary slightly depending on the type of media and the platform you are using.

```
Booting sd(ncsc(0),0,0) root -f /dgux -i 3
DG/UX System Release R4.11 Bootstrap
Loading image .........................................
DG/UX System Release R4.11, Version generic
Using 32 Megabytes of physical memory
Found 2 processor(s)
Configuring devices .................................
Registering disks ..
Using vdm(swap,2D039A43,0C027700,0) as swap disk.
No check necessary for vdm(root,2D1F019E,0C027700,0).

Mounting vdm(root,2D1F019E,0C027700,0) as root file
system.

Creating /dev .... .
```

.   \<additional messages\>
.
.

```
   NOTE:   The run level change is complete.   See
           /etc/log/init.log for a verbose description of
           the system initialization process.
```

IMPORTANT *Intel-based systems*: If instead of rebooting, your system displays the `Boot command:` prompt, you must enter the **boot** command for your system. For example, to boot to init level 3, you might type

```
Boot command: sd(npsc(cpci(),3),0) root -f /dgux -i 3 ↵
```

You can use the command above, substituting the device name for your system in place of **npsc(cpci(),3)**. (See the sample dialog in Appendix C.) When you see the login screen, proceed to Chapter 7 to complete your installation.

For more information on using the **boot** command, refer to Appendix D. If you are not sure of the device name for your system, refer to the section on identifying boot, load, and system disk devices in Chapter 1. If in the future you want to set up your system to boot automatically, refer to the **admnvram** (1M) man page after you complete your installation.

If the kernel encounters a device it cannot configure, it displays an error message and resumes configuration of the remaining devices. Depending on the circumstances, you may choose either to investigate and correct the problem on the spot, or postpone investigation until after your DG/UX system is operational. If, for example, a particular device requires repair, it might be prudent to complete your installation and work temporarily without that device.

IMPORTANT If you receive an error message indicating that a package has not been set up, after you complete installation, perform package setup using **sysadm**, as necessary.

When the DG/UX system has finished booting, the login prompt appears.

```
            Press New Line to continue.  ↵
moe
DG/UX Operating System    R4.11
Console Login:
```

If you are using a graphics monitor, don't log in at the login prompt. Within a few seconds, a login screen will appear. Chapter 7 explains how to log in and complete your installation.

Where to go next

Go now to Chapter 7 to complete your installation, set up your documentation CD-ROM, configure nonstandard devices, and identify post-installation tasks.

SECURITY If you are installing security software, go to the section on logging in as Proto in Chapter 6 for instructions on logging in and setting up additional users.

End of Chapter

4 *Upgrading your DG/UX system*

This chapter explains how to upgrade from DG/UX 5.4R3.00 software or later to the DG/UX System Release R4.11. If you have an earlier release, you must upgrade to Release 3.00, 3.10, or 4.10 software before you can upgrade to the DG/UX R4.11 software.

> **IMPORTANT**   If you are upgrading to DG/UX 4.11 and you change the default configuration and set up a separate **/var** file system, you will need to add an entry to your **/etc/inittab** file to mount **/var**. For instructions, be sure to read the first section in this chapter on changing your configuration.

This chapter includes the following major sections:

- Changing your configuration
- Keeping your old system file
- Upgrading on hosts in a dual-initiator configuration
- Preparing for the upgrade
- Building the kernel for an upgrade
- Booting the kernel for an upgrade
- Sample upgrade dialog
- Restoring kernel customizations after the upgrade
- Restoring files from tape
- Where to go next

To complete the upgrade, you perform the steps shown in Figure 4–1.

Prepare for upgrade
(read this chapter)

Changing
your
configuration
?

Yes → Complete Planning
Worksheets
(Chapter 1 or
Appendix A)

No

Follow sample dialog in this chapter, or go
to Chapter 3 for step-by-step instructions
on:

    Booting stand-alone sysadm

    Preparing physical and virtual disks

Remote
load device
?

Yes → Go to Chapter 5

No

Follow sample dialog in this chapter, or go to
Chapter 3 for step-by-step instructions on:

    Loading software

    Setting up packages

    Building a configured kernel

    Booting the new kernel

Restore kernel customizations
(if any) and/or files from tape

Go to Chapter 7 to complete
your installation and set up
your documentation CD-ROM

Figure 4–1   Summary of upgrading tasks

Changing your configuration

If you are changing any network parameters, virtual disk sizes, selection of packages, or have other configuration changes, complete the Planning Worksheets as described in Chapter 1 before proceeding. If you are keeping the same configuration as your existing DG/UX System, you simply accept defaults at most installer program prompts.

If you intend to change the default values for the software packages on the usr_opt_networker and usr_opt_X11 virtual disks, refer to the general procedure for this outlined in Chapter 3 in the section on modifying the default virtual disks for optional software packages, **step 33.**

> **IMPORTANT**   If you want to set up the **/var** file system independent from the / (root) file system, read the following instructions:

▶ In the DG/UX R4.11 release, the **/etc/utmp** and **/etc/wtmp** files have been moved to **/var/adm**, and the **/etc/utmp** and **/etc/wtmp** files are now symbolic links.

If when upgrading your DG/UX system you do not use the default configuration and set up the **/var** file system separate from the / (root) file system, you will not be able to boot to init 3. This is because the init process will attempt to make **/var/adm/utmp** entries before the **/var** file system is mounted. You will receive a write error and the system will stop at run level s, even if you specified booting to run level 3.

You can correct this problem by adding the following entry to your **/etc/inittab** file to mount the independent **/var** file system.

```
mnt::sysinit:/sbin/mount /var </dev/syscon >/dev/syscon 2>&1
```

You can edit the **/etc/inittab** file from init level s, after which you should halt the system and reboot.

Keeping your old system file

Starting with DG/UX System Release 4.10, the system configuration file, **/var/Build/system.*name***, is comprised of two separate files: **system.device.*name*** and **system.params.*name***, where *name* is the name you assign to the system configuration file.

During the upgrade, your old system file is saved in a backup file. For the DG/UX System Release 4.11, this backup file is named **Pre4.11.system.*name*.**

▶ If you are upgrading from DG/UX Release 4.10, the **system.device.***name* and **system.params.***name* files already exist. The system will ask if you want to retain your existing device and parameter customizations or to override them with the system defaults.

▶ If you are upgrading directly from DG/UX Release 3.00, 3.10, or 4.00 (limited release) you can preserve your custom configuration by copying your previous kernel customizations from the backup file to the corresponding **system.device.***name* and/or **system. params.***name* configuration files, immediately following the upgrade. You can make changes to either or both of these template files (or neither one if you decide to use the default configuration). Next, reconfigure and rebuild your kernel using the sysadm operations.

> **IMPORTANT** You need only copy your kernel customizations once. Subsequent kernel building sessions will allow you to choose whether to keep your existing device and parameter customizations or to override them with the system defaults.

CAUTION *For kernel packages that aren't included on the DG/UX medium (Netware, OSI/P, PICK, SNA, X.25, etc.), you must refer to the individual Release Notices for these products for information on how to keep your parameters.*

If you want to keep your customized device or parameter specifications from your old system file, first perform the upgrade, and then refer to the instructions on restoring kernel customizations at the end of this chapter.

Upgrading on hosts in a dual-initiator configuration

If you are running a dual-initiator configuration, you need to make some special preparation before upgrading.

If you are running a failover configuration, you should migrate your system to the DG/UX Cluster Software product. For information on how to do this, refer to *Managing a DG/UX® Cluster*.

If you are running a failover configuration and do not want to install the DG/UX Cluster Software product immediately, you can obtain a separate failover package from Data General. This failover package will allow you to upgrade to the DG/UX R4.11 software right away and continue to use your failover configuration. It is only available to customers already running failover configurations, and contains no new features or documentation. You must retain your current *Achieving High Availability on AViiON® Systems* manual to use with the DG/UX R4.11 package.

Since the hosts in a failover configuration are set up in a dual-initiator configuration, you need to make some special preparation before upgrading the DG/UX system on those hosts. We will refer to the host on which you boot or install the DG/UX system as the "local" host, and we will call the other host the "remote" host.

While the SCSI bus operating parameters should have been set before the DG/UX system was first booted on the local host, you should still check these parameters to make sure they are correct. Refer to the 014–series operating manual for your hardware model.

Failing disks over to the remote host

If you are upgrading the DG/UX system on a host in an existing failover configuration, make sure the remote host takes ownership of the dual-initiator disks before you start. This minimizes the downtime of the failover configuration as a whole.

You may skip the following steps if any of the following conditions exist:

- You do not use failover.
- You are adding a new system to an existing failover configuration.
- You are certain the local host does not own any dual-initiator disks.

To check whether the local host owns a dual-initiator disk, use the following sysadm menu path.

```
Availability -> Disk Failover -> Giveaway -> List
```

If sysadm displays a message like the following, the local system does not own any dual-initiator disks.

```
No failover giveaway entries found.
```

If sysadm does list failover giveaway entries, the local host owns one or more dual-initiator disks. Transfer these disks to the remote host through the sysadm operation `Availability -> Disk Failover -> Give`. For detailed information about giving failover disks to another host, see the *Achieving High Availability on AViiON® Systems* manual.

Preparing for the upgrade

To ensure a successful upgrade, we strongly recommend you do the following before you actually begin:

- Verify adequate free space.
- Back up files to tape.
- Prepare attached hardware devices.

IMPORTANT   The default size of the **usr** virtual disk increased by 40,000 blocks from DG/UX 5.4R3.00 to DG/UX 5.4R3.10. If you are upgrading directly from R3.00 to R4.11, you will need to increase the size of /**usr**. You may do so now, or let the installation utility prompt you through the process.

Before beginning an upgrade, you can expand the size of a virtual disk by adding contiguous partitions. You can add noncontiguous partitions to root and usr as long as they reside on the same physical disk. For information on using sysadm to expand virtual disks, refer to the *Managing Mass Storage Devices and DG/UX® File Systems* manual on the documentation CD-ROM.

Verifying free space

Your root and usr virtual disks must have sufficient additional free space to ensure a successful upgrade. The amount of free space needed depends on the location and size of existing files and the packages you intend to load.

Table 4–1 lists estimated total space requirements, assuming that you load all packages on the release tape. These guidelines assume that your / (root) and /**usr** file systems do not contain extraneous files.

Table 4–1   Total space needed to upgrade to a DG/UX R4.11 system

Mount point	Upgrade succeeds
swap	Intel-based systems: 100,000 blocks *or more* 88K-based systems: 50,000 blocks *or more*
/	60,000 blocks *or more*
/usr	280,000 blocks *or more*

IMPORTANT   For DG/UX 4.11, root requires 60,000 blocks. If you are upgrading (overloading) **sysadm** attempts to enlarge the root virtual disk to this size. If your disk does not have enough free blocks available to enlarge root sufficiently, you will need to move, delete, or shrink another file system on root's disk, or move root to another physical disk with enough available space. The root virtual disk *must be on one physical disk.*

You may check available free space and perform manual cleanup, if necessary, before starting the upgrade, or you may rely on the installation utility to check free space during the actual upgrade process. Freeing up space before you start the upgrade will expedite the upgrade procedure and will improve your chances of a successful upgrade. Even if you perform manual cleanup now, the installation utility automatically will perform an additional check during the upgrade process. If you forgo manual cleanup entirely, the utility-assisted cleanup operation can be time-consuming.

▶ **To forgo manual cleanup before the upgrade, skip the remainder of this section and go to the next section. Otherwise, continue reading this section for manual cleanup suggestions.**

To determine the number of free blocks in the / and **usr** file systems currently mounted on your system, use the **df** command. For example:

df / /usr ↵

```
/        (/dev/dsk/root  ):    26097 blocks       4994 files
/usr     (/dev/dsk/usr   ):    42836 blocks      26473 files
```

To increase free space before you begin the upgrade procedure remove these files (as superuser):

- Large files in **/tmp** and **/var/tmp** (unless you have a tmp virtual disk mounted at / and **/var**).

- **lost**+**found** files in / and **/usr**.

- Large log files such as **/var/adm/messages, /var/cron/log**, **/etc/log/fast_fsck.log**, and anything in directory **/var/adm/log**.

- Saved text editing sessions, such as files in directories under **/var/preserve**.

- Extra kernels (such as **/dgux***) in / and **/var/Build**.

- Site-supplied executables in directories such as **/local** or **/usr/local**.

- Any files unrelated to the operating system.

- Core files.

- Obsolete files in the **/usr/admin** and **/usr/lib/gcc–1** directories.

Backing up files to tape

Please back up all file systems on the system disk—including the / (root), **/usr**, **/usr/opt/networker, /usr/opt/X11**, and **/usr/opt/sdk** file systems. (Do not back up swap: it is not a file system.) A backup allows you to restore your DG/UX system to its previous operating state, if necessary.

You will need a dump medium to back up a system disk; for example, a QIC-150 cartridge tape. The file **/etc/dumptab** lists supported dump device media. If you're using a cartridge tape, make sure it is write-enabled: the arrow should point away from the SAFE position.

If you use NetWorker as your archiving mechanism, use it to perform the system backup. Refer to the NetWorker documentation instead of this section for details. Otherwise, you may use dump2 procedures to perform system backup.

Follow these steps:

1. **Insert a blank tape in the tape drive, and close the drive door.**

2. **At the shell prompt, issue the su command followed by the superuser password.**

3. **At the shell prompt, issue the dump2 command in the following form:**

   `# /usr/sbin/dump2  -0  -f  /dev/rmt/0n  /  ↵`

   where

   `-0` (zero)   Specifies the entire file system.

   `-f  /dev/rmt/0n`   Identifies the tape drive on which you want to back up the file system; **n** specifies no-rewind mode. If you do not know your tape drive's name, check the **/etc/devlinktab** file or list the **/dev/rmt** directory to obtain a list of configured tape drive names.

   `/`   Is the name of the file system you want to back up.

   The **dump2** command prompts you to insert additional tapes if necessary.

4. **Repeat this procedure for each file system you want to back up.**

   IMPORTANT For the final file system you are backing up, omit the no-rewind option (**n**) from the tape drive name so that the tape will rewind at the conclusion of the file dump.

5. **Remove the tape from the tape drive when you have finished backing up the desired files.**

   The section on restoring files from tape in this chapter explains how to restore a file system that you have backed up.

Preparing hardware devices

Before you begin the upgrade procedure, make sure all device power cables are connected. If a device is disconnected, power down the system before you connect it.

For devices requiring a removable recording medium (such as a diskette or optical disk), make sure that the correct medium is inserted in the drive and that the drive door is closed.

> **IMPORTANT**   WORM (Write-Once Read-Many) devices are the exception to this rule. Power down these devices before you begin the upgrade procedure. For more information, see the following subsection on powering down WORM devices.

Powering down WORM devices

If you have a WORM (Write-Once Read-Many) device in your configuration, before you begin the upgrade procedure, power down the device to prevent the installation utility from preparing (writing) that disk. A write operation to a WORM disk could inadvertently destroy its contents.

After you have completed the upgrade, turn on power to the device and configure the device in the system file.

Setting up a dual-initiator configuration

Be sure to check the SCSI bus parameters every time you install or upgrade the DG/UX software. Unset or improperly set parameters will cause a system halt on the remote host. Note that you must set the parameters before booting a DG/UX installer kernel or autoconfigured DG/UX custom kernel. If for some reason you cannot set the parameters first, you may have to shut down the remote host or disconnect the shared SCSI bus from the local host before booting such a kernel.

> **IMPORTANT**   Do not boot a DG/UX installer kernel or autoconfigured DG/UX custom kernel in an active dual-initiator configuration before setting the SCSI bus operating parameters.

> Note also that in a dual-initiator disk configuration, one SCSI bus cable connects two computer systems, either directly or (more commonly) daisy-chained through one or more SCSI disk devices such as a CLARiiON™ disk array.

Shutting down your DG/UX system

To upgrade your DG/UX system, first you must shut down your computer. To accomplish this in an orderly fashion, use the following procedure.

1. **If you are running in the X Window System, log out, and then exit the login screen by clicking on the Terminate button.**

2. **Ensure that you are logged in as root.**

3. **Change to the root (/) directory using the following command:**

   ```
   #  cd  /  ↵
   ```

4. **Shut down the system using the following command:**

   ```
   #  shutdown  –g0  –y  ↵
   ```

   This command broadcasts an announcement to all logged-in users informing them of the impending shutdown. The **–y** option overrides the confirmation prompt. This command provides no grace period (0 second). For multiuser systems, you may want to give users a grace period of at least 5 minutes.

   The actual time required to shut down the system depends on the number of file systems being unmounted. Messages similar to the following will appear:

   ```
   Shutdown started.        <Day Month date time year>...

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

5. **Halt all processors. To halt the processors without prompting for confirmation, use the following command:**

   ```
   # halt –q ↵
   ```

   ```
   DG/UX system shutdown complete.
   ```

   ▶ Systems that are not equipped with an SCM will immediately reenter the powerup sequence, which includes a default boot attempt. Therefore, you must power off your computer.

   ▶ On SCM-equipped systems, the DG/UX system shutdown complete message is immediately followed by the SCM> prompt.

   When the SCM> prompt appears, the DG/UX system is completely shut down. The System Control Monitor (SCM) program resides in your system's firmware, and maintains control until the DG/UX kernel takes over.

Loading the installation utility

In this section you begin the installation upgrade process by loading the installation utility from the system console. Refer to the section below that pertains to your system.

Loading the installation utility on systems without an SCM

Follow the instructions in this subsection if you are upgrading from the DG/UX R4.10 software to DG/UX R4.11 on an Intel system that does *not* have an SCM.

> **IMPORTANT**   Model AV 2000 and AV 3000 computers do not include an SCM. All other Intel-based systems do contain an SCM.

Before you begin the boot process, make sure your system is powered off.

▶ Insert the DG/UX 4.11 medium (CD-ROM) and the boot floppy (diskette) in their respective drives.

> **IMPORTANT**   The boot floppy is not required if your system was previously set up to boot from the hard disk. If this is the case, when you power on your system, you will see the automatic-boot count-down message:

```
DG/UX will boot in xx seconds
```

> To interrupt the automatic boot from disk, press the <Esc> key before the count-down message completes. This will display the `Boot command:` prompt, and you can enter the name of the boot device as explained below.

▶ Power on your system. The system will reset, boot the installation floppy, and display the following prompt:

```
Boot command:
```

Worksheet 2

▶ Enter the name of the boot device (CD-ROM) at the prompt. Enter *only* the name of the device. Consult Planning **Worksheet 2** for the name of your boot device, or refer to the instructions in Chapter 1. For example:

```
Boot command: sd(apsc(pci(),b),4) ↵
```

> **IMPORTANT**   Do NOT type: **b** *device_name*.

▶ You can remove the boot floppy from the diskette drive at any time now. The boot floppy provides the `Boot command:` prompt. You may choose to leave it in the drive until you are sure that you don't need to start over, but you must remove the boot floppy from the drive before you reboot the configured kernel.

The installation utility will proceed to load.

Loading the installation utility on systems with an SCM

Follow the instructions in this subsection if you are

- Upgrading the DG/UX R4.10 software to DG/UX R4.11 on an Intel system that *does* have an SCM.

- Upgrading DG/UX 5.4R3.10 or later software to DG/UX R4.11 on an 88K-based system.

  IMPORTANT   Model AV 4700, AV 4800, and AV 5800 computers include an SCM, but if you receive an early model, a boot floppy may still be required. If you do not see an SCM prompt, you can boot from the floppy by following the instructions in the previous section on loading the installation utility without an SCM.

If your system is powered off, you must turn it on and wait for the SCM prompt before you can begin the boot process. If you are already running the DG/UX software, you must initiate an orderly system shutdown using the **halt** or **shutdown** commands. The system then will reset and bring up the SCM prompt.

▶ Insert the DG/UX 4.11 medium in the appropriate CD or tape drive.

  IMPORTANT   If you are using cartridge tape, make sure the tape is write-protected: the arrow should point to the SAFE position.

Worksheet 2

▶ Boot the medium by typing the appropriate boot command at the SCM prompt, and press Enter. Consult Planning **Worksheet 2** in Appendix A for the name of your boot device. For example

The following is an example for an Intel-based system where **2** is the pci slot number and **4** is the CD-ROM device ID number:

```
SCM86> b sd(npsc(cpci(),2),4) ↵
```

The following is an example for an 88K-based system where 3 is the CD-ROM device ID number:

```
SCM/JP0> b sd(ncsc(),3) ↵
```

The installation utility will proceed to load.

Beginning the boot process

You have now loaded the installation utility. You can either follow the dialog in the sample upgrade dialog section later in this chapter, or you can refer to the step-by-step instructions in the section on booting the installation utility in Chapter 3.

CAUTION   *If you want to keep your old system file that has been custom tuned, first perform the upgrade, and then refer to the restoring kernel customizations section toward the end of this chapter.*

If you elect to answer the kernel build questions before loading the software packages, we suggest you follow the example in the sample dialog section later in this chapter.

> **IMPORTANT**   If you prefer to only load essential packages now, and then add others later, refer to instructions on loading and setting up application software in *Managing the DG/UX*[®] *System.*

If you do not answer the kernel build questions before loading the software, then after you prepare the physical and virtual disks, and load and set up the software, you can return here to the following section on building the kernel for an upgrade.

Building the kernel for an upgrade

This section contains step-by-step procedures for building the kernel when you upgrade to the DG/UX R4.11 software. This section assumes you did not elect to answer the kernel build questions before loading the software packages. If you did preanswer the kernel build questions, you can refer to the sample dialog section later in this chapter.

After package setup completes, the DG/UX installer program prompts you to configure and build a kernel for your system. Your old system file will be preserved in the **Pre4.11.system.*name*** file. If you want to include customizations from your old system file, you can do so after the upgrade. Refer to the section on restoring kernel customizations towards the end of this chapter.

CAUTION   *If you are running software applications that write to the system file (for example, Netware, X.25, SNA, etc.), you can either add the cutomizations to the new DG/UX R4.11* **system.params.*name*** *file and/or the new* **system.device.*name*** *file, or you can choose not to configure and build your kernel at this time. For more information on the latter, refer to* Managing the DG/UX System *or the* **admkernel***(1M) man page.*

1. **To configure and build the kernel, press Enter at the initial prompt. For example:**

    ```
    5. Configure and build kernel

    Run this step now? [yes] ↵
    System configuration identifier: [moe]
    ```

2. **Assign a name for your system configuration file or accept the default name. For example:**

   ```
   System configuration identifier [moe] ↵
   ```

   The default (in brackets) is the hostname supplied during **tcpip** package setup. If you did not perform **tcpip** package setup, the generic filename, **aviion**, is the default. We recommend selecting a unique name for your system configuration file.

3. **The next prompt you see depends on whether the system.*name* configuration file already exists.**

   ▶ If the **system.*name*** file does exist, you will see the following prompt:

   ```
   Use existing [moe] system files? [yes]
   ```

   If you want to overwrite the **system.*name*** configuration file with the contents of the **system.device.*name*** and **system.params.*name*** files, accept the default [yes] by pressing Enter. For example:

   ```
   Use existing [moe] system files? [yes] ↵
   Operating system client? [no]
   ```

   If you answer **no,** you will return to the System configuration identifier prompt where you can enter a new identifier name under which to build your system kernel.

   ▶ If the **system.*name*** configuration file does *not* exist, you will be asked to confirm the name by pressing Enter. For example:

   ```
   [moe] Correct? (yes) ↵
   Operating system client? [no]
   ```

4. **Answer if this host is an operating system client of another host.**

   Since you are upgrading the DG/UX system on the host, the host must have its own disks for the operating system. Therefore, you should accept the default for this prompt.

   ```
   Operating system client? [no]↵
   ```

   IMPORTANT   The DG/UX R4.11 operating system for Intel-based systems does not support diskless workstations.

5. **The next prompt depends on whether or not your system already has a system.device.*name* file.**

   IMPORTANT   If previously you never loaded the DG/UX R4.10 software on your system and this is the first time you are loading the DG/UX R4.11 software, it is unlikely that you will already have a **system.device.*name*** file.

▶ If your system does *not* have a **system.device.*name*** file,
   continue with **step 6.**

▶ If your system does have a **system.device.*name*** file, you will
   be asked if you want to retain the parameter configuration file.

   • Accept the default [retain] to the prompt if you have
      already added customizations to the device file
      (**system.device.*name***) and want to keep it. For example:

      ```
      Device configuration file: [retain] ↵
      ```

   • Type **regenerate** after the prompt if you want to use the
      default devices for your system. This will regenerate the file
      by overwriting it and dismissing your customizations,
      replacing them with the system defaults. For example:

      ```
      Device configuration file: [retain] regenerate ↵
      ```

   • Type **?** if you want more information.

6. **The next prompt depends on whether or not your system
   has a system.params.*name* file.**

   IMPORTANT   If this is the first time you have loaded the
   DG/UX R4.11 software on your system, it is unlikely that you
   will already have a **system.params.*name*** file.

▶ If your system does *not* have a **system.params.*name*** file,
   proceed to **step 8.**

▶ If your system does have a **system.params.*name*** file, you will
   be asked if you want to retain the parameter configuration file.

   • Accept the default [retain] to the prompt if you have
      already added customizations to the parameter
      configuration file (**system.params.*name*)**, and want to
      keep them. For example:

      ```
      Parameter configuration file: [retain] ↵
      Include new package proto files? [yes]
      ```

   • Type **regenerate** after the prompt if you want to use the
      default parameters for your system. This will regenerate
      the file by overwriting it and dismissing your
      customizations, replacing them with the system defaults.
      For example:

      ```
      Parameter configuration file: [retain] regenerate ↵
      ```

   • Type **?** if you want more information.

7. **Decide if you want to include new package proto files.**

   A package proto file is the prototype kernel configuration file, if any, included as part of the software package. It specifies the kernel configuration parameters required by the package, as well as pseudo-devices, protocols, STREAMS modules, etc. provided by that package.

▶ Accept the default [yes] and include the new package proto files if you want to immediately start using the features of any new packages loaded as part of the upgrade. For example:

```
Include new package proto files? [yes] ↵
Automatically reboot after building kernel? [yes]
```

   If you are not sure, type **?** for a list of the packages loaded, but not configured. If you are still not sure, accept the default and include the proto files.

▶ Answer **no** and do not include the new package proto files if you do not want to use the new packages immediately and want to keep the DG/UX kernel image as small as possible. For example:

```
Include new package proto files? [yes] no ↵
Automatically reboot after building kernel? [yes]
```

8. **Decide whether or not to reboot automatically after building the kernel.**

   ▶ If you prefer to pause between kernel building and booting (for example, to verify a successful kernel build or the boot path), answer **no** after the prompt and press Enter. For example:

```
Automatically reboot after building kernel? [yes] no ↵
OK to perform this operation? [yes]
```

   ▶ To expedite installation, accepting the default **yes** response causes the kernel to boot automatically after it is built. For example:

```
Automatically reboot after building kernel? [yes] ↵
OK to perform this operation? [yes]
```

9. **When you are ready to begin building the kernel, press Enter.**

```
OK to perform this operation? [yes] ↵
.
.
.
Building kernel......
Successfully built dgux.moe

Linked /dgux. You must reboot in order for this kernel to
take effect.
```

If you previously elected to automatically reboot after rebuilding the kernel, proceed to Chapter 7 to complete your installation. To recapture customized parameters, return to this chapter after you complete the upgrade and refer to the section on restoring kernel customizations.

Booting the kernel for an upgrade

After the kernel builds successfully, the installer utility prompts you to boot the kernel you just built.

IMPORTANT   The sample dialog in this section reflects an 88K-based system. The physical disk names may vary slightly depending on the type of media and the platform you are using.

10. To boot the kernel, press Enter at the initial prompt.

```
6. Reboot kernel

Run this step now? [yes] ↵
Boot path: [sd(ncsc(0,7),0,0)root:/dgux −3]
```

11. To confirm the boot path and run level, press Enter.

Note that, as this example illustrates, you boot the new kernel to a run level of 3 (multiuser mode).

```
Boot path: [sd(ncsc(0,7),0,0)root:/dgux −3] ↵

All currently running processes will be killed.
Are you sure you want to reboot the system? [yes]
```

12. To confirm that you are ready to reboot the system now, press Enter. For example:

```
Are you sure you want to reboot the system? [yes] ↵
```

The screen clears and the new kernel boots, displaying startup and other informative messages similar to the following. Remember that the physical disk names will vary slightly depending on the type of media and the platform you are using.

IMPORTANT   *Intel-based systems*: If instead of rebooting, your system displays the `Boot command:` prompt, you must enter the **boot** command for your system. For example, to boot to init level 3, you might type

```
Boot command: sd(npsc(cpci(),0),0) root −f /dgux −i 3↵
```

You can use the command above, substituting the device name for your system in place of **npsc(cpci(),0**. (See the sample dialog in Appendix C.) When you see the login screen, proceed to Chapter 7 to complete your installation.

For more information on using the **boot** command, refer to
Appendix D. If you are not sure of the device name for your
system, refer to the section on identifying boot, load, and
system disk devices in Chapter 1. If in the future you want to
set up your system to boot automatically, refer to the
admnvram (1M) man page after you complete your
installation.

