

# Tru64 UNIX

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## Installation Instructions and Release Notes Device Driver Kit Version 2.0

Part Number: AV-RNG5A-TE

**December 2000**

**Product Version:** Device Driver Kit Version 2.0

**Operating System and Version:** Tru64 UNIX Version 5.0A or higher

This manual explains how to install the Device Driver Kit Version 2.0 product, including source code with examples and user manuals. It also describes changes to the product and documentation since Device Driver Kit Release 1.0.

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## About This Manual

This manual explains how to install the Device Driver Kit Version 2.0 product, including source code with examples and user manuals. It also describes changes to the product and documentation since Device Driver Kit Release 1.0.

### Audience

This document is for the person who installs the Device Driver Kit (DDK) and for anyone who uses the product following installation.

### Organization

This document is organized as follows:

<i>Chapter 1</i>	Contains notes on installing the DDK.
<i>Chapter 2</i>	Contains notes on the DDK software and documentation.

### Related Documentation

The following documentation is included in the DDK:

- *Installation Instructions and Release Notes*
- *Writing Device Drivers*
- *Writing Kernel Modules*
- *Guide to Preparing Product Kits*
- *Writing a Graphics Device Driver and DDX for the Tru64 UNIX X Server*
- *Writing Network Device Drivers*
- *Writing PCI Bus Device Drivers*
- *Writing VMEbus Device Drivers*
- Reference Pages
- Driver code examples
- Driver Development Tool (code template generator)

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Please include the following information along with your comments:

- The full title of the manual and the order number. (The order number is printed on the title page of this manual and on its back cover.)
- The section numbers and page numbers of the information on which you are commenting.
- The version of Tru64 UNIX that you are using.
- If known, the type of processor that is running the Tru64 UNIX software.

The Tru64 UNIX Publications group cannot respond to system problems or technical support inquiries. Please address technical questions to your local system vendor or to the appropriate Compaq technical support office. Information provided with the software media explains how to send problem reports to Compaq.

## Conventions

This manual uses the following conventions:

:	A vertical ellipsis indicates that a portion of an example that would normally be present is not shown.
...	In syntax definitions, a horizontal ellipsis indicates that the preceding item can be repeated one or more times.
<i>file</i>	Italic (slanted) type indicates variable values, placeholders, and function parameter names.
buf	In function definitions and syntax definitions used in driver configuration, this typeface indicates names that you must type exactly as shown.

[ ]

In formal parameter declarations in function definitions and in structure declarations, brackets indicate arrays. Brackets also specify ranges for device minor numbers and device special files in file fragments. However, for the syntax definitions that are used in driver configuration, these brackets indicate items that are optional.

|

Vertical bars separating items that appear in the syntax definitions used in driver configuration indicate that you choose one item from among those listed.



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## Installation Notes

This chapter provides information on installing the Tru64 UNIX Device Driver Kit (DDK). Failure to read these notes can result in serious installation problems. Also, before you start your installation, be sure to review the Tru64 UNIX installation and hardware documentation.

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### Note

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We recommend that you do not install the DDK documentation onto your system's hard disk. HTML hot links from the documentation to the driver code examples will not work properly if the documentation is not being read from the CD-ROM.

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## 1.1 System Requirements

To install the Tru64 UNIX Device Driver Kit Version 2.0, you must be running Tru64 UNIX Version 5.0 or higher.

## 1.2 Kit Contents

The Tru64 UNIX Device Driver Kit Version 2.0 contains these printed *Installation Instructions and Release Notes*, a Read This First letter, and a CD-ROM that includes the Tru64 UNIX Device Driver example drivers, the Driver Development Tool (code template generator), and documentation (manuals and reference pages). The manuals are in HTML and PDF format; the reference pages are in HTML format or are available from the command line.

