

**Release Notice:**  
**DG/UX™ System for**  
**AViiON® Computers**  
**System 5.4 Release 3.10**

**June 1995**

Part number 085-600419-01

This release notice applies to the following models:

P001  
Q001

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### Release Notice:

**DG/UX System 5.4 for AViiON® Computers**

**Release 3.10**

085-600419-01

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# 1 Introduction

This release notice describes the DG/UX™ System 5.4 Release 3.10 operating system for Data General's family of AViiON® computers. DG/UX 5.4R3.10 enhances reliability, performance, high availability, and interoperability of DG/UX systems. It also provides hardware support for the StorageTek 4220 cartridge tape subsystem with autoloader, AV 8500 Plus computer, AV 9500 Plus computer, and model 61004 8mm cartridge driver.

In response to customer requests to simplify the DG/UX system installation procedures, DG/UX 5.4R3.10 is a complete release. The time required to install R3.10 is comparable to other complete DG/UX releases.

The minimum memory required to run the DG/UX system remains at 16 MB.

This notice also applies to the TCP/IP, ONC™, and NFS® packages, which are on the same release medium but are separately installable. See the separate release notice for the GNU C compiler for information about compilation in DG/UX System 5.4 Release 3.10.

This release is available in a base model and a workstation model. This release notice, which accompanies both, describes the base model. The workstation model includes the features described here, plus additional features appropriate to workstations and workstation servers. If you are using the workstation model, see also the release notices for the X Window System™ and X.desktop™ for DG/UX System 5.4 Release 3.10. These two notices describe graphics and windowing topics, including OSF/Motif™, for this release.

*This version of the release notice contains new information not contained in the on-line version, file /usr/release/dgux\_5.4R3.10.rn. Revision bars (vertical bars in the margin) in the typeset version identify changes that take precedence over the on-line version.*

## 2 Product Description

New or expanded features in this release are described in the following two sections. Refer to "Enhancements and Changes" for more detailed information.

### 2.1 Hardware Support

Support was added or enhanced for the following:

- StorageTek 4220 Cartridge Tape Subsystem with Autoloader
- AV 8500 Plus (G70624) Computer
- AV 9500 Plus (G70619) Computer
- Model 61004 8mm Cartridge Driver

## 2.2 Software Support

Support was added or enhanced for the following:

- Mirror fracturing, which increases mirror synchronization performance.
- Kernel configuration parameter, `NQUEUE`, changed the default for the maximum total number of `STREAMS` queues that may exist at any one time on a `DG/UX` system.
- High availability (HA)
  - Multi-path disk I/O, which allows a single system to take advantage of multiple I/O paths (if available) to its physical disks, to ride through adapter failures and continue data access.
  - Shared disk administration, which supports limited sharing of `CLARiiON` physical disks for concurrent access by multiple systems. This feature is available only with the Distributed Lock Manager (DLM).
- FDDI driver enhancements, which provide additional support.
- Wide SCSI addressing, which supports up to 16 SCSI device IDs (addresses).
- User license enforcement, which enhances the `usermond` command.
- TCP/IP and `DG/UX` commands, which were enhanced with additional features in response to customer requests.
- Printer services, which contains enhancements to `lp` interface scripts, `terminfo`, and commands.
- Multi-threaded watchpoint debugging, which was enhanced to attribute threads.

## 3 Environment

### 3.1 Development Environment

The next major release of the `DG/UX` system will contain the following development environment changes:

- The `m88kdguxcoff` development environment will be discontinued. This environment was introduced in the first release of `DG/UX` System 5.4 to help developers transition from the COFF object and executable file format to the ELF format. Most users of the `DG/UX` system have made this transition and are using the default environment, `m88kdguxelf`. The other two COFF-based development environments, `m88kbcs` and `m88kocs`, will continue to be supported.

If you create a `DG/UX` kernel component such as a device driver, you should compile it with the `m88kocs` environment. The `m88kocs` environment creates the same COFF object files for



kernel development that the **m88kdguxcoff** environment does. Changing now will prevent you from getting an error message if you need to build with a future release.

- The **sdb** debugger is obsolete and will be discontinued. You should use the **mxdb** debugger (sold separately) or the **dbx** debugger that comes with the DG/UX system.
- The **dbx** debugger will be changed when using the remaining COFF-based development environments (**m88kbc**s and **m88koc**s) so that it requires **legend** format debugging information. This means that you will need to recompile object files with COFF-based debugging information after you install the next release of the DG/UX system.

## 3.2 Profiling Libraries

The next release of the DG/UX system will reduce the number of profiling libraries in order to conserve system disk space. Profiling libraries are in **/usr/lib/libp**, and are the same as the normal libraries with the same name in **/usr/lib**. The difference is that the profiling libraries are used when linking with the **-p** option to the **cc** or **gcc** commands. Libraries that remain are:

```
/usr/lib/libp/
    libc.a
    libdgc.a
    libm.a
    libmalloc.a
```

For more information, refer to the **cc(1)** and **gcc(1)** manual pages.

## 3.3 Hardware

This release of the DG/UX system allows the use of SCSI IDs greater than 7 (8-f) for machines capable of supporting the feature. If you intend to use a device with a SCSI ID greater than 7, be sure that the firmware for your AViON is at the correct revision. AV 5500 requires prom revision release 1.18.0 or greater. AV 8500 and AV 9500 require prom revision release 3.6.0 or greater.

New hardware supported for this release includes the AV 5500H/550H/450H/4500H and AV 5500LC systems. The AV XXXXH systems replace their counterpart AV XXXX systems with additional performance advantages. The AV 5500LC is a low cost version of the AV 5500 family.

Note that the memory component of the recommended minimum equipment configuration (MEC) is 16 MB. **Do not attempt to install this release on an AViON system that has less than 16 MB of memory.** The disk component of the recommended minimum equipment configuration (MEC) remains the same (322 MB).

This release is intended for use on all Data General AViON computers.

### 3.4 Software

This release can be installed on a new system or overloaded on DG/UX 5.4 Release 3.00 or on any DG/UX System 5.4R3.00 maintenance update (MU). The following table shows the disk space required to load each release package, with totals for loading *all* packages. The table also includes the number of disk blocks used within each virtual disk. Package sizes are rounded to the nearest 100 blocks.

The DG/UX system measures virtual disks in 512-byte disk blocks. 1 MB is roughly 2,000 disk blocks.

| Package              | Virtual disk |        |        |           |       | Total<br>Blocks | Total<br>MB |
|----------------------|--------------|--------|--------|-----------|-------|-----------------|-------------|
|                      | root         | usr    | X11    | networker | xdt   |                 |             |
| <b>dgux</b>          | 11078        | 173715 | 0      | 0         | 0     | 184793          | 93          |
| <b>dgux.man</b>      | 0            | 16223  | 0      | 0         | 0     | 16223           | 8           |
| <b>gcc</b>           | 0            | 6543   | 0      | 0         | 0     | 6543            | 3           |
| <b>gcc.man</b>       | 0            | 75     | 0      | 0         | 0     | 75              | 0           |
| <b>tcpip</b>         | 436          | 9916   | 0      | 0         | 0     | 10352           | 5           |
| <b>tcpip.man</b>     | 0            | 1826   | 0      | 0         | 0     | 1826            | 0           |
| <b>nfs</b>           | 52           | 2619   | 0      | 0         | 0     | 2671            | 1           |
| <b>nfs.man</b>       | 0            | 154    | 0      | 0         | 0     | 154             | 0           |
| <b>onc</b>           | 37           | 3992   | 0      | 0         | 0     | 4029            | 2           |
| <b>onc.man</b>       | 0            | 205    | 0      | 0         | 0     | 205             | 0           |
| <b>X11</b>           | 52           | 25     | 82369  | 0         | 0     | 82446           | 42          |
| <b>X11.man</b>       | 0            | 16     | 1132   | 0         | 0     | 1148            | 0           |
| <b>X11.sde</b>       | 0            | 15     | 32044  | 0         | 0     | 32059           | 16          |
| <b>X11.sde.man</b>   | 0            | 5      | 5537   | 0         | 0     | 5542            | 2           |
| <b>networker</b>     | 37           | 27     | 0      | 18049     | 0     | 18113           | 9           |
| <b>networker.man</b> | 0            | 2      | 0      | 594       | 0     | 596             | 0           |
| <b>xdt</b>           | 0            | 2      | 0      | 0         | 41759 | 41761           | 21          |
| <b>xdt.man</b>       | 0            | 23     | 0      | 0         | 21    | 44              | 0           |
| <b>All packages</b>  | 11692        | 215383 | 121082 | 18643     | 41780 | 408580          | 202         |