```
Booting sd(ncsc(0,7),0,0)root:/dgux −3
DG/UX System Release R4.11 Bootstrap
Loading image ...........................................
DG/UX System Release R4.11, Version generic
Using 24 Megabytes of physical memory
Found 2 processor(s)
Configuring devices .................................
Registering disks ..
Using vdm(swap,2D039A43,0C027700,0) as swap disk.
No check necessary for vdm(root,2D1F019E,0C027700,0).

Mounting vdm(root,2D1F019E,0C027700,0) as root file
system.

Creating /dev .... .


.  <additional messages>
.
.
    NOTE:  The run level change is complete.  See
           /etc/log/init.log for a verbose description of
           the system initialization process.
```

IMPORTANT   If you receive an error message indicating that a
package has not been set up, after you complete installation,
perform package setup using **sysadm**, as necessary.

If the kernel encounters a device it cannot configure, it displays an
error message and resumes configuration of the remaining devices.
Depending on the circumstances, you may choose either to investigate
and correct the problem on the spot, or postpone investigation until
your DG/UX system is operational. If, for example, a particular device
requires repair, it might be prudent to complete your upgrade and work
temporarily without that device.

When the DG/UX system has finished booting, the login prompt
appears.

```
             Press New Line to continue.  ↵
moe
DG/UX Operating System    R4.11
Console Login:
```

If you are using a graphics monitor, don't log in at the login prompt. Within a few seconds, a login screen will appear. Chapter 7 explains how to log in and complete your installation.

Sample upgrade dialog

This section contains typical dialog for upgrading a DG/UX R3.10 system to DG/UX R4.11 using a local CD-ROM device. Follow this sample dialog as you upgrade your own system.

*CAUTION   If you don't create all recommended virtual disks, then later when you are prompted to select packages to load, you probably do not want to accept the default response [development]. Else you will get **all** the packages in the development package suite, and the ones you didn't create virtual disks for would be loaded and set up in **usr**, which could overfill. Therefore, if you do not want this to happen,answer* **?** *to the Package Name(s): prompt and select your packages individually from the list.*

In the following 88K-platform example, the DG/UX system with hostname **moe** is upgraded from DG/UX 5.4R3.10 to DG/UX R4.11 using a CD-ROM device. If you are installing from tape, the dialog will occasionally vary slightly, but the procedure is essentially the same.

If you are using an Intel-based system, the initial boot path, device names, and required block sizes for virtual disks may vary slightly. Also Intel-based systems include the Application Capture Option (**aco**) package suite. Appendix C shows the full installation dialog for an Intel-based system.

When your system is up and running, proceed to the section on restoring kernel customizations after the upgrade for instructions on how to restore your device and parameter customizations.

In the sample dialog, user responses such as answering questions appear in boldface and pressing the Enter key is represented by the ↵ symbol.

IMPORTANT   You'll see an estimate of elapsed time in the left margin, using the form hours:minutes. Note that the elapsed times in this example reflect a particular hardware and software configuration; installation times vary according to your system's configuration.

0:00   SCM/jp0> **b sd(ncsc(),3)** ↵

              Booting sd(ncsc(),3)
              DG/UX System Release R4.11 Bootstrap

              Loading image...
              DG/UX System Release R4.11, Version Standalone sysadm
              Using 32 Megabytes of physical memory
              Found 2 processors
0:05   Configuring devices ....
              Registering disks ..
              Running with no swap area.
              Using memory-resident root file system
              Creating /dev ....

              INIT: SINGLE USER MODE

                             Standalone Sysadm Main Menu

                 1 Physical Disk ->   Manage physical disks
                 2 Virtual Disk ->   Manage virtual disks
                 3 File System ->   Manage file systems
                 4 Install Software -> Install system software

              Enter a number, a name, ? or <number>? for help, <NL> to take
              the default, or q to quit: [Install Software] ↵

                             Install System Software Menu

                 1 Prepare physical disks ...
                 2 Prepare virtual disks ...
                 3 Load software ...
                 4 Set up software ...
                 5 Configure and Build kernel ...
                 6 Reboot kernel ...
                 7 All steps

              Enter a number, a name, ? or <number>? for help, <NL> to take
              the default,^ to return to previous menu, or q to quit: [All
              steps] ↵

```
        1.  Prepare physical disks

        Run this step now? [yes] ↵
        Physical disk(s) to prepare: [all] ↵
        Bootstrap installed in existing partition on
            sd(ncsc(0,7),0,0)
        Physical disk sd(ncsc(0,7),0,0) prepared.

        2.  Prepare required virtual disks

        Run this step now? [yes] ↵
        Register all standard physical disks? [yes] ↵
        Physical disk sd(ncsc(0,7),0,0) registered.
```

 (short pause)

```
Required File System Mount Points:

File System   Virtual   Current   Action     Blocks   Physical
Mount Point   Disk      Blocks    Required   To Add   Disk
-----------   -------   -------   --------   ------   --------
-none-        swap       50000    none         -      sd(ncsc(0,7),0,0)
/             root       40000    Enlarge    20000    sd(ncsc(0,7),0,0)
/usr          usr       280000    none         -      sd(ncsc(0,7),0,0)

Modify this information? [no] ↵
```

```
        Beginning swapping on /dev/dsk/swap.
        Enlarging root to 60000 blocks.
        20000-block unnamed child partition created at 667621 on
            "sd(ncsc(0,7),0,0)"
        Virtual disk "root" expanded by 20000 blocks
        Expanding file system on /dev/dsk/root
        28590 of 60000 blocks used (31410 free);
           1016 of 8638 inodes used (7622 free).

        Time to fix /dev/dsk/root was 8 seconds.

        Mounting /dev/dsk/root.
        Mounting /dev/dsk/usr.
```

**At this point, you may be asked if you want
to create a virtual disk for halt dumps. If
you do not have enough free space, or if you
already have a virtual disk named dump,
you will proceed directly to the section on
loading the software.**

```
            No existing 'halt dump' disk found. Current free disk
            pieces (specified in blocks):

            Physical Disk      Free Pieces
            -------------      -----------
            sd(ncsc(0,7),0,0)    1439703


            Create a virtual disk for halt dumps? [yes] ↵

      Required File System Mount Points:

      File System     Virtual  Current   Action     Blocks   Physical
      Mount Point     Disk     Blocks    Required   To Add   Disk
      ------------    -------- -------   --------   ------   ---------------
      -none-          dump     -         Create     57000    sd(ncsc(0,7),0,0)

      Modify this information? [no] ↵
```

**For instructions when loading from remote
media, refer to the section on identifying
the remote tape or file system as a DG/UX
system software load device in Chapter 5.**

```
            Creating /dev/dsk/dump (57000 blocks) on
               sd(ncsc(0,7),0,0).
            Virtual disk "dump" created.
            Virtual disk "dump" made a volume.
            Making vdm_dump(sd(ncsc(0,7),0,0),dump) the default dump
               device.

        3.  Load software

        Run this step now? [yes] ↵
        Type of release medium: [CD-ROM] ↵
```

0:10   `Release Name: [DG/UX R4.11] ↵`

(short pause)

```
        DG/UX Operating System with X Window Systems R4.11 of
        <month/date/year> from Data General Corporation
        Package Name(s): [development] ↵
```

```
You selected the following packages:
    dgux
    networker
    nfs
    onc
    sdk
    sdk.X11
    tcpip
    X11
    dgux.man
    networker.man
    nfs.man
    onc.man
    sdk.man
    sdk.X11.man
    tcpip.man
    X11.man

Correct? [yes] ↵

List file names while loading? [no] ↵
Answer kernel build questions before loading? [yes] ↵

System configuration identifier [aviion] moe ↵
[moe] Correct? [ yes] ↵

Use existing [moe] system files? [yes] ↵
```

If the system.device.*name* and the system.params.*name* template files do not yet exist, then answer yes and the default values are used to generate them. You can copy your customizations into these files after the upgrade.

If the system.device.*name* and the system.params.*name* files do exist, you will be asked if you want to retain them. For a description of these prompts, refer to the building the kernel section, step 1.

```
Operating system client? [no] ↵
```

> **IMPORTANT**   The DG/UX R4.11 operating system for Intel-based systems does not support diskless workstations.

```
Automatically reboot after building kernel? [yes] ↵
```

```
0:10     Checking for recommended file system mount points ........
```

(short pause)

```
Recommended File System Mount Points:

File System        Virtual             Current  Action     Physical
Mount Point        Disk                Blocks   Required   Disk
-----------        ---------           -------  --------   -------------
/usr/opt/X11       usr_opt_X11         140000   None       sd(ncsc(0,7),0,0)
/usr/opt/networker usr_opt_networker   50000    None       sd(ncsc(0,7),0,0)
/usr/opt/sdk       usr_opt_sdk          60000   Create     sd(ncsc(0,7),0,0)


          Modify this information? [no] ↵

          Mounting /dev/dsk/usr_opt_X11.
          Mounting /dev/dsk/usr_opt_networker.
          Creating /dev/dsk/usr_opt_sdk (60000 blocks) on
               sd(ncsc(0,7),0,0).
          Virtual disk "usr_opt_sdk" created.
          Virtual disk "usr_opt_sdk" made a volume.
          Making file system on /e=dev/dsk/usr_opt_sdk.
          Mounting /dev/dsk/usr_opt_sdk.

          NOTE:  You may specify additional file systems which
                 should be mounted during the installation.

          Mount other file system(s)? [no] ↵
```

```
0:20      Validating capacity of the mounted file systems
          .............................................................
          .............................................................
          .............................................................
          ..................................................
```

**See Chapter 8
if validation fails.**

```
          NOTE:  The installation utility will now start the
                 package loading phase of the installation
                 procedure. Once this phase begins, you cannot
                 interrupt it.
```

```
0:30      Continue with the installation? [yes] ↵

          NOTE:  If the packages you have selected require setup
                 (e.g. onc, tcpip, networker, etc.) then please
                 wait until the next prompt appears. The delay
                 may take up to 5 minutes depending on the number
                 of packages you have chosen to load.

          Loading DG/UX Operating System with X Window Systems R4.11 of
          <month/date/year> from Data General Corporation.
```

**If loading from tape, there will be a system
message and a pause while the tape is
positioning itself.**

```
        NOTE:  To expedite the package loading and setup steps,
               you can answer package setup questions in
               advance of package loading by pressing Enter at
               the prompt. If instead, you prefer to continue
               the package loading and setup steps inter-
               actively and at your own pace, type no before
               you press Enter.

        Do you want to answer, in advance, package setup questions
        before package loading is complete? [yes] ↵
```

**If you choose to answer setup
questions now, use Worksheet 5
for the prompts that follow.**

```
        Is this system being set up as a node within a cluster?
        [no] ↵

        Configure system as a client for a remote NetWorker
        server?[no] ↵
```

**If you answer no here, you need
to allocate space for NetWorker
index and log files. If you answer
yes, there are no more NetWorker
questions.**

```
        You now have the opportunity to create or adjust the size of
        the /var/opt/networker file system.  This file system is
        needed to store the NetWorker online index and log files.
        The default size of 10000 blocks is enough space to store
        index information for multiple versions of several thousand
        files--about enough for a small workstation with a single
        disk drive.  THIS IS NOT ENOUGH SPACE FOR A SERVER WITH
        REMOTE CLIENTS!  If your system has more than one disk drive,
        or if it will be acting as a NetWorker server for remote
        clients, you probably need to allocate additional space for
        the online index.  See the installing manual for instructions
        on estimating the space requirements for the online index.
```

```
/var/opt/networker File System:
```

File System Mount Point	Virtual Disk	Current Blocks	Action Required	Blocks To Add	Physical Disk
/var/opt/networker	var_opt_networker	10000	None	–	sd(ncsc(0,7),0)

```
Modify this information? [no] ↵


Mounting /dev/dsk/var_opt_networker.
/dev/rdsk/var_opt_networker: File System is now mountable.

/dev/rdsk/var_opt_networker: 1076 of 10000 blocks used (8924
free); 28 of 1726 inodes used (1698 free).

/dev/rdsk/var_opt_networker: Time to fix
/dev/rdsk/var_opt_networker was 2 seconds.
```

(short pause)

```
Enter the NIS Domain name: [worknet] ↵
[worknet] Correct? [yes] ↵
```
(short pause)

```
Do you want to keep the current values of your TCP/IP
parameters (e.g. primary host name, Internet address,
controller name?) [yes] ↵
```

0:45
```
Preparing to load the packages
.............................
Loading package dgux
......................................................
Package dgux has been loaded.

Loading package networker ......
Package networker has been loaded.

Loading package nfs .......
Package nfs has been loaded.

Loading package onc .......
Package onc has been loaded.

Loading package sdk ........
Package sdk has been loaded.

Loading package sdk.X11 ........
Package sdk.X11 has been loaded.

Loading package tcpip ............
Package tcpip has been loaded.

Loading package X11 ................................
Package X11 has been loaded.

Loading package dgux.man ......
Package dgux.man has been loaded.
```

```
Loading package networker.man ....
Package networker.man has been loaded.

Loading package nfs.man .....
Package nfs.man has been loaded.

Loading package onc.man .....
Package onc.man has been loaded.

Loading package sdk.man ........
Package sdk has been loaded.

Loading package sdk.X11.man ........
Package sdk.X11 has been loaded.

Loading package tcpip.man ....
Package tcpip.man has been loaded.

Loading package X11.man .........
Package X11.man has been loaded.

Package load is finished.
The selected packages have been loaded.
```

2:15

```
4.  Set up software

Setting up dgux in usr.

    Initializing DG/UX /usr files ....
    Continuing setup of DG/UX ....

NOTE:  See srv/release/PRIMARY/root/MY_HOST/var/setup.d/log/dgux.usr
       for a detailed account of the usr setup of DG/UX.

Package dgux has been successfully set up in usr.
Setting up dgux in MY_HOST root.

    Setting up DG/UX .......
    Initializing DG/UX prototype files
......................................
.
.
    Creating DG/UX run level links
..................................

    Initializing sysadm(1M) ..........Renaming preR4.11
kernel system file with prefix 4.11.

NOTE: See/srv/release/PRIMARY/root/MY_HOST/var/setup.d/log/dgux.root
      for a detailed account of the root setup of DG/UX.
```

```
Package dgux has been successfully set up in MY_HOST root.
Package setup for dgux is complete.

Setting up dg/ux.man in usr.
Setting up dgux.man man pages:...

Package dgux.man has been successfully set up in usr.
Package setup for dgux.man is complete.

Setting up networker in usr.
Creating symbolic links ...
Package networker has been successfully set up in usr.
Setting up networker in MY_HOST root.

  Creating networker run level links.....
..Package networker has been successfully set up in MY_HOST
    root.
Package setup for networker is complete.


Setting up nfs in MY_HOST root.
Setting up NFS in MY_HOST root....
Creating NFS run level links.........
Initializing NFS prototype files......
```

NOTE: See /srv/release/PRIMARY/root/MY_HOST/var/setup.d/log/nfs.root
        for a detailed account of the root setup of NFS.

```
...Package nfs has been successfully set up in MY_HOST root.
Package setup for nfs is complete.

Setting up nfs.man in usr.
Setting up nfs.man man pages:...

Package nfs.man has been successfully set up in usr.
Package setup for nfs.man is complete.

Setting up onc in MY_HOST root.
    Initializing ONC prototype files.......
    Creating ONC run level links........

    NOTE:   This host will first run as an NIS client.
```

NOTE: See /srv/release/PRIMARY/root/MY_HOST/var/setup.d/log/onc.root
        for a detailed account of the root setup of ONC.

```
Package onc has been successfully set up in MY_HOST root.
Package setup for onc is complete.

Setting up onc.man in usr.
Setting up onc.man man pages:...

Package onc.man has been successfully set up in usr.
Package setup for onc.man is complete.
```

```
Setting up sdk in usr.
......................................................

Package sdk has been successfully set up in usr.
Package setup for sdk is complete.

Setting up sdk.man in usr.
Setting up sdk.man man pages:...

Package sdk.man has been successfully set up in usr.
Package setup for sdk.man is complete.

Setting up sdk.X11 in usr.
    Creating sdk.sde directories and links..
Package sdk.X11 has been sucessfully set up in usr.
Package setup for sdk.X11 is complete.

Setting up tcpip in usr.
    Setting up tcpip...

  NOTE:  The /usr/bin/rsh command now executes as a remote
         shell(remsh), not as a restricted shell(restsh).

NOTE: See /srv/release/PRIMARY/root/MY_HOST/var/setup.d/log/tcpip.usr
      file for a verbose description of the package setup for usr.

Package tcpip has been successfully set up in usr.
Setting up tcpip in MY_HOST root.
    Setting up tcpip ...
    Creating TCP/IP run level links ...

    NOTE:  See /var/setup.d/log/tcpip.root file for a
           verbose description of the package setup for root.

Package tcpip has been successfully set up in MY_HOST root.
Package setup for tcpip is complete.

Setting up tcpip.man in usr.
Setting up tcpip.man man pages:...

Package tcpip.man has been successfully set up in usr.
Package setup for tcpip.man is complete.

Setting up X11 in usr.
    Creating X11 directories and links...........
    Creating root and usr prototypes for X11........
    Cleaning up the SDK area.
Package X11 has been successfully set up in usr.
Setting up X11 in MY_HOST root.
Package X11 has been successfully set up in MY_HOST root.
Package setup for X11 is complete.

Setting up X11.man in usr.
```

```
      Creating X11.man directories and links...
Setting up X11.man man pages.

Package X11.man has been successfully set up in usr.
Package setup for X11.man is complete.
```

2:30   5. Configure and build a kernel

```
Building kernel...
Successfully built dgux.moe.
Linked /dgux.  You must reboot in order for this kernel to
take effect.

6.  Reboot kernel

Booting sd(ncsc(0,7),0,0)root:/dgux -3
DG/UX System Release R4.11 Bootstrap
Loading image
............................................................

DG/UX System Release R4.11, Version generic
Using 32 Megabytes of physical memory
Found 2 processors
Configuring devices ........................................
Registering disks ..
Using vdm(swap,2D039A43,0C027700,0) as swap disk.
No check necessary for vdm(root,2D1F019E,0C027700,0).

Mounting vdm(root,2D1F019E,0C027700,0) as root file system.
Creating /dev ....
```

```
      Checking local file systems ........
      Mounting local file systems .....
      Current date and time is <day month date time year> ...

      Checking system files .......
      Enabling automatically pushed STREAMS modules ........
      Linking short names for /dev device nodes .........
      Restoring TCP/IP tunable parameters
      Loading terminal controllers ....
      Starting disk daemons ....
      Mounting local file systems .....
      Checking for packages that have not been set up ....
      Starting miscellaneous daemons ...
      Starting STREAMS error logging daemon ....
      Starting Logical Link Control Services ....
```

```
                Attaching TCP/IP network interfaces ...........
                Starting system logging daemon ....
                Starting NIS services as NIS client ......
                Starting NFS lock services .....
                Starting batch services ....
                Starting line printer scheduler ....
                Saving ex(1) and vi(1) temporary files ....
                Starting NFS services .....
                Starting TCP/IP daemons .......
                Loading terminal controllers......
                Mounting NFS file systems .....
                Starting DG/UX administrative services .....
                Starting NetWorker server daemons .....

                NOTE:  The run level change is complete.  See
                       /etc/log/init.log for a verbose description of
                       the system initialization process.


2:45                   Press New Line to continue.

        moe
        DG/UX Operating System    R4.11
        Console Login:
```

Restoring kernel customizations after the upgrade

For DG/UX System Release 4.11, the system configuration file, named
/var/Build/system.*name*, is formed from two separate files:
system.device.*name* and **system.params.*name***, where name is the
name you assign to the system configuration file. Typically this name
would be your host's name. Your previous system configuration file is
saved in the backup file **Pre4.11.system.*name***.

Figure 4–2 shows an example of how the system files are arranged for
DG/UX System R4.11.

DG/UX 5.4R3.10 | system.moe |

DG/UX R4.11 new device and parameter files

| system.device.moe | | system.params.moe | | Pre4.11.system.moe |

**DG/UX R3.10 system
configuration file
retained and
renamed**

| /var/Build/system.moe |

**DG/UX R4.11
new system
configuration file**
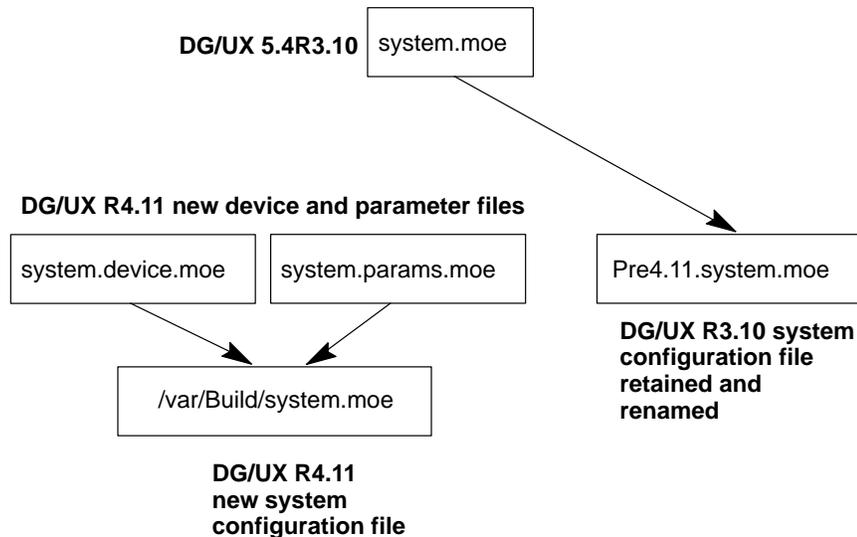
Figure 4–2   New system configuration file arrangement

When you first load the DG/UX R4.11 software, the kernel building
section of the upgrade automatically creates the generic system
configuration template files (**system.device.*name*** and
system.params.*name*).

This new arrangement gives you the choice of confining changes to only
devices or to only the kernel tunable parameters and software package
attributes.

During the upgrade, your customizations are saved in a backup file
named **Pre4.11.system.*name***. As soon as the upgrade is complete,
you explicitly copy only your kernel customizations from the backup file
Pre4.11.system.*name* to the appropriate generic template file(s) —
system.device.*name* and/or **system.params.*name***.

You do not edit the **/var/Build/system.*name*** file directly. Instead, you
edit its separate components: the **system.device.*name*** file and the
system.params.*name* file. You can edit either file, or both files (or
neither one if you want to use the default configuration).

> **IMPORTANT**   Entering your kernel customizations to
> **system.device.*name*** and **system.params.*name*** is a one-time
> event. Subsequent kernel building sessions will update the kernel
> using the customized files as a base.

CAUTION   For kernel packages that aren't included on the DG/UX medium (Netware, OSI/P, PICK, SNA, X.25, etc.), you must refer to the individual Release Notices for these products for information on how to keep your parameters.

To restore your customizations, follow these instructions:

1. **Use the procedures earlier in this chapter to upgrade your DG/UX system.**

    You will be instructed to build and boot a new kernel. The basis for the new kernel will reside in two separate configuration files: **system.device.*name*** and **system.params.*name***. Your previous kernel configuration, including customizations, are preserved in **Pre4.11.system.*name***.

2. **Append the customizations from your old system configuration file to the new device and parameter configuration files.**

    Append your previous device customizations (if any) from the old system kernel backup file, **Pre4.11.system.*name***, to the new **system.device.*name*** configuration file. Then append your previous kernel tunable parameters and nonstandard software package attributes to the **system.params.*name*** file. You can accomplish this procedure by using stand-among **sysadm**.

    First assume the appropriate privilege, and then type **sysadm** at the shell prompt. Follow the menu path System –> Kernel –> Config and Build. Accept the defaults to the initial prompts. A sample dialog follows:

```
System configuration identifier: [hostname] ↵
Use existing [hostname] system files? [yes]
Build for this host or for OS client(s) of this host:
   [this host]  ↵

Device configuration file: [retain] ↵
Parameter configuration file: [retain] ↵
Packages to include: [all] ↵
Editor: [/usr/bin/vi] ↵
```

    Sysadm automatically starts the text editor you choose and opens the device configuration file. When you finish adding your customizations, save and exit the file. Next, **sysadm** automatically puts you in the parameters configuration file. Add your customizations, save, and exit.

    For more detailed information, refer to the sections on checking and editing device configuration parameters and editing system configuration parameters in *Managing the DG/UX® System*.

When you exit the text editor, the **sysadm** Config and Build prompts will continue.

```
Link the new kernel to /dgux? [yes] ↵
Save the old kernel? [yes]
```

3. **Decide whether to save your old kernel.**

It is a good idea to save your old kernel. If your new kernel doesn't boot for some reason, you will be able to boot the old kernel instead.

> **IMPORTANT**   You must have enough room in **root** to save your old kernel.

```
Save the old kernel? [yes] ↵
Continue with the build? [yes]
```

This backs up the **dgux.*name*** file into a file called **dgux.*name*.old.**

4. **Rebuild your kernel.**

```
Continue with the build? [yes] ↵
```

Building kernel...
Successfully built dgux.*name*
Linked /dgux. You must reboot in order for this kernel to take effect.

5. **Reboot your kernel.**

You must reboot your kernel to implement your customizations. Follow the **sysadm** menu path `System -> Kernel -> Reboot`.

For a detailed step-by-step description of the prompts when you reboot your system after transferring your kernel customizations to the device and parameter configuration files, refer to the section on building the kernel for an upgrade, **step 1.**

Restoring files from tape

If you use the **dump2** command, you can use the **restore** command to replace any files that you may have overwritten during the system upgrade procedure. If you use Legato NetWorker, then refer to the Networker documentation.

To restore files from tape, follow these steps:

1. **Insert the backup tape in the tape drive, and close the drive door.**

2. **Change to your /tmp directory and issue the restore command:**

```
# cd /tmp ↵
# /usr/sbin/restore if /dev/rmt/0 ↵
```

where

i   is interactive mode. You can search through the dump tape and look for files to restore. Because you are in the **/tmp** directory, you may restore any files you wish without fear of accidentally overwriting an existing file.

f   specifies a nondefault archive name. In this example, **/dev/rmt/0** is the default.

3. **At the restore> prompt, you can use the following commands:**

ls   List directory contents, or just filenames. (Do not use the **ls** options given in the **ls**(1) manual page.) Files that have been added to the extract list are marked with an asterisk (*).

cd   Change directory. The / directory on the tape is the file system's mount point directory (the directory from which you made the backup). Make sure you specify a pathname relative to the top-level root directory when specifying the desired file system. For example, assume that your backup tape contains the **/usr** file system. Since **/usr** is the top-level root directory, you would use the command **cd /lib/acct** instead of **/usr/lib/acct** to change to the desired directory.

pwd   Print working directory.

add   Add filename to the list of files to be extracted.

delete   Delete filename from the list of files to be extracted.

extract   Extract requested files.

quit   Exit program.

help   Print list of files to be extracted.

For example, to restore the file **/etc/fstab**, change to the appropriate directory:

restore> **cd /etc** ↵

Verify that the file exists, and add it to the list to be extracted:

```
restore> ls filename ↵
fstab
```

```
restore> add filename ↵
```

```
restore> ls filename ↵
*fstab
```

Files to be extracted are preceded by an asterisk (*). Use the **extract** command to copy the file (*filename*) from tape to the /tmp directory on disk.

```
restore> extract ↵

You have not read any tapes yet. Unless you know which
volume your file(s) are on, you should start with the last
volume and work towards the first.
Specify next volume #: 1 ↵
Set owner/mode for '.'? [yn] no ↵
```

Answer **no** to the preceding prompt asking whether or not you want to copy the file system's mode (access permissions) from the root file system on tape to the file system in the **tmp** directory. After the file copies, you may then inspect the file and move it from the **/tmp** directory to the desired location.

Type **quit** at the restore prompt when finished.