The kit includes the following manuals:

- *Writing Device Drivers*
- *Writing Kernel Modules*
- *Guide to Preparing Product Kits*
- *Writing a Graphics Device Driver and DDX for the Tru64 UNIX X Server*
- *Writing Network Device Drivers*
- *Writing PCI Bus Device Drivers*
- *Writing VMEbus Device Drivers*

The kit includes the following examples:

- The directory `/usr/examples/ddk/src/myvga` includes the example source files that are used throughout the *Writing a Graphics Device Driver and DDX for the Tru64 UNIX X Server* manual.
- The directory `/usr/examples/ddk/src/network` includes the example source files that are used throughout the *Writing Network Device Drivers* manual.
- The directory `/usr/examples/ddk/src/pci` includes the example source files that are used throughout the *Writing PCI Bus Device Drivers* manual.
- The directory `/usr/examples/ddk/src/dm100` includes the example source files that are used throughout the *Writing VMEbus Device Drivers* manual.

### 1.3 Browsing the DDK Documentation on the CD-ROM

To view the DDK documentation on the CD-ROM, do the following:

1. Log in as `root` or use the `su` command to become the superuser.
2. Make the `/usr/share/doclib/ddk` directory, as follows:

```
# mkdir -p /usr/share/doclib/ddk
```

3. Edit the `/usr/doc/netcape/Welcome.html` file and add the following immediately before the first `REMOVE TO ENABLE WEBMAN` line:

```
<TR>
  <td><a href="../../share/doclib/ddk/DOCS/HTML/LIBRARY.HTM">
    <font face="Arial, Helvetica" size="2">
      Tru64 UNIX Driver Development Documentation</font></a>
</tr>
```

4. Place the DDK CD-ROM in your system's CD-ROM drive and ensure that the drive is on line.
5. If you do not know the name of your CD-ROM device, you can determine the device special file basename by using the `hwmgrr` utility:

```
# hwmgrr -view dev | grep cdrom
86: /dev/disk/cdrom0c    COMPAQ    CDR-8435
bus-1-targ-0-lun-0
```

The block device special file name in this example is `/dev/disk/cdrom0c`.

6. Mount the DDK CD-ROM on your system by entering the following command, replacing `/dev/disk/cdrom0c` with your CD-ROM block device special file name:

```
# mount -t cdfs /dev/disk/cdrom0c /usr/share/doclib/ddk
```

7. Invoke Netscape and click on the browser's Home button. If you have changed the default home page to something other than the Compaq Tru64 UNIX welcome page, invoke Netscape as follows:

```
/usr/bin/X11/netscape file:/usr/doc/netscape/Welcome.html &
```

8. Click on the Tru64 UNIX Driver Development Documentation link to display the DDK documentation.

To link the DDK documentation with the Compaq Tru64 UNIX welcome page, see step 3 and step 7.

If you unmount the DDK CD-ROM (`umount /usr/share/doclib/ddk`), you can remount it by repeating step 6. You do not need to reedit the `/usr/doc/netscape/Welcome.html` file.

If you upgrade your operating system or update Netscape, you will lose any changes to the `/usr/doc/netscape/Welcome.html` file. Ensure that you have a backup copy of the `/usr/doc/netscape/Welcome.html` file before you upgrade your operating system or Netscape.

## 1.4 Installing the Reference Pages on Your Tru64 UNIX System

You can install the reference pages on your system.

You must have at least 1 MB of disk space in the `/usr` partition to hold the reference pages.

To install the reference pages on your system, do the following:

1. Log in as `root` or use the `su` command to become the superuser.
2. Verify that the `/usr` directory has enough disk space:  

```
# df /usr
```
3. Place the DDK CD-ROM in your system's CD-ROM drive and ensure that the drive is on line.
4. To determine the name of your CD-ROM device, see step 5 of Section 1.3.
5. To mount the DDK CD-ROM on your system, see step 6 of Section 1.3.
6. Install the reference pages with the `setld` utility:

```
# setld -l /usr/share/doclib/ddk/DEVICE_DRIVER_KIT
```

The `setld` utility presents you with the following menu:

The subsets listed below are optional:

```
There may be more optional subsets than can be presented on a single screen. If this is the case, you can choose subsets screen by screen or all at once on the last screen. All of the choices you make will be collected for your confirmation before any subsets are installed.
```