This release includes fixes that were previously released as software patches. If any problem that was previously fixed by a patch reappears in this release, contact Data General. **Do not attempt to install any patches, patch kits, or maintenance updates for previous releases on this release.**

This release also includes support for software and hardware that were previously released as supplements. **Do not attempt to install any supplements for previous releases on this release.**

### 3.5 Using Layered Software Products

Before attempting to use a layered software product with this release, ask your Data General representative or the vendor about the product. Some layered products may require a particular DG/UX release.

### 3.5.1 OpStar

Data General OpStar 1.60 and previous OpStar releases numbered 1.XX will not run on this release. If you are currently using any OpStar software release 1.XX, you will not be able to upgrade to this release at this time. Please contact your Data General representative regarding OpStar software that supports this release.

Opstar 2.0 is certified only on this release.

## 4 Enhancements and Changes

This section contains information about enhancements and changes made in this release.

### 4.1 New Hardware Features

This section discusses support for new hardware.

#### 4.1.1 StorageTek 4220 Cartridge Tape Subsystem

This release supports the StorageTek 4220 Cartridge Tape Subsystem (DG model 61001/61002), an IBM 3480-compatible tape stacker. The external interface to manipulate the autoloader (stacker) is through the **mt** command MTPOSLOAD. For more information, refer to the **mt(1)** and **rmt(7)** manual pages.

Base driver support is included in this release, but no utility supplied with the DG/UX system will automatically operate the stacker. For example, **cpio**, **tar**, **dd**, **dump2**, and **Networker** work with this device, but they do not automatically operate the tape stacker. You can use the **mt** command to change media as required.

The primary use of this device is expected to be data interchange with IBM systems. No utility supplied with the DG/UX system translates or exchanges this data. If you require this feature, a REELexchange product is available that incorporates data conversion functions and automatic stacker operation. This product is available from Software Clearing House (SCH) at (513)579-0455 (USA).

When using this product, the StorageTek 4220 Cartridge Tape Subsystem with Autoloader must be set in Auto Mode. In Auto Mode, the MTUNLOAD command used by the REELexchange product will unload and then load the cartridge from the next higher occupied magazine slot. While in System Mode, it will only unload.

If you write your own scripts instead of using the REELexchange product from SCH, refer to the **mt(1)** manual page. You can use the MTUNLOAD command in auto mode or the MTPOSLOAD command in auto or system mode to position to the next occupied slot or a particular slot, respectively. When the magazine is ejected, the MTLOAD and MTUNLOAD commands are not supported. Use the MTPOSLOAD command to reseal the magazine and load from a specified slot.

The REELexchange product supplied with the DG/UX system will *NOT* operate with this tape stacker. It is included as part of the DG/UX system to support existing 9-track tape devices and applications.

NOTE: You must manually load a tape into the StorageTek 4220 Cartridge Tape Subsystem drive from the front panel before trying to issue software commands to the drive. This restriction will be removed in a future patch to the DG/UX System.

#### 4.1.2 Model 61004 8mm Cartridge Drive

This release supports a new 8mm cartridge drive, DG model 61004. This drive is similar to the existing 8mm drives models 6760/6761 except that, in addition to 15m, 54m, and 112m cartridge media, it also supports 160m XL 8mm data cartridges. This drive has a maximum capacity of 7 GB native format or up to 14 GB with compression.

#### 4.1.3 AV 8500 Plus (Model G70624)

This release supports the dual processor AV 8500 Plus (Model G70624) with a CPU board incorporating two 50 MHz 88110 microprocessors with 1 MB of secondary cache for each processor. The office package system also includes:

- 64 MB of ERCC memory (two 32 MB SIMMs)
- I/O controller with Ethernet interface
- Single-ended SCSI-2 interface for internal mass storage
- VME interface
- 2 connectors for I/O option (Styx) cards
- 5 slot VME chassis
- 520 MB disk
- CD-ROM drive

Additional processors are added *at the time of system purchase* using the Model 7049S dual CPU board. This base model can be taken to a maximum of six processors (that is, a maximum of two 7049S CPU's can be added to the base system).

#### 4.1.4 AV 9500 Plus (Model G70619)

This release supports the dual processor AV 9500 Plus (Model G70619) with a CPU board incorporating two 50 MHz 88110 microprocessors with 1 MB of secondary cache for each. The 33.25" CPU chassis also includes:

- 128 MB of ERCC memory (four 32 MB SIMMs)

- I/O controller with Ethernet interface
- SCSI-2 interface for internal storage devices
- VME interface
- 2 connectors for I/O option (Styx) cards
- 520 MB disk
- CD-ROM drive

Additional processors are added *at the time of system purchase* using the Model 7049S dual CPU board.

## 4.2 New Software Features

This section discusses new software features.

### 4.2.1 Mirror Fracturing

Mirror fracturing lets you suspend I/O to a mirror image. While the mirror image is “fractured,” write requests to the fractured mirror image are deflected to a bitmap log.

You can use mirror fracturing to perform on-line backup. When you fracture a mirror image, I/O to that image is suspended while that image is backed up. Once the backup is complete, you can “unfracture” the mirror with a synchronization operation. Only those blocks that you updated on the source image while the mirror image was fractured are reinstated to the fractured image.

Mirror fracturing increases mirror synchronization performance. For example, synchronizing a 512 MB mirror image in DG/UX System 5.4 Release 3.00 on a CLARiiON (RAID-5 stripes) takes approximately 18 minutes to complete. With mirror fracturing enabled, if you modify only 30% of the source image during the time the mirror is fractured, the same synchronization takes approximately 6 minutes.

For a discussion of the fracture operation, consult the **admvdisk(1M)** manual page. For more information on mirror fracturing, consult the manual *Managing Mass Storage Devices and DG/UX™ File Systems*.

### 4.2.2 Kernel Configuration Parameters

#### 4.2.2.1 NQUEUE

The kernel configuration parameter NQUEUE is the maximum total number of STREAMS queues that can exist at any one time on a DG/UX system. The default value for this parameter is now two times the number of physical memory pages in the AViiON system. A physical page is

defined as 4096 bytes. For a system with 24 MB of physical memory, the NQUEUE parameter is initialized to approximately 12288. This change allows the NQUEUE parameter to scale with system memory size.

The default value for this kernel parameter was 2048 in previous releases of the DG/UX system.

### 4.2.3 High Availability (HA)

This release provides the following new high-availability (HA) features described in this section:

- Multi-Path Disk I/O
- Shared Disk Administration

For more information on high availability, refer to the technical brief *High Availability and AViiON Systems* (012-004567-00).