```
restore> quit ↵
```

Where to go next

Go now to Chapter 7 to complete your upgrade installation. Chapter 7 contains information on post-upgrade tasks.

End of Chapter

5 *Installing or upgrading from remotely mounted release media*

This chapter provides procedures for installing or upgrading your DG/UX system from a tape drive attached to a remote host, or from a remotely mounted file system (disk or CD-ROM) containing the DG/UX system release.

> **IMPORTANT**   The DG/UX R4.11 operating system for Intel-based systems does not support remote installations.

This chapter includes the following major sections:

- Verifying the remote host resources

- Recording host information

- CD-ROM only: Mounting and exporting the release file system on the remote host

- Setting up the remote host to support the local host as an OS client

- Beginning the installation from a remote release medium

- Preparing physical and virtual disks

- Identifying the remote tape or file system as DG/UX system software load device

- Cleaning up files after installation

- Where to go next

Figure 5–1 summarizes the steps for installing or upgrading your DG/UX system from remotely mounted release media.
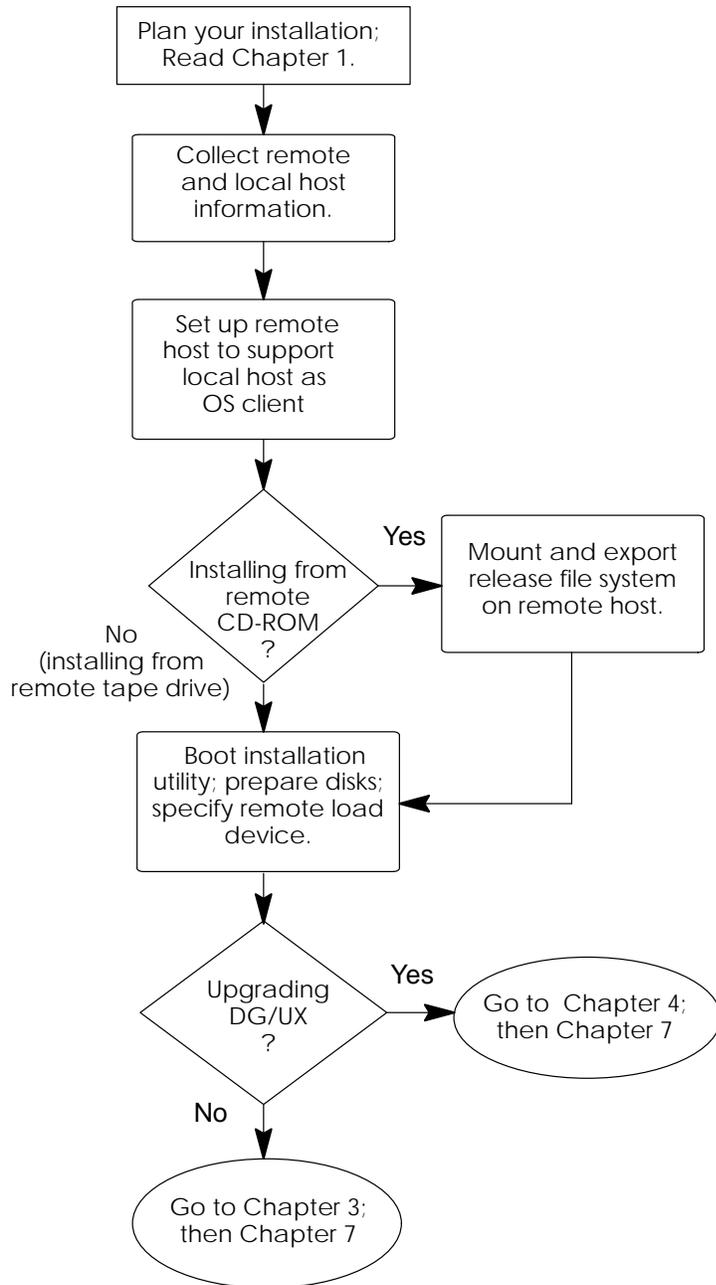
Figure 5–1   Installation procedure for remotely mounted media

IMPORTANT   In this chapter, the computer to which the remote tape drive or file system is attached is called the *remote host*. The system on which you are installing DG/UX R4.11 is called the *local host.*

Verifying the remote host resources

The remote host's requirements depend on whether you are installing the DG/UX R4.11 software from tape, or from a remote file system (already mounted in a release area) such as CD-ROM.

Make sure the remote host has the requirements listed in Table 5–1.

Table **5–1**   Remote host requirements

Remote Host Resource	When installing from:	
	Remote File System	Remote Tape
Runs the DG/UX 5.4R3.10 or later operating system, and the Bourne shell, in particular.	✔	
Configured as a Network File System server.	✔	
May be a computer running any DG/UX release or a Sun® computer running the SunOS® operating system.		✔
Connected to a local area network (LAN). The remote host and the local host must be on the same sub-net.	✔	✔
If the remote host uses the Network Information Service (NIS), the NIS package must be fully operational.	✔	✔
Requires 6 megabytes of storage in its client root hierarchy (usually located at **/srv/release/PRIMARY/root/***local-hostname*) to temporarily store the local host's root space.	✔	✔

Recording host information

▶ **Supply configuration information for both the remote host and the local host. (Note that you duplicate some entries in Tables 5–2 and 5–3.)**

Table 5–2 Remote host information required for remote installation or upgrade

Item	Example	Actual
Local hostname	**moe**	
Internet address of local host	**128.222.2.1**	
Internet address of local host, in hexadecimal	**80e00201**	
Ethernet address of local host	**8:0:1B:18:23:F7**	
Pathname of remote device or file system	**/dev/rmt/0** for tape **/release** for file system	

Table 5–3 Local host information required for remote installation or upgrade

Item	Example	Actual
Local hostname	**moe**	
Internet address of local host	**128.222.2.1**	
Subnetwork mask for this host	**0xffffff00**	
Broadcast address for this host	**128.222.2.255**	
Remote hostname	**alvin**	
Internet address of remote host	**128.222.2.3**	
Tape only: Operating system type	**DG/UX**	
Pathname of remote device or file system	**/dev/rmt/0** for tape **/release** for file system	

For help filling in the information in Tables 5–2 and 5–3, review the following subsections.

Hostname

You need to know the hostname for both the remote host and local host computers. A *hostname* is a unique name you assign to a computer. It is a unique combination of alphabetic characters and numbers. The period (.), hyphen (-), and comma (,) characters also are allowed. A hostname may comprise as many as 63 characters. Select a hostname that relates to the use or location of your system. Mnemonic names are particularly helpful in networked environments where hosts may share file systems. Do not use the names **MY_HOST** or **PRIMARY**; these names are reserved by the system.

If you are upgrading, use the **hostname** command at each host to determine the hostname for that machine.

Operating system type

For remote tape installation only, you need to know what operating system the remote host is running. For example: DG/UX operating system (**DG/UX**) or SunOS operating system (**sun**).

Internet address

You need to know the Internet address for both the remote host and the local host.

For the local host only, you must also express its Internet address in hexadecimal format.

You can determine a host's Internet address using these methods:

- View the **/etc/hosts** file.

- Use the **ypcat** command:

    % **ypcat hosts | grep** *hostname* ↵

- Use the **arp** command:

    % **arp** *hostname* ↵

If you are performing a clean install, from any usable host you may execute an **awk** script that converts an Internet address from decimal to hexadecimal format. An example of such an **awk** script follows:

```
# echo 128.222.1.2 | awk −F. \
'{printf "%02X%02X%02X%02X\n", $1, $2, $3, $4}' ↵
80e00201
```

If upgrading, to find out the hexadecimal equivalent, type the **hostid** command at the local host. As an example, to find out the hexadecimal representation for your Internet address, you can type the following:

```
# hostid ↵
80e00201
```

Ethernet address

For the local host only, you need to know the Ethernet address. This is the host address that is unique to the particular hardware. The factory sets this address. It consists of six 2-digit (hexadecimal) fields separated by colons in the form *nn:nn:nn:nn:nn:nn*.

To determine a host's Ethernet address, watch the hardware powerup messages or refer to your hardware operating manual for instructions.

If you are upgrading, you can locate your host's Ethernet address by checking **/etc/ethers** either by viewing it or by using the **ypcat** command:

```
% ypcat ethers | grep hostname ↵
```

> **IMPORTANT**   The above method of locating the Ethernet address depends on your site administrator maintaining such information.

Network device

You need to know the network device name. This is the name of the device used to connect a computer to the LAN, such as **dgen()**.

> **IMPORTANT**   Installation from remote release media is supported only on systems that use Ethernet LAN controllers.

Subnetting network mask

For the local host only, you need to know the subnetting network mask. This is a hexadecimal bit pattern that specifies the number of bits used to identify the network designator within an Internet address. Examples of network masks are **0xff000000** and **0xffff0000**.

To find out the local host's subnet mask on any host on the sub-net, use the **ifconfig** command and the name of the network device. An example follows:

```
% ifconfig dgen0 ↵
dgen0:128.222.2.1 flags=8443<UP,BROADCAST,RUNNING,STARTED>
      broadcast=128.222.2.255  netmask=0xffffff00  metric=0
```

In this example, the subnet mask is **0xffffff00**.

Broadcast address

For the local host only, you need to know the broadcast address. This is the Internet address used for all hosts on the network. An Internet address with a host portion that contains all ones (1) is reserved for BSD 4.3-compatible systems. A host portion that contains all zeros (0) is reserved for BSD 4.2-compatible systems.

To find out the local host's broadcast address on any host on the sub-net, use the **ifconfig** command and the name of the network device. An example follows:

```
% ifconfig dgen0 ↵
dgen0: 128.222.2.1 flags=8443<UP,BROADCAST,RUNNING,STARTED>
       broadcast=128.222.2.255  netmask=0xffffff00  metric=0
```

In this example, the broadcast address is **128.222.2.255**.

Pathname of remote host

You need to know the pathname of the release media on the remote host.

> **IMPORTANT**   Specify the pathname for the applicable remote device: either a tape device or a file system to be remotely mounted.

- **Remote file system**

    The pathname referencing the release area from which the remote load will occur.

- **Remote tape drive**

    Remote tape device name in character (raw) mode in which the rewind option is specified. For example, the tape device name for an AViiON tape device is **/dev/rmt/0**, where **0** is the tape device's unit number.

Mounting and exporting the release file system on the remote host

CD-ROM only

IMPORTANT   Follow the instructions in this section only if you have a remote CD-ROM device attached to a remote host.

1. **Insert the release medium in the remote CD-ROM drive.**

2. **Register the CD-ROM device so that the system can recognize the "+release" virtual disk, which contains the DG/UX software.**

    An example follows. You may use either a command line or a **sysadm** operation.

    Command:

    ```
    # admpdisk -o register  "sd(insc(0),3,0)"  ↵
    ```

    Sysadm path:

    ```
    Device -> Disk -> Physical -> Register
    ```

3. **Create a mount-point directory and /etc/fstab file entry for the file system on the remote host, and export the file system over NFS.**

    You may choose an appropriate location to mount the file system. This example uses /**release**.

    Command:

    ```
    # admfilesystem -o add -f +release -e -x /release  ↵
    ```

    where **–f +release** identifies the virtual disk, **–e** exports the file system, **–x** mounts the file system, and /**release** names the mount point.

    Sysadm:

    ```
    File System -> Local Filesys -> Add
    ```

    Take the default response for all prompts, except for the following prompts where you supply specific information. For example:

    ```
    Virtual disk: +release ↵
    Mount Directory: /release ↵
    Exportable: yes ↵
    ```

Setting up the remote host to support the local host as an OS client

The procedures you perform at the remote host depend on the type of UNIX® operating system it is running.

If the remote host is a computer running the DG/UX operating system, you can use the **sysadm** utility to set up the local host. Otherwise, you must enter commands from the Bourne shell and edit several files. Steps in this section describe both methods.

Consult Table 5–3 when performing the following procedures.

1. **For a remote tape device only: Insert the release tape in the remote tape drive.**

   IMPORTANT   If you are using a release tape, make sure the tape is write-protected: the arrow should point to the SAFE position.

2. **Add the local host's Internet address and hostname to the /etc/hosts file.**

   Examples follow. You may either edit a file or perform a **sysadm** operation, whichever is preferable.

   File Entry:

   ```
   128.222.2.1    moe
   ```

   Sysadm:

   ```
   Networking -> TCP/IP -> Databases -> Hosts -> Add
   ```

   When prompted, supply the local hostname and its Ethernet address.

   ```
   Host name:  moe ↵
   Internet address:  128.222.2.1 ↵
   ```

3. **Add the local host's Ethernet address and hostname to the /etc/ethers file.**

   File Entry:

   ```
   08:00:1B:03:45:11    moe
   ```

   Sysadm:

   ```
   Networking -> TCP/IP -> Databases -> Ethers -> Add
   ```

When prompted, supply the local hostname and its Ethernet
address.

```
Host name:  moe ↵
Internet address:  08:00:1B:03:45:11 ↵
```

4. **For a remote tape device only, add the local hostname to the
   /etc/hosts.equiv file.**

   File Entry:

   ```
   moe
   ```

   Sysadm:

   ```
   Networking -> TCP/IP -> Databases -> Trusted Hosts -> Add
   ```

   When prompted, supply the local hostname.

   ```
   Host name: moe ↵
   ```

5. **Copy the bootstrap file to /tftpboot, supplying the local
   host's Internet address in hexadecimal format.**

   IMPORTANT   If the Internet address (in hexadecimal) of the
   local host contains letters, those letters *must* be entered in
   uppercase form when naming the bootstrap file under the
   /tftpboot directory.

   Examples follow for a remote tape drive and a file system.

   Remote file system:

   # cp /release/R4.11/0.boot.aviion /tftpboot/80E00201 ↵

   where **0.boot.aviion** is the bootstrap file name, and **80E00201** is
   the Internet address (in hexadecimal) of the local host.

   Remote tape:

   # cd /tftpboot ↵
   # dd bs=16k if=/dev/rmt/0n of=80E00201 ↵

   where **/dev/rmt/0n** is the name of the tape device in no-rewind
   mode, and **80E00201** is the Internet address (in hexadecimal) of
   the local host.

   A message appears indicating that the bootstrap file was
   successfully read and written.

6. **Create the local host's temporary root directory.**

    On DG/UX systems, the appropriate location is
    /srv/release/PRIMARY/root. Use the local host's name for the
    directory name. For example:

    ```
    # cd /srv/release/PRIMARY/root ↵
    # mkdir moe ↵
    # cd moe ↵
    ```

7. **Copy the sysadm utility to the local host's root directory.**

    Examples follow for a file system and tape drive.

    Remote file system:

    ```
    # cp /release/R4.11/3.standalone \
    /srv/release/PRIMARY/root/moe/dgux ↵
    ```

    Remote tape:

    The tape currently is positioned at the second file (the **sysadm**
    utility is the fourth file on the tape).

    ```
    #: < /dev/rmt/0n ↵
    #: < /dev/rmt/0n ↵
    # dd bs=16k of=dgux if=/dev/rmt/0 ↵
    ```

    Or you can use the **mount** command to position the tape.

    ```
    # mt –f /dev/rmt/0n fsf 2 ↵
    # dd bs=16k of=dgux if=/dev/rmt/0 ↵
    ```

8. **Verify that the file dgux has been copied to the local host's
    root directory:**

    ```
    # cd /srv/release/PRIMARY/root/moe ↵
    # ls dgux ↵
    dgux
    ```

9. **Edit the /etc/bootparams file to add an entry for the local
    host using the following format:**

    ```
    local–host<Tab>root=remote–host:local–host–root–pathname
    ```

    Be sure to use a tab instead of spaces.

    An example follows:

    ```
    moe<Tab>root=simon:/srv/release/PRIMARY/root/moe
    ```

10. **Edit the /etc/exports file to add the local host's pathname
    using the following format.**

File Entry:

local–host–root–pathname <Tab> **–access=***local–host*,
root=*local–host*

An example follows:

/srv/release/PRIMARY/root/moe -access=moe,root=moe

Sysadm:

File System –> Local Filesys –> Modify

Accept all defaults, with the following exceptions:

Exportable: **yes** ↵
Export options: **–access=moe,root=moe** ↵

11. **Export the local host's directory listed in /etc/exports using the following command:**

    # **exportfs –v /srv/release/PRIMARY/root/moe** ↵
    re–exported /srv/release/PRIMARY/root/moe

    The message indicates that the directory was exported successfully.

12. **Reinstall the remote host's ARP table as follows:**

    # **initrarp** ↵

    ARP entry for moe (128.222.2.1) added to device cien0.

Now you have completed the procedures you must perform at the remote host.

Beginning the installation from remote release media

In this section you begin the installation process by booting the installation utility. Once you start the installation utility over the network and specify the remote drive for software loading, you return to the installation procedures in Chapter 3, or Chapter 4 if you are upgrading.

1. **Boot the release medium by typing the appropriate boot command at the prompt, and press Enter.**

    IMPORTANT   If you are using an Intel-based system, you may need to use a boot floppy. For more information refer to the section on loading the DG/UX software for Intel-based systems in Chapter 3.

Worksheet 2   Consult **Planning Worksheet 2** in Appendix A for the name of your boot device.

For example:

SCM> **b dgen(0)** ↵

Consult Table 5–4 for typical LAN device names. Your hardware operating manual or Release Notice contains the most current device list for your computer model, and details on constructing an SCM (System Control Monitor) LAN boot argument.

Table 5–4   LAN device boot arguments

AViiON computer	LAN device name
Integrated Ethernet controller on AViiON 100, 200, 300, 400, 3000, 4000, and 4300 series	**inen**
Integrated Ethernet controller on other AViiON models	**dgen**
PCI Ethernet controllers on Intel-based models	**dpen** **tcen** **alen**

You identify LAN controllers by the controller device name and controller number, using the form *device-name*(*controller-num*).

While the installation utility starts, a process that takes several minutes, messages similar to the following appear:

> **IMPORTANT**   Remember that the LAN device names and other messages will vary slightly depending on the type of media and the platform you are using.

```
Booting dgen(0)
Local Ethernet address is 08:00:1B:18:23:F7
Local Internet address is 128.222.2.1, or 80e00201 hex
Broadcasting TFTP request
Server responding to broadcast: 128.222.2.3 or 80e00203 hex
DG/UX System Release R4.11 Bootstrap
Booting network device dgen(0)
Local Ethernet address is 08:00:1B:18:23:F7
Doing RARP
Local Internet address is 128.222.2.1, or 80e00201 hex
Broadcasting request for a boot server...
Host name: moe
Using alvin:/srv/release/PRIMARY/root/moe as root
Loading /dgux -> 3.standalone
Loading image ....................................
DG/UX System Release R4.11, Version Standalone sysadm
Using 32 Megabytes of physical memory
Found 2 processor(s)
Configuring devices ...........
Registering disks ..
```

The installation utility automatically configures all standard
devices attached to your system. A standard device is one that is
recognized by the installation utility and the DG/UX system.
Periods (.) written to the screen indicate that the utility is
configuring your system's devices. The number of devices attached
to your system determines the duration of the configuration
process.

> **IMPORTANT**   A significant delay in the writing of periods to
> the screen means that the installation utility cannot locate all
> of the devices that are specified in the utility's built-in list of
> standard devices. Because your system is unlikely to include all
> standard devices, this delay is normal.

The initialization process continues as follows:

```
Running with no swap area.
Using memory resident file system
Creating /dev ....

INIT: SINGLE USER MODE
```

Periods (.) are written to the screen at regular intervals to indicate
that the installation utility is loading.

After the installation utility has finished loading, **sysadm** displays
the Standalone Sysadm Main Menu.

```
                Standalone Sysadm Main Menu

1 Physical Disk    ->  Manage physical disks
2 Virtual Disk     ->  Manage virtual disks
3 File System      ->  Manage file systems
4 Install Software ->  Install system software

Enter a number, a name, ? or <number>? for help, <NL> to
take the default, ^ to return to previous menu, or q to
quit: [Install Software]:
```

**2. Press Enter to begin the DG/UX software installation, as
    follows:**

```
Enter a number, a name, ? or <number>? for help, <NL> to
take the default, ^ to return to previous menu, or q to
quit: [Install Software]: ↵

            Install System Software Menu

1 Prepare physical disks
2 Prepare virtual disks
3 Load software
4 Set up software
5 Configure and Build kernel
6 Reboot kernel
7 All steps

Enter a number, a name, ? or <number>? for help, <NL> to
take the default, ^ to return to previous menu, or q to
quit: [All Steps]:
```

**3. Press Enter again to select all steps necessary to install, as
    follows:**

```
Enter a number, a name, ? or <number>? for help, <NL> to
take the default, ^ to return to previous menu, or q to
quit: [All Steps]: ↵
```

Preparing physical and virtual disks

Prepare the disks on the local host as described in Chapter 3. In most
cases, you can accept the default response at system queries. The
following examples are from an upgrade to an 88K-based system.

```
1.  Prepare physical disks

Run this step now? [yes] ↵
Physical disk(s) to prepare: [all] ↵
Bootstrap installed in existing partition on
sd(ncsc(0,7),0,0)
Physical disk sd(ncsc(0,7),0,0) prepared.

2.  Prepare required virtual disks

Run this step now? [yes] ↵
Register all standard physical disks? [yes] ↵

Required File System Mount Points:

File System   Virtual    Current  Action    Blocks  Physical
Mount Point   Disk       Blocks   Required  To Add  Disk
-----------   ---------  -------  --------  ------  --------
-none-        swap        50000   None       -      sd(ncsc(0),0,0)
/             root        40000   Expand    20000   sd(ncsc(0),0,0)
/usr          usr        240000   Expand    40000   sd(ncsc(0),0,0)

Modify this information? [no] ↵
```

Identifying the DG/UX system software load device

Now you are ready to load the software, and you must identify the
remote tape or file system as the DG/UX load device.

4. **Press Enter to accept the default, and then type ? to list the
    types of release media and press enter again. For example:**

```
3.  Load software

Run this step now? [yes] ↵
Type of release medium: [Local tape device] ? ↵

1. CD-ROM
2. Local tape device
3. Remote tape device
4. Remote file system
```

5. **Select "Remote tape device" or "Remote file system" as the
    load device. For example:**

```
Type of release medium: [Local tape device] remote tape ↵
```

Note that you choose "Remote file system" if you are using a CD-ROM release medium.

6. Specify the network configuration information recorded in Table 5–3. Press Enter to accept the default response, or type ? for a list of choices. For example:

```
Network device to use on this host: [dgen0] ↵
Name of this host: moe ↵
Internet address of this host: 128.222.2.1 ↵
Subnetting network mask used by this host: 0xffffff00 ↵
Broadcast address used by this host: 128.222.2.255 ↵
Name of remote host: alvin ↵
Internet address of remote host: 128.222.2.3 ↵
```

7. Identify the operating system used by the remote host.

```
Operating system used by remote host [DG/UX]
```

▶ **If you are loading from remote tape, enter the operating system running on your remote host.**

▶ **If you are loading from a remote file system or CD-ROM device, skip this step and go to step 8.**

If the remote host is running DG/UX, press Enter to accept the default, as follows:

```
Operating system used by remote host [DG/UX]  ↵
```

Or, for a list of choices, type **?** and press Enter as follows:

```
Operating system used by remote host [DG/UX]: ? ↵
```

The system will display a list of valid operating system names to choose from. Select the name appropriate for your remote host and press Enter.

8. Specify the pathname for the tape device or the file system on the remote system.

▶ The prompt for a remote tape device follows:

```
Pathname of tape device on remote host: /dev/rmt/0 ↵
```

▶ The prompt for the remote file system follows:

```
Pathname of release area on remote host: /release ↵
```

9. Proceed from here as if you were installing from local release medium .

▶ If you are upgrading to DG/UX R4.11 from 5.4R3.00 or later, go to Chapter 4 and continue with the sample upgrade dialog. When you complete the installation procedures in Chapter 4, go to Chapter 7 to complete your installation, but remember to perform the cleanup steps listed below.

▶   If you are installing DG/UX R4.11 on a blank disk, proceed with the section on selecting the packages to load in Chapter 3, **step 20.** When you complete the installation procedures in Chapter 3, go to Chapter 7 to complete your installation, but remember to perform the cleanup steps listed below.

Cleaning up files after installation

After you complete your installation or upgrade, remove the local host's entries from the remote host's environment as follows:

- If you do not intend to use the remote host's tape device again, remove the local host entry from **/etc/hosts.equiv** file.

- Remove the local host's temporary root directory: for DG/UX systems, **/srv/release/PRIMARY/root/***local-hostname*.

- Remove the entry for the local host's temporary root directory from the **/etc/exports** file.

- Remove the bootstrap file from the **/tftpboot** directory.

- Remove the local host entry in the **/etc/bootparams** file.

Where to go next

Go now to Chapter 7 to complete your installation. Chapter 7 contains information on post-installation tasks.

End of Chapter

6 *Installing information security software*

This chapter provides information on installing Release 4.11 of DSO™ Information Security for the DG/UX® System.

> **IMPORTANT**   Although DSO Information Security and the DG/UX System are separate products and are shipped on a separate release medium, the former is a superset of the latter, and the installation procedure for each is virtually the same. Therefore, this chapter does *not* cover a complete installation for DSO Information Security; it provides only the information required for installing an information security operating environment that differs from the generic DG/UX procedures in Chapter 3.

This chapter includes the following major sections:

- Beginning your installation

- Selecting information security software packages

- Setting up network packages

- Setting up security packages

- Logging in as proto

- Adding new users to the system

- Adding a separate file system for the A&A database

- Customizing your information security software

Figure 6–1 provides a summary of information security software installation steps.

Beginning your installation

You begin your installation of the information security software with the installation of the generic DG/UX R4.11 software. Go to Chapter 3 to start your installation and return to this chapter when you are ready to select information security packages. Figure 6–1 shows a summary of the installation procedure for information security software.
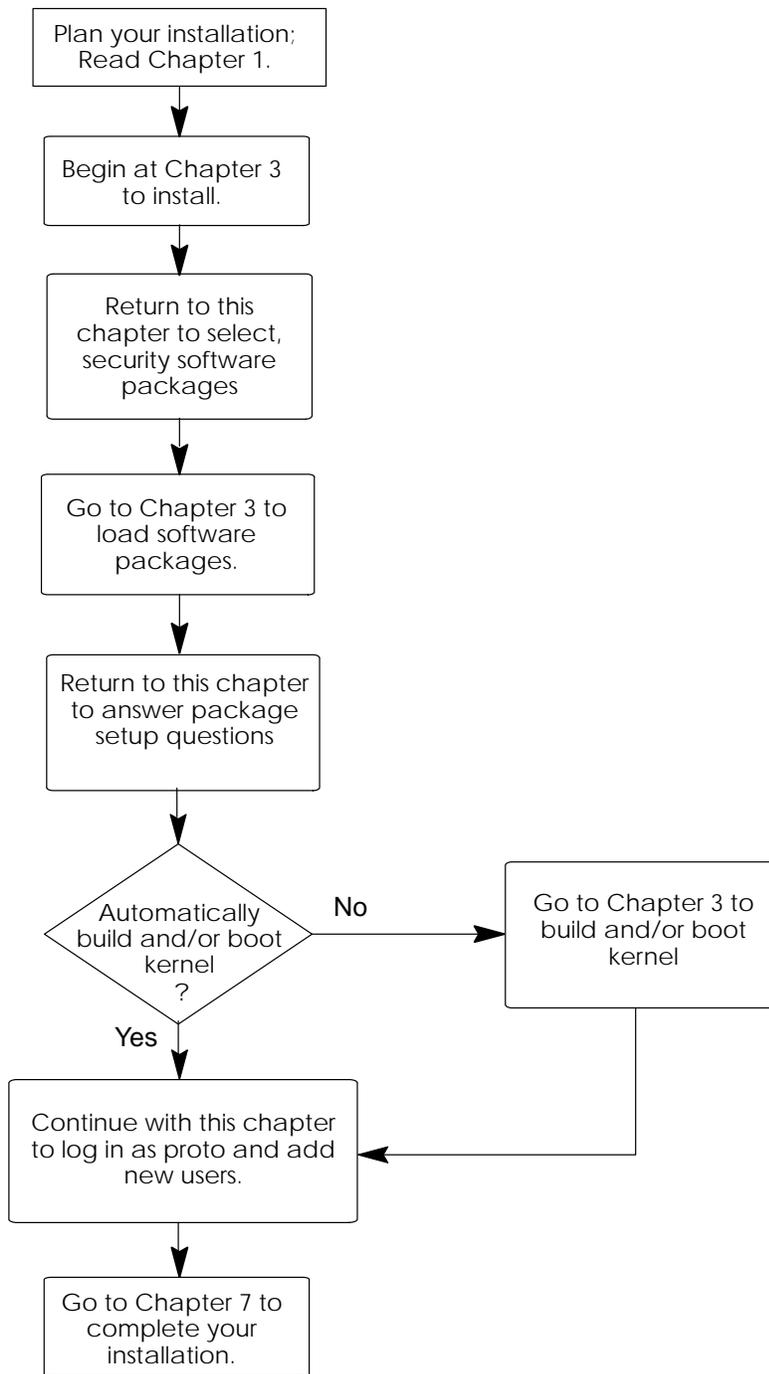
Figure 6–1   Installation procedure for information security software

Selecting information security software packages

In Chapter 3, you began your installation of DG/UX R4.11 by preparing physical and virtual disks, and then you began the loading software phase of installation. After specifying the load device for the release media, you must select the software packages to load. Use **Planning Worksheet 8** in Appendix A to record the packages you intend to load when installing.

You see the following screen prompt:

```
Package Name(s): [development]
```

1. **Decide whether to load all the DG/UX files or select packages individually.**

    The DSO Information Security development suite contains the following software packages on all platforms:

    ```
    dgux
    dso
    nfs
    onc
    sdk
    sdk.X11
    tcpip
    X11
    dgux.man
    dso.man
    tcpip.man
    nfs.man
    sdk.man
    sdk.X11.man
    onc.man
    X11.man
    ```

    > **IMPORTANT**   The **networker** package is not an option with the DSO Information Security software. Use **cpio** or **dump2** as backup facilities instead.

    To successfully run the DSO Information Security software, you *must* load and set up the **dgux** and **dso** packages; all others are optional. (If you prefer to only load essential packages now, and then add others later, refer to the instructions on loading and setting up application software in *Managing the DG/UX® System*.)

    On Intel-based systems only, there are additional packages for running UnixWare® applications. The **aco** suite contains the following packages, which you can select as a suite or individually:

    ```
    dgux.aco
    X11.aco
    dgux.aco.man
    ```

IMPORTANT   For best results, if you are using now or plan to use TCP/IP and/or X11 in the future, you should load these packages at the same time that you load the information security software. This will ensure that trusted setup is done correctly on these products.

▶ **To load all the recommended DG/UX files on the release medium (including the manual pages, but excluding the aco packages for Intel-based systems), press Enter to accept the development (default) package suite as shown below. Then, go to step 3.**

```
Package Name(s): [development] ↵
```

▶ **To view a list of all the available suites and packages for your system, enter a question mark (?) .**

IMPORTANT   If you are using an Intel-based system and want to load **aco** packages, type a question mark (**?**) to list all the available suites and packages to choose from.