- 1) Device Driver Examples
- 2) Ref Pages: Device Driver
- 3) X11 Sys /contrib
- 4) X11 Sys /contrib/programs
- 5) X11 Sys /xc
- 6) X11 Sys /xc/doc
- 7) X11 Sys /xc/fonts
- 8) X11 Sys /xc/include
- 9) X11 Sys /xc/lib
- 10) X11 Sys /xc/programs
- 11) X11 Sys /xc/programs/Xserver

Or you may choose one of the following options:

- 12) ALL of the above
- 13) CANCEL selections and redisplay menus
- 14) EXIT without installing any subsets

Enter your choices or press RETURN to redisplay menus.

Choices (for example, 1 2 4-6):

7. To install the reference pages, enter 2
8. The `setld` utility prompts you to confirm your choice of subsets, as follows. Enter `y` to confirm.

You are installing the following optional subsets:

Ref Pages: Device Driver

Is this correct? (y/n): `y`

9. The `setld` utility determines whether there is enough room on your disk to install the subset that you selected. If there is enough space, it begins installing the subset.

Checking file system space required to install selected subsets:

File system space checked OK.

1 subset(s) will be installed.

Loading 1 of 1 subset(s)...

Ref Pages: Device Driver

Copying from /mnt/DEVICE\_DRIVER\_KIT (disk)

Verifying

1 of 1 subset(s) installed successfully.

Configuring "Ref Pages: Device Driver" (OSCDDDKMAN505)  
#

After installation, you can view the reference pages by using the following command:

```
# man 9 ref_page
```

Where *ref\_page* is the name of your reference page.

## 1.5 Installing the Examples on Your Tru64 UNIX System

You can install the example files on your system.

The Device Driver Kit example files are located in the `/usr/examples/ddk` directory. You must have at least 3 MB of disk space in the `/usr` partition to hold the examples.

To install the examples on your system, do the following:

1. Repeat step 1 through step 6 of Section 1.4.
2. To install the example files, enter 1
3. The `setld` utility prompts you to confirm your choice of subsets, as follows. Enter **y** to confirm.

```
You are installing the following optional subsets:
```

```
Device Driver Examples
```

```
Is this correct? (y/n): y
```

4. The `setld` utility determines whether there is enough room on your disk to install the subset that you selected. If there is enough space, it begins installing the subset.

```
Checking file system space required to install selected subsets:
```

```
File system space checked OK.
```

```
1 subset(s) will be installed.
```

```
Loading 1 of 1 subset(s)...
```

```
Device Driver Examples
```

```
Copying from /usr/share/doclib/ddk/DEVICE_DRIVER_KIT (disk)
```

```
Verifying
```

```
1 of 1 subset(s) installed successfully.
```

```
Configuring "Device Driver Examples" (OSCBDDKEXAMPLES505)
```

```
#
```

## 1.6 Using the DDK CD-ROM with a Windows-based OS

To view the HTML documentation on these systems, open the `LIBRARY.HTM` file with your Web browser. (Some systems open the library bookshelf page automatically when the CD-ROM is inserted into the system's CD-ROM drive.)

Additionally, the AltaVista Search CD-ROM software runs on an x86-based PC with Windows NT Version 4.0, Windows 95, Windows 98, or Windows 2000.

## 1.7 Installing the X Developers Kit

The X Developers Kit (XDK) is located in the `/usr/opt/OSCX505` directory. You must have approximately 185 MB of disk space in the `/usr` partition to hold the source files for the kit. An additional 200 MB of disk space is needed to build the sources.