#### 4.2.3.1 Multi-Path Disk I/O

This release supports multi-path disk I/O. Multi-path disk I/O allows a single system to take advantage of multiple I/O paths via multiple adapters attached to a physical disk, ride through adapter failures, and continue data access. You can set up the system to use multi-path disk I/O so that if a failure occurs on one path to the disk, access can still continue via the alternate path.

For example, to use an AV 9500 computer with two I/O channels to provide two I/O paths to a CLARiiON® disk array with two Storage Processors (SP), place one dgsc adapter in ioc(0) and connect it to SP-A and place a second dgsc adapter in ioc(1) and connect it to SP-B.

Disk interfaces must be one of the following SCSI adapter types:

- dgsc
- ncsc

For more information, refer to the **admiopath(1M)** manual page and the manual *Achieving High Availability on AViiON® Systems*.

#### 4.2.3.2 Shared Disk Administration

This release supports limited sharing of CLARiiON physical disks for concurrent access by multiple systems. This disk sharing capability is provided in addition to the traditional give-and-take sharing of failover. This functionality is required by the ORACLE Parallel Server and is supported only for use by that product.

The Shared Disk Administration component of this release provides functions that define disks to be shared (public disks), as well as functions to manage disks that are enabled for sharing (shared disks). It also coordinates administrative operations between systems to improve the safety of shared disk management. Such a group of systems is called a *cluster*.

Shared Disk Administration requires the AViiON Distributed Lock Manager (DLM) product, which you must purchase separately. Most shared disk management operations will fail if this separate product is not installed. DLM 1.00 supports this release and DG/UX 5.4 Release 3.00.

NOTE: If you are upgrading from DG/UX System 5.4R3.00 and have been running the Distributed Lock Manager with Oracle Parallel Server, you will need to reinstall the DLM after installing this release.

The **sysadm** menu Availability -> Shared Disk provides a high-level interface for managing public and shared disks. It is documented in the manual *Managing the DG/UX™ System for the ORACLE® Parallel Server*. Note that **sysadm** will not display this menu unless the DLM product is installed.

For more information on Shared Disk Administration commands, daemons, and databases, see the following manual pages:

**admshreddiskdevice**(1M)  
**admshreddiskhost**(1M)  
**shreddiskd**(1M)  
**shreddisk**(4M)

For more information on disk sharing in general, see the manual *Managing the DG/UX™ System for the ORACLE® Parallel Server* and the following manual pages:

**admdevice**(1M)  
**admfilesystem**(1M)  
**admpdisk**(1M)  
**admswap**(1M)  
**admvdisk**(1M)  
**fstab**(4)  
**mount**(1M)  
**swapon**(1M)

#### 4.2.4 FDDI Driver Enhancements

The FDDI device driver was enhanced as follows:

- Support was added to allow LLC-based protocols other than those that use the LLC and SNAP defined for 802.2 Type I communication.
- Support for an alternate network hardware address was added. For more information, refer to the **pefn**(7) manual page.
- Performance enhancements and tuning parameters were added. These new configuration variables allow you to tune the driver for optimal performance in your environment. For further details on these configuration variables, refer to the **pefn**(7) manual page.

## 4.2.5 Wide SCSI Addressing

This release supports SCSI device IDs (addresses) greater than 7 (8-f) for machines capable of supporting the feature. There is no visible change except that the higher ID is part of the device name. Booting from a device with an ID greater than 7 may require a later release of AViiON firmware. AV 5500 requires release 1.18.0 or greater. AV 8500 and AV 9500 require release 3.6.0 or greater.

## 4.2.6 User License Enforcement

The license manager, **usermond**, supports enforcement of the DG/UX user license. The **usermond** command was introduced in DG/UX System 5.4R3.00 to monitor the number of users logged in to a DG/UX system and to inform the user **root** when the user count exceeded the license. In this release, **usermond** makes licensing information available so that login mechanisms such as **xdm** and **login** can verify when the user count meets or exceeds the license. If the user count meets or exceeds the license, the system continues to operate normally but additional users are not allowed to log in until the number of users drops below the license maximum.

As in DG/UX System 5.4 Release 3.00, you can use either the **admuserlicense** command or the **sysadm** system -> License menu to obtain license information and to upgrade the license. Please note the following:

- Any user with a user ID of 0 (**root** users) can always log in regardless of the user count and the license.
- **usermond** must be running. If **usermond** is not running, the license is set to two users. Log in performance is affected when **usermond** is not running because **login** has to read the **/etc/utmp** file and recount the current users on the system. In this release, **usermond** is started by **init**, which starts a new **usermond** if the license manager goes down.
- **usermond** creates a data file, **/var/license/license\_data**. This file must exist and must be valid. If this file does not exist or is invalid, the license is set to two users and log in performance is affected because **login** has to read the **/etc/utmp** file and recount the current users on the system.
- The user count should not exceed the license. If the user count meets or exceeds the license, users are not allowed to log in unless they are already logged in to the system. For example, 16 different users are logged in to a system with a license for 16 users. One of these users has the username "elvis." If the user "elvis" attempts to log in again (perhaps on a separate terminal), "elvis" can log in.
- In DG/UX 5.4 Release 3.00, **usermond** and **admuserlicense** relied on two daemons, **lmgrd** and **dguxuserd**. In DG/UX 5.4 Release 3.10, these daemons are not used by **usermond** and **admuserlicense**.
- In this release, the license manager is not dependent on TCP/IP in any way.

If your present user license limit is insufficient for your needs, you need to purchase a licensed user upgrade. Contact your Data General account representative for ordering and price information. Be sure to include your current license limit in your purchase order. You can obtain



your current license limit either by typing:

```
# admuserlicense -o list -c ↵
```

or by using the **sysadm** System ->License ->List operation. After your purchase order is processed, you will receive the license token you need to upgrade your licensed user count. Installation instructions will accompany the token.

## 4.2.7 TCP/IP Commands

This release provides new and enhanced TCP/IP commands described in this section.

### 4.2.7.1 netuser

The **netuser** command provides a mapping between TCP/IP communication endpoints and user processes. **netuser** is to TCP/IP endpoints what **fuser** is to files. For more information, refer to the **netuser**(1M) manual page.

### 4.2.7.2 ftp

This release enhances the **ftp** command to support the creation of user-defined macros. You can create these macros interactively or initialize them from the **\$HOME/netrc** file. New or enhanced **ftp** commands implementing this functionality include **macdef**, **\$<macro-name>**, **status**, and **close**. For more information, see the **ftp**(1C) manual page.

### 4.2.7.3 telnetd

This release supports options to configure the bannering displayed before the **login** prompt. Bannering can be either suppressed or user-defined. For more details, see the **telnetd**(1M) manual page.

## 4.2.8 DG/UX Commands

This release provides new and enhanced DG/UX commands described in this section.

### 4.2.8.1 admiopath

The **admiopath** command was enhanced as follows:

- The **-o {add, delete, modify, list, start, stop, switch, and repaired}** operations now accept physical disk specifications for managing multi-path disk I/O functionality.
- The **-o reset** operation is new for this revision. This operation resets all specified switched I/O paths back to the primary path if possible.

For more information, see the **admiopath(1M)** manual page.

#### 4.2.8.2 **admpdisk**

The **-o repair** operation was enhanced to support the repair of both the secondary and primary Virtual Disk Information table (VDIT).

#### 4.2.8.3 **admvdisk**

The **admvdisk** command was enhanced as follows:

- The new **-o fracture** operation makes a mirror image temporarily unavailable for any I/O operation. Any I/O (write) intended for the mirror image is instead “logged” in a bitmap. Each bitmap entry indicates a block range on the fractured image. When the mirror is unfractured, only those locations that were modified (as specified by the bitmap) are updated.
- Use the **-o sync** operation to “unfracture” a mirror image.
- The **-o list** operation displays “fractured” for such mirror images.