```
Package Name(s): [development] ? ↵
```

```
As a convenience, package suites have been defined for
this release. Suites are collections of packages.
Selecting a suite causes all packages associated with
that suite to be loaded from the release medium. The
following list shows all suites and the packages
associated with them, as well as the individual
package selections.
```

```
If there are specific suites and/or packages you want
to load, you may select the suite or package by name
or number. Separate the names or numbers with commas.
A combination of multiple suites and/or packages may
be selected. Note that this results in the
installation of the union of the selected suites
and/or packages.
```

```
The available suites and packages are:
```

Next the system will describe the available suites of packages for your system, and then list all your choices.

2. **Select suites and/or packages by name or number, separated by commas and/or spaces. You may also use a dash to specify a range of package numbers.**

Worksheet 7

IMPORTANT   The following example is from an Intel-based system, which includes the Application Capture Option (**aco**) package suite. Note that there is no **aco** package suite for 88K-based systems.

```
The available suites and packages are:

The suite 'development' contains the packages:

   dgux
   dso
   nfs
   onc
   sdk
   sdk.X11
```

To display
the full
screen, press
Enter at the
Pager
prompt.

```
   .... next page? (? for help) [yes] ↵

   tcpip
   X11
   dgux.man
   dso.man
   nfs.man
   onc.man
   sdk.man
   sdk.X11.man
   tcpip.man
   X11.man

   This suite contains the base DG/UX
   Operating System and Software Development
   Kit packages.

The suite 'production' contains the packages:

   dgux
   dso
   nfs
   onc
   tcpip
   X11
   dgux.man
```

To display
the full
screen, press
Enter at the
Pager
prompt.

```
   .... next page? (? for help) [yes] ↵

   dso.man
   nfs.man
   onc.man
   tcpip.man
   X11.man

   This suite contains the base DG/UX
   Operating System packages.
```

The suite 'sdk_all' contains the packages:

```
sdk
sdk.X11
sdk.man
sdk.X11.man
```

This suite contains the Software Development Kit packages.The base DG/UX Operating System packages must already be loaded.

The suite 'aco' contains the packages:

```
dgux.aco
X11.aco
dgux.aco.man
```

This suite only contains the Application Capture Option. The base DG/UX Operating System packages must already be loaded.

Choices are

```
 1  development
 2  production
 3  sdk_all
 4  aco
 5  dgux
 6  dgux.aco
 7  dso
 8  nfs
 9  onc
10  sdk
11  sdk.X11
12  tcpip
13  X11
14  X11.aco
15  dgux.man
   .... next page? (? for help) [yes] ↵
16  dgux.aco.man
17  dso.man
18  nfs.man
19  onc.man
20  sdk.man
21  sdk.X11.man
22  tcpip.man
23  X11.man
```

Press Enter at the Pager prompt to display the full screen.

```
Enter a number, a range of numbers (n-m, where m can
be '$' to indicate the last item), a name, the initial
part of a name, <NL> to take the default, ? for help,
^ to return to the previous query, < to restart the
operation, or q to quit.

...end pager? (? for help) [yes] ↵

Package Name(s): [development]
```

In the following example we select five packages by name:

```
Package Name(s):[development] dgux dso nfs onc tcpip
    dgux.man dso.man↵
```

The next example selects the same packages by number:

```
Package Name(s):  [development] 5,7-9,12,15,17 ↵

You selected the following packages:

    dgux
    dso
    nfs
    onc
    tcpip
    dgux.man
    dso.man

Correct? [yes]
```

3. The system lists the packages you select and asks you to confirm your selections. Press Enter to accept the packages selected or type "no" and repeat step 2. For example, if you want to accept the packages you selected, press Enter :

```
Correct? [yes] ↵
List file names while loading? [no]
```

STOP

4. Now you are ready to load and set up the packages you selected. To proceed, go to the installation instructions in Chapter 3, step 25.

After your packages are loaded, you will return to this chapter to answer package setup questions in the following section.

Setting up network packages

For most packages, the setup process is not interactive. However, if you selected either the **onc** or **tcpip** optional packages, you must provide information when prompted. You must set up the **dso** package and answer the security account password questions.

▶ If you did *not* select any of the optional network packages **(onc** or **tcpip)**, go to the section on setting up security packages for information on answering the security package password questions.

▶ If you *did* select any of the optional network packages **(onc** or **tcpip)**, continue with this section and **step 4.**

A detailed account of each package's setup is logged in a file that is named in one of the following general forms:
/var/setup.d/log/*package***.root** or **/var/setup.d/log/***package***.usr**.

> **IMPORTANT**   For purposes of complete illustration, in this section, we will assume that you have loaded all the software packages on the disk.

Once package loading completes, you see the following message:

```
Package load is finished.
The selected packages have been loaded.

4.  Set up software

Run this step now?  [yes]
```

1. To set up packages, press Enter. For example:

```
Run this step now?  [yes] ↵
```

The system pauses while the installation utility checks for packages that need to be set up, and then returns the following prompt.

```
Package Name(s):  [all]
```

2. Decide whether to accept the default and set up all the packages or to specify them individually.

Worksheet 7

> **IMPORTANT**   The package selection screen will vary depending on the platform you are using and the packages you chose to load on the disk. The following example assumes you loaded all the packages for an Intel-based system, including the Application Capture Option (**aco**) packages. ***Note that there are no aco packages for 88K-based systems***.

▶ **To set up all the packages that were loaded, accept the default [all] by pressing Enter and go to step 3. For example:**

```
Package Name(s):  [all] ↵
```

▶ **To set up packages individually, list them by entering a question mark (?). For example:**

```
Package Name(s): [all] ? ↵
```

A screen similar to the following appears.

```
Select the package(s) you want to set up.  If you want to
set up all packages select 'all,' do not select any
individual package names.
Choices are
        1  all
        2  dgux
        3  dgux.aco
        4  dso
        5  nfs
        6  onc
        7  sdk
        8  sdk.X11
        9  tcpip
       10  X11
       11  X11.aco
```

Press Enter at the Pager prompt to display the full screen.

```
...next page? (? for help) [yes] ↵



Enter a number, a range of numbers (n-m, where m can be
'$' to indicate the last item), a name, the initial part
of a name, <NL> to take the default, ? for help, ^ to
return to the previous query, < to restart the operation,
or q to quit.

Package Name(s): [all]
```

Next specify the individual packages you want to set up, using the full names or corresponding numbers of the packages in the list. Separate each name or number by commas and/or spaces. You also may use a dash to specify a range of package numbers. For example, if you didn't want to set up the **aco** packages, you might answer as follows:

```
Package Name(s): [all] 2,4-10 ↵
OK to perform operation? [yes]
```

3. **To start the setup scripts for selected packages, press Enter. If you wish to modify your selection, type "no" and repeat the process. When you are satisfied with your selections, press enter as shown below:**

```
OK to perform operation? [yes] ↵
```

Status messages are displayed during setup; a message appears when setup has been completed successfully. Packages are set up in alphabetical order.

> **IMPORTANT**   Read system-generated messages during package setup, especially those labeled NOTE and WARNING.

If the setup of a particular package fails, the utility informs you with a warning message. Write down the message, and refer to Chapter 8 for troubleshooting help.

4. **Determine how to proceed by reviewing this step carefully.**

   ▶   If you selected **onc**, go to the section on answering ONC questions that follows, and proceed with **step 5.**

   ▶   If you selected **tcpip**, but did *not* select **onc**, go to the section on answering TCP/IP questions and proceed with **step 7.**

Answering ONC package setup questions

To set up ONC (Open Network Computing), you must supply the NIS domain name that you recorded in **Planning Worksheet 9** in Appendix A.

5. **Type the NIS domain name for your installation ("worknet" in this example) and press Enter. For example:**

Worksheet 9
```
Enter the NIS Domain name: worknet ↵
[worknet] Correct? [yes]
```

6. **Press Enter to confirm the NIS domain name. For example:**

```
[worknet] Correct? [yes] ↵
```

A completion message appears when the **onc** package is set up successfully. If you also selected **tcpip**, go to the section on answering TCP/IP questions that follows, and proceed with **step 7.**

Notes on ONC and NFS

Initially, your computer runs as an NIS client. ONC and NFS may require further setup (such as changing your host from an NIS client to either an NIS master or NIS server). For the final setup procedures after you build and boot the kernel and when you have your documentation CD-ROM loaded and set up, see *Managing ONC™/NFS® and Its Facilities on the DG/UX® System*.

You can find a detailed account of the ONC and NFS root setup in **onc.root** and **nfs.root** log files located in the directory **/srv/release/PRIMARY/root/MY_HOST/var/setup.d/log**.

Answering TCP/IP package setup questions

To set up TCP/IP, you supply information that you recorded in
Planning Worksheet 9 from Appendix A (see Chapter 1).

The exact text of your screen dialog depends on whether your computer
has one or more Ethernet LAN controllers.

> **IMPORTANT**   You set up a token ring or FDDI controller *after* the
> DG/UX System installation is complete. Follow this **sysadm** path:
> `Networking -> TCP/IP -> Interface`. See the section on
> maintaining network interfaces in *Managing TCP/IP on the
> DG/UX® System* for details.

> The DG/UX manuals are on the documentation CD-ROM. If you
> want, you can view the documentation CD-ROM on a PC *before* the
> DG/UX software is up and running. Or, after you complete your
> installation, set up the documentation CD-ROM as described in the
> *DG/UX® Documentation Release Notice.*

7. **Enter the network configuration information recorded in
   Planning Worksheet 6 from Appendix A (see Chapter 1).**

   Refer to whichever of the following samples for this step is
   appropriate for your system's Ethernet LAN configuration. (Note
   that the values **moe**, **128.222.2.1**, **0xffffff00**, and the Ethernet
   controller device configurations in the sample dialogs are examples
   only.)

   After you finish entering the network configuration information,
   proceed with the rest of this chapter to build and boot a kernel.

   ### Multiple Ethernet LAN controllers

```
The following queries refer to the primary network
interface:

Enter host name: moe ↵
[moe] Correct? [yes] ↵
Enter host Internet address: 128.222.2.1 ↵
[128.222.2.1] Correct? [yes] ↵
Is your local network subnetted? [no] yes ↵
Enter the network mask: 0xffffff00 ↵
[0xffffff00] Correct? [yes] ↵

NOTE:  Using "dgen0" as the primary network
       interface controller.

Preparing to load the packages..........
```

```
The following Ethernet controller devices are configured
on this system

    dgen0 cien0 cien1

Enter controller device name: [dgen0] ↵
Package setup for tcpip is complete.
```

Single Ethernet LAN controller

```
The following queries refer to the primary network
interface:

Enter host name: moe ↵
[moe] Correct? [yes] ↵
Enter host Internet address: 128.222.2.1 ↵
[128.222.2.1] Correct? [yes] ↵
Is your local network subnetted? [no] yes ↵
Enter the network mask: 0xffffff00 ↵
[0xffffff00] Correct? [yes] ↵

NOTE:  Using "dgen0" as the primary network
       interface controller.

Preparing to load packages.........

Package setup for tcpip is complete.
```

No Ethernet LAN controller

```
The following queries refer to the primary network
interface:

Enter host name: moe ↵
[moe] Correct? [yes] ↵
Enter host Internet address: 128.222.2.1 ↵
[128.222.2.1] Correct? [yes] ↵

WARNING:   No Ethernet controllers are configured on
           this system.  A primary network interface
           will not be added at this time.  You can
           add TCP/IP network interfaces later
           through sysadm(1M).

Package setup for tcpip is complete.
```

Notes on TCP/IP

The file **/var/setup.d/log/tcpip.usr** contains a verbose description of the **tcpip** package setup process.

Additional TCP/IP setup may be required depending on your network and site configuration. Consult *Managing TCP/IP on the DG/UX®️ System* on the documentation CD-ROM for information on the following additional TCP/IP features: routing, Domain Name System (DNS), server program management, SNMP, **sendmail**, and network databases.

▶ Now the system will prompt you to assign security account passwords for the security packages. Proceed with the section on setting up security packages that follows.

Setting up security packages

You must set up the **dso** package to have full B2 functionality. During security package setup you are prompted for password information necessary to configure the system.

Use this section to answer the specific DSO Information Security package setup questions.

Explaining security account passwords

The DSO Information Security product uses a specialized password system that authenticates a user's identity, and grants or denies user access to certain services. For details on passwords, refer to *Managing Security Features on the DG/UX®️ System*.

You assign passwords to login accounts and administrative roles while setting up the DSO Information Security package.

Assign passwords to each password type as follows:

Accounts	Password Types		
root	public		
sysadmin	public	assume	
installer	public	assume	
secadmin	public	assume	
other roles	public	assume	
proto	public		local

public	Generic DG/UX password, entered in the **/etc/passwd** file, enabling you to use generic DG/UX utilities that consult this file for passwords.
assume	The DSO Information Security software uses the **assume** password to assume an administrative role.
local	For the **proto** account only, the DSO software uses the **local** password for **login** and **xdm** services.

The following are recommended guidelines for legal passwords:

- Should not be the same as the login name.

- Should have at least six characters.

- Should contain at least two upper- or lowercase alphabetic characters (a–z and A–Z).

- Should contain at least one numeric or special character, such as ?, !, @, $, 0 through 9, or a space.

- Should not be a circular shift of the login name (for example, the login name **anemone** cannot be transcribed as the password **nemonea**).

Some valid password examples: **$99down**, **2nafish**, **man2man**.

Assigning initial passwords

Assign passwords for **root, sysadmin, installer, secadmin,** other roles, and **proto** as described in the following sections.

Root

The **root** account is disabled by default; therefore, it only has a public password. Your system administrator must manually set the **root** assume password to enable it.

> **IMPORTANT**   The **root** user no longer has superuser privileges. You must assume another role (like **sysadmin**) to perform administrative tasks.

For more information, refer to *Managing Security on the DG/UX®️ System*.

▶ Assign the public password to the **root** account.

1. Type the public password you have chosen and press Enter.

```
Enter "public" password for "root" role:
```

To help maintain security, your password does not appear on the screen as you type it.

2. To confirm the new password, at the prompt retype it and press Enter.

```
– – enter again to verify:
```

Sysadmin

▶ Assign the public and assume passwords to the sysadmin account.

1. Type the public password you have chosen and press Enter.

```
Enter "public" password for "sysadmin" role:
```

To help maintain security, your password does not appear on the screen as you type it.

2. To confirm the new password, at the prompt retype it and press Enter.

```
– – enter again to verify:
```

3. Type the assume password you have chosen and press Enter.

```
Enter "su" password for "sysadmin" role:
```

4. To confirm the new password, at the prompt retype it and press Enter.

```
– – enter again to verify:
```

CAUTION   Do not forget the assume password. If you do, you cannot assume the sysadmin role.

Installer

▶ Assign the public and assume passwords to the installer account.

1. **Type the public password you have chosen and press Enter.**

   ```
   Enter "public" password for "installer" role:
   ```

   To help maintain security, your password does not appear on the screen as you type it.

2. **To confirm the new password, at the prompt retype it and press Enter.**

   ```
   – – enter again to verify:
   ```

3. **Type the assume password you have chosen and press Enter.**

   ```
   Enter "su" password for "installer" role:
   ```

4. **To confirm the new password, at the prompt retype it and press Enter.**

   ```
   – – enter again to verify:
   ```

CAUTION   Do not forget the assume password. If you do, you cannot assume the installer role.

Secadmin

▶ Assign the public and assume passwords to the secadmin account.

1. **Type the public password you have chosen and press Enter.**

   ```
   Enter "public" password for "secadmin" role:
   ```

   To help maintain security, your password does not appear on the screen as you type it.

2. **To confirm the new password, at the prompt retype it and press Enter.**

   ```
   – – enter again to verify:
   ```

3. **Type the assume password you have chosen and press Enter.**

   ```
   Enter "su" password for "secadmin" role:
   ```

4. **To confirm the new password, at the prompt retype it and press Enter.**

    ```
    – – enter again to verify:
    ```

CAUTION   *Do not forget the assume password. If you do, you cannot assume the secadmin role.*

Other roles

▶ Assign the public and su passwords to the other roles. These passwords are used for all roles *except* **sysadmin, installer,** and **secadmin**. In other words, they are used for the following roles: **audadmin, auditor, lpadmin, lpoper, netadmin, netoper,** and **sysoper**.

CAUTION   *For security purposes, after the system comes up, you should change these passwords so they are not the same for all roles. For more information, refer to* Managing Security on the DG/UX® *System on the documentation CD-ROM. Do not forget the passwords. If you do, you cannot assume these roles.*

1. **Type the public password you have chosen and press Enter.**

    ```
    Note: The password you are about to enter will be used as
          the public password for all roles except root,
          sysadmin, installer, and secadmin.

    Enter "public" password for other "roles":
    ```

    To help maintain security, your password does not appear on the screen as you type it.

2. **To confirm the new password, at the prompt retype it and press Enter.**

    ```
    – – enter again to verify:
    ```

3. **Type the assume password you have chosen and press Enter.**

    ```
    Note: The password you are about to enter will be used as
          assume password for all roles except sysadmin,
          installer, and secadmin.

    Enter assume password for other "roles":
    ```

4. **To confirm the new password, at the prompt retype it and press Enter.**

    ```
    – – enter again to verify:
    ```

Proto Account

The **proto** account is the only account that you can use for logging in until you add new users. After you have logged in as **proto**, you can use the **assume** command to assume an administrative role**.**

▶ **Assign the public and local passwords to the proto account.**

  1. **Type the public password you have chosen and press Enter.**

     ```
     Enter "public" password for user "proto":
     ```

  2. **To confirm the new password, at the prompt retype it and press Enter.**

     ```
     – – enter again to verify:
     ```

  3. **Type the local password you have chosen and press Enter.**

     ```
     Enter "local" password for user "proto":
     ```

  4. **To confirm the new password, at the prompt retype and press Enter.**

     ```
     – – enter again to verify:
     ```

     IMPORTANT   As a security aid, do *not* record the passwords for these security accounts.

STOP The next steps are to build and boot the kernel. Note that the **dso** package does not really complete setup until the new DG/UX R4.11 kernel is booted.

▶ If earlier you answered the kernel build questions before loading and selected to automatically boot the kernel, now continue with the section on logging in as proto. We recommend, however, that you take a moment to document your configuration as described in the subsection below.

▶ If earlier you did *not* answer the kernel build questions before loading, go to the section on building a kernel in the installation procedure in Chapter 3 and continue with **step 60.**

▶ If earlier you answered the kernel build questions before loading, but did *not* select to automatically boot the kernel, go to the section on booting a kernel in the installation procedure in Chapter 3 and continue with **step 63.**

Logging in as proto

When the DSO Information Security system has finished booting, the login prompt appears. The login prompt depends on whether the system console is a graphics monitor or an alphanumeric display terminal. Proceed to the following subsection appropriate to your system.

Logging in using a graphics monitor

Congratulations! You have successfully installed your new DSO Information Security system. The console login prompt is displayed momentarily.

CAUTION   *Do not log in at the console login prompt. It is displayed for several seconds before it is replaced with the login window shown in Figure 6–2.*

```
                  Hostname – DG/UX R4.11


    Login:
    Password:


    | Reset |    | Restart |   | Terminate |   | Failsafe |
```
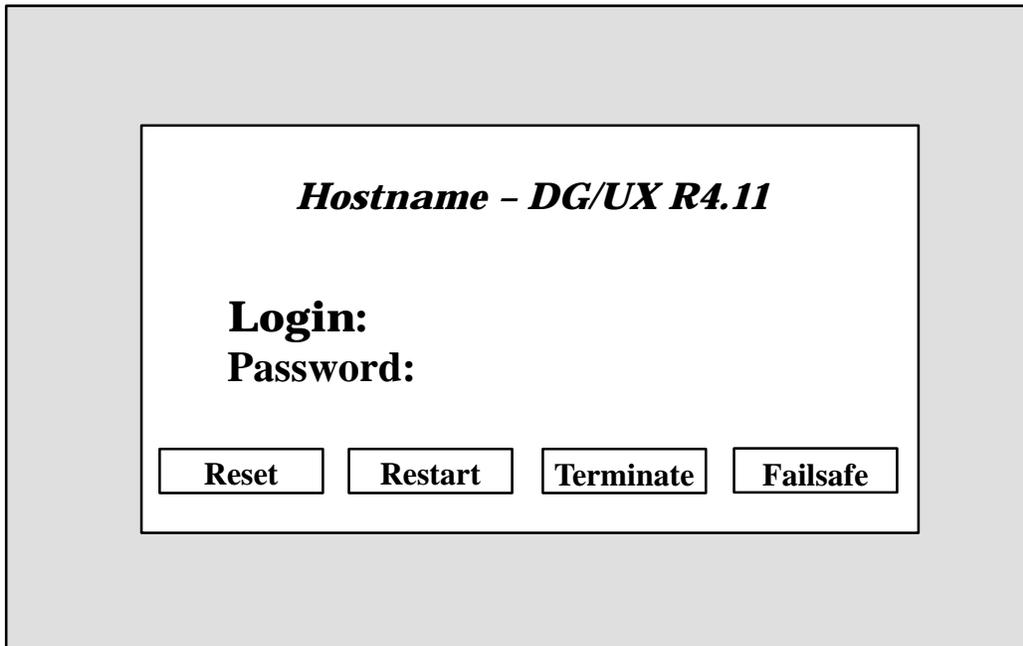
Figure 6–2   DG/UX DSO Information Security login screen for a graphics monitor

For the present, you do not need to know how to use the DG/UX X Window System environment. (After you set up your documentation CD-ROM, refer to *Using the DG/UX® System* for information on getting started in the X Window environment, and see the *X Window System User's Guide: OSF/Motif Edition* for detailed information on working in the X environment. See also *Update Notice: X11R5 DG/UX® Window System for AViiON® Systems.)*

Make sure the root pointer (the large **X** symbol on your screen) is inside the login window. If necessary, use the mouse to move it.

1. **At the login prompt, log in as "proto."**

2. **At the password prompt, type the local password that you specified earlier, and press Enter.**

    This action clears the screen and displays two X clients:

    xterm   VT100 terminal emulator.

    session log   Icon that represents an output-only display of error messages produced from the startup of the X Window System.

Logged in as **proto**, you have limited access to the DSO Information Security system. In the **xterm** window at the shell prompt ($ or %), you must assume the **sysadmin** role so that you can add additional users, if necessary.

You can access the system administration (**sysadm**) utilities. These utilities provide a menu-driven set of system administration procedures that you use to continue setting up your environment.

Exiting the X Window environment

To leave the X Window environment and continue working in a single VT100 terminal emulator environment, follow these steps:

1. **Move the root pointer to the Terminate button in the login window and click the left mouse button.**

2. **From the terminal emulator window, type Ctrl-D several times to obtain a login prompt.**

Restoring the X Window environment

To return to the X Window environment, follow these steps:

1. **At the login prompt, log in as "proto."**

2. **At the password prompt, type the local password that you specified earlier, and press Enter.**

3. **Assume the sysadmin role.**

   ```
   # assume sysadmin ↵
   ```

4. **To restore the X Window environment, type this command:**

   ```
   # /usr/bin/X11/telxdm ↵
   ```

Now you can proceed to create a separate file system for the A&A database and add new users as described in the following major sections.

Logging in using a nongraphical display terminal

Congratulations! You have successfully installed your new DSO Information Security system. If your system console is an alphanumeric terminal, a console login prompt similar to the following appears:

```
DSO for DG/UX Systems Release R4.11
Console login:
```

1. **Log in as "proto" and press Enter.**

2. **At the password prompt, type the local password that you specified earlier, and press Enter.**

   This action clears the screen and presents a shell prompt ($).

Now you can proceed to create a separate file system for the A&A database and add new users as described in the following major sections.

Adding a separate file system for the A&A database

The following procedure provides additional storage space for the Authentication and Authorization (A&A) database. Normally, the A&A database is located in the root file system under **/etc/tcb/aa**. In some cases, the **root** file system may not be configured properly to provide the correct amount of disk space or file inodes for the A&A database. Generally, if you plan to have more than 50 users on your system or if you receive a message such as `No space left on device`, you should perform this procedure and create a new file system to contain your A&A database.

Ideally, you should create the new file system before you add any new users to your system. The procedure will work, though, even if your A&A database already contains users.

Before you perform this procedure, you must have installed your DG/UX DSO Information Security system (i.e., you have built a DSO kernel and booted the system to **init** level 3). To create the new file system for the A&A database, you must return to **init** level 1. If you are currently in **init** level 3, issue the **shutdown** command:

shutdown –y 1 ↵

> **IMPORTANT**   You need to terminate your **xdm** window if you are performing this procedure at a workstation.

Creating a file system for the A&A database

You need to assume the correct administrative role (**sysadmin**) to perform this procedure. You do this from the shell prompt in an **xterm** window. Type **assume sysadmin**, and press Enter. When prompted, type the **sysadmin** password you established earlier.

1. Create virtual disk **etc_tcb_aa.** Type **sysadm** to access the system administration utilities. From the **sysadm** main menu, select the menu options:

```
Device –> Disk –> Virtual –> Create
```

Use the chart below to determine the size of your new file system. Data General recommends that you specify a higher inode ratio. You can do this by using the **–i** switch when **sysadm** prompts you for options (at this point **mkfs** is actually running under **sysadm**).

Number of Users	Recommended Size in Blocks	Data Byte to Inode Ratio
50	2500	640
100	5000	1150
150	7000	800
200	9100	900
250	12000	750
300	15000	750

2. Mount this virtual disk on a temporary mount point. From the shell prompt type

```
# mount /dev/dsk/etc_tcb_aa /mnt
```

3. Copy your A&A directory to the new file system.

   ```
   # cp –pr /etc/tcb/aa/* /mnt
   ```

4. Adjust MAC on the new file system.

   ```
   # setmac –r vp_tcb_data /mnt
   ```

5. Unmount /mnt.

   ```
   # umount /mnt
   ```

6. Add file system **/etc/tcb/aa** and mount new virtual disk. You can use the following **sysadm** operation:

   ```
   File System –> Local Filesys –> Add
   ```

After verifying that this works, you might want to unmount the file system and remove the database from the root file system, and then remount it.

Adding new users to the system

> **IMPORTANT**   Before you attempt to add new users to the system, be sure to read the previous section on adding a separate file for the Authentication and Authorization (A&A) database.

Logged in as **proto**, you have limited access to the DSO Information Security system. To add new users to the system you must assume the **sysadmin** role. You do this from the shell prompt ($ or %) in an **xterm** window. Type **assume sysadmin**, and press Enter. When prompted, type the **sysadmin** password you established earlier.

To add new users to the system or perform other administrative tasks, you can type **sysadm** to access the system administration utilities collectively known as **sysadm**. These utilities provide a menu-driven set of system administration procedures that you use to continue setting up your environment.

Customizing your information security software

Your DSO Information Security software is installed. Before your system is fully operational, however, you may need to further customize your operating environment.

First make sure you have set up the documentation CD-ROM as described in the *DG/UX® Documentation Release Notice* and have access to the DG/UX documentation (see the *Quick Start Guide for Viewing DG/UX® Documentation*).

Next go to Chapter 7 and refer to the post installation tasks to complete your installation. The cross-reference summary in Table 6–1 below lists some security-specific tasks not included in Chapter 7.

Table 6–1 DSO Information Security task cross-reference summary

For this task	Refer to this manual
Add users.	*Managing Security on the DG/UX® System*
Learn about security features.	*Using Security Features on the DG/UX® System*
Manage security features.	*Managing Security on the DG/UX® System*
Manage auditing features.	*Managing Security Auditing on the DG/UX® System*

End of Chapter

7 *Completing your installation*

This chapter helps you complete your installation; it contains the following major sections:

- Logging in
- Assigning passwords to sysadm and root
- Post-installation tasks
- Where to go next

Logging in

When the DG/UX system finishes booting, a **login** prompt appears. Congratulations! You have successfully installed your DG/UX system.

The **login** prompt you see depends on whether your system console is a graphics monitor or a nongraphical display terminal. Proceed to the section below appropriate to your system.

Logging in using a graphics monitor

If you are using a graphics monitor, you'll see the following console **login** prompt for several seconds before your **login** screen appears:

```
DG/UX System Release 4.11
Console login:
```

> **IMPORTANT**   Do not log in at the console **login** prompt. Within moments it is replaced by the **login** screen shown in Figure 7–1.