To install the XDK on your system, do the following:

1. Repeat step 1 through step 6 of Section 1.4.
2. To install the entire X Developers Kit, enter 3-11
3. The `setld` utility prompts you to confirm your choice of subsets, as follows. Enter `y` to confirm.

```
You are installing the following optional subsets:
```

```
X11 Sys /contrib
X11 Sys /contrib/programs
X11 Sys /xc
X11 Sys /xc/doc
X11 Sys /xc/fonts
X11 Sys /xc/include
X11 Sys /xc/lib
X11 Sys /xc/programs
X11 Sys /xc/programs/Xserver
```

```
Estimated free disk space (MB) in root:36.9 usr:315.6
```

```
Is this correct? (y/n): y
```

4. The `setld` utility determines whether there is enough room on your disk to install the subsets that you selected. If there is enough space, it begins installing the source kit. It takes approximately 15 minutes to install the XDK. As each subset is installed, the utility displays an information message, as follows:

```
Checking file system space required to install selected subsets:
```

```
File system space checked OK.
```

```
9 subsets will be installed.
```

```
Loading subset 1 of 9 ...
```

```
X11 Sys /xc
  Copying from /usr/share/doc/lib/ddk/DEVICE_DRIVER_KIT (disk)
  Verifying
```

```
Loading subset 2 of 9 ...
```

```
X11 Sys /xc/programs/Xserver
  Copying from /usr/share/doc/lib/ddk/DEVICE_DRIVER_KIT (disk)
```

```
Verifying
Loading subset 3 of 9 ...

X11 Sys /xc/programs
  Copying from /usr/share/doc/lib/ddd/DEVICE_DRIVER_KIT (disk)
  Verifying

Loading subset 4 of 9 ...

X11 Sys /xc/lib
  Copying from /usr/share/doc/lib/ddd/DEVICE_DRIVER_KIT (disk)
  Verifying

Loading subset 5 of 9 ...

X11 Sys /xc/include
  Copying from /usr/share/doc/lib/ddd/DEVICE_DRIVER_KIT (disk)
  Verifying

Loading subset 6 of 9 ...

X11 Sys /xc/fonts
  Copying from /usr/share/doc/lib/ddd/DEVICE_DRIVER_KIT (disk)
  Verifying

Loading subset 7 of 9 ...

X11 Sys /xc/doc
  Copying from /usr/share/doc/lib/ddd/DEVICE_DRIVER_KIT (disk)
  Verifying

Loading subset 8 of 9 ...

X11 Sys /contrib/programs
  Copying from /usr/share/doc/lib/ddd/DEVICE_DRIVER_KIT (disk)
  Verifying

Loading subset 9 of 9 ...

X11 Sys /contrib
  Copying from /usr/share/doc/lib/ddd/DEVICE_DRIVER_KIT (disk)
  Verifying

9 of 9 subsets installed successfully.

A symlink of ./usr/X11R6.3 has been created to the X11 sources.
Please read /usr/X11R6.3/xc/README_X_IMPLEMENTORS_KIT for instructions.
```

```
Configuring "X11 Sys /xc" (OSCXXC505)
Configuring "X11 Sys /xc/programs/Xserver" (OSCXXCSERVR505)
Configuring "X11 Sys /xc/programs" (OSCXXCPRGRM505)
Configuring "X11 Sys /xc/lib" (OSCXXCLIB505)
Configuring "X11 Sys /xc/include" (OSCXXCINCL505)
Configuring "X11 Sys /xc/fonts" (OSCXXCFONTS505)
```

```
Configuring "X11 Sys /xc/doc" (OSCXXCDOC505)
Configuring "X11 Sys /contrib/programs" (OSCXCTRIBP505)
Configuring "X11 Sys /contrib" (OSCXCTRIB505)
#
```

**After installation, the Tru64 UNIX X Server sources are in the /usr/opt/OSCX505 directory. A link is set up to make it easy to find the sources through /usr/X11R6.3, as follows:**

```
# ls -al /usr/X11R6.3
lrwxrwxrwx  /usr/X11R6.3 -> ./opt/OSCX505/src
```

# 2

---

## DDK Release Notes

This chapter provides information on the Tru64 UNIX Device Driver Kit (DDK) documentation, examples, and Driver Development Tool.