Mirror fracturing increases synchronization performance. For more information, refer to the **admvdisk(1M)** manual page.

### 4.2.9 **Printer Services**

This release provides **lp** service enhancements described in this section:

- Interface script
- Terminfo
- Commands

#### 4.2.9.1 **lp Interface Script Enhancements**

The **lp** interface scripts were redesigned to improve printing performance. The scripts are smaller in size and utilize new **lp** utilities such as **lp.banner**, which prints banner pages.

This release includes new **lp** interface scripts that provide better support for printers attached to a terminal server. The new **lp** interface scripts are as follows:

|                        |  |
|------------------------|--|
| <b>dg_annex</b>        | Model script for printers on a Data General annex TermServer |
| <b>datability</b>      | Model script for printers on a Datability TermServer         |
| <b>termprinter_tcp</b> | Model script for printers on a tcpip TermServer              |

**termprinter\_telnet** Model script for printers on a telnet TermServer

**termprinter\_3com3.3** Model script for printers on a CS/2x00 TermServer

#### 4.2.9.2 Ip Termino Enhancements

New terminfo entries are provided to support the Data General Laser printer models 6892/6893. The following new entries are available:

```
dg6892-PS
dg6892-PS-b
dg6892-hp3Si
dg6893-PS
dg6893-PS-b
dg6893-hp3Si
```

#### 4.2.9.3 Ip Command Enhancements

The **lp** command supports the following new **-y<modes>** options:

- Choosing between simplex and duplex printing on LaserJet™ printers (or printers that support PCL) that support duplex printing. The following is an example **lp** command that prints the **fstab** file in duplex mode:

```
# lp -d laserjet1 -y duplex /etc/fstab ↵
```

- The pagination filter **pageprint** now supports a raw mode for printing files that have embedded control characters. Such files are sometimes generated by programs for a specific type of printer, such as an eponfx printer, and have eponfx specific escape codes embedded. While in raw mode, the **pageprint** filter only uses linefeed and formfeed characters to track pages, and does not line wrap (a feature which can cause problems when there are embedded control or escape characters). All characters (printable and non-printable) are passed through. The following is an example **lp** command that prints page 1 (in raw mode) of a file that has embedded control characters:

```
# lp -d epon1 -P 1 -y raw report_file ↵
```

For more details on the **-y<modes>** options, consult the **lp(1)** manual page.

#### 4.2.10 Multi-Threaded Watchpoint Debugging

Multi-threaded debugging support for watchpoints (stop on store) was enhanced. In DG/UX System 5.4 Release 3.00, watchpoint events were attributed to the process instead of to the particular thread(s) involved. In this release, only threads that execute code causing storage event(s) are attributed.

## 5 Notes and Warnings

This section contains notes and warnings about this release.

### 5.1 Notes

#### 5.1.1 New `sar` and `ps` Commands

New `sar` and `ps` commands were introduced in DG/UX System 5.4R3.00. These commands, named `nsar` and `nps` respectively, will replace the existing `sar` and `ps` commands in a future release, when the existing commands will be renamed `osar` and `ops`, respectively. For more information on these new commands, see the `nps(1)`, `nsar(1M)`, and `nsadc(1M)` manual pages.

#### 5.1.2 `admpdisk`

The `-o initialize` and `-o install` operations of the `admpdisk` command register the physical disk only when a bootstrap or bad-block mapping is installed. For details, see the `admpdisk(1M)` manual page.

If you incorrectly label a non-SCSI disk in standalone `sysadm` while the disk is deregistered, you will have to exit `sysadm` to install a correct label.

For example, assume the ESDI disk `cied(0,0)` is incorrectly labeled:

- To escape to the shell, type:

```
# !sh ↵
```

- To see which labels are available, type:

```
# ls /usr/etc/sysadm/pdisk_labels ↵
```

- To install the correct label, use the `admpdisk` command:

```
# admpdisk -oinstall -l /usr/etc/sysadm/pdisk_labels/<LABEL>
  'cied(0,0)' ↵
```

#### 5.1.3 `/etc/sendmail.cf` File

The `/etc/sendmail.cf` file was modified to pass the `-D` option to the local mailer `/usr/bin/mail`. This informs `/usr/bin/mail` that it was invoked by `/usr/bin/sendmail` for local delivery. Previous revisions of the DG/UX system relied on an environment variable that was set by `/usr/bin/sendmail` to indicate local delivery. This resulted in problems when customers ported other versions of `sendmail` that did not know about this environment variable.

In this release, `/usr/bin/mail` supports either the environment variable or the `-D` option. Future DG/UX releases will support only the `-D` option; therefore, upgrade your `sendmail.cf` file to the version provided in this release. For example, if your `/etc/sendmail.cf` has the local mailer line:

```
Mlocal, P=/bin/mail, F=PlsDFMmn, S=10, R=20, A=mail $u
```

you should change it to:

```
Mlocal, P=/bin/mail, F=PlsDFMmn, S=10, R=20, A=mail -D $u
```

For information on other options, see the `/etc/sendmail.cf` file.

## 5.2 Shared Disk Notes

The following notes apply only if you have the Shared Disk Administration component of this release.

### 5.2.1 `/etc/services` File and ONC/YP Services Database

The `shreddiskd` daemon that coordinates Shared Disk Administration provides a new service that you may need to add to your `services` database. The DG/UX system installation and setup procedure automatically updates the `/etc/services` file for you. If you do not use ONC/YP, no further action is required. However, if you do use ONC/YP and disk sharing, you should add the following line to your ONC/YP services database:

```
shreddisk      21400/tcp                # shared disk daemon
```

In this revision, Shared Disk Administration functions properly even if the above line is not added to the ONC/YP services database (or is deleted from the `/etc/services` file). The port number “21400” is provided as a default in the shared disk communications software. However, this default may be removed in a future revision of the DG/UX operating system. To prevent problems with Shared Disk Administration in the future, update your services database now.

### 5.2.2 Restrictions on `configure` and `register`

If you use the `configure` operation of the `admdevice` and `admpdisk` commands or the `register` and `deregister` operations of the `admpdisk` command for shared disk devices at run level 1, you will receive this error message:

```
Error:  Cannot manage sharing for <name> [device]
        Cannot find an address for the local client
```

However, these commands work at run levels 2 and 3.

This behavior is an implementation restriction. That is, you can perform the `configure` and `register` operations on shared disk devices only when the network is operational (that is, at run levels 2 or 3).

### 5.2.3 admdevice

The **admdevice** command was enhanced so that the **-o configure** operation automatically enables sharing for a device listed in the shared disk devices database.

### 5.2.4 admfilesystem

The **admfilesystem** command was enhanced as follows:

- Prompts you for confirmation before defining a file system that resides on a public physical disk.
- Prompts you for confirmation before defining a file system on a virtual disk that resides on a public physical disk.

### 5.2.5 admpdisk

- The **-o configure** operation automatically enables sharing for a physical disk device listed in the shared disk devices database.
- The **-o register** and **-o deregister** operations perform additional locking necessary to ensure the consistency of virtual disk metadata on shared physical disks.
- The **-o list** operation displays “shared” for the availability of a physical disk that is enabled for sharing.

Certain other operations are not allowed on shared physical disks.

### 5.2.6 admswap

The **admswap** command was enhanced as follows:

- Prompts you for confirmation before defining a swap area that resides on a public physical disk.
- Prompts you for confirmation before defining a swap area on a virtual disk that resides on a public physical disk.