```
    ┌─────────────────────────────────────────┐
    │                                         │
    │        Hostname - DG/UX R4.11           │
    │                                         │
    │                                         │
    │      Login:                             │
    │      Password:                          │
    │                                         │
    │                                         │
    │    ┌───────┐ ┌─────────┐ ┌───────────┐ ┌─────────┐
    │    │ Reset │ │ Restart │ │ Terminate │ │ Failsafe│
    │    └───────┘ └─────────┘ └───────────┘ └─────────┘
    └─────────────────────────────────────────┘
```
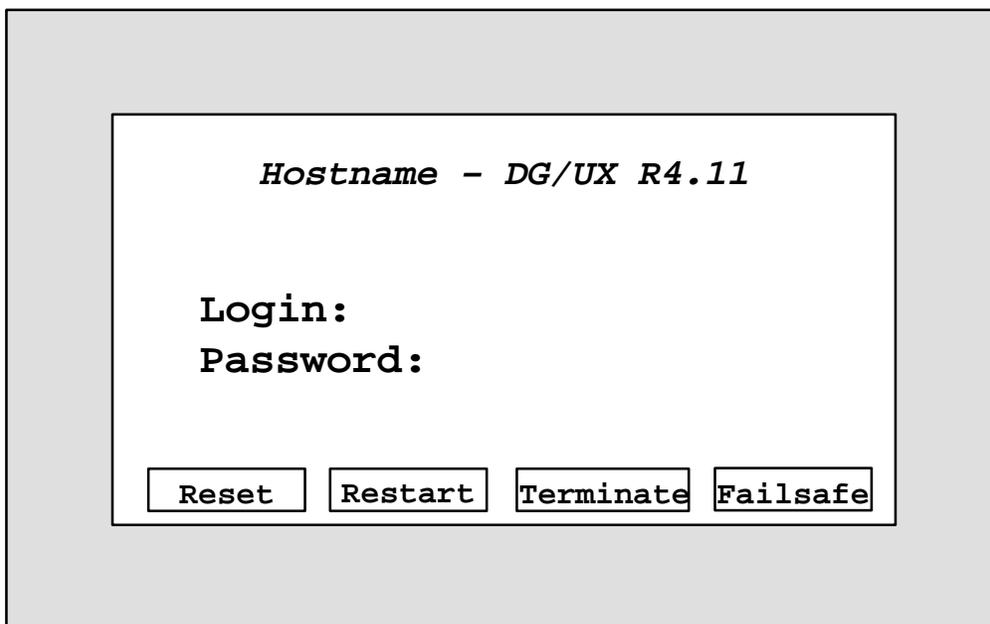
Figure 7–1   **Login** screen for a graphics monitor

For the present, you do not need to know how to use the DG/UX
X Window System environment. For information on getting started in
the X environment, refer to *Using the DG/UX® System* on the
documentation CD-ROM. For detailed information on working in the X
environment, see the *X Window System User's Guide: OSF/Motif
Edition.*

1. At the **login** prompt, type **sysadm** and press Enter.

    IMPORTANT   If necessary, use the mouse to move the root pointer
    (the large X symbol on your screen) inside the **login** window.

2. At the password prompt, press Enter.

    A password for **sysadm** is not required at this time.

    This action clears the screen and displays two X clients:

    xterm   VT100 terminal emulator

    session log   Icon which represents an output-only display of error
                       messages produced from the startup of the X Window
                       System

Logging in as **sysadm** gives you the appropriate privileges required to use the system administration (**sysadm**) utilities. These utilities provide a menu-driven set of system administration procedures that you use to customize your system. The final section of this chapter that tells you where to go next, lists the customization tasks you will or may need to perform to make your system fully operational.

Exiting the X Window Environment

To exit the X Window environment and continue working in a single VT100 terminal emulator environment, do the following:

1. Move the root pointer to the **Terminate** button in the **login** window and click the left mouse button**.**

   A single window appears.

2. Press Enter after about 10 seconds to display the console **login** prompt**.**

   ```
   DG/UX System Release 4.11
   Console login:
   ```

3. Log in by typing **sysadm,** and press Enter**.**

   The superuser (#) prompt appears:

   ```
   #
   ```

4. To return to the X Window system environment, log out by typing **exit** and pressing Enter**,** and then log in again by typing **xdm** and pressing Enter**.**

   No password is required.

Logging in using a nongraphical display terminal

If your system console is a nongraphical display terminal, a console **login** prompt similar to the following appears:

```
DG/UX System Release 4.11
Console login:
```

▶ Log in by typing **sysadm,** and press Enter**.**

The superuser prompt (#) appears. Logging in as **sysadm** gives you the superuser privileges required to use the system administration (**sysadm**) utilities. These utilities provide a menu-driven set of system administration procedures that you use to customize your system. The final section of this chapter that tells you where to go next, lists the customization tasks you will or may need to perform to make your system fully operational.

Assigning passwords to sysadm and root

It is important to secure your system immediately to prevent unauthorized access. Two **login** names have been established for installation and system management tasks: **sysadm** and **root** . The **sysadm** name normally is reserved for the system administrator, who customarily installs the DG/UX system and performs system administration duties. The **root** name is reserved for the superuser, who can access all files and perform privileged system calls.

To adhere to naming conventions, a password:

- Cannot be the same as the **login** name.

- Must have at least six characters.

- Must contain at least two uppercase or lowercase alphabetic characters (a–z and A–Z).

- Must contain at least one numeric or special character, such as ?, !, @, $, 0 through 9, or a space.

- Cannot be a circular shift of the **login** name (for example, the **login** name **anemone** cannot be transcribed as the password **nemonea**).

Examples of valid passwords are **$99down**, **2nafish**, **!opr8r**, and **man2man**.

Select a password you won't forget, such as a name or word that is meaningful to you alone, following these steps:

1. Logged in as **sysadm**, at the shell prompt (#) , type **passwd** and press Enter.

2. In response to the following prompt:

    ```
    Changing password for sysadm
    New password:
    ```

    type the password you have chosen and press Enter. (To help maintain security, your password does not appear on the screen as you type it.)

3. To confirm the new password, at the prompt

    ```
    Re-enter new password:
    ```

    retype your new password and press Enter. After the system verifies your new password, the shell prompt (#) appears.

4. While logged in as **sysadm** you can assign a password to **root** by entering:

   # **passwd root** ↵

   and answering the prompts. Likewise, you can assign a password to **sysadm** when logged in as **root** by entering:

   # **passwd sysadm** ↵

   You may repeat steps 1 through 3 to assign a password to **root**.

For more information on passwords, see the **passwd** manual page.

Post-installation tasks

After you complete your installation or upgrade, you should perform all of the following tasks that apply to your situation:

- Removing and storing the release medium.

- Documenting your configuration.

- Running In-Service Diagnostics software.

- Setting up your documentation CD-ROM.

- Formatting disks other than the system disk.

- Installing boot strings on a hard disk on an Intel-based system.

- Adding a third-party operating system to an Intel-based computer.

- Configuring tunable parameters.

- Powering up WORM devices and configuring them in the kernel.

- Registering read-only devices in compatibility mode.

- Adding nonstandard devices.

- Adding nonstandard packages.

- Restoring a failover configuration.

- Setting up OS clients, or freeing up disk space if your configuration does not contain OS clients.

The following subsections explain these tasks.

Removing and storing the release medium

After you have finished your installation and are successfully logged in, remove the DG/UX release medium from the drive and store it safely.

> **IMPORTANT**   To remove CD-ROM medium from a drive, you must first deregister the device. If you are already familiar with the **sysadm** utility, you can use the `Device -> Disk -> Physical -> Deregister` **operation.**
>
> If you want more information, you can refer to *Managing Mass Storage Devices and DG/UX® File Systems* on the documentation CD-ROM for detailed instructions. See the section below on setting up your documentation CD-ROM.

Documenting your configuration

After you built and booted your kernel, you may want to document your configuration by printing a list of configured devices and the system file.

You can use the **sysdef** command to extract from the kernel a list of configured devices, pseudo devices, network protocols, streams modules and values of all tunable parameters. The command format follows:

shell command
sysdef *kernel–file* **| nl | pr –h** *"header"*

where:

sysdef is a command that generates configuration information from the specified *kernel–file*.

nl is a line-numbering filter.

pr is a command that prints the contents of a file; **–h** designates an enquoted *header*.

An example follows:

```
# sysdef /dgux.monarch | nl | pr –h "Production Kernel for
monarch"  ↵
```

Running In-Service Diagnostics software

We strongly urge you to run the Default In-Service Diagnostics (ISD) test session immediately after loading (installing or upgrading) the DG/UX Release 4.11 software on your computer system. If the test session reports any problems (either in the error log, or displayed on the console screen), please contact Data General immediately.

For more information on the Default ISD test session, refer to the hardware manual, *Using AViiON® Diagnostics and the AV/Alert Diagnostic Support System — DG/UX® Environment* on the Documentation CD-ROM.

Setting up your documentation CD-ROM

The DG/UX manuals are on the documentation CD-ROM. If you want, you can view the documentation CD-ROM on a PC *before* the DG/UX software is up and running. Or, after you complete your installation, you can set up the documentation CD-ROM on your system.

The DG/UX documentation CD-ROM includes DG/UX manuals and the WorldView® Viewer software from Interleaf, Inc. The WorldView Viewer software lets the user access the documentation using hypertext links. Workstation users can easily run the software from the CD-ROM drive.

For instructions on how to load, set up, and view the documentation CD-ROM, refer to the *Quick Start Guide for Viewing DG/UX®️ Documentation.*

Formatting disks other than the system disk

If you have any other disks in addition to the system disk, you can format them and create the necessary virtual disks and file systems now. Refer to *Managing Mass Storage Devices and DG/UX®️ File Systems* on the documentation CD-ROM for information on how to do this.

Installing boot strings on a hard disk on an Intel-based system

After you install the DG/UX R4.11 software, you can use either the **sysadm** utility or the **admnvram** command to set the primary default boot command string in the NVRAM database (NDB) to boot from a network controller.

Before you can write to the NVRAM database, you must initialize it. You only need to perform this operation once after soft formatting the disk. Examples of the **sysadm** operations and the **admnvram** commands follow.

CAUTION   *Initializing the* NVRAM database *will destroy any parameters previously set on this physical disk with the* **admnvram** *command.*

From the **sysadm** utility, use the following menu paths:

```
System -> NvRAM -> Initialize Database
Systen -> NvRAM -> Set Parameter
```

From the shell prompt, use the following **admnvram** commands:

```
admnvram -o initialize -f 'sd(apsc(pci(1),D),0)' -p

admnvram -o set -f 'sd(apsc(pci(1),D),0)' -p \
  boot_command_1='sd(apsc(pci(1),D),0) root -f /dgux -1 3'
```

> **IMPORTANT**   You can set up to nine boot commands in the
> NVRAM database. The system will attempt to boot from them in
> order until one succeeds; or if none succeeds, you will receive the
> `Boot command:` prompt.

For more information, refer to the **admnvram**(1) and **boot**(8) man
pages.

Adding a third-party operating system to an Intel-based computer

If you want to run a third-party operating system (e.g., MS-DOS®) on
an Intel-based system in addition to running DG/UX, you must
temporarily move all the preinstalled DG/UX file systems to a
secondary disk.

You must do this for the following reason:

- By default, the DG/UX operating system upon installation will
  consume the largest free disk space for itself. This means it will
  likely take the entire disk and there will not be any space left on
  the primary disk for a third-party operating system. A third-party
  operating system is most useful on the primary disk so you can boot
  it on system reset.

This is why we tell users to install any other operating systems before
installing DG/UX. In the case of a preloaded system, however, the
DG/UX software is already on the disk, and must be removed
temporarily so you can install any other operating systems you want to
use. Then you can move the DG/UX software back onto the primary
disk.

The following procedure is to install a third-party operating system on
your system after the DG/UX operating system is on the primary disk.
Make sure you have a full backup of your files.

1. **Boot DG/UX standalone sysadm.** (Standalone sysadm should
   configure both the primary and the secondary disks.)

2. **Determine which scenario applies to your secondary disk
   and follow the instructions.**

▶ If the secondary disk is at least as large as the primary disk, then do a physical disk copy from the primary disk to the secondary disk. Be sure this secondary disk is *not* registered. For example:

```
Physical Disk -> Copy
```

When the physical disk copy is complete, go to **step 6.**

▶ If the secondary disk is not as large as the primary disk, be sure that it's large enough to hold all the DG/UX file systems.

You must be able to individually move the virtual disks containing the DG/UX file systems from the primary disk to the secondary disk. Continue with the next step.

3. **Prepare the secondary physical disk to hold the virtual disks currently on the primary physical disk.** Perform the following tasks if necessary.

▶ Initialize the secondary disk to hold virtual disks using the following **sysadm** path:

```
Physical Disk -> Soft Format -> Perform All
```

CAUTION   *If you create a new virtual disk information table on a disk, any existing virtual disks will be lost.*

The Perform All operation performs each step in order: labeling the physical disk, creating the new virtual disk information table, establishing bad block mapping facilities, and installing a bootstrap program. You can also elect to perform the steps individually and may omit any step you want.

In the following example, we do not allow the operation to create the virtual disk information table because we do not want to completely reformat the physical disk.

```
Enter a number, a name, ? or ,number>? for help, <NL>
to redisplay menu, ^ to return to previous menu, or q
to quit:  5↵

Physical Disk(s): sd(ncsc(0),0)
Install Disk Label? [yes]  ↵
Create Virtual Disk Information Table? [yes]  no↵
Establish Bad Block Mapping Facilities? [yes]  ↵
Install Bootstrap? [yes]  ↵
Size of Bad Block Remap Area (blocks): [100]  ↵
Disk type:  generic↵
Label installed on sd(ncsc(0,7),0,0)
Physical disk sd(ncsc(0,7),0,0) registered.
Bootstrap installed in existing partition on
    sd(ncsc(0,7),0,0).
Bad block mapping established on physical disk
    sd(ncsc(0,7),0,0).
```

▶ Register the secondary disk using the following **sysadm** path:

```
Physical Disk -> Register
```

4. Using slightly different names, create the virtual disk partitions on the secondary disk to hold the file systems currently on the primary disk using the following sysadm path:

```
Virtual Disk -> Create
```

For example, you might create a virtual disk named **root_temp** to hold the **root** file system that resides on the primary disk. You would perform the same step for **usr**, **usr_opt_networker**, and all other file systems on the primary disk.

It is necessary to create these disk partitions on the secondary disk before you can actually move the virtual disks.

> **IMPORTANT**   Virtual disks created on the secondary physical disk must be the same size as the file system they intend to hold (for example, **root_temp** should be the same size as **root**.

It is not necessary to move the **swap** and **dump** virtual disks as they do not contain persistent data. They will be recreated on the primary disk later.

5. Move the virtual disks from the primary disk to the secondary disk (e.g., source root to the destination root_temp) using the following sysadm menu path:

```
Virtual Disk -> Move
```

After a virtual disk move, the destination virtual disk assumes the name of the source virtual disk, and the source virtual disk disappears. In other words, **root_temp** will no longer exist and **root** will reside on the secondary disk.

Perform this virtual disk move for **root**, **usr**, **usr_opt_networker** and all other file systems on the primary disk.

When all the DG/UX file systems are located on the secondary disk, you are ready to prepare the primary disk for the third-party operating system installation.

6. **Deregister the primary disk using the following sysadm menu path:**

```
Physical Disk -> Deregister
```

7. **Remove the DGUX_vdm PC partitions on the primary disk using the following sysadm menu path:**

```
Physical Disk -> PC Partitions -> Departition
```

After you complete this step, there will be no PC partitions located on the primary disk.

8. **Halt DG/UX standalone sysadm:**

```
Enter a number a name, ? or ,number.? for help, <NL> to
redisplay the menu, or q to quit: q ↵
```

9. **Install the third-party operating system following the installation instructions that shipped with the third-party software.**

   IMPORTANT   Be sure not to allow the third-party software to occupy the entire primary disk (consult the documentation).

10. **After the third-party software is installed, use the SCM or the boot floppy that shipped with your system to boot the DG/UX standalone sysadm from the secondary disk.**

Remember to use the device specification for the secondary disk in the boot path.

11. **Prepare the primary physical disk to receive the DG/UX virtual disks (currently on the secondary disk). Use the following sysadm menu path:**

```
Physical Disk -> Soft Format -> Perform All
```

This initializes the primary disk, installs bootstraps, installs bad block remapping, and registers the primary disk.

12. **If you used a physical disk copy (see step 2), remove the swap and dump virtual disks on the secondary physical disk using the following sysadm menu path:**

    ```
    Virtual Disk -> Remove
    ```

13. **Recreate the swap and dump virtual disks on the primary physical disk using the following sysadm menu path:**

    ```
    Virtual Disk -> create
    ```

14. **Using slightly different names, create the virtual disk partitions on the primary disk to hold the DG/UX file systems currently on the secondary disk using the following sysadm menu path:**

    ```
    Virtual Disk -> create
    ```

    For example, you could use the name **root_temp**, this time to hold the **root** file system that currently resides on the secondary physical disk. You would perform this step for **root, usr**, **usr_opt_networker**, and all other DG/UX file systems on the secondary physical disk.

    > **IMPORTANT**   Virtual disks created on the primary physical disk must be the same size as the file system they intend to hold (for example, **root_temp** should be the same size as **root**.

    It is necessary to create these disk partitions on the primary physical disk before you can actually move the DG/UX virtual disks back to the primary disk from the secondary disk. Also note that it is not necessary to move the swap and dump virtual disks as you should have recreated them in **step 13.**

    > **IMPORTANT**   Depending on the amount of disk space used by the third-party operating system on the primary physical disk, all the DG/UX file systems may not fit again on the the primary disk. If this is the case, move what can be moved, starting with **root** and **usr**, and leave the remaining file systems on the secondary disk.

15. **Move the DG/UX virtual disks from the secondary disk to the primary disk (e.g, source root to the destination root_temp) using the following sysadm menu path:**

    ```
    Virtual Disk -> Move
    ```

    After a virtual disk move, the destination virtual disk assumes the name of the source virtual disk, and the source virtual disk disappears. In other words, **root_temp** will no longer exist and **root** will reside on the primary disk.

Perform this virtual disk move for **root**, **usr**, **usr_opt_networker** and as many other DG/UX file systems located on the secondary disk as you can fit on the primary disk.

Some or all of the DG/UX file systems should now be located on the primary physical disk along with the third-party operating system.

16. **Reboot the system.**

If you are using an Intel-based system, you may want to escape to the shell (entering "**!**" at any prompt), and use the **admnvram** command to set up a default boot path, etc., in the nonvolatile RAM database on the primary physical disk.

Configuring tunable parameters

Chapter 4 explains how to edit the components of the system configuration file to restore kernel customizations from the kernel backup file. If you need more information on configuring and rebuilding a kernel, refer to *Managing the DG/UX® System*.

You configure tunable parameters by adding the necessary parameters to the **system.params.*name*** file, and then rebuilding and rebooting the kernel. The section on restoring kernel customizations in Chapter 4 explains how to add data to the **system.params.*name*** file.

Powering up WORM devices

After completing the upgrade, return power to WORM devices and configure them in the kernel.

You need to add any WORM devices after the upgrade. Chapter 4 explains how to add new kernel customizations or restore previous ones from the old system configuration backup file, **Pre4.11.system.*name***.

You can easily add devices to the kernel by using the **sysadm** operation `System -> Kernel -> Config and Build.` This allows you to edit the device configuration file to include a WORM device, and then rebuild your kernel. For additional information on configuring and rebuilding a kernel, refer to *Managing the DG/UX® System* on the documentation CD-ROM.

Registering read-only devices

After completing the upgrade, you must explicitly register in compatibility mode (logical disk rather than virtual disk format), any read-only devices that were created *prior* to DG/UX 5.4R3.00. To do this you can use the following **sysadm** menu path: Device -> Disk -> Physical -> Register.

Refer to *Managing Mass Storage Devices and DG/UX® File Systems* on the documentation CD-ROM for more information on registering physical devices.

Adding nonstandard devices

If you have any nonstandard devices, you may need to configure these devices and rebuild your DG/UX R4.11 kernel.

A *standard device* is one you purchased from Data General for use with AViiON computers. Its device ID has been preset through a jumper or a DIP switch setting at the factory. The installation process automatically configures standard devices.

The file **/usr/etc/probedevtab** lists the names of all standard devices. A device that isn't listed in **/usr/etc/probedevtab** is *nonstandard*.

You configure nonstandard devices by adding the necessary device names to the **system.device.*name*** file, and then you rebuild and reboot the kernel. The section on restoring kernel customizations in Chapter 4 explains how to add data to the **system.device.*name*** file. For more information on configuring nonstandard devices and kernel building, refer to *Managing Mass Storage Devices and DG/UX® File Systems* on the documentation CD-ROM.

> **IMPORTANT**   A standard device becomes nonstandard if you rejumper it to a nonstandard address. For information on determining the controller addresses, refer to *Programming in the DG/UX® Kernel Environment* on the documentation CD-ROM.

If you try to add a device purchased from a third-party vendor, it may be recognized by the DG/UX system, but there are no guarantees. The device may not be compatible with the device driver provided by Data General. In this event, you will have to write a compatible device driver to accommodate the device. For details, see *Writing a Standard Device Driver for the DG/UX® System* on the documentation CD-ROM.

With your system Data General Corporation ships a separate documentation CD-ROM that contains DG/UX manuals and WorldView Viewer® software for viewing those manuals. It is important to load and set up the documentation CD-ROM as soon as you complete your upgrade procedure. The documentation CD-ROM contains DG/UX manuals that will help you perform other tasks.

For instructions on how to load, set up, and view the documentation CD-ROM, refer to the *Quick Start Guide for Viewing DG/UX® Documentation.*

Adding nonstandard packages

A *standard package* is one that is included on the DG/UX medium; all other packages are considered *nonstandard.*

If you have a nonstandard software application, you need to know if it writes to the system file. For example, Netware, OSI/P, PICK, SNA, and X.25 all put parameters in the system file. The Release Notice for the software application should provide you with the necessary information.

To run these applications, you can either add the customizations to the new DG/UX R4.11 configuration file as described in the section on restoring kernel customizations in Chapter 4, or you can choose not to configure and build your kernel at this time. For more information on the latter, refer to the Release Notice for the product.

Restoring a failover configuration

To restore a failover configuration, you must obtain a separate failover package from Data General. This failover package will allow you to upgrade to the DG/UX R4.11 software and continue to use your failover configuration without the cluster option. It is only available to customers already running failover configurations, and contains no new features or documentation. You must retain your current *Achieving High Availability on AViiON® Systems* manual to use with the DG/UX R4.11 package.

For failover configurations (in which two or more host computers share a single SCSI bus), you may need to edit the system file and build a new kernel after the upgrade is complete.

Chapter 4 explains how to edit the components of the system configuration file to restore kernel customizations from the kernel backup file. If you need more information on configuring and rebuilding a kernel, refer to *Managing the DG/UX® System.*

Setting up OS clients or freeing up disk space

If your configuration supports OS clients, follow the instructions concerning OS clients and servers in *Managing the DG/UX® System* to set up your clients to be recognizable to the DG/UX System R4.11.

If your configuration does not support OS clients, you can reclaim
system space by deleting the directory tree **/usr/root.proto**. Use this
command:

```
# rm –rf /usr/root.proto ↵
```

> **IMPORTANT**   Do not delete /usr/root.proto if you plan to install
> the DG/UX Cluster Software product. The DG/UX Cluster option
> needs that directory tree to install the operating system on the
> second and subsequent nodes and to distribute software packages
> throughout the cluster.

Where to go next

Your DG/UX system is installed. Make sure your documentation
CD-ROM is loaded and set up ready for use (as described in the *Quick
Start Guide for Viewing DG/UX® Documentation*). Before your DG/UX
system is fully operational, you might need to perform some or all of
the tasks listed in Table 7–1. Use the WorldView Viewer software
(explained in the *DG/UX® Quick Start Guide for Viewing DG/UX®
Documentation*) to access the appropriate manuals.

Table 7–1 Additional installation information

For this task	Refer to this manual
Setting up the documentation CD-ROM	*Quick Start Guide for Viewing DG/UX® Documentation*
Viewing the DG/UX documentation and using the WorldView® Viewer software	*Quick Start Guide for Viewing DG/UX® Documentation*
Activating or verifying AV/Alert service.	*Using AViiON® Diagnostics and the AV/Alert^{SM} Diagnostic Support System — DG/UX® Environment*
Addressing performance problems	*Preventing and Fixing Problems on the DG/UX® System*
Configuring CLARiiON storage systems.	*Planning a CLARiiON® Disk-Array Storage System Installation— DG/UX® Environment* and *Installing and Maintaining a CLARiiON® Disk-Array Storage System*
Configuring and managing disk and tape drives.	*Managing Mass Storage Devices and DG/UX® File Systems*
Configuring printers.	*Installing and Managing Printers on the DG/UX® System*
Configuring modems.	*Managing Modems and UUCP on the DG/UX® System*
Configuring other standard devices.	*Managing the DG/UX® System*
Configuring nonstandard devices.	*Managing Mass Storage Devices and DG/UX® File Systems*
Configuring TCP/IP network features such as routing, Domain Name System (DNS), Daemon management, SNMP, sendmail, and network databases.	*Managing TCP/IP on the DG/UX® System*

Table 7–1   Additional installation information

For this task	Refer to this manual
Creating and mounting file systems.	*Managing Mass Storage Devices and DG/UX® File Systems*
Formatting disks other than the system disk	*Managing Mass Storage Devices and DG/UX® File Systems*
Installing additional software application packages.	*Managing the DG/UX® System*
Recovering from power failures, hangs, halts, and diagnosing other system problems and errors.	*Preventing and Fixing Problems on the DG/UX® System*
Running In-Service Diagnostics Acceptance Test.	*Using AViiON® Diagnostics and the AV/Alert^SM Diagnostic Support System — DG/UX® Environment*
Setting up a DG/UX Cluster (dual-initiator) configuration.	*Managing a DG/UX® Cluster*
Setting up DG/UX Manager to manage DG/UX files.	*Using the DG/UX Manager™ Interface*
Setting up DG/UX CLARiiON Manager to manage DG/UX files.	*Using the DG/UX CLARiiON Manager™ Interface*
	Managing Mass Storage Devices and DG/UX® File Systems
Restoring a failover configuration	*Achieving High Availability on AViiON® Systems*
Setting up auto-reboot for non-SCM systems.	**admnvram**(1) command man page. See also the **boot**(8) command man page.
Setting up modems.	*Managing Modems and UUCP on the DG/UX® System*
Setting up or adding OS clients and X terminal clients.	*Managing the DG/UX® System*
Setting up other communications devices.	*Managing the DG/UX® System*
Setting up printers.	*Installing and Managing Printers on the DG/UX® System*

Table 7-1   Additional installation information

For this task	Refer to this manual
Setting up user home directories.	*Managing the DG/UX® System* and *Using the DG/UX® System*
Using stand-alone sysadm.	*Preventing and Fixing Problems on the DG/UX® System* and *Managing the DG/UX® System*

You may perform some of these tasks immediately following installation; you perform others over the lifetime of your DG/UX system (for example, adding new devices or packages). In some instances, these tasks require you to build and boot a custom kernel, as described in *Managing the DG/UX® System*.

You may need to further customize your own personal operating environment. Coordinate with the head system administrator for guidance on what to do next.

End of Chapter

8   *Fixing problems*

This chapter identifies some problems you could encounter while installing or upgrading your DG/UX system, and recommends appropriate recovery action. It includes the following major sections:

- Responding to error messages

- Addressing insufficient swap space

- Addressing insufficient space to load packages

- Receiving a system halt

- Selecting to load all packages by mistake

- Supplying the wrong data at a package setup prompt

- Upgrade problem with **/tmp** while preparing to load software packages

- Addressing faulty selection of CD-ROM disk drive for software loading

- When booting to init 3 fails.

- When rebooting fails on an Intel-based system.

- Accidentally booting a pre-DG/UX 5.4R3.00 release kernel

If we haven't documented your problem here, or if the problem persists after you follow the suggestions in this chapter, contact Data General (as described in the Preface) for assistance.

> **IMPORTANT**   Also refer to *Preventing and Fixing Problems on the DG/UX System* for tips and techniques on preventing and/or fixing typical system problems.

Responding to error messages

Table 8–1 provides a quick reference for resolving the problems described in this chapter. Refer to the sections that follow for more detailed explanation and instructions.

Table 8–1   Responding to error messages

Error text or screen display	Explanation and response
The operating system has detected a serious error and halted. Please record the following halt code: "DG/UX 4.11 halt code *nnnnnnnn*" Do you want to take a system dump? [Y]	**A system halt indicates a fatal hardware malfunction or internal software inconsistency.** **Write down the halt code number and restart the installation. If the error reoccurs, complete a system dump and contact Data General as described in the Preface. You may also run AViiON diagnostics.**
Do you want to load from the system software distribution disk? [yes]	**If a CD-ROM and tape drive both contain DG/UX distribution software, sysadm may select the CD-ROM drive as the load device even when you are upgrading from tape. Deregister the CD-ROM device and remove the media.**
Out of swap space	**The swap virtual disk is too small for system operation. Increase swap as described in** *Managing the DG/UX® System.*
/root//tmp: file exists UX: mkdir: ERROR: Cannot create directory "/root//tmp": file exists**** Error: Cannot create directory /root//tmp/root.proto.tmp Press New Line to continue.	**The installer encountered a symbolic link with an absolute rather than a relative target pathname during an upgrade.** **Change the link (for the tmp file, in this example) and restart the upgrade.**

Continued

Error text or screen display	Explanation and response

`Warning:  There is not enough room`
`in /mnt/root to load `*`nnnn`*` blocks,`
`as only `*`nnnn`*` blocks are available.`
 	
`To make space available now, you`
`may clean up the system before`
`loading packages. The cleanup`
`scripts will list the pathname and`
`files that you may want to remove.`
`NOTE:  No file will be removed`
`without your explicit confirmation.`
 	
`Clean up the system before loading`
`packages?  [yes]`
	You don't have the disk space needed to load the packages you selected.
	
	Your choices are to:
	● **Run a cleanup script now to reclaim disk space.**
	
	● **Restart the installation; then, select packages that require less space or increase virtual disk size.**
	
	Don't proceed without fixing the problem, as installation will almost certainly fail

Addressing insufficient swap space

Insufficient swap space can result in the termination of running processes, and errors such as "`out of swap space`" displayed at the system console.

If you encounter such an error, increase swap by expanding the existing swap virtual disk or creating additional swap area virtual disks (such as swap1 and swap2). Refer to the section on sizing a virtual disk for swap space in Chapter 1 or to the manual *Managing the DG/UX*® *System* for more information.

Addressing insufficient space to load packages

During an upgrade, the installer utility validates the free space in your configuration before loading packages. If you receive a warning that you do not have sufficient space to successfully upgrade your system, you must address the problem before continuing.

The warning message appears as follows:

```
Warning:  There is not enough room in /mnt/root to
          load 18332 blocks, as only 17247 blocks
          are available.