For access to the Device Driver Kit Version 2.0 online documentation (manuals and reference pages), Driver Development Tool (code template generator), and driver examples, go to the following URL:

[http://www.tru64unix.compaq.com/faqs/publications/dev\\_doc/DOCUMENTATION/HTML/dev\\_docs\\_r2.html](http://www.tru64unix.compaq.com/faqs/publications/dev_doc/DOCUMENTATION/HTML/dev_docs_r2.html)

### 2.1 Compatibility Notes

Device drivers that were written for previous versions of the operating system are not binary compatible with Tru64 UNIX Version 5.0A. They will, however, be source compatible and will only require a recompilation.

Future enhancements to the Tru64 UNIX Operating System will necessitate changes to a number of interfaces that are described in the Tru64 UNIX Device Driver Kit Version 2.0. The planned enhancements change the underlying structures and provide additional functionality. However, it is also planned for the enhancements to incorporate a compatibility or translation mode so that drivers that are written under the DDK Version 2.0 model will be source compatible and only require recompilation. However, these drivers will not be able to take advantage of the new functionality that is provided by the planned enhancements.

### 2.2 Changes to Documentation Since Release 1.0

Version 2.0 of the Tru64 UNIX Device Driver Kit (part number QA-6ADAV-A8) does not contain printed manuals. You can order printed copies of the manuals by using the following part number: QA-6ADAV-GZ, Tru64 UNIX Device Driver Documentation Kit.

#### 2.2.1 Changes to the Reference Pages

The following reference pages are new with Version 2.0 of DDK:

- `bus_config(9s)`
- `create_bus_struct(9r)`

- CLEAR\_LAN\_COUNTERS(9r)
- detachpfilter(9r)
- if\_alloc(9r)
- if\_detach(9r)
- if\_dealloc(9r)
- lan\_build\_mclist(9r)
- lan\_configure(9r)
- lan\_create\_controller(9r)
- lan\_ehm\_free(9r)
- lan\_ehm\_init(9r)
- lan\_register\_adapter(9r)
- lan\_set\_attribute(9r)
- lan\_set\_common\_attributes(9r)
- lan\_zer\_multi(9r)
- fddi\_header(9s)
- lan\_config\_data(9s)
- net\_hw\_mgmt(9s)
- trn\_header(9s)
- vba\_badaddr(9r)
- vba\_get\_info(9r)

The following reference pages have been revised for Version 2.0 of DDK:

- controller\_config(9s)
- device\_config(9s)
- The video\_on\_off.9r reference page has been renamed to video\_on.9r. Entering `man 9 video_on` or `man 9 video_off` displays the video\_on.9r reference page, which covers both conditions. See video\_on(9r) for more information.

The following reference pages have been removed from Version 2.0 of DDK:

- All reference page that are related to the SCSI/CAM architecture have been removed.
- Various reference pages that relate to the *Writing Kernel Modules* manual have been moved to section 9 of the Tru64 UNIX base operating system.

## 2.2.2 New Manuals

*Writing Device Drivers* is new with Version 2.0 of DDK. This manual offers the following new and changed features:

- This manual has been entirely rewritten and replaces *Writing Device Drivers: Tutorial*. It includes the chapter on funnels and the chapter on how to write disk device drivers that were previously part of *Writing Device Drivers: Advanced Topics*.
- This manual uses the fictitious `xx` example device driver.

## 2.2.3 Updated Manuals

The following manuals have been revised for DDK Version 2.0:

- *Writing a Graphics Device Driver and DDX for the Tru64 UNIX X Server*

This manual was updated to describe how to modify the device driver and DDX library to support linear space addressing on the EV6 class of systems. This modification pertains only to graphics adapters that support both sparse space and linear space addressing.

- *Writing Network Device Drivers*

This manual offers the following new features:

- Enhanced hardware management (EHM) allows you to modify hardware attributes, such as the type of LAN device, on either a local or a remote system.
- The `unattach()` routine stops the network device and frees resources prior to unloading the device driver or powering off the bus to which the device is attached.