### 5.2.7 admvdisk

- The **-o create** operation performs additional locking and coordination between systems when creating a partition that resides on a shared physical disk.
- With the **-o create** operation, or **-o expand** of an unshared virtual disk, the **-n** option does not allocate space from public or shared disks. With a public virtual disk, the **-n** option normally looks for free space only on the same underlying physical disk.

- The `-o list` operation flags free space and partitionable virtual disks as one of the following:
  - “shared” when the underlying physical disk is enabled for sharing.
  - “public” when the underlying physical disk is entered in the shared disk devices database.

Other operations that affect the virtual disk configuration of a shared physical disk are generally not allowed. For more information, see the `admvdisk(1M)` manual page.

## 5.2.8 libdgpd

This release adds two new functions to the `libdgpd` library: `dgpd_clean()` and `dgpd_reregister()`. These routines aid in the coordination of Shared Disk Administration.

## 5.3 Warnings

### 5.3.1 Kernel Parameter SDESLIM

Do not set the value of the kernel parameter `SDESLIM` (`cf_cm_soft_descriptor_limit`) above 2048 for the following reasons:

- Many programs (such as `statd`, `networker`, `named`, `yplibd`, `ttymon`, `lpsched`, and some X applications) will not start because they cannot handle the large number of file descriptors (for example, the `select` system call may fail).
- Performance may suffer since all processes would include a large number of file descriptors.

To allow more file descriptors on your system, do the following. In the application, define `FD_SETSIZE` to be the maximum number of descriptors that you will ever open and recompile the application. Be sure that the value used for `HDESLIM` is large enough to accommodate the maximum number of descriptors that your program will open. By default, the DG/UX system is shipped with `HDESLIM` and `FD_SETSIZE` to 2048 as shown below:

```
#ifndef FD_SETSIZE
#define FD_SETSIZE      2048
#endif
```

In this way, an application that needs more file descriptors can use the system call `setrlimit` to change the number of descriptors it needs to use (bounded by the `HDESLIM` value).

If `open` fails with an `EMFILE` error (the open file descriptor limit has been exceeded), perform the `getrlimit` (`RLIMIT_NOFILE`, `@ptr_to_rlim_t_structure`) call to find out the hard and soft descriptor limit in the structure, and then do the `setrlimit` (`RLIMIT_NOFILE`, `@ptr_to_rlim_t_structure`) to increase the value of the soft limit. For correct program behavior, the new soft limit must not be larger than `HDESLIM` or `FD_SETSIZE`.

For more information, refer to the **select(2)** manual page.

### 5.3.2 sigaction System Call

In order to use the **sigaction** system call to allow processes to ignore the SIGCHLD signal and allow the system to clean up children without having to explicitly wait on them, please note the following:

- The BCS (Binary Compatibility Standard) does not define a flag for the **sa\_flags** field of the **sigaction** structure for this purpose. Because of this, under BCS, when you use **sigaction** to ignore SIGCHLD, the system sets things up to clean up children when they terminate.
- Under the ABI (Application Binary Interface), a process must explicitly set the **sa\_flags** field to SA\_NOCLDWAIT to get the system to clean up terminated children. Failure to set the flag results in defunct processes unless the application explicitly waits for terminated children.

In DG/UX System 5.4R3.00, the actions for the ABI and BCS cases were reversed. The problem is fixed in this release. If you want the system to clean up terminated children and build ABI-compliant applications (the default), make sure that the **sa\_flags** field has the SA\_NOCLDWAIT flag set.

### 5.3.3 Streams Resource Configuration

If you have a diskless system, change the STREAMS configuration variable STRMSGSZ in **/usr/etc/master.d/dgux** from the default value of 0 to 16384, and perform a kernel rebuild. Limiting the maximum number of bytes allowed in the message portion of a stream prevents the rare occurrence of very large streams messages depleting physical memory resources. This is not a problem on diskfull systems.

### 5.3.4 Stand-Alone sysadm

The stand-alone **sysadm** utility uses a memory-based **root** file system. The size of this **root** file system is limited to the amount of physical memory on your system. On small systems (such as 16MB), when you boot stand-alone **sysadm**, if you do not select a swap device right away, you can run out of paging space. This will result in panic number 57000145.

To avoid this problem, you should select a swap device as soon as you enter stand-alone **sysadm**. Do this by choosing the Install Software menu. Then, run the first two install steps, as follows:

1. Prepare physical disks.
2. Prepare virtual disks.

If you are running on a system that has 16MB and includes a large number of disks (that is, more than six disks), you may still receive this panic when attempting to select the swap device. In this case, you should select only the disk that will contain the swap device, when preparing physical disks.



## 5.4 Shared Disk Warnings

The following warnings apply only if you have the Shared Disk Administration component of this release.

### 5.4.1 Shared Disks

You can format shared physical disks for only a limited subset of the high-level storage abstractions that the DG/UX system provides. Subsets of the Virtual Disk Manager (VDM) formats are supported in addition to raw physical disk (**pdisk**) format. Shared physical disks in VDM format support partitioning only. Specifically, the following DG/UX data storage abstractions are not allowed on shared physical disks:

1. File systems  
You must put your database on raw disk partitions with ORACLE Parallel Server.
2. Software bad block remapping  
However, CLARiiON hardware bad block remapping is available.
3. Software mirrors  
However, CLARiiON hardware mirrors are supported.
4. Software caches  
However, CLARiiON hardware mirrored NVRAM caches are supported.
5. VDM aggregations  
However, CLARiiON RAID-5 hardware striping is supported.

The current implementation of disk sharing does not support full on-line management of shared disks. You can create, but not delete or modify, virtual disk partitions on a physical disk that is enabled for sharing. To perform the above operations, first disable disk sharing. For more information, see the **admvdisk(1M)** manual page.

Shared disks must be configured properly in order for Shared Disk Administration to manage them safely. Take special note of the following:

6. When editing the kernel configuration (“system”) file for the custom kernel that is to be run on a system sharing disks, closely follow the instructions in the manual *Managing the DG/UX™ System for the ORACLE® Parallel Server*. Pay attention to warning messages from operations in the **sysadm** menu Availability -> Shared Disk -> Devices or from the **admshreddiskdevice** command. These messages can alert you to incompatibilities in the system file and to other problems that can impair your use of disk sharing. Whenever you change your custom kernel configuration, run the **sysadm** operation Availability -> Shared Disk -> Devices -> Check or the **admshreddiskdevice -o check** command. Do this after installing your new kernel, but before booting it.
7. Include all hosts that can share a physical disk in the hosts’ shared disk hosts databases. Verify the lists with the **sysadm** operation Availability -> Shared Disk -> Hosts -> List or the **admshreddiskhost -o list** command.

8. Use the **sysadm** operation `Availability -> Shared Disk -> Devices -> List` or the **admshreddiskdevice -o list** command to make sure that every shared physical disk is listed in each host's shared disk devices database. Make sure that the public device name associated with each individual shared disk device is identical across all hosts.
9. If you must make changes to shared disk databases while shared disks are in use, do not use the unconditional option found in queries under the **sysadm** menu `Availability -> Shared Disk` or the **admshreddiskhost** and **admshreddiskdevice** commands. The unconditional option overrides safeguards built into Shared Disk Administration that prevent dangerous management operations. In general, use this option only when necessary to correct mistakes in a shared disk database.
10. Do not boot from a shared disk device as this can cause other systems to lose access to a shared disk. To avoid the possibility of booting a shared disk device, never install a DG/UX bootstrap on a physical disk to be shared.