To make space available now, you may clean up the system
before loading packages. The cleanup scripts will list the
pathname and files that you may want to remove.
```

```
NOTE:  No file will be removed without your explicit
confirmation.
```

```
Clean up the system before loading packages?  [yes]
```

You may answer **yes** or **no**. If you answer **yes**, the installation utility will interrogate your configuration and make recommendations for files to delete, which frees up space. Go to the next section for instructions on an assisted cleanup.

If you answer **no** because you do not want to clean up the system before loading, you can pursue either of two paths:

- You could proceed to the next upgrade step, package loading. Since your system does not have enough free space to accommodate loading, however, package loading will eventually fail.

- You can restart the upgrade procedure, resizing virtual disks or omitting selected packages from loading. Go to the section on restarting the upgrade later in this chapter.

Performing an assisted cleanup

The installation utility immediately begins its search for files that can be deleted. Each time it locates a file for deletion, it presents the file's path, size, and an opportunity to delete it.

1. **To delete the recommended file, override the default and type yes, and then press Enter.**

   Alternatively, you may note the recommendation, answer **no** and later escape to the shell to investigate before deleting.

   An example of the installation utility's recommendations follows.

   ```
   Searching for large files in /mnt/root/var ...

   6 files found.
   Warning:  Typing 'yes' will permanently remove the file.

   Remove /mnt/root/var/adm/spellhist (128 blocks)? [no]
   Remove /mnt/root/var/adm/dgsvcmgr/dgsvcd_log (128 blocks)?
   [no]
   Remove /mnt/root/var/lp/logs/lpNet (144 blocks)? [no]
   Remove /mnt/root/var/saf/_log (80 blocks)? [no]
   Remove /mnt/root/var/saf/ttymon1/log (177 blocks)? [no]
   Remove /mnt/root/var/cron/log (7349 blocks)? [no]

   Searching for old files in /mnt/root/tmp ...

   2 files found.
   ```

```
Warning:  Typing 'yes' will permanently remove the file.

Remove /mnt/root/tmp/vi.tar (6277 blocks)? [no]
Remove /mnt/root/tmp/f1 (193 blocks)? [no]

Searching for obsolete programs ...

1 program found.
Warning:  Typing 'yes' will permanently remove the file.

Searching for non-standard files ...

39 files found.
Warning: Typing 'yes' will permanently remove the file.
Remove /mnt/root/archive/LogFile (32 blocks)? [no]
Remove /mnt/root/archive/LogFile.old (32 blocks)? [no]
Remove /mnt/root/archive/LogFile.save (32 blocks)? [no]
Remove /mnt/root/archive/Nightly (16 blocks)? [no]
Remove /mnt/root/archive/RunArchive (64 blocks)? [no]
Remove /mnt/root/dgux (6565 blocks)? [no]
Remove /mnt/root/dgux.viper (6565 blocks)? [no]
Remove /mnt/root/etc/fstab_OLD (32 blocks)? [no]
```

After the installation utility has finished its recommendations, it asks if you want to escape to the shell to manually free up space.

2. **Decide if you want to perform manual cleanup.**

```
Escape to the shell to perform manual cleanup?  [yes]
```

You may answer **yes** or **no**.

▶ If you answer **yes**, you will escape to the shell where you can perform manual cleanup. Proceed to **step 3.**

▶ If you answer **no** and forgo a shell escape for continued cleanup, the installation utility checks space again, displaying this message:

```
Checking the capacity again ...
```

If you have freed up sufficient space for package loading, the warning message will not be displayed this time. Otherwise, it will be redisplayed.   The process repeats until there is sufficient free space to load packages.

After you have freed up sufficient space for package loading, you can proceed to **step 4.**

3. **Perform manual cleanup from the shell.**

If you are aware of other files to remove, do so. If you did not delete the files that the installation utility recommended, you may investigate them now and remove them, as desired.

Check **/sbin**, **/usr/sbin**, and **/usr/bin** for the supported stand-alone **sysadm** shell commands.

After you have freed up sufficient space for package loading, you can proceed to **step 4.**

4. **After you finish your manual cleanup from the shell, resume the upgrade procedure by exiting the shell. For example:**

```
# exit ↵
```

The installation utility checks space again, displaying this message:

```
Checking the capacity again ...
```

If you have freed up sufficient space for package loading, the warning message will not be displayed this time. Otherwise, it will be redisplayed. The process repeats until there is sufficient free space to load packages.

Restarting the upgrade

You may restart the upgrade, this time making different virtual disk sizing decisions. Or, you may decide to omit some optional packages for loading. The only required package is **dgux**, but we strongly recommend you load **dgux.man** as well. The system will prompt you as follows:

```
Clean up the system before loading packages? [yes]
```

1. To free up space manually, without the assistance of the installation utility, answer no. For example:

```
Clean up the system before loading packages? [yes] no ↵
```

The system will display a note, followed by a prompt.

2. Read the entire note before answering.

```
NOTE:   You can restart the software installation
        procedures and expand your virtual disks or
        select a different set of packages. If you
        want to begin loading packages, even though
        there is not enough room, type "no" at the
        prompt below.

Restart the software installation procedures?  [yes]
```

▶ To restart the upgrade, this time making different decisions, accept the **yes** default, and go to **step 3.**

▶ To continue the upgrade procedure, despite a warning that there is insufficient space for package loading, answer **no**. Eventually the upgrade will fail.

3. Decide whether to modify or confirm your default configuration.

When the upgrade procedure restarts, you may want to modify the default configuration, creating larger virtual disks, as necessary.

Or, you may confirm your default configuration selections, and alter your package selections for loading instead.

For example, exclude packages that are not critical for your normal operation. Review package descriptions in Chapter 2 to help you decide.

After you have freed up space, the installation utility checks space again, displaying this message:

```
Checking the capacity again ...
```

If you have freed up sufficient space for package loading, the warning message will not be displayed this time. Otherwise, it will be redisplayed.   The process repeats until there is sufficient free space to load packages.

Receiving a system halt

A system halt is a condition indicating a fatal hardware malfunction or internal software inconsistency. How you respond to a system halt depends on whether you receive the error early in system initialization or during package loading.

System halt early in system initialization

A system halt that occurs early in system initialization usually results from serious system failures, such as hard memory failures, or an inability to load kernel image properly during the boot process. When such an error occurs, the standard kernel dump mechanism is not yet operational. Instead, debug screens will display the general register contents and some kernel stack trace information generated around the time of the system halt.

To fix a system halt generated early in system initialization, first try to reboot the system. If the error persists, contact your Data General hardware support representative with the general register and trace information in an attempt to identify the failing unit.

System halt during disk preparation

A system halt during the "Prepare physical disks" step or early in the "Prepare virtual disks" step of the installation procedure can indicate that you tried to format or register too many physical disks.

The recommended solution is to format and/or register only those physical disks necessary to install the DG/UX system. These are the physical disks that hold the OS virtual disks like **root**, **swap**, **dump**, **usr_opt_networker**, and **usr_opt_X11**.

System halt during package loading

A system halt that occurs during package loading indicates a fatal hardware malfunction or internal software inconsistency. The installer kernel halts the package loading procedure and issues a message and prompt in the following format:

```
The operating system has detected a serious error and halted
Please record the following halt code:
"DG/UX halt code nnnnnnnnn"

Do you want to take a system dump? [Y]
```

Before answering, write down the actual halt code number received and any other accompanying error messages. Follow these steps to recover from the problem:

- Perform a system dump.
- Perform diagnostics.
- Resume the installation or upgrade procedure.

Performing a system dump

The Data General Customer Support Center needs a copy of the contents of the system memory to investigate the cause of a system halt. Follow these steps to perform a system dump.

> **IMPORTANT**   Refer to the chapter on recovering from power failures, hangs, and halts in *Preventing and Fixing Problems on the DG/UX® System* for more information on performing a system dump.

1. Accept the `yes` default response to the prompt to perform a system dump.

2. Insert a blank tape in the drive to receive the system memory contents.

3. When prompted, supply the name of the dump device; for example, the device name for a tape might be

   `st(insc(0),4)`

4. When prompted for the type of dump to be performed, specify a system dump (system memory contents).

5. Remove the dump tape from the drive when the system tells you that the dump is complete.

Performing diagnostics

A set of system diagnostics provides menu-based utilities to fully test your computer. If there is a hardware problem, the system diagnostics can isolate faults and provide the information necessary for Data General to replace defective parts. For information on running system diagnostics and the acceptance test, refer to *Using AViiON® Diagnostics and the AV/Alert Diagnostics Support System* (014–002512). Record the results for relaying to the Data General Customer Support Center.

Resuming the installation or upgrade procedure

Following the completion of system diagnostics, exit the diagnostics program and, if you booted diagnostics from tape, remove the tape from the tape drive and re-insert the DG/UX release tape in its place. Re-install the DG/UX system using the procedures from the chapter appropriate to your situation.

If the installation or upgrade procedure completes successfully, continue steps to customize and operate, as desired, but still submit the details of the problem to the Data General Customer Support Center. If the installation or upgrade failure persists, contact the Data General Customer Support Center immediately.

Selecting to load all packages by mistake

If you accidentally select to load all packages when previously you chose not to build virtual disks for all packages, the recovery on a clean installation is to start again from scratch. Type **q** to quit at the next available prompt. However, if you are performing an upgrade, you can either clean up a file system or add space to it.

Supplying the wrong data at a package setup prompt

After you have built and successfully booted a kernel, your system may be inoperable because you supplied incorrect data to one or more package setup queries. The data may be valid input, but may inaccurately reflect your configuration. For example, supplying an inaccurate Internet address during the **tcpip** package setup process may be syntactically correct to the system, but will prevent a successful network connection. As a consequence, you cannot access remotely mounted file systems, nor can you exchange electronic mail.

If you supplied incorrect data to a package setup query, you must perform package setup again, this time providing the correct data. Follow these steps to recover:

1. At the shell prompt, log in as **root** (become superuser) and supply the correct password.

    ```
    # su ↵
    ```

2. Change the run level to **init 1.**

    ```
    # init 1 ↵
    ```

3. Shut down the system.

    ```
    # shutdown –g0 –y ↵
    ```

4. Rerun package setup for the desired package, such as **tcpip,** using the following command:

    ```
    # admpackage –o setup –F –rPRIMARY tcpip ↵
    ```

    Answer the queries relating to **tcpip** package setup, this time supplying the correct data. Refer to section on package setup in the appropriate chapter for a review of the procedure.

5. Change the run level to **init 3.**

    ```
    # init 3 ↵
    ```

6. Log in to the DG/UX system.

Upgrade problem with /tmp while preparing to load software packages

This problem occurs only during an upgrade. The system presents this progress message prior to package loading and setup:

```
Preparing to load the packages .....................
```

If you receive the following message:

```
/root//tmp:  file exists
UX:  mkdir:  ERROR:  Cannot create directory "/root
                     //tmp":  file exists

****  Error:  Cannot create directory
/root//tmp/root.proto.tmp

Press New Line to continue.
```

you previously created a symbolic link for the **tmp** file using an absolute rather than a relative pathname. You may have created a symbolic link from **/tmp** to **/var/tmp** or from **/var/tmp** to **/tmp** as follows:

```
ln  -s  /var/tmp  /tmp

ln  -s  /tmp  /var/tmp
```

You need to change the symbolic link's absolute pathname to a relative pathname before you can continue. Follow these steps:

1. Press Enter to end the installation process.

2. Type **q** and press Enter to quit the installation utility.

3. Reboot the system.

▶ If your system has an SCM, you can reboot from the system disk. Enter the appropriate boot command for your platform at the SCM> prompt. For example:

```
Intel:    SCM> b sd(npsc(pci(0),0,0))  ↵

88K:      SCM> b sd(ncsc(0),0,0)  ↵
```

▶ If your system does *not* have an SCM, you must turn off the power to your computer, and then turn it on again. The system will automatically reboot.

4. After the system boots, log in as **root**.

5. To change the absolute pathname to a relative pathname, type the following commands from the shell prompt.

▶ If you linked **/tmp** to **/var/tmp**, use these commands:

```
# cd / ↵
# rm tmp ↵
# ln -s var/tmp tmp ↵
```

▶ If you linked **/var/tmp** to **/tmp**, use these commands:

```
# cd /var ↵
# rm tmp ↵
# ln -s ../tmp tmp ↵
```

6. Restart the upgrade procedure using the chapter appropriate to your situation.

While repetition of the upgrade procedure up to the point of failure is unavoidable, you can step quickly through most of the prompts by pressing Enter to accept the answers you've already given.

Addressing faulty selection of CD-ROM disk drive for software loading

When upgrading from tape, if you inadvertently left a previous release or update of the DG/UX 5.4 distribution software in a CD-ROM drive, the **sysadm** utility may mistakenly select that drive as the load device. Answer **no** to the following prompt presented during system software loading:

```
Do you want to load from the system software distribution
disk? [yes] no ↵
```

You must deregister the CD-ROM device and remove the media before continuing.

To deregister the CD-ROM device, follow these steps:

1. Go to the sysadm Main Menu (type ^ to ascend menu levels until you reach the main menu).

2. Follow this sysadm path:

```
Devices -> Disk -> Physical -> Deregister
```

3. Sysadm lists registered disks. Select the offending CD-ROM drive for deregistering.

   The device is deregistered immediately, allowing you to open the drive door and remove the CD-ROM.

4. From the Sysadm Main Menu, follow this path to resume the upgrade procedure:

   ```
   Install Software -> Load software
   ```

   After you complete software loading, you must select explicitly the remaining installation steps from the Install System Software Menu.

   Resume the upgrade procedure using the chapter appropriate to your situation.

When booting to init 3 fails

In the DG/UX R4.11 release, the **/etc/utmp** and **/etc/wtmp** files have been moved to **/var/adm**, and the **/etc/utmp** and **/etc/wtmp** files are now symbolic links.

If you do not use the default configuration and set up the **/var** file system separate from the / (root) file system, you will not be able to boot to init 3. This is because the init process will attempt to make **/var/adm/utmp** entries before the **/var** file system is mounted. You will receive a write error and the system will stop at run level s, even if you specified booting to run level 3.

You can correct this problem by adding the following entry to your **/etc/inittab** file to mount the independent **/var** file system.

```
mnt::sysinit:/sbin/mount /var </dev/syscon >/dev/syscon 2>&1
```

You can edit the **/etc/inittab** file from init level s, after which you should halt the system and reboot.

When rebooting fails on an Intel-based system

If instead of rebooting, the system displays the `Boot command:` prompt, you must enter the **boot** command for your system. Remember that you are booting from the hard disk to init level 3. For example:

Boot command: **sd(npsc(pci(),d,0) root –f /dgux –i 3** ↵

You can use the command above, substituting the device name for your system in place of **npsc(pci(),d**. When you see the login screen, proceed to Chapter 7 to complete your installation.

For more information on using the **boot** command, refer to Appendix D. If you are not sure of the device name for your system, refer to the section on identifying boot, load, and system disk devices in Chapter 1.

Accidentally booting a pre-DG/UX 5.4R3.00 release kernel

If you boot a pre-Release 3.00 DG/UX 5.4 kernel (including stand-alone diskman) after converting disks from logical to virtual disk format, the kernel will attempt to repair what it interprets to be a damaged LDM-formatted physical disk. That *repair* operation destroys the disk's primary virtual information table (VDIT), which restricts the ways in which you can access data.

To recover, follow these steps:

1. Shut down the system and boot a DG/UX System 5.4 Release 3.00 or later kernel.

2. Using **sysadm,** execute the following:

   ```
   Device -> Disk -> Physical -> Repair
   ```

   This copies the secondary VDIT from the rear of the physical disk to the front, restoring the corrupted primary VDIT.

3. Register the repaired disk, as follows:

   ```
   Device -> Disk -> Physical -> Register
   ```

   IMPORTANT If you find it necessary to convert your DG/UX System to a release previous to Release 3.00, you must convert disks from virtual to logical disk format.

   You can convert only those disks that were originally created as logical disks using a pre-5.4R3.00 release of the DG/UX System. Any disks formatted under DG/UX 5.4 Release 3.00 or later in VDM format and cannot be converted to LDM format.

   You cannot access virtual disks under releases previous to DG/UX 5.4 Release 3.00. For more information, refer to the **admpdisk**(1M) man page and its discussion of the –o convert option.

End of Chapter

A   *Planning worksheets*

This appendix contains planning worksheets for gathering information required during installation or upgrade (see Table A–1). Chapter 1 provides information for completing the worksheets in this appendix.

Recording this data ahead of time accelerates the installation process. If you don't have this information on hand when prompted, it will disrupt the procedure.   Providing incorrect information may force you to abort the process and begin again.

You may photocopy and keep the worksheets at hand while actually performing the installation or upgrade. It's a good idea to save your planning worksheets as a record of your system's configuration after installation; they may be useful when or if you or someone else upgrades your system in the future.

Table A–1   Summary of planning worksheets

Worksheet	Description	When it's used during installation
Worksheet 1	Prerequisites	Before starting
Worksheet 2	Typical device specifications	Specifying boot device, load device and system disk names.
Worksheet 3	Remote host information	Booting sysadm from a remote host; specifying load device to sysadm.
Worksheet 4	Local host information	Booting sysadm from a remote host; specifying load device to sysadm.
Worksheet 5	Physical disks to prepare	"Prepare physical disks" phase of sysadm installer
Worksheet 6	Virtual disk sizes	"Prepare virtual disk" phase of sysadm installer
Worksheet 7	Packages to install	"Load packages" phase of sysadm installer
Worksheet 8	Secuirty software packages	Setting up DG/UX with information security packages and passwords
Worksheet 9	Network package information	Setting up ONC and TCP/IP packages.

Prerequisites

▶ **Ensure that your computer is equipped with sufficient main memory. If it is not, your installation or upgrade procedure will fail.**

- Intel-based computers require 32 Mbytes of main memory.
- 88K-based computers require 16 Mbytes of main memory.

Complete the following prerequisite checklist before proceeding .

Worksheet 1 Prerequisite conditions to accomplish installation or upgrade

Check here	If this is true:
❏ Yes ❏ No	My system has a System Control Monitor (SCM).
❏	My system is brand new or has a newly formatted system disk (I am *installing*); or, my system is currently running DG/UX 5.4R3.00 or later (I am *upgrading*).
❏	**Intel Only:** My Intel-based system is equipped with 32 Mbytes or more of main memory.
❏	**88K Only:** My 88K-based system is equipped with 16 Mbytes or more of main memory.
❏	**Intel Only:** If I have an Intel system and want to install other operating systems in addition to DG/UX, I have already done so, as described in the third-party documentation. I partitioned the disk to use only what disk space was necessary to install the software.
❏	If my system is in a dual-initiator failover or DG/UX cluster configuration, I have already completed necessary preparations described in related documentation.

Physical devices

Local boot, load, and system disk device

▶ Record your system's boot device (either local tape drive, local CD-ROM drive, or network device) and system disk drive name in the following table. Refer to your hardware operating manual or your release notice to verify the correct device name for your system.

> **IMPORTANT**   For additional information, refer to the DG/UX **boot** manual page reproduced in Appendix D.

Worksheet 2 Default boot, load, and system disk device names

Drive	Example Device Names	Actual Device Name
Local boot tape drive name	**Intel:** st(apsc(pci(),b),2) **88K:** st(dgsc(),4,0)	
Local boot CD-ROM drive	**Intel:** sd(apsc(pci(),b),4) **88K:** sd(dgsc(),3,0)	
Ethernet LAN device	**Intel:** dpen() or tcen() **88K:** dgen() or inen()	
System disk drive name	**Intel:** sd(apsc(pci(),b),0) **88K:** sd(dgsc(),0,0)	

Remote boot and load device

▶ **If you are installing or upgrading using a remote tape drive or remote file system, supply the necessary information for the remote host and local host. Record the information in the following tables.**

Worksheet 3 Remote host information required for remote installation or upgrade

Item	Example	Actual
Local host name	moe	
Internet address of local host	128.222.2.1	
Internet address of local host in hexadecimal	08e00201	
Pathname of remote device or file system	**/dev/rmt/0** for tape **/release** for file system	

Worksheet 4 Local host information required for remote installation or upgrade

Item	Example	Actual
Local host name	moe	
Internet address of local host	128.222.2.1	
Subnetwork mask for this host	0xffffff00	
Broadcast address for this host	128.222.2.255	
Remote host name	godot	
Internet address of remote host	128.222.2.3	
Tape only: Operating system type	DG/UX	
Pathname of remote device or file system	**/dev/rmt/0** for tape **/release** for file system	

Prepare physical disks

Unless you have read-only devices in your configuration, you can convert all devices to virtual disk format.

> **IMPORTANT** You *must* prepare the system disk, other physical disks that contain the DG/UX operating system, or any physical disks you have to convert to virtual disk format from logical disk format (e.g., compatibility mode).

You cannot convert read-only physical devices such as CD-ROM drives or WORM (Write once, read many) drives to virtual disk format.

▶ **Record the device names of physical disks to prepare in the following table.**

Worksheet 5 Physical disks to prepare

Physical Disks to prepare in Virtual Disk format*
1.
2.
3.
4.
Examples:
Intel: sd(apsc(pci(0),b),1,0)
88K: sd(ncsc(0),1,0)

* Leave these disks unregistered during installation

Prepare virtual disks

▶ **Record your system's space requirement for required virtual disks in the section of the table that pertains to your system.**

Worksheet 6 Space requirements for required virtual disks

88K virtual disk space requirements

Default virtual disk name	Required mount point directory	Default size (in blocks)	Actual size (to create at installation)
swap	None	50,000	
root	/	60,000	
usr	/usr	280,000	
dump (optional)	None	See Chap 1	
usr_opt_X11	/usr/opt/X11	90,000*	
usr_opt_networker	/usr/opt/networker	40,000	
usr_opt_sdk	/usr/opt/sdk	60,000	
var_opt_networker	/var/opt/networker	10,000	
TOTAL		590,000	

* If you do *not* load the **sdk** package, then usr_opt_X11 is 80,000.

Intel virtual disk space requirements

Default virtual disk name	Required mount point directory	Default size (in blocks)	Actual size (to create at installation)
swap	None	100,000	
root	/	60,000	
usr	/usr	280,000	
dump (optional)	None	*See Chap 1*	
usr_opt_X11	/usr/opt/X11	90,000*	
usr_opt_networker	/usr/opt/networker	30,000	
usr_opt_sdk	/usr/opt/sdk	50,000	
var_opt_networker	/var/opt/networker	10,000	
TOTAL		620,000	

* If you do *not* load the **sdk** package, then usr_opt_X11 is 80,000.

Load Software

DG/UX software packages

▶ **Use the following table to check the names of the DG/UX software packages you are installing or upgrading.**

Worksheet 7 DG/UX software packages to install

Check Box	Package name
❑	**dgux**
❑	**dgux.man**
❑	**dgux.aco (Intel only)**
❑	**dgux.aco.man (Intel only)**
❑	**networker**
❑	**networker.man**
❑	**nfs**
❑	**nfs.man**
❑	**onc**
❑	**onc.man**
❑	**sdk**
❑	**sdk.man**
❑	**sdk.X11**
❑	**sdk.X11.man**
❑	**tcpip**
❑	**tcpip.man**
❑	**X11**
❑	**X11.man**
❑	**X11.aco (Intel only)**

DG/UX information security software packages

▶ **Use the following table to check the names of theinformation security software packages you are installing.**

Worksheet 8 DG/UX DSO Information Security software packages to install

Check Box	Package Name
❑	**dgux**
❑	**dgux.man**
❑	**dgux.aco (Intel only)**
❑	**dgux.aco.man (Intel only)**
❑	**dso**
❑	**dso.man**
❑	**nfs**
❑	**nfs.man**
❑	**onc**
❑	**onc.man**
❑	**sdk**
❑	**sdk.man**
❑	**sdk,X11**
❑	**sdk.X11.man**
❑	**tcpip**
❑	**tcpip.man**
❑	**X11**
❑	**X11.man**
❑	**X11.aco (Intel only)**

Set up software

▶ **Record your package parameter and network configuration
information in the following table.**

Worksheet 9 Optional package setup parameters

Package parameters	Example	Actual
Configure system as client of a remote NetWorker server?	no	
NIS domain	worknet	
Host	moe	
Host Internet address	128.224.1.2	
Do you subnet?	yes	
Network mask	0xffffff00	
Controller device	dgen0	

End of Appendix

B Sample installation dialog for 88K-based systems

This appendix contains a typical dialog for the full installation of DG/UX Release 4.11 on a typical 88K-based system using a local CD-ROM device.

Installer actions, such as answering questions or pressing Enter, appear in boldface. You'll see an estimate of elapsed time in the left margin, using the form `hours:minutes`.

> **IMPORTANT**   Note that the elapsed times in this example reflect a system loading using a particular hardware and software configuration; installation times vary according to your system's configuration.