- *Writing PCI Bus Device Drivers*

The previous version of this manual contained both general device driver information and PCI-specific device driver information. All of the general information is now contained in *Writing Device Drivers* and has been deleted from this manual to avoid duplication. This manual now mainly contains information that is specific to PCI device drivers.

- *Writing VMEbus Device Drivers*

Three appendixes that were in previous editions of this manual have been deleted, because the material in them is now on line:

- VMEbus-specific reference information (formerly Appendix A) is now provided as online `vba*` and related reference pages included on the Tru64 UNIX Device Driver Kit CD-ROM.
- VMEbus example device driver files (formerly Appendix B) are provided in source format in the `/usr/examples/ddk/src/dm100`

directory on the Tru64 UNIX Device Driver Kit CD-ROM. The files include the `DM100.list` registration file, the files and `sysconfigtab` file fragments, the `dmaexreg.h` device register header file, the `dmaex.c` example driver source, the `dmaex_test.c` driver exerciser program source, and a README file that provides further explanation and instructions.

- Information about configuring the VMEbus and the VMEbus backplane (vb) driver on AXPvme and Alpha™ VME systems (formerly Appendix C) is now provided in the Tru64 UNIX operating system documentation. See the manual *System Configuration Supplement: OEM Platforms* and the reference pages `vme_manual_setup(7)`, `vme_univ_manual_setup(7)`, and `vb(7)`.

## 2.2.4 Corrections to Updated Manuals

Some of the information in Version 2.0 of *Writing a Graphics Device Driver and DDX for the Tru64 UNIX X Server* is already out-of-date, as follows:

- In Section 5.1.1 "Producing a Single Binary Module," replace the example commands in step 2 with the following:

```
# cd /usr/sys/io/MYVGA100
# cp /usr/examples/ddk/src/myvga/driver/myvga* .
# cp /usr/examples/ddk/src/myvga/driver/sysconfigtab .
# cp myvga.h /usr/sys/include/io/dec/ws
```

- In step 3, the module name should be `myvga` instead of `myvta`.
- In step 5, use the `/usr/sys/io/MYVGA100/sysconfigtab` file rather than typing this file in by hand as shown in the example.
- Before building the X Window System as described in Section 5.3.1 "Building the X Window System," make the following changes to the X Window System files in `/usr/X11R6.3`:

1. Create the following directories and files:

```
# cd /usr/X11R6.3/xc/programs/Xserver/hw/dec
# mkdir ati64linear genlinear s3linear
```

```
# cat > ati64linear/Imakefile
#define ATI64LINEAR 1
#define LinkDirectory ../ati64
#include "../ati64/Imakefile"
^D
```

```
# cat > genlinear/Imakefile
#define GENLINEAR 1
#define LinkDirectory ../gen
#include "../gen/Imakefile"
^D
```

```
# cat > s3linear/Imakefile
#define S3LINEAR 1
#define LinkDirectory ../s3
```

```
#include "../s3/Imakefile"
^D
```

Press Ctrl+D to create ^D.

2. Edit the file `/usr/X11R6.3/xc/programs/Xserver/Imakefile` to remove all references to the following:

```
hw/dec/wd
hw/dec/comet
hw/dec/wd/lib_dec_wd.a
hw/dec/comet/lib_dec_comet.a
```

3. Edit the file `/usr/X11R6.3/xc/programs/xdm/genauth.c` to remove the second instance of the following variables and routines (delete lines 186 through 207):

```
#ifndef HASXDMAUTH
/* A random number generator that is more unpredictable
   than that shipped with some systems.
   This code is taken from the C standard. */

static unsigned long int next = 1;
static int
xdm_rand()
{
    next = next * 1103515245 + 12345;
    return (unsigned int)(next/65536) % 32768;
}

static void
xdm_srand(seed)
    unsigned int seed;
{
    next = seed;
}
#endif /* no HASXDMAUTH */
```

4. Edit the file `/usr/X11R6.3/xc/programs/Xserver/Xprint/mi-initext.c` to add a PANORAMIX conditional around the assignment of the `noPanoramiXExtension` variable. Add `#ifdef PANORAMIX` before line 185 and `#endif` after line 185:

```
#ifdef PANORAMIX
    noPanoramiXExtension = TRUE;
#endif
```