## 5.4.2 Distributed Lock Manager (DLM)

If you are upgrading from DG/UX R3.00 and have been running the Distributed Lock Manager with Oracle Parallel Server, you will need to reinstall the DLM after installing this release.

## 5.4.3 Multi-Path Disk I/O and Shared Disks

Do *not* define multiple I/O paths to disks intended for shared use (that is, with ORACLE Parallel Server and AV/DLM).

Multi-path disk I/O does not currently work in conjunction with shared disks. You can define backup I/O paths to a public physical disk, but the MPIIO relationship will not start up correctly. In the worst-case scenario, one system can obtain exclusive access to the physical disk while another system is using the disk, possibly causing data loss. This problem will be corrected in the very near future.

Multiple disk I/O paths are defined by the **admiopath -o add** command and the **sysadm** menu operation `Availability -> Multi-Path I/O -> Disk -> Add`.

## 5.4.4 admshreddiskdevice

The following restrictions apply to the **admshreddiskdevice** command:

1. You can disable sharing only if you know the public device name for the shared physical disk. You cannot disable sharing for a device by its device specification alone.
2. You can disable sharing for a device only if it has an entry in the shared disk devices database. Therefore, do not delete the entry for a device that is enabled for sharing. That is, do not perform the **sysadm** `Availability -> Shared Disk -> Devices -> Delete` operation with the "Delete Unconditionally" option or with the following command line:

```
# admshreddiskdevice -o delete -f ↵
```

### 5.4.5 mount

The following restrictions apply to the **mount** command:

1. Does not mount a file system that resides on a shared physical disk.
2. Does not mount a file system contained in a virtual disk that resides on a shared physical disk.

### 5.4.6 rc.shreddisk

The shared disk RC script does not enable disk sharing while any other node in the shared disk cluster is down. However, it keeps running in the background. Within a minute or so after all nodes come up, your shared disks are enabled automatically. If you know a system in the cluster will be down for an extended period of time, you can temporarily delete it from the cluster using the **sysadm** operation Availability -> Shared Disk -> Hosts -> Delete.

The shared disk RC script does not enable sharing for any physical disk that is disabled for sharing on another node in the shared disk cluster. If this happens, you can manually configure, register, and enable sharing for the appropriate devices using operations in the **sysadm** menu Availability -> Shared Disk. Use the “All Nodes” option to accomplish this from a single system.

Currently, no shutdown actions are defined for shared disks. As a result, shared disks are deregistered by the kernel at system shutdown without the benefit of the extra coordination performed by **admpdisk**. This can cause virtual disk metadata corruption if a virtual disk was deleted or updated since the physical disk was last deregistered. To avoid this problem, do not shut down a system while any other system in the cluster is booting. Also, do not shut down a system while any system in the cluster is creating a virtual disk that resides upon a shared physical disk.

### 5.4.7 swapon

The **swapon** command does not allow you to page to a shared physical disk or to a virtual disk that resides on a shared physical disk.

## 6 Documentation

### 6.1 Printed Documentation

During this and the last two releases, DG/UX system administration documentation was reorganized to consolidate information about specific topics and tasks. If you need information about a DG/UX system administration topic or task, refer to one of the following manuals.

#### 6.1.1 Revised Manuals

1. *Achieving High Availability on AViiON® Systems* (093-701133-01)
2. *Analyzing DG/UX™ System Performance* (093-701129-02)
3. *Guide to AViiON® and DG/UX™ System Documentation* (069-701085-05)
4. *Installing and Managing Printers on the DG/UX™ System* (093-701132-01)
5. *Installing the DG/UX™ System* (093-701087-06)
6. *Managing the DG/UX™ System* (093-701088-05)

#### 6.1.2 New Manual

1. *Managing Mass Storage Devices and DG/UX™ File Systems* (093-701136-00)

This manual consolidates all operations necessary to add a mass storage device to the DG/UX system and to operate the device following its addition. This book tells you how to configure the device into the kernel, plan its storage, soft format and register it, create virtual disks, and create/add/mount its file system. The book includes physical and virtual disk and file system management operations and file system checking procedures.

#### 6.1.3 New Shared Disk Manual

1. *Managing the DG/UX™ System for the ORACLE® Parallel Server* (093-701134-00)

This manual describes how to install, set up, and administer the AViiON Distributed Lock Manager for the ORACLE Parallel Server product and its associated DG/UX system components. These components include the Distributed Lock Manager (DLM), shared disks, and the DLM cluster manager. This manual complements the AViiON and CLARiiON hardware manuals, DG/UX operating system manuals, and ORACLE RDBMS manuals that cover the other components of the ORACLE Parallel Server.

## 6.1.4 Obsoleted Manual

### 1. *Customizing the DG/UX™ System*

As of this release, Data General no longer provides the manual *Customizing the DG/UX System*. The content of the manual was merged into the manuals *Managing the DG/UX™ System* and *Managing Mass Storage Devices and DG/UX™ File Systems*.

## 6.2 On-Line Documentation

The DG/UX system on-line documentation consists of manual pages and **sysadm** help messages. The following sections list the locations of the 5.4R3.10 manual pages and list the manual pages that were added, modified, or deleted.

### 6.2.1 Manual Pages

For a complete list of manual pages, see the following files:

| <b>Package</b> | <b>Pathname</b>  |
|----------------|--|
| DG/UX          | <b>/usr/release/dgux.man_5.4R3.10.fl</b>               |
| gcc            | <b>/usr/release/gcc.man_2.5.8.1.fl</b>                 |
| TCP/IP         | <b>/usr/release/tcpip.man_5.4R3.10.fl</b>              |
| ONC            | <b>/usr/release/onc.man_5.4R3.10.fl</b>                |
| NFS            | <b>/usr/release/nfs.man_5.4R3.10.fl</b>                |
| X11            | <b>/usr/opt/X11/release/X11.man_5.4R3.10.fl</b>        |
| X11 SDE        | <b>/usr/opt/X11/release/X11.sde.man_5.4R3.10.fl</b>    |
| NetWorker      | <b>/usr/opt/networker/release/networker.man_1.0.fl</b> |
| X.desktop      | <b>/usr/opt/xdt/release/xdt.man_3.5.fl</b>             |

### 6.2.2 New Manual Pages

Following are the manual pages added for this release:

**admshreddiskdevice(1M)**  
**admshreddiskhost(1M)**  
**find2perl(1)**  
**idid(1M)**  
**idischd(1M)**  
**netuser(1M)**  
**shreddisk(4M)**  
**shreddiskd(1M)**  
**vdmpio(7)**