```
0:00          SCM> b sd(ncsc(),3) ↵

              Booting sd(ncsc(),3)
              DG/UX System Release 4.11 Bootstrap
0:01          Loading image
              ......................................................
              DG/UX System Release 4.11, Version Standalone sysadm
0:04          Using 32 Megabytes of physical memory
              Found 1 processor
              Configuring devices .....................................
              Registering disks ..
              Running with no swap area.
              Using memory-resident root file system
              Creating /dev ....


              INIT: SINGLE USER MODE

                          Standalone Sysadm Main Menu

                1  Physical Disk ->     Manage physical disks
                2  Virtual Disk ->      Manage virtual disks
                3  File System ->       Manage file systems
                4  Install Software ->  Install system software

              Enter a number, a name, ? or <number>? for help, <NL> to take
              the default, or q to quit: [Install Software] ↵
```

```
                    Install System Software Menu

          1  Prepare physical disks ...
          2  Prepare virtual disks ...
          3  Load software ...
          4  Set up software ...
          5  Configure and Build kernel ...
          6  Reboot kernel ...
          7  All steps


        Enter a number, a name, ? or <number>? for help, <NL> to take
        the default,^ to return to previous menu, or q to quit: [All
        steps] ↵

        1.  Prepare physical disks

        Run this step now? [yes] ↵
        Physical disk(s) to prepare: [all] ↵
        Bootstrap installed in existing partition on
            sd(ncsc(0,7),0,0)
(short    Physical disk sd(ncsc(0,7),0,0) prepared.
pause)
        2.  Prepare required virtual disks

        Run this step now? [yes] ↵
        Register all standard physical disks? [yes] ↵
        Physical disk sd(ncsc(0,7),0,0) registered.

(short    Required File System Mount Points:
pause)
    File System   Virtual   Current  Action    Blocks   Physical
    Mount Point   Disk      Blocks   Required  To Add   Disk
    -----------   -------   -------  --------  ------   --------
    -none-        swap        -      Create    50000    sd(ncsc(0,7),0,0)
    /             root        -      Create    60000    sd(ncsc(0,7),0,0)
    /usr          usr         -      Create    280000   sd(ncsc(0,7),0,0)

    Modify this information? [no] ↵
```

```
        Creating /dev/dsk/swap (50000 blocks) on sd(ncsc(0,7),0,0).
        Virtual disk "swap" created.
        Virtual disk "swap" made a volume.
        Beginning swapping on /dev/dsk/swap.
        Creating /dev/dsk/root (60000 blocks) on sd(ncsc(0,7),0,0).
        Virtual disk "root" created.
        Virtual disk "root" made a volume.
        Making file system on /dev/dsk/root.
        Mounting /dev/dsk/root.
        Creating /dev/dsk/usr (280000 blocks) on sd(ncsc(0,7),0,0).
        Virtual disk "usr" created.
        Virtual disk "usr" made a volume.
        Making file system on /dev/dsk/usr.
        Mounting /dev/dsk/usr.

        No existing 'halt dump' disk found. Current free disk pieces
        (contiguous free space regions specified in blocks):

        Physical Disk      Free Pieces
        -------------      -----------
        sd(ncsc(0,7),0,0)    439703

        Create a virtual disk for halt dumps? [yes] ↵

   Recommended Virtual Disks:

   File System    Virtual   Current   Action     Blocks    Physical
   Mount Point    Disk      Blocks    Required   To Add    Disk
   ------------   --------  -------   --------   ------    ----------------
   -none-         dump      -         Create     57000     sd(ncsc(0,7),0,0)

   Modify this information? [no] ↵

        Creating  /dev/dsk/dump (57000 blocks) on sd(ncsc(0,7),0,0).
        Virtual disk "dump" created.
        Virtual disk "dump" made a volume.
        Making vdm_dump(sd(ncsc(0,7),0,0),dump) the default dump
          device.

        3.  Load software

        Run this step now? [yes] ↵
        Type of release medium: [CD-ROM] ↵

        Release Name: [DG/UX R4.11] ↵
```

(short
pause)
```
        DG/UX Operating System with X Window System R4.11 of
        <month/date/year> from Data General Corporation
        Package Name(s): [development] ↵
```

As a convenience, package suites have been defined for this
release. Suites are collections of packages. Selecting a
suite causes all packages associated with that suite to be
loaded from the release medium. The following list shows all
suites and the packages associated with them, as well as the
individual package selections.

If there are specific suites and/or packages you want to
load, you may select the suite or package by name or number.
Separate the names or numbers with commas. A combination of
multiple suites and/or packages may be selected. Note that
this results in the installation of the union of the selected
suites and/or packages.

The available suites and packages are:

The suite 'development' contains the packages:
  dgux
  networker
  nfs
  onc
  sdk
  sdk.X11

Press Enter   .... next page? (? for help) [yes]
at the Pager
prompt to   tcpip
display the   X11
full screen.   dgux.man
                    networker.man
                    nfs.man
                    onc.man
                    sdk.man
                    sdk.X11.man
                    tcpip.man
                    X11.man

    This suite contains the base DG/UX Operating System
    and Software Development Kit packages.

The suite 'production' contains the packages:
  dgux
  networker
  nfs
  onc
  tcpip
  X11
  dgux.man

Press Enter   .... next page? (? for help) [yes]
at the Pager
prompt to
display the
full screen.

```
    networker.man
    nfs.man
    onc.man
    tcpip.man
    X11.man

    This suite contains the base DG/UX Operating System
    packages.

  The suite 'sdk_all' contains the packages:
    sdk
    sdk.X11
    sdk.man
    sdk.X11.man

    This suite contains the Software Development Kit packages.
  The base DG/UX Operating System packages must already be
  loaded.

  Choices are

    1  development
```

Press Enter
at the Pager
prompt to
display the
full screen.

```
   .... next page? (? for help) [yes]

    2  production
    3  sdk_all
    4  dgux
    5  networker
    6  nfs
    7  onc
    8  sdk
    9  sdk.X11
   10  tcpip
   11  X11
   12  dgux.man
   13  networker.man
   14  nfs.man
   15  onc.man
   16  sdk.man
   17  sdk.X11.man
   12  tcpip.man
   13  X11.man
```

B-6

```
Enter a number, a range of numbers (n–m, where m can be '$'
to indicate the last item), a name, the initial part of a
name, <NL> to take the default, ? for help, ^ to return to
the previous query, < to restart the operation, or q to quit.

  .... next page? (? for help) [yes] ↵
...end pager? (? for help) [yes] ↵

Package Name(s): [development] ↵

        You selected the following packages:

          dgux
          networker
          nfs
          onc
          sdk
          sdk.X11
          tcpip
          X11
          dgux.man
          networker.man
          nfs.man
          onc.man
          sdk.man
          sdk.X11.man
          tcpip.man
          X11.man


         Correct? [yes]

    List file names while loading? [no] ↵
    Answer kernel build questions before loading? [yes] ↵
    System configuration identifier: [aviion] moe ↵
    [moe] Correct? [ yes] ↵
    Operating system client? [no] ↵

    Automatically reboot after building kernel? [yes] ↵
```

<table>
<tr><td>(short
pause)</td><td>Checking for recommended file system mount points ....</td></tr>
</table>

```
    Recommended File System Mount Points:
```

File System Mount Point	Virtual Disk	Current Blocks	Action Required	Blocks To Add	Physical Disk
/usr/opt/X11	usr_opt_X11	–	Create	90000	sd(ncsc(0,7),0,0)
/usr/opt/networker	usr_opt_networker	–	Create	40000	sd(ncsc(0,7),0,0)
/usr/opt/sdk	usr_opt_sdk	–	Create	60000	sd(ncsc(0,7),0,0)

```
Modify this information? [no] ↵
```

```
Creating /dev/dsk/usr_opt_X11 (90000 blocks) on
   sd(ncsc(0,7),0,0).
Virtual disk "usr_opt_X11" created.
Virtual disk "usr_opt_X11" made a volume.
Making file system on /dev/dsk/usr_opt_X11
Mounting /dev/dsk/usr_opt_X11.
Creating /dev/dsk/usr_opt_networker (40000 blocks) on
   sd(ncsc(0,7),0,0).
Virtual disk "usr_opt_networker" created.
Virtual disk "usr_opt_networker" made a volume.
Making file system on /dev/dsk/usr_opt_networker.
Mounting /dev/dsk/usr_opt_networker.
Creating /dev/dsk/usr_opt_sdk (60000 blocks) on
   sd(ncsc(0,7),0,0).
Virtual disk "usr_opt_sdk" created.
Virtual disk "usr_opt_sdk" made a volume.
Making file system on /dev/dsk/usr_opt_sdk.
Mounting /dev/dsk/usr_opt_sdk.
```

0:35
```
Validating capacity of the mounted file systems
......................................................
......................................................
.................................................
NOTE:  The installation utility will now start the package
       loading phase of the installation procedure. Once
       this phase begins, you cannot interrupt it.
```

0:50
```
Continue with the installation? [yes] ↵

NOTE:  If the packages you have selected require setup
       (e.g., onc, tcpip, networker, etc.), then please wait
       until the next prompt appears. The delay may take
       up to 5 minutes depending on the number of packages
       you have chosen to load.

Loading DG/UX Operating System with X Window System R4.11 of
<month/date/year> from Data General Corporation.


NOTE:  To expedite the package loading and setup steps,
       you can answer package setup questions in advance
       of package loading by pressing Enter at the
       prompt. If, instead, you prefer to continue the
       package loading and setup steps interactively and
       at your own pace, type no before you press Enter.
```

```
            Do you want to answer, in advance, package setup questions
            before package loading is complete? [yes] ↵

            Configure system as a client for a remote NetWorker server?
            [no] ↵

            Will this system be running as a node within a cluster?
            [no] ↵

            You now have the opportunity to create or adjust the size of
            the /var/opt/networker file system.  This file system is
            needed to store the NetWorker online index and log files.
            The default size of 10000 blocks is enough space to store
            index information for multiple versions of several thousand
            files--about enough for a small workstation with a single
            disk drive.  THIS IS NOT ENOUGH SPACE FOR A SERVER WITH
            REMOTE CLIENTS!  If your system has more than one disk drive,
            or if it will be acting as a NetWorker server for remote
            clients, you probably need to allocate additional space for
            the online index.  See the installing manual for instructions
            on estimating the space requirements for the online index.

/var/opt/networker File System:

File System        Virtual            Current Action   Blocks Physical
Mount Point        Disk               Blocks  Required To Add Disk
-----------        -------            ------- -------- ------ ---------------
/var/opt/networker var_opt_networker  -       Create   10000  sd(ncsc(0,7),0)

        Modify this information? [no] ↵

        Creating /dev/dsk/var_opt_networker (10000 blocks) on sd(ncsc(0,7),0,0).


        Virtual disk "var_opt_networker" created.
        Virtual disk "var_opt_networker" made a volume.
        Making file system on /dev/dsk/var_opt_networker.
        Mounting /dev/dsk/var_opt_networker.

            Enter the NIS Domain name: ux_kernel ↵
            [ux_kernel] Correct? [yes] ↵

        The following queries refer to the primary network
        interface:

            Enter host name: moe ↵
            [moe] Correct? [yes] ↵
            Enter host Internet address: 128.222.2.1 ↵
            [128.222.21.3] Correct? [yes] ↵
            Is your local network subnetted? [no] yes ↵
            Enter the network mask: 0xffffff00 ↵
            [0xffffff00] Correct? [yes] ↵
```

```
          NOTE:  Using "dgen0" as the primary network interface
                 controller.

1:05      Preparing to load the packages...............................


          Loading package dgux .......................................
1:45      Package dgux has been loaded.

          Loading package networker ......
          Package networker has been loaded.

          Loading package nfs ........
          Package nfs has been loaded.

          Loading package onc ........
          Package onc has been loaded.

          Loading package sdk ........
          Package onc has been loaded.

          Loading package sdk.X11 ........
          Package onc has been loaded.

          Loading package tcpip ............
          Package tcpip has been loaded.


2:05      Loading package X11 ...............................
          Package X11 has been loaded.

          Loading package dgux.man ......
          Package dgux.man has been loaded.

          Loading package networker.man ............
          Package networker.man has been loaded.

          Loading package nfs.man .....
          Package nfs.man has been loaded.

          Loading package onc.man .....
          Package onc.man has been loaded.

          Loading package sdk.man ........
          Package onc has been loaded.

          Loading package sdk.X11.man ........
          Package onc has been loaded.

          Loading package tcpip.man ....
          Package tcpip.man has been loaded.
```

```
            Loading package X11.man .........
            Package X11.man has been loaded.

            Package load is finished.
            The selected packages have been loaded.

            4.  Set up software

            Setting up dgux in usr.

                  Initializing DG/UX /usr files ....

                  Continuing setup of DG/UX ....

NOTE: See srv/release/PRIMARY/root/MY_HOST/var/setup.d/log/dgux.usr
      for a detailed account of the usr setup of DG/UX.

            Package dgux has been successfully set up in usr.
            Setting up dgux in MY_HOST root.

                  Setting up DG/UX .......

                  Initializing DG/UX prototype files ....................
            .....
            ....
                  Creating DG/UX run level links ....................

                  Initializing sysadm(1M) ..........

            ....
      NOTE: See /srv/release/PRIMARY/root/MY_HOST/var/setup.d/log/dgux.root
            for a detailed account of the root setup of DG/UX.

            Package dgux has been successfully set up in MY_HOST root.
            Package setup for dgux is complete.

            Setting up dg/ux.man in usr.
            Setting up dgux.man man pages:...

            Package dgux.man has been successfully set up in usr.
            Package setup for dgux.man is complete.

            Setting up networker in usr.
            Creating symbolic links ...
            Package networker has been successfully set up in usr.
            Setting up networker in MY_HOST root.

              Creating Networker run level links........................
            ..Package networker has been successfully set up in MY_HOST
                root.
            Package setup for networker is complete.
```

```
        Setting up nfs in MY_HOST root.
        Setting up NFS in MY_HOST root....
        Creating NFS run level links.........
        Initializing NFS prototype files......

 NOTE:  See /srv/release/PRIMARY/root/MY_HOST/var/setup.d/log/nfs.root
        for a detailed account of the root setup of NFS.

        ...Package nfs has been successfully set up in MY_HOST root.
        Package setup for nfs is complete.

        Setting up nfs.man in usr.
        Setting up nfs.man man pages:...

        Package nfs.man has been successfully set up in usr.
        Package setup for nfs.man is complete.

        Setting up onc in MY_HOST root.
            Initializing ONC prototype files.......
            Creating ONC run level links.........

            NOTE:  This host will first run as an NIS client.

 NOTE:  See /srv/release/PRIMARY/root/MY_HOST/var/setup.d/log/onc.root
        for a detailed account of the root setup of ONC.

        Package onc has been successfully set up in MY_HOST root.
        Package setup for onc is complete.

        Setting up onc.man in usr.
        Setting up onc.man man pages:...

        Package onc.man has been successfully set up in usr.
        Package setup for onc.man is complete.

        Setting up sdk in usr.
        ........................................................
        Package sdk has been successfully set up in usr.
        Package setup for sdk is complete.

        Setting up sdk.man in usr.
        Setting up sdk.man man pages:...

        Package sdk.man has been successfully set up in usr.
        Package setup for sdk.man is complete.

        Setting up sdk.X11 in usr.
            Creating sdk.sde directories and links..
        Package sdk.X11 has been sucessfully set up in usr.
        Package setup for sdk.X11 is complete.

        Setting up tcpip in usr.
            Setting up tcpip...

          NOTE:  The /usr/bin/rsh command now executes as a remote
              shell(remsh), not as a restricted shell(restsh).
```

```
NOTE: See /srv/release/PRIMARY/root/MY_HOST/var/setup.d/log/tcpip.usr
      file for a verbose description of the package setup for usr.

      Package tcpip has been successfully set up in usr.
      Setting up tcpip in MY_HOST root.
          Setting up tcpip ...
          Creating TCP/IP run level links ...
          Continuing TCP/IP setup......................

          NOTE:  See /var/setup.d/log/tcpip.root file for a
                 verbose description of the package setup for root.

      Package tcpip has been successfully set up in MY_HOST root.
      Package setup for tcpip is complete.

      Setting up tcpip.man in usr.
      Setting up tcpip.man man pages:...

      Package tcpip.man has been successfully set up in usr.
      Package setup for tcpip.man is complete.

      Setting up X11 in usr.
          Creating X11 directories and links...........
          Creating root and usr prototypes for X11........
          Cleaning up the SDK area.
      Package X11 has been successfully set up in usr.
      Setting up X11 in MY_HOST root.
      Package X11 has been successfully set up in MY_HOST root.
      Package setup for X11 is complete.

      Setting up X11.man in usr.
          Creating X11.man directories and links..
      Package X11.man has been successfully set up in usr.
      Package setup for X11.man is complete.

      Setting up X11.man in usr.
          Creating X11.man directories and links..
      Setting up X11.man man pages.

      Package X11.man has been successfully set up in usr.
      Package setup for X11.man is complete.

      5.  Configure and Build kernel
```

2:30
```
      Configuring system...
      Building kernel...
      Successfully built dgux.moe.
      Linked /dgux.  You must reboot in order for this kernel to
      take effect.
```

```
6.  Reboot kernel

Booting sd(ncsc(0,7),0,0)root:/dgux -3
DG/UX System Release 4.11 Bootstrap
Loading image .........................................


DG/UX System Release 4.11, Version generic
Using 24 Megabytes of physical memory
Found 1 processor
Configuring devices ......................................
Registering disks ..
Using vdm(swap,2D039A43,0C027700,0) as swap disk.
No check necessary for vdm(root,2D1F019E,0C027700,0).

Mounting vdm(root,2D1F019E,0C027700,0) as root file system.
Creating /dev ....




     Checking local file systems ........
     Mounting local file systems .....
     Current date and time is <day month date time year> ...

     Checking system files .......
     WARNING:  These local accounts need passwords:
                  root
                  sysadm
              Assign passwords as soon as possible.


     Continuing system initialization ....
     Enabling automatically pushed STREAMS modules ........
     Linking short names for /dev device nodes .........
     Restoring TCP/IP tunable parameters
     Loading terminal controllers ....
     Starting disk daemons ....
     Mounting local file systems .....
     Checking for packages that have not been set up ...
     Starting miscellaneous daemons ...
     Starting STREAMS error logging daemon ....
     Starting Logical Link Control Services ....

     Attaching TCP/IP network interfaces ...........
     Starting system logging daemon ....
     Starting NIS services as NIS client ......
     Starting NFS lock services .....
     Starting batch services ....
     Starting line printer scheduler ....
```

```
        Saving ex(1) and vi(1) temporary files ....
        Starting NFS services .....
        Starting TCP/IP daemons .......
        Mounting NFS file systems .....
        Starting DG/UX administrative services .....
        Starting NetWorker server daemons .....


    NOTE:  The run level change is complete.  See
           /etc/log/init.log for a verbose description
           of the system initialization process.
```

2:50   Press New Line to continue.

```
moe
DG/UX Operating System    R4.11
Console Login:
```

> **IMPORTANT**   If you are using a graphics monitor, do not log in at
> the console login prompt, wait a few seconds for the login screen to
> appear.

End of Appendix

C   *Sample installation dialog for Intel-based systems*

This appendix contains a typical dialog for the full installation of DG/UX Release 4.11 on a typical AV 2000 Intel-based system using a boot floppy and a local CD-ROM device.

User actions, such as answering questions or pressing Enter, appear in boldface. You'll see an estimate of elapsed time in the left margin, using the form `hours:minutes.`

> **IMPORTANT**   Note that the elapsed times in this example reflect a system loading using a particular hardware and software configuration; installation times vary according to your system's configuration.

▶ Insert the DG/UX 4.11 medium (CD-ROM) and the boot floppy (diskette) in their respective drives.

▶ Power on your system. The system will reset and proceed to boot the installation floppy and display the following prompt:

```
Boot command:
```

▶ Enter the name of the CD device.

```
Boot command: sd(apsc(pci(),b),4) ↵
```

▶ You can remove the boot floppy from its drive at any time now. The boot floppy provides the initial `Boot command:` prompt. You may choose to leave it in the drive until you are sure that you will not need to start over, but you should remove it from the drive before you reboot the kernel.

 After you complete the installation of the DG/UX R4.11 product, the DG/UX system will provide the `Boot command:` prompt. However, you can always use the boot floppy to provide the `Boot command:` prompt or to override the system boot path if the DG/UX system is unable to do so.

```
          Booting sd(apsc(pci(),b),4)
          DG/UX System Release 4.11 Bootstrap
0:01      Loading image
          ..........................................................
          DG/UX System Release 4.11, Version Standalone sysadm
0:04      Using 32 Megabytes of physical memory
          Found 1 processor
          Configuring devices ......................................
          Registering disks ..
          Running with no swap area.
          Using memory-resident root file system
          Creating /dev ....


          INIT: SINGLE USER MODE

                        Standalone Sysadm Main Menu

            1  Physical Disk ->    Manage physical disks
            2  Virtual Disk ->     Manage virtual disks
            3  File System ->      Manage file systems
            4  Install Software -> Install system software

          Enter a number, a name, ? or <number>? for help, <NL> to take
          the default, or q to quit: [Install Software] ↵

                        Install System Software Menu

            1  Prepare physical disks ...
            2  Prepare virtual disks ...
            3  Load software ...
            4  Set up software ...
            5  Configure and Build kernel ...
            6  Reboot kernel ...
            7  All steps

          Enter a number, a name, ? or <number>? for help, <NL> to take
          the default,^ to return to previous menu, or q to quit: [All
          steps] ↵

          1.  Prepare physical disks

          Run this step now? [yes] ↵
          Physical disk(s) to prepare: [all] ↵

          NvRAM database installed in existing partition on
             sd(apsc(pci(0),B,0,7),0,0).
          Bootstrap installed in existing partition on
             sd(apsc(pci(0),B,0,7),0,0).

(short    Physical disk sd(apsc(pci(0),B,0,7),0,0) prepared.
pause)
```

```
        2.  Prepare required virtual disks

        Run this step now? [yes] ↵
        Register all standard physical disks? [yes] ↵
```

```
                Required File System Mount Points:
```

File System Mount Point	Virtual Disk	Current Blocks	Action Required	Blocks To Add	Physical Disk
–none–	swap	–	Create	100000	sd(apsc(pci(0),B,0,7),0,0)
/	root	–	Create	60000	sd(apsc(pci(0),B,0,7),0,0)
/usr	usr	–	Create	280000	sd(apsc(pci(0),B,0,7),0,0)

```
Modify this information? [no] ↵


        Creating /dev/dsk/swap (100000 blocks) on
            sd(apsc(pci(0),B,0,7),0,0)
        Virtual disk "swap" created.
        Virtual disk "swap" made a volume.
        Beginning swapping on /dev/dsk/swap.
        Creating /dev/dsk/root (60000 blocks) on
            sd(apsc(pci(0),B,0,7),0,0)
        Virtual disk "root" created.
        Virtual disk "root" made a volume.
        Making file system on /dev/dsk/root.
        Mounting /dev/dsk/root.
        Creating /dev/dsk/usr (280000 blocks) on
            sd(apsc(pci(0),B,0,7),0,0)
        Virtual disk "usr" created.
        Virtual disk "usr" made a volume.
        Making file system on /dev/dsk/usr.
        Mounting /dev/dsk/usr.


        No existing 'halt dump' disk found. Current free disk pieces
        (contiguous free space regions specified in blocks):

        Physical Disk                 Free Pieces
        -------------                 -----------
        sd(apsc(pci(0),B,0,7),0,0)      543643


        Create a virtual disk for halt dumps? [yes] ↵

      Recommended Virtual Disks:
```

File System Mount Point	Virtual Disk	Current Blocks	Action Required	Blocks To Add	Physical Disk
–none–	dump	–	Create	57000	sd(apsc(pci(0),B,0,7),0,0)

```
        Modify this information? [no] ↵
```

```
Creating  /dev/dsk/dump (57000 blocks) on
     sd(apsc(pci(0),B,0,7),0,0).
Virtual disk "dump" created.
Virtual disk "dump" made a volume.
Making vdm_dump(sd(apsc(pci(0),B,0,7),0,0),dump) the default
     dump device.

3.  Load software

Run this step now? [yes] ↵
Type of release medium: [CD-ROM] ↵

Release Name: [DG/UX R4.11] ↵
```

(short
pause)
```
DG/UX Operating System with X Window System R4.11 of
<month/date/year> from Data General Corporation
Package Name(s): [development] ? ↵


As a convenience, package suites have been defined for this
release. Suites are collections of packages. Selecting a
suite causes all packages associated with that suite to be
loaded from the release medium. The following list shows all
suites and the packages associated with them, as well as the
individual package selections.

If there are specific suites and/or packages you want to
load, you may select the suite or package by name or number.
Separate the names or numbers with commas. A combination of
multiple suites and/or packages may be selected. Note that
this results in the installation of the union of the selected
suites and/or packages.

The available suites and packages are:

The suite 'development' contains the packages:
  dgux
  networker
  nfs
  onc
  sdk
  sdk.X11
```

Press Enter
at the Pager
prompt to
display the
full screen.
```
.... next page? (? for help) [yes]


tcpip
X11
dgux.man
networker.man
nfs.man
onc.man
```

```
        sdk.man
        sdk.X11.man
        tcpip.man
        X11.man

        This suite contains the base DG/UX Operating System
        and Software Development Kit packages.

    The suite 'production' contains the packages:
        dgux
        networker
        nfs
        onc
        tcpip
        X11
        dgux.man
```

Press Enter at the Pager prompt to display the full screen.

```
        .... next page? (? for help) [yes]

        networker.man
        nfs.man
        onc.man
        tcpip.man
        X11.man

        This suite contains the base DG/UX Operating System
        packages.

    The suite 'sdk_all' contains the packages:
        sdk
        sdk.X11
        sdk.man
        sdk.X11.man

        This suite contains the Software Development Kit packages.
        The base DG/UX Operating System packages must already be
        loaded.

    The suite 'aco' contains the packages:

        dgux.aco
        X11.aco
        dgux.aco.man

        This suite only contains the Application Capture
        Option. The base DG/UX Operating System packages
        must already be loaded.
```

```
         Choices are

          1  development
          2  production
          3  sdk_all
          4  aco
          5  dgux
          6  dgux.aco
          7  networker
          8  nfs
          9  onc
         10  sdk
         11  sdk.X11
         12  tcpip
         13  X11
         14  X11.aco
         15  dgux.man
```

Press Enter
at the Pager   `.... next page? (? for help) [yes]`
prompt to
display the
full screen.

```
         16  dgux.aco.man
         17  networker.man
         18  nfs.man
         19  onc.man
         20  sdk.man
         21  sdk.X11.man
         22  tcpip.man
         23  X11.man

         Enter a number, a range of numbers (n–m, where m can be '$'
         to indicate the last item), a name, the initial part of a
         name, <NL> to take the default, ? for help, ^ to return to
         the previous query, < to restart the operation, or q to quit.

         ...end pager? (? for help) [yes]

         Package Name(s): [development] 1,4 ↵
```

```
            You selected the following packages:

              dgux
              networker
              nfs
              onc
              sdk
              sdk.X11
              tcpip
              X11
              dgux.man
              networker.man
              nfs.man
              onc.man
              sdk.man
              sdk.X11.man
              tcpip.man
              X11.man
              dgux.aco
              X11.aco
              dgux.X11.man
              dgux.aco.man

            Correct? [yes]

            List file names while loading? [no] ↵
            Answer kernel build questions before loading? [yes] ↵
            System configuration identifier: [aviion] moe ↵
            [moe] Correct? [ yes] ↵
            Operating system client? [no] ↵
```

> **IMPORTANT**   The DG/UX R4.11 operating system for Intel-based systems does not support diskless workstations.

```
            Automatically reboot after building kernel? [yes] ↵
```

> **IMPORTANT**   If you have not already done so, be sure to remove the boot floppy from the drive before the system tries to reboot.

(short
pause)

```
            Checking for recommended file system mount points ........