5. Edit the file `/usr/X11R6.3/xc/config/cf/site.def.in` installed to add the following definition:

```
#define ServerExtraSysLibs    -ldnet_stub
```

If you want to build a loadable X Server, add the following definition:

```
#define SharedServerLibs    YES
```

## 2.2.5 Manuals from Tru64 UNIX Version 5.1

The following manuals are part the Tru64 UNIX base operating system and are included in DDK Version 2.0:

- *Writing Kernel Modules*

This manual offers the following new and changed features:

- Information on module initialization, module attributes, dispatch point callbacks, and kernel-mode capabilities has been revised.
- New and revised information for building kernel modules has been added.

- *Guide to Preparing Product Kits*

This manual offers the following new and changed features:

- Information about using context-dependent symbolic links (CDSLs), preparing product kits to run on clusters, and examples with CDSLs has been updated.
- The references to hardware product kits and new hardware delivery (NHD) have been removed.

## 2.2.6 Retired Manuals

The following manuals are not part of the DDK Version 2.0 documentation set:

- *Writing Device Drivers: Reference*

All reference pages are now available on line and from the command line.

- *Writing Device Drivers: Advanced Topics*

Most of the topics previously discussed in this manual are now included in the *Writing Kernel Modules* manual. The chapter on funnels and the chapter on how to write disk device drivers are now part of the *Writing Device Drivers* manual.

- *Writing Device Drivers: Tutorial*

This manual was replaced with *Writing Device Drivers*.

- *Writing Device Drivers for the SCSI/CAM Architecture Interfaces*
- *Writing EISA and ISA Bus Device Drivers*
- *Writing TURBOchannel Device Drivers*

These manuals are still available for DDK Release 1.0 (for Tru64 UNIX Version 4.x).

## 2.3 Changes to Examples Since Release 1.0

### 2.3.1 New Examples

The `if_tu.c` example is used in *Writing PCI Bus Device Drivers*.

### 2.3.2 Updated Examples

The `if_el.c` example for the *Writing Network Device Drivers* manual has a new routine, `el_unattach()`, and a new data structure, `net_hw_mgmt`.

### 2.3.3 Retired Examples

The following examples are not included in DDK Version 2.0:

- The `edpseudo.c` example that was described in *Writing Device Drivers: Tutorial*.
- The `cb.c` example that was described in *Writing TURBOchannel Device Drivers*.
- The `sb.c` example that was described in *Writing EISA and ISA Bus Device Drivers*.
- The `cam_generic.c` example that was described in *Writing Device Drivers for the SCSI/CAM Architecture Interfaces*.
- The `pnvram.c` example that was described in *Writing PCI Bus Device Drivers*.

## 2.4 Changes to the Compaq Tru64 UNIX Driver Development Tool Since Release 1.0

This package contains programs and resource files that enable developers to create customized device driver skeletons for Compaq Tru64 UNIX device drivers. The resulting driver can be configured and loaded statically and dynamically. The tool consists of an HTML front end and a parsing back end. Sources for these are freely available on the Web. Use Netscape, an HTTP server, and an editor to generate and view the skeleton driver files.

### 2.4.1 Installing the Tool

This package is part of the driver example subset. See Section 1.5. Installation of the subset places the tool in the `/usr/examples/ddk/tools/driver_tool` directory.

## **2.4.2 Using the Tool**

First, make sure that Netscape is running on your desktop. Then open the Driver Development Tool's startup page, `/usr/examples/ddk/tools/driver_tool/index.html`.

The driver tool requires an HTTP server to create the skeleton driver files. Consult your HTTP server's documentation for more information.

## **2.5 Changes to the Compaq Tru64 UNIX X Developers Kit Since Release 1.0**

The source files included in this version of the X Developers Kit correspond to the X11 6.3 release of the X Window System from The Open Group and X.Org.