## 6.2.3 Modified Manual Pages

Following are the manual pages modified for this release:

|                             |  |                        |
|-----------------------------|--|------------------------|
| <b>acct</b> (1M)            | <b>dgen</b> (7)                          | <b>rlogin</b> (1C)     |
| <b>acctsh</b> (1M)          | <b>directory</b> (3C)                    | <b>rmt</b> (7)         |
| <b>acctcom</b> (1)          | <b>dump2</b> (1M)                        | <b>runacct</b> (1M)    |
| <b>acctprc</b> (1M)         | <b>ex</b> (1)                            | <b>sac</b> (1M)        |
| <b>acctsh</b> (1M)          | <b>expr</b> (1)                          | <b>sd</b> (7)          |
| <b>admaccounting</b> (1M)   | <b>find</b> (1)                          | <b>sdb</b> (1)         |
| <b>admbootpclient</b> (1M)  | <b>fsck</b> (1M)                         | <b>sde</b> (5)         |
| <b>admdevice</b> (1M)       | <b>fstab</b> (4)                         | <b>setegid</b> (2)     |
| <b>admfailoverdisk</b> (1M) | <b>ftp</b> (1C)                          | <b>seteuid</b> (2)     |
| <b>admfilesystem</b> (1M)   | <b>gcc</b> (1)                           | <b>setgid</b> (2)      |
| <b>admiopath</b> (1M)       | <b>gethostent</b> (3N)                   | <b>setitimer</b> (2)   |
| <b>admpdisk</b> (1M)        | <b>getitimer</b> (2)                     | <b>setpriority</b> (2) |
| <b>admpf</b> (1M)           | <b>getopt</b> (3C)                       | <b>setregid</b> (2)    |
| <b>admswap</b> (1M)         | <b>hken</b> (7)                          | <b>siginfo</b> (5)     |
| <b>admuser</b> (1M)         | <b>idl</b> (4)                           | <b>sort</b> (1)        |
| <b>admuserlicense</b> (1M)  | <b>ifconfig</b> (1M)                     | <b>st</b> (7)          |
| <b>admvdisk</b> (1M)        | <b>inert</b> (7)                         | <b>stime</b> (2)       |
| <b>async_daemon</b> (2)     | <b>init</b> (1M)                         | <b>string</b> (3C)     |
| <b>at</b> (1)               | <b>intro</b> (7)                         | <b>strtol</b> (3C)     |
| <b>atq</b> (1)              | <b>login</b> (1)                         | <b>swapon</b> (1M)     |
| <b>automount</b> (1M)       | <b>lex</b> (1)                           | <b>sysadm</b> (1M)     |
| <b>bzero</b> (3C)           | <b>ln</b> (1)                            | <b>sysconf</b> (1M)    |
| <b>calendar</b> (1)         | <b>lpadmin</b> (1M)                      | <b>sysconf</b> (2)     |
| <b>cancellation</b> (3)     | <b>lpstat</b> (1)                        | <b>sysdef</b> (1M)     |
| <b>chmod</b> (1)            | <b>lsd</b> (1M)                          | <b>system</b> (4)      |
| <b>chown</b> (1)            | <b>man</b> (1)                           | <b>systemtape</b> (1M) |
| <b>chied</b> (7)            | <b>master</b> (4)                        | <b>tail</b> (1)        |
| <b>cien</b> (7)             | <b>mkdir</b> (1)                         | <b>tar</b> (1)         |
| <b>cimd</b> (7)             | <b>mknod</b> (1M)                        | <b>tclload</b> (1M)    |
| <b>cird</b> (7)             | <b>more</b> (1)                          | <b>telnet</b> (1M)     |
| <b>config</b> (1M)          | <b>mount</b> (1M)                        | <b>termprinter</b> (1) |
| <b>cpio</b> (1)             | <b>mt</b> (1)                            | <b>tmpnam</b> (3S)     |
| <b>cron</b> (1M)            | <b>mterm</b> (1)                         | <b>ttynam</b> (3C)     |
| <b>crontab</b> (1)          | <b>ncsc</b> (7)                          | <b>uucp</b> (1)        |
| <b>cu</b> (1)               | <b>nps</b> (1)                           | <b>uname</b> (1)       |
| <b>deblock</b> (1)          | <b>passwd</b> (4)                        | <b>units</b> (1)       |
| <b>dg_lcctl</b> (2)         | <b>pefn</b> (7)                          | <b>usermond</b> (1M)   |
| <b>dg_lock_kill</b> (2)     | <b>pg</b> (1)                            | <b>vacation</b> (1)    |
| <b>dg_lock_reset</b> (2)    | <b>ps</b> (1)                            | <b>vi</b> (1)          |
| <b>dg_lock_wait</b> (2)     | <b>pthread_attr_setinheritsched</b> (3T) | <b>vitr</b> (7)        |
| <b>dg_sysctl</b> (1M)       | <b>rand</b> (3C)                         | <b>write</b> (2)       |
| <b>dg_sysctl</b> (2)        | <b>resolv.conf</b> (4M)                  | <b>xdgmail</b> (1)     |

## 6.3 Documentation on CD-ROM

**DG/UX 5.4 System Documentation on CD-ROM** contains almost all of the DG/UX System documentation on CD-ROM with the WorldView® 1.1 for X Windows Motif software. (**DG/UX 5.4R3.00 Documentation on CD-ROM** is available now. The System 5.4R3.10 version will be available later in the year.) With this product, you can view documentation on-line and use hypertext links through a manual's Table of Contents and Index, or you can cross reference to instantly access a target section. You can request text searches of all manuals in the collection. You can print one or more pages on a PostScript® laser printer. A menu-driven user interface groups manuals by the intended audience: end-user, system administrator, and programmer.

# 7 Software Distribution

## 7.1 Media

This release is released on QIC 150 tapes and compact disks (CD). This release is available via the following model numbers:

|                      |   |
|----------------------|---|
| <b>P001A</b>         | The <i>DG/UX Operating System with X Window System</i> package. The part numbers are 079-600389-00 for the tape and 068-600105-01 for CD. |
| <b>Q001A</b>         | The <i>DG/UX Operating System</i> package. The part numbers are 079-600388-00 for the tape and 068-600104-01 for CD.                      |
| <b>Documentation</b> | The CD part number is 068-003052.   |

## 7.2 Files

For a complete list of files that are loaded when the DG/UX system is loaded on your disk, see the following files:

| <b>Package</b> | <b>Pathname</b>                             |
|----------------|---|
| DG/UX          | <code>/usr/release/dgux_5.4R3.10.fl</code>  |
| TCP/IP         | <code>/usr/release/tcpip_5.4R3.10.fl</code> |
| ONC            | <code>/usr/release/onc_5.4R3.10.fl</code>   |
| NFS            | <code>/usr/release/nfs_5.4R3.10.fl</code>   |

## 8 Installation Instructions

For package space requirements, refer to the table in the “Software” section of this notice.

The primary instructions for installing this release from the release medium (tape or CD-ROM) and from remote tape or file system are contained in the manual *Installing the DG/UX™ System*. For additional setup information, full explanations of the **sysadm** installation and management program, and other management topics, see the manual *Managing the DG/UX™ System*.

Before beginning installation, see Section 3, “Environment,” for a list of the supported hardware environments.

***Do not attempt to install this release on an AVüON system that has less than 16 MB of memory.***

***Note that the minimum size of the `fsusr` file system has increased to 280,000 blocks.***

### 8.1 Upgrading from DG/UX System 5.4 Release 3.00

The instructions for upgrading a DG/UX 5.4R3.00 system to DG/UX 5.4R3.10 contained in the manual *Installing the DG/UX™ System* are incomplete. If your DG/UX 5.4R3.00 system kernel includes custom tuning parameters or nonstandard devices, you must preserve your configuration as follows:

1. Answer “no” to the question “Automatically rebuild kernel after loading?”.
2. Answer “no” when prompted to build a kernel. You will then be prompted to reboot the kernel.
3. To boot the system to run level 1, retype the boot string, adding `-1` at the end.
4. When the system boots, invoke **sysadm** and select the option `System -> Kernel -> Build` to rebuild your custom kernel.
5. Once your kernel is rebuilt, reboot your system in order for the changes to take effect.

If you are upgrading from DG/UX System 5.4R3.00 and have been running the Distributed Lock Manager with Oracle Parallel Server, you will need to reinstall the DLM after installing this release.



## 9 Preparing a Software Trouble Report (STR)

If you believe that you have found an error in the DG/UX system or its documentation or if you have a suggestion for enhancing or improving the product, do the following:

1. Describe the error or suggestion using a Data General Software Trouble Report (STR) form. See “Collecting STR Materials” below. For software problems, prepare a tape containing diagnostic information and problem illustrations. See “Preparing STR Tapes” below.
2. To simply make a comment, edit a copy of the Reader Comment form in **usr/release/doc\_comment\_form**, and send it to the address contained on the form.