            Recommended File System Mount Points:
```

File System Mount Point	Virtual Disk	Current Blocks	Action Required	Blocks To Add	Physical Disk
/usr/opt/X11	usr_opt_X11	–	Create	10000	sd(apsc(pci(0),B),0,0)
/usr/opt/networker	usr_opt_networker	–	Create	30000	sd(apsc(pci(0),B),0,0)
/usr/opt/sdk	usr_opt_sdk	–	Create	50000	sd(apsc(pci(0),B),0,0)

```
Modify this information? [no] ↵
```

```
Creating /dev/dsk/usr_opt_X11 (90000 blocks) on
   sd(apsc(pci(0),B,0,7),0,0).
Virtual disk "usr_opt_X11" created.
Virtual disk "usr_opt_X11" made a volume.
Making file system on /dev/dsk/usr_opt_X11.
Mounting /dev/dsk/usr_opt_X11.
Creating /dev/dsk/usr_opt_networker (30000 blocks) on
   sd(apsc(pci(0),B,0,7),0,0).
Virtual disk "usr_opt_networker" created.
Virtual disk "usr_opt_networker" made a volume.
Making file system on /dev/dsk/usr_opt_networker.
Mounting /dev/dsk/usr_opt_networker.
Creating /dev/dsk/usr_opt_sdk (50000 blocks) on
   sd(apsc(pci(0),B,0,7),0,0).
Virtual disk "usr_opt_sdk" created.
Virtual disk "usr_opt_sdk" made a volume.
Making file system on /dev/dsk/usr_opt_sdk
Mounting /dev/dsk/usr_opt_sdk.
```

0:30
```
Validating capacity of the mounted file systems
..........................................................
..........................................................
...................................................
NOTE:   The installation utility will now start the package
        loading phase of the installation procedure. Once
        this phase begins, you cannot interrupt it.
```

0:45
```
Continue with the installation? [yes] ↵

NOTE:   If the packages you have selected require setup
        (e.g. onc, tcpip, networker, etc.) then please wait
        until the next prompt appears. The delay may take
        up to 5 minutes depending on the number of packages
        you have chosen to load.

Loading DG/UX Operating System with X Window System R4.11 of
<month/date/year> from Data General Corporation.


NOTE:   To expedite the package loading and setup steps,
        you can answer package setup questions in advance
        of package loading by pressing Enter at the
        prompt. If, instead, you prefer to continue the
        package loading and setup steps interactively and
        at your own pace, type no before you press Enter.


Do you want to answer, in advance, package setup questions
before package loading is complete? [yes] ↵

Configure system as a client for a remote NetWorker server?
[no] ↵
```

Will this system be running as a node within a cluster?
[no] ↵

You now have the opportunity to create or adjust the size of
the /var/opt/networker file system. This file system is
needed to store the NetWorker online index and log files.
The default size of 10000 blocks is enough space to store
index information for multiple versions of several thousand
files--about enough for a small workstation with a single
disk drive. THIS IS NOT ENOUGH SPACE FOR A SERVER WITH
REMOTE CLIENTS! If your system has more than one disk drive,
or if it will be acting as a NetWorker server for remote
clients, you probably need to allocate additional space for
the online index. See the installing manual for instructions
on estimating the space requirements for the online index.

/var/opt/networker File System:

File System Mount Point	Virtual Disk	Current Blocks	Action Required	Blocks To Add	Physical Disk
/var/opt/networker	var_opt_networker	–	Create	10000	sd(apsc(pci(0),B,0,7

Modify this information? [no] ↵

Creating /dev/dsk/var_opt_networker (10000 blocks) on
    sd(apsc(pci(0),B,0,7),0,0)

Virtual disk "var_opt_networker" created.
Virtual disk "var_opt_networker" made a volume.
Making file system on /dev/dsk/var_opt_networker.
Mounting /dev/dsk/var_opt_networker.

    Enter the NIS Domain name: **ux_kernel** ↵
    [ux_kernel] Correct? [yes] ↵

The following queries refer to the primary network interface:

    Enter host name: **moe** ↵
    [moe] Correct? [yes] ↵
    Enter host Internet address: **128.224.2.1** ↵
    [128.224.2.1] Correct? [yes] ↵
    Is your local network subnetted? [no] **yes** ↵
    Enter the network mask: **0xffffff00** ↵
    [0xffffff00] Correct? [yes] ↵

NOTE: Using "dpen0" as the primary network interface
        controller.

1:05   Preparing to load the packages
        ....

        Loading package dgux ....
1:45   Package dgux has been loaded.

```
Loading package dgux.aco ......
Package dgux.aco has been loaded.

Loading package networker ......
Package networker has been loaded.

Loading package nfs ........
Package nfs has been loaded.

Loading package onc ........
Package onc has been loaded.


Loading package sdk ........
Package onc has been loaded.

Loading package sdk.X11 ........
Package onc has been loaded.

Loading package tcpip ............
Package tcpip has been loaded.
```

2:00
```
Loading package X11 ...............................
Package X11 has been loaded.

Loading package X11.aco ......
Package X11.aco has been loaded.

Loading package dgux.man ......
Package dgux.man has been loaded.

Loading package dgux.aco.man ......
Package dgux.aco.man has been loaded.

Loading package networker.man ....
Package networker.man has been loaded.

Loading package nfs.man .....
Package nfs.man has been loaded.

Loading package onc.man .....
Package onc.man has been loaded.

Loading package sdk.man ........
Package onc has been loaded.

Loading package sdk.X11.man ........
Package onc has been loaded.
```

```
        Loading package tcpip.man ....
        Package tcpip.man has been loaded.

        Loading package X11.man .........
        Package X11.man has been loaded.

        Package load is finished.
        The selected packages have been loaded.


        4.  Set up software

        Setting up dgux in usr.

              Initializing DG/UX /usr files ....

              Continuing setup of DG/UX ....


NOTE: See srv/release/PRIMARY/root/MY_HOST/var/setup.d/log/dgux.usr
        for a detailed account of the usr setup of DG/UX.


        Package dgux has been successfully set up in usr.
        Setting up dgux in MY_HOST root.

              Setting up DG/UX .......

              Initializing DG/UX prototype files.....................
        ......
        .....
              Creating DG/UX run level links..........................

              Initializing sysadm(1M) ..........

        .....


NOTE: See /srv/release/PRIMARY/root/MY_HOST/var/setup.d/log/dgux.root
        for a detailed account of the root setup of DG/UX.


        Package dgux has been successfully set up in MY_HOST root.
        Package setup for dgux is complete.

        Setting up dgux.aco in usr.
        Setting up dgux.aco in MY_HOST root.
        package dgux.aco has been successfully st up in usr.
        Initializing dgux.aco prototyping files.................
        Linking sort names for /dev device modes
        Package dgux.aco has been successfully set up in MY_HOST
          root.
        Package setup for dgux.aco is complete.
```

```
        Setting up dg/ux.aco.man in usr.
        Setting up dgux.aco.man man pages:...

        Package dgux.aco.man has been successfully set up in usr.
        Package setup for dgux.aco.man is complete.

        Setting up dg/ux.man in usr.
        Setting up dgux.man man pages:...

        Package dgux.man has been successfully set up in usr.
        Package setup for dgux.man is complete.

        Setting up networker in usr.
        Creating symbolic links ...
        Package networker has been successfully set up in usr.
        Setting up networker in MY_HOST root.

          Creating Networker run level links.........................
        ..Package networker has been successfully set up in MY_HOST
        root.
        Package setup for networker is complete.


        Setting up nfs in MY_HOST root.

             Setting up NFS in MY_HOST root....

             Creating NFS run level links........

             Initializing NFS prototype files......
```

NOTE: See /srv/release/PRIMARY/root/MY_HOST/var/setup.d/log/nfs.root
        for a detailed account of the root setup of NFS.

```
        Package nfs has been successfully set up in MY_HOST root.
        Package setup for nfs is complete.

        Setting up nfs.man in usr.
        Setting up nfs.man man pages:...

        Package nfs.man has been successfully set up in usr.
        Package setup for nfs.man is complete.

        Setting up onc in MY_HOST root.

             Initializing ONC prototype files.......
             Creating ONC run level links........

             NOTE:  This host will first run as an NIS client.
```

NOTE: See /srv/release/PRIMARY/root/MY_HOST/var/setup.d/log/onc.root
        for a detailed account of the root setup of ONC.

```
        Package onc has been successfully set up in MY_HOST root.
        Package setup for onc is complete.

        Setting up onc.man in usr.
        Setting up onc.man man pages:...

        Package onc.man has been successfully set up in usr.
        Package setup for onc.man is complete.

        Setting up sdk in usr.
        ...........................................................

        Package sdk has been successfully set up in usr.
        Package setup for sdk is complete.

        Setting up sdk.man in usr.
        Setting up sdk.man man pages:...

        Package sdk.man has been successfully set up in usr.
        Package setup for sdk.man is complete.

        Setting up sdk.X11 in usr.
            Creating sdk.sde directories and links..
        Package sdk.X11 has been sucessfully set up in usr.
        Package setup for sdk.X11 is complete.

        Setting up tcpip in usr.
            Setting up tcpip...

            NOTE:  The /usr/bin/rsh command now executes as a remote
                   shell(remsh), not as a restricted shell(restsh).

  NOTE: See /srv/release/PRIMARY/root/MY_HOST/var/setup.d/log/tcpip.usr
        file for a verbose description of the package setup for usr.

        Package tcpip has been successfully set up in usr.
        Setting up tcpip in MY_HOST root.
            Setting up tcpip ...
            Creating TCP/IP run level links ...
            Continuing TCP/IP setup......................

            NOTE:  See /var/setup.d/log/tcpip.root file for a
                   verbose description of the package setup for root.

        Package tcpip has been successfully set up in MY_HOST root.
        Package setup for tcpip is complete.

        Setting up tcpip.man in usr.
        Setting up tcpip.man man pages:...

        Package tcpip.man has been successfully set up in usr.
        Package setup for tcpip.man is complete.
```

```
Setting up X11 in usr.
    Creating X11 directories and links...........
    Creating root and usr prototypes for X11........
    Cleaning up the SDK area.

Package X11 has been successfully set up in usr.
Setting up X11 in MY_HOST root.
Package X11 has been successfully set up in MY_HOST root.
Package setup for X11 is complete.

Setting up X11.aco in usr.
     Creating X11 directories and links...........
     Creating root and usr prototypes for X11........
Package X11.aco has been successfully set up in MY_HOST
   root.
Package setup for X11.aco is complete.

Setting up X11.man in usr.
    Creating X11.man directories and links..
Setting up X11.man man pages.

Package X11.man has been successfully set up in usr.
Package setup for X11.man is complete.

5.  Configure and Build kernel
```

2:30
```
Configuring system...
Building kernel...
Successfully built dgux.moe.
Linked /dgux.  You must reboot in order for this kernel to
take effect.
```

*CAUTION   If you have not already done so, be sure to remove the boot
           floppy from the diskette drive before rebooting the kernel.*

```
6.  Reboot kernel
....
Boot command: sd(apsc(pci(),0),0) root –f /dgux –i 3 ↵

Booting sd(apsc(pci(0),B,0,7),0,0) root –f /dgux –i 3
DG/UX System Release 4.11 Bootstrap
Loading image
.......................................................

Cleaning up failover database ...
    Starting failover monitors ...
    Starting Floating IP Addresses ...
    Starting Multi-Path I/O ...

DG/UX System Release 4.11, Version generic
```

```
Using 24 Megabytes of physical memory
Found 1 processor
Configuring devices ........................................
Registering disks ..
Using vdm(swap,2D039A43,0C027700,0) as swap disk.
No check necessary for vdm(root,2D1F019E,0C027700,0).

Mounting vdm(root,2D1F019E,0C027700,0) as root file system.
Creating /dev ....




    Checking local file systems ........
    Mounting local file systems .....
    Current date and time is <day month date time year>  ...

    Checking system files .......
    WARNING:  These local accounts need passwords:
                   root
                   sysadm
              Assign passwords as soon as possible.

    Continuing system initialization ....
    Enabling automatically pushed STREAMS modules ........
    Linking short names for /dev device nodes .........

    Loading terminal controllers ....
    Starting disk daemons ....
    Mounting local file systems .....
    Checking for packages that have not been set up ...
    Starting miscellaneous daemons ...
    Starting STREAMS error logging daemon ....
    Starting Logical Link Control Services ....
    Restoring TCP/IP tunable parameters
    Attaching TCP/IP network interfaces ...........
    Starting system logging daemon ....
      Starting NIS services as NIS client ......
    Starting NFS lock services .....
      Starting batch services ....
    Starting line printer scheduler ....
    Saving ex(1) and vi(1) temporary files ....
    Starting NFS services .....
    Starting TCP/IP daemons .......
    Mounting NFS file systems .....
      Starting DG/UX administrative services .....
    Starting NetWorker server daemons .....
```

```
        NOTE:   The run level change is complete.  See
                /etc/log/init.log for a verbose description
                of the system initialization process.


2:45                    Press New Line to continue.

        moe
        DG/UX Operating System    R4.11
        Console Login:
```

End of Appendix

D   *Using the boot command*

The **boot** command loads and executes stand-alone executables. Although boot is used primarily for loading and executing the DG/UX system kernel or the stand-alone **sysadm** utility, it can load and execute other programs that are linked for stand-alone execution.

The syntax of the **boot** command is:

[**boot**] *phys–dev–name* [*volume–name*] [**–f** *filename*]
[**–r** [*root–pdisk–name*] *root–vdisk–name*]
[**–s** [*swap–pdisk–name*] *swap–vdisk–name*]
[**–i** *init–options*] [**–k** *root–fsck–options*]
[**–a**] [**–d**] [**–I**] [**–D**] [**–R**] [**–l** *keyboard–language*]
[**–n** *node_number*] [**–c** [*cdb_pdisk*] *cdb_vdisk*] [**–g**]

where:

phys–dev–name is a physical device or network controller to be used as a boot source.

volume–name is a virtual disk or IP address associated with *phys–dev–name*.

The boot operation loads and executes stand-alone executables. Although the boot operation is used primarily for loading and executing the DG/UX system kernel or the stand-alone **sysadm** utility, it can load and execute other programs that are linked for stand-alone execution.

The implementation of the boot operation varies on different hardware platforms. On some hardware, the **boot** command itself is not issued, and booting is accomplished via a menu or other interactive dialogue. Some platforms offer the ability to boot from a diskette or a CD-ROM. Some boot options apply only to specific hardware or DG/UX features.

Use your hardware documentation and DG/UX release notice in combination with this documentation to determine the options and features applicable on your system.

Boot operation parameters common to all systems

You always need the *phys–dev–name* argument when you boot a system. The argument must specify a physical disk device, tape device, or network controller in DG/UX common device name format. The boot operation interacts with this physical device and attempts to locate a stand-alone executable stored there.

The search for an executable can be limited to a specific volume on the physical device. The volume can be specified in the *volume–name* argument. Otherwise, a default will be used.

The meaning of *volume–name* varies with the device type, as follows:

- If *phys–dev–name* is a disk, *volume–name* is the name of a virtual disk that exists entirely on that physical disk. If *volume–name* is not specified, the physical disk is examined for a default root virtual disk previously set by the **admpdisk**(1M) command. If no default is set on the physical disk, the name **root** is used.

- If *phys–dev–name* is a network device, *volume–name* is the IP address, in Internet dot notation (e.g., 111.222.333.444), to be used by the network controller. If *volume–name* is not specified, the default address is obtained by sending a network broadcast request.

Options common to all boot operations

[**–f** *filename*]
The name of the executable to be booted. If *phys–dev–name* is a disk, *filename* is a pathname within the file system on *volume–name*. If *phys–dev–name* is a network device, *filename* is the pathname of the kernel image to be booted, relative to the boot client root directory on the boot server host. In either case, the default *filename* is **/dgux**. If *phys–dev–name* is a tape device, *filename* is a tape file number, where 0 is the first file on the tape. The default is tape file 1. Beginning with the selected tape file, the boot operation will examine all remaining files on the tape. It will boot the first one that is recognized as an executable file.

Most of the remaining options affect the operation of the booted executable rather than the boot operation itself.

Options affecting DG/UX kernels

[**–r** [*root–pdisk–name*] *root–vdisk–name*]
The virtual disk device to be used as the root file system. *root–vdisk–name* specifies the name of the virtual disk device, and *root–pdisk–name* specifies the name of the physical disk containing it. *root–pdisk–name* is required only if multiple virtual disks named *root–vdisk–name* exist among the physical disks that will be registered by the kernel. If **–r** is not specified, the booted kernel attempts to find the following defaults, in this order:

  1. A default root virtual disk name previously set on *phys–dev–name* by the **admpdisk**(1M) command.

2. A virtual disk named root on *phys–dev–name*.

3. A default root virtual disk on any registered disk.

[**–s** [*swap–pdisk–name*] *swap–vdisk–name*]
The virtual disk device to be used as the swap device.
swap–vdisk–name specifies the name of the virtual disk device, and
swap–pdisk–name specifies the name of the physical disk
containing it. *swap–pdisk–name* is required only if multiple virtual
disks named *swap–vdisk–name* exist among the physical disks that
will be registered by the kernel. If **–s** is not specified, the booted
kernel attempts to find the following defaults, in this order:

1. A default swap virtual disk name previously set on
phys–dev–name by the **admpdisk**(1M) command.

2. A virtual disk named swap on *phys–dev–name*.

3. A default swap virtual disk on any registered disk.

[**–i** *init–options*]
The options to be supplied as arguments to the **init**(1M) command
after the kernel starts running. The most common argument is the
run level.

[**–k** *root–fsck–options*]
The options to be supplied as arguments to the **fsck**(1M) command
for checking the root file system during system initialization.

Options specific to the DG/UX Cluster option

[**–n** *node_number]*
The node number used by the DG/UX kernel to join a cluster. In
addition, if neither *volume_name* nor –f *filename* are specified on
the boot command line, the boot operation accesses a cluster
database located on *phy–dev_name*. Using *node_number* as an
index, it retrieves *phy_dev_name*, *volume_name*, and *filename* from
the cluster database and uses them to locate the executable image
to be booted.

[**–c** [*cdb_pdisk_name*] *cdb_vdisk_name*]
Virtual disk *cdb_vdisk_name,* located on physical device
cdb_pdisk_name, specifies the location of the cluster database used
by the boot operation. If **–c** is not specified, "cluster db" is used as
the default *cdb_vdisk_name.* If *cdb_pdisk_name* is not specified,
phy_dev_name is used as the default. The **–c** option is ignored
unless *–n* is specified*.*

[**–g**]
Boot the node in cluster administration mode. If this option is
specified while any other nodes are already active, the boot will fail.

Options specific to stand-alone sysadm

[**–I**]
Boot stand-alone **sysadm** as a non-diskless installer kernel.

[**–D**]
Boot stand-alone **sysadm** as a diskless installer kernel.

[**–R**]
Boot stand-alone **sysadm** as a CD-ROM installer kernel.

Options specific to the boot operation

The following options are recognized solely by the boot operation and have no effect on DG/UX stand-alone executables.

[**–a**]
Ask for a **boot** command line instead of using the one that initiated the boot operation. This option is used only for debugging.

[**–d**]
Invoke a diskless client memory dump. The DG/UX system uses this option only when halting abnormally. It should never be entered on a command line.

Options specific to hardware without SCM

[**–l** *keyboard–language*]
A four-character string describing the system keyboard. (If both **–l** and an NDB entry are present, the value supplied with **–l** is used.) The first two characters represent the country, as specified by ISO 3166. The second two characters represent the language, as specified by ISO 639. Currently supported keyboards are:

USen	United States / English; this is the default
CHde	Switzerland / German
DEde	Germany / German
DKdk	Denmark / Danish
ESes	Spain / Spanish
FRfr	France / French
GBen	Great Britain / English
ITit	Italy / Italian
NOno	Norway / Norwegian
PTpt	Portugal / Portuguese
SEsv	Sweden / Swedish

Booting without SCM

Hardware without an SCM relies on DG/UX support that may not be described in the hardware documentation. This section provides additional information necessary for booting without an SCM.

NVRAM database parameters

Most hardware platforms that support the DG/UX system offer a System Control Monitor (SCM) that stores default system information in Non–Volatile RAM (NVRAM). Platforms lacking this support can use a DG/UX feature called the NVRAM database (NDB) to store the same information. The NDB can be modified only while the DG/UX system is running.

Use the **admnvram**(1M) command to store parameter/value pairs in the NDB while the DG/UX system is running. When the system is next booted, the boot operation examines the NDB and acquires values associated with certain parameters. See the **admnvram**(1M) man page for examples of setting these parameters.

The following NDB parameters are used by the boot operation:

boot_command_n
NDB entries of this type represent default command lines that can be executed by the boot operation. These command lines must not include the **boot** keyword, and n must be in the range 1 through 9. All arguments and options are acceptable, subject to hardware restrictions.

boot_timeout
The decimal number of seconds the bootstrap will wait before automatically booting the command line specified by **boot_command_**n. A value of 0 disables automatic booting.

keyboard_language
Same action as the **–l** option . (If both **–l** and a keyboard language NDB entry are present, the value supplied with **–l** is used.)

Identifying the boot disk

Normally, you will *not* need to identify the boot disk because the system will automatically identify the correct boot disk for you in almost every case. The following informtion does explain how to supply the boot disk name to **admnvram**(1M), if for some reason you do not want to let the system do it by default.

A system without an SCM selects a single boot disk from all of the disks in its configuration. Selection of this disk cannot be modified by you or by the DG/UX system. You must analyze the hardware configuration to determine which disk the hardware will select, and specify that disk name to the **admnvram**(1M) command when creating or modifying an NDB.

Usually, if a diskette is in the diskette drive, the system uses it as the boot disk (unless configured otherwise in firmware). If an NDB is installed on the diskette, the boot operation will check it for a boot disk default.

Otherwise, the system uses the following algorithm to select a boot disk:

1. Use the lowest-numbered PCI bus.

2. Use the SCSI adapter card installed in the lowest-numbered slot on that bus.

3. Use the lowest-numbered SCSI ID connected to that adapter.

4. Use the lowest Logical Unit Number (LUN) on that SCSI ID.

Initiating the boot operation

If the DG/UX system is running, it initiates the boot operation at completion of the **halt**(1M) or **reboot**(1M) command. The boot operation also is initiated whenever you power-up the system or press the reset button. Once initiated, the boot operation acquires information from a boot disk.

Most hardware with no SCM comes with both a diskette drive and a hard disk. Either can be used as a boot disk if it is properly formatted and DG/UX bootstraps are installed (see **admpdisk**(1M)). If a diskette is installed in the diskette drive, the hardware usually ignores the hard disk and attempts to use the diskette as the boot disk. (This behavior may be configurable in firmware.) Most hardware without an SCM cannot boot directly from CD-ROM.

Automatic booting

If the boot disk contains an NDB with default **boot** command lines, the lowest-numbered **boot_command_**n string in the NDB is used as the initial default. A timer runs for **boot_timeout** seconds to allow you to override this default. When the timer expires, the boot operation attempts to boot the default command line. If the boot fails, the operation attempts to boot the remaining **boot_command_**n entries in numerical order. If they all fail, you are prompted for a **boot** command line. The command line must not contain the **boot** keyword.

If no default **boot** command lines are stored, or if you request an override during the timeout period, the boot operation prompts for some or all of the following information:

- On hardware with several installed operating systems, the DG/UX boot operation prompts you to select one of them. If you select an operating system other than DG/UX, control transfers to that operating system's boot operation. Otherwise, the DG/UX boot operation proceeds.

- If default **boot** command lines are stored on the boot disk, the DG/UX boot operation prompts you to select one of them for booting or to enter a **boot** command line. The command line *must not* contain the **boot** keyword.

How a system console is selected

The DG/UX boot operation and the stand-alone executables both communicate with you through a system console. If the hardware has a keyboard directly attached when the boot operation begins, that keyboard and its associated display are used as the system console. If no keyboard is attached, the console serial port is used (COM1 port on Intel machines).

Examples of boot command lines

To boot stand-alone **sysadm** on an 88K machine with an integrated SCSI adapter, enter a **boot** command line similar to the following at the SCM prompt:

```
SCM> boot sd(insc()) usr -f /stand/sysadm
```

To boot an 88K machine using a kernel from virtual disk **root** on physical disk **sd(ncsc(0),0)** and then have that kernel use virtual disk **root4** from the same disk as the root file system and virtual disk **swap2** from **sd(ncsc(1),1,2)** as the swap device, enter a **boot** command line similar to the following at the SCM prompt:

```
SCM> b sd(ncsc(0),0) -r root4 -s sd(ncsc(1),1,2) swap2
```

To boot an Intel machine with a Swedish keyboard to run level 3, enter a **boot** command line similar to the following when prompted for a **boot** command:

```
Boot Command: sd(npsc(pci(),b),3) -l SEsv -i 3
```

To boot a kernel named **/dgux.myhost** to run level 1 on an Intel machine, enter a **boot** command line similar to the following when prompted for a **boot** command:

```
Boot Command: sd(npsc(pci(),d),0) -f /dgux.myhost -i 1
```

See also

For more information, see also the **admnvram**(1M) and the **init**(1M)
man pages.

End of Appendix

Index

Symbols

.man files, 1-13, 3-26

.man packages, planning worksheet, A-10

/ (root). *See* root file system; root virtual disk

/ file system
    sizing, 1-28
    space required, 1-29

/etc/bootparams file, 5-18

/etc/exports file, 5-18

/etc/hosts.equiv file, 5-18

/etc/utmp file, 3-5, 4-3

/etc/wtmp file, 3-5, 4-3

/srv/release/PRIMARY/root directory, 5-18

/tftpboot directory, 5-18

/tmp file, upgrading problems with, 8-11

/usr file system, space required, 1-29

/usr/etc/master.d directory, 3-51

/usr/etc/probedevtab file, 3-15, 7-14

/usr/opt/networker file system, space required, 1-31

/usr/opt/sdk file system, space requirements, 1-30

/usr/opt/X11 file system, space required, 1-30

/var file system, 3-5, 4-3

/var/adm directory, 3-5, 4-3

/var/Build/system.name file, 4-3, 4-31

/var/opt/networker file system, calculating space, 1-31

/var/setup.d/log file, 3-47

Numbers

88K-based systems, operating system model numbers, iii

A

A&A database, enlarging, 6-21

aco package, defined, 1-14

aco package suite, 3-29
    information security, 6-6

adding a third-party OS, after installing DG/UX, 7-8

adding nonstandard packages, 7-15

admkernel command, 4-13

admnvram command, 2-18, 3-53, 3-54, 4-18

admpdisk command, 1-32, 8-14

alphanumeric console. *See* nongraphical display terminal

Application Capture Option
    package suite, 3-29
        information security, 6-6
    software package, defined, 1-14

applications, nonstandard, 3-4, 4-13, 4-33

arp command, 1-36, 5-5

assisted cleanup, performing, 8-4

Authentication and Authorization (A&A) database, enlarging, 6-21

AViiON computers, operating system model numbers, iii

AViiON system, turning on power, 2-5

B

backup facilities, for information security, 6-3

backup files, restoring, 4-34

blank system disk, installation, 3-1

boot command, D-1
   example command lines, D-7
   operation without SCM, D-5

Boot command: prompt, rebooting the system, 3-54, 4-17

boot device
   default name
      88K platform, 1-12
      Intel platform, 1-10
   defined, 1-9
   planning worksheet, A-4

boot floppy, 3-8

boot path
   boot command descripton, D-1
   in startup messages, 3-10
      full installation, 3-53
      preloaded system, 2-18
      remote installation, 5-13
      upgrade installation, 4-17
   LAN, 5-13

boot process
   88K platform, 3-9
   Intel platform with SCM, 3-8
   Intel platform without SCM, 3-8
   performing an upgrade
      system with SCM, 4-12
      system without SCM, 4-11

booting
   boot floppy, 3-8
   installation utility, from remote host, 5-1, 5-12
   messages
      full installation, 3-53
      LAN boot, 5-13
      preloaded system, 2-18
      upgrade installation, 4-17

new kernel, 3-52
   for an upgrade, 4-17
   preloaded system, 2-18
problems
   init 3 fails, 8-13
   pre-3.00 release, 8-14
   rebooting Intel-based system, 8-13
release media
   for 88K platform, 3-9
   for Intel platform, 3-7
   messages, 3-10

bootstrap file, installing on system disk, 3-14

bridge, PCI host, Intel platform, 1-11

broadcast address, local host, 5-7

build, kernel
   answering setup questions, 3-31
   preloaded system, 2-16
   sysadm utility, 3-51, 4-13

C

case-sensitivity, boot paths
   88K platform, 1-12
   Intel platform, 1-11

CD-ROM, documentation, 1-18, 7-7

CD-ROM disk drive
   deregistering, 7-6, 8-12
   device names, 1-9
   faulty selection of for software loading, 8-12
   local, installing from, 3-1
   removing release medium from, 7-5, 8-12

clean installation, preparing a clean disk, 3-4, 3-11

cleaning files
   for a clean installation, 3-11
   on remote host, 5-18

cleanup
   performing a manual, 4-7, 8-5
   performing an assisted, 3-36, 8-4

S

Installing the DG/UX® System

Installing the DG/UX® System

093–701087–09