A copy of the standard STR form suitable for printing on a line printer is in the file **usr/release/STR\_form**. STR forms are also available from the nearest Data General office, from your representative, or from the Customer Support Center. Depending on your support contract, you can submit STR reports to the Customer Support Center or directly to your Data General representative.

There are two types of system error: those associated with system panics or hangs (type 1) and those having to do with failure of specific programs or components only (type 2). On a type 1 STR tape, you *must* include a system memory dump (tape file 0) and a copy of the system image (tape file 1); you may also include other requested files (tape file 2). A type 2 STR tape should include in tape file 0 only the program source, executable, and output files that demonstrate the problem.

Indicate on the problem description form whether or not you are providing a tape and, if so, how the tape is organized. Also, be sure to record the panic code.

### 9.1 Collecting STR Materials

For each problem you report, fill in the three-page STR form completely. Where asked for the release, enter **5.4R3.10**. For the name and model number, enter one of the following selections:

1. TCP/IP and C001A for TCP/IP problems.  
  
For assistance in diagnosing, describing, and solving TCP/IP problems, see *Managing TCP/IP on the DG/UX™ System*.
2. NFS and C002A for NFS problems.
3. DG/UX and Q501A for other DG/UX problems.

Also, indicate the type of STR you are writing:

4. An enhancement request: Describe it clearly and explain why you want it.
5. A documentation error: Identify the document—the manual page name, the document title, ordering number, the page number(s) and section(s) containing the error; and explain the error.

6. A software problem: Clearly describe the problem, indicating how to reproduce it.

## 9.1.1 Generating a System Dump

### 9.1.1.1 If the System Hangs

If you are running on an M88110 platform, an “abort” button is recessed in the back panel of the system near the “Warm reset” button. Press the “abort” button. The system should generate a panic and prompt you for a dump. If for some reason the “abort” button is inaccessible or if you are running on an M88100 platform, try to take a “hot key” dump. If neither of these methods work, use the “reset” button to obtain a dump as follows. Once in the SCM, enter “reset” followed by “start 1000”. This invokes the dump dialog described in the manual *Managing the DG/UX™ System*.

NOTE: On some systems, especially MC88100-based, the **start 1000** command from the PROM SCM prompt may take two or three minutes to respond with the prompt,

Do you want to take a dump?

If the **start 1000** command seems hung, you should wait three minutes before attempting another reset, since it may proceed properly in time.

NOTE: You should always perform the above actions in order before cycling the power on your system.

### 9.1.1.2 If the System Panics

The behavior of your system after a panic depends on the configurable system parameters. For more information, refer to the manual *Managing the DG/UX™ System*.

## 9.1.2 Documenting DG/UX Component Problems

### 9.1.2.1 System Calls, Device Drivers, and Commands

Write the shortest possible program or shell script that demonstrates the problem. This can be a shortened version of your actual program or script, without unnecessary variables and logic. Supply both source and executable copies of this program and a copy of the system image (*/dgux*), along with a detailed description of how to reproduce the problem.

Before submitting the problem, be sure that it can be duplicated under “sterile” conditions; for example, with a standard path and standard permissions on files. In other words, try to ensure that your environment is not the cause of the problem.

### 9.1.2.2 Fast-Recovery File System

If you are filing an STR about the fast-recovery file system, include `/etc/log/fast_fsck.log` on the STR tape. Include also on the tape all output produced by the fast-recovery or normal run of `fsck` that reported problems. When you run `fsck` as part of an `init` script, that output is placed in `/etc/log/fsck.log`. If you run `fsck` manually, get this information for the STR tape by redirecting output to a file or piping it through the `tee` command.

## 9.2 Preparing STR Tapes

For information on preparing STR tapes, refer to the manual *Managing the DG/UX™ System*. Special cases are noted in this section.

### 9.2.1 Transferring a Dump from Virtual Disk to Tape

If you wish, you can specify a virtual disk as the default system dump device. If you have selected this option, the first step in preparing an STR tape (for a problem connected with a system panic) is to transfer, from the virtual disk to tape, the system memory image that was dumped after the panic. The command below transfers a memory dump from a virtual disk named `/dev/rdisk/sys_dump` to the tape in drive `/dev/rmt/0n`:

```
# lsd -t /dev/rdisk/sys_dump /dev/rmt/0n ↵
```

The memory image is copied to file 0 of the tape. Note that the no-rewind option (`n`) is specified for the drive. This is so that the tape will be ready for writing file 1.

### 9.2.2 Copying Your Tailored System File

In all cases, an STR tape that includes a memory dump image must also include a copy of your tailored system file. Without an image of the operating system that was running when the panic occurred, a memory dump is useless for diagnosis. The following command transfers the system file named `dgux` to tape drive `/dev/rmt/0n`:

```
# cd /; echo dgux | cpio -oBcv > /dev/rmt/0n ↵
```

The system file is copied to file 1. The tape, because it was not rewound, is ready for writing any additional files to file 2.

### 9.2.3 Copying Additional Diagnostic Files

For copying any additional files to the STR tape, use a command line like the following:

```
# ls filenames | cpio -oBcv > /dev/rmt/0 ↵
```

This example assumes `filenames` is a template for files in the current directory that you wish to copy. The tape rewinds after this command line. It is now ready for forwarding to Data General with the STR and problem description forms.

## 9.2.4 Preparing an STR Tape for a Diskless Workstation

### 9.2.4.1 If You are Logged Into a Server

Use commands similar to the following to make an STR tape for a diskless workstation if you are logged in to a server.

1. Change to the server directory containing the memory dump:

```
# cd /srv/dump ↵
```

2. Transfer the memory dump to file 0, without rewind:

```
# ls diskless_client_name | cpio -oBcv >/dev/rmt/0n ↵
```

3. Change to the server directory containing the tailored system file:

```
# cd /srv/release/PRIMARY/root/_kernels ↵
```

4. Transfer the system file to file 1 (The tape is set for copying additional files to tape file 2):

```
# ls dgux.diskless | cpio -ocvB >/dev/rmt/0n ↵
```

The actual pathname of the memory dump file for a workstation (**/srv/dump/diskless\_client\_name** in this example) is specified in the file **/etc/bootparams** on the workstation's server. Also, the name of the custom kernel may be something other than **dgux.diskless**.

### 9.2.4.2 If You are Logged Into a Workstation

Use commands similar to the following to make an STR tape for a diskless workstation if you are logged in to a workstation.

1. Make sure that **/srv/dump** is mounted:

2. Change to the server directory containing the memory dump:

```
# cd /srv/dump ↵
```

3. Transfer the memory dump to file 0, without rewind:

```
# ls diskless_client_name | cpio -oBcv >/dev/rmt/0n ↵
```

4. Change directories:

```
# cd / ↵
```

5. Transfer the system file:

```
# ls dgux | cpio -ocvB >/dev/rmt/0 ↵
```

### 9.2.5 Preparing an STR Tape Without a Memory Dump

For problems that do not involve a system dump, put all files associated with the problem in tape file 0, in **cpio** format, using a command like the following:

```
# ls filenames | cpio -oBcv > /dev/rmt/0 ↵
```

Do not use absolute pathnames (pathnames starting with */*) for the filenames being listed.

If you need to include a directory such as **/var/spool/lp** that also includes links, change to that directory and use the **tar** command. For example,

```
# tar cvfL /dev/rmt/0 * ↵
```

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