Driver Update 3 Guide for Solaris 2.6 (Intel Platform Edition)

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Preface

This document provides information about x86 hardware devices that are now supported in the Solaris™ 2.6 computing environment. Typically, as new or updated drivers become available, they are bundled with a release in a separate Driver Update. You can use a Driver Update to install a new system for the first time or to update your installed Solaris 2.6 system with new and updated drivers.

Since Driver Updates are cumulative distributions for a given Solaris release, "New Device Functionality" on page 1 in Chapter 1 describes what's been added or changed since the last Driver Update. You only need to install the current Driver Update to get the support described in this document.

Note - The term "x86" refers to the Intel 8086 family of microprocessor chips, including the Pentium, Pentium Pro, and Pentium II processors and compatible microprocessor chips made by AMD and Cyrix. In this document the term "x86" refers to the overall platform architecture, whereas *"Intel Platform Edition"* appears in the product name.

Before You Read This Book

The importance of configuring your hardware before Solaris installation is discussed in the Configuring Devices module in *Information Library for Solaris 2.6 (Intel Platform Edition)* (part of Solaris 2.6 System Administrator Collection Vol 1 at `http://docs.sun.com`). This document assumes you have fully read and understood that module.

Beginning with Driver Update 2, those devices that require configuration have Device Reference Pages in *Device Reference Manual for Solaris 2.6 (Intel Platform Edition)*. Any names of Device Reference Pages ending in "(DU *x*)" supersede those

in the Configuring Devices module and contain device configuration information for hardware supported by new or updated drivers.

The installation instructions in this Driver Update supplement the instructions in *Information Library for Solaris 2.6 (Intel Platform Edition)* and *Solaris Advanced Installation Guide* in Solaris 2.6 System Administrator Collection Vol 1.

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CHAPTER 1

Driver Update 3 for Solaris 2.6 (Intel Platform Edition)

Driver Update 3 (DU 3) provides additional driver support for Solaris 2.6 *Intel Platform Edition* and must be used with this release.

New Device Functionality

Device Drivers

This table lists device drivers in Driver Update 3 that contain new and updated functionality added since the last Solaris 2.6 *Intel Platform Edition* Driver Update. A new or updated Section 7D man page for each of the drivers that added new device support is installed in the appropriate `man` page directory during installation.

Note - Each driver is assigned a version number. Note that a driver produced by a third-party driver developer is assigned the version number used by that third-party developer and may therefore differ from those Sun Microsystems uses.

TABLE 1–1 New and Updated Drivers in This Driver Update

Disk Interface		
`ata`	Version 2.1	Fixed numerous CD-ROM problems, particularly with newer drives **Note -** If you are not currently having problems with your existing `ata` driver, you need not download and install this version of the driver. However, you are encouraged to do so and to provide feedback (positive or negative) by following the instructions at `http://access1.sun.com/drivers/DU3/feedback.txt`.
SCSI Host Bus Adapter		
`adp`	Version 2.4	Fixed bugs, added additional supported devices to the Device Reference Page, and added support for the AIC-7880 (Revision B) and AIC-7895 chips
`cpqncr`	Version 3.0	Added support for Compaq Dual Channel Wide Ultra SCSI-3 (876) PCI controller
SCSI Disk Array/RAID Controller		
`mlx`	Version 2.3	Fixed bugs and added support for Mylex DAC960PG and DAC960PJ PCI-to-SCSI cards
Ethernet Network Adapters		
`dnet`	Version 2.1	Fixed a bug that caused delays during start-up
`elx`		Updated Device Reference Page
`elxl`	Version 2.1	New driver to support 3Com EtherLink XL (3C90*x*, 3C90*x*B) cards
`spwr`	Version 2.1	New driver to support SMC 9432 cards

Driver Update Contents

Driver Update 3 for Solaris 2.6 *Intel Platform Edition* contains the following diskettes:

- Solaris 2.6 Device Configuration Assistant, Version 1.2 Diskette
- Solaris 2.6 Driver Update 3 Diskette 1
- Solaris 2.6 Driver Update 3 Diskette 2
- Solaris 2.6 Driver Update 3 Diskette 3
- Solaris 2.6 Driver Update 3 `ata` Diskette
- Solaris 2.6 `ata` Recovery Diskette

These diskettes are to be used with a Solaris 2.6 CD or net install image.

Solaris 2.6 Device Configuration Assistant, Version 1.2 Diskette

If you are installing Solaris 2.6 *Intel Platform Edition* and you want to install the drivers in Driver Update 3, you must use Solaris 2.6 Device Configuration Assistant, Version 1.2 Diskette instead of the Solaris 2.6 Device Configuration Assistant diskette you received with Solaris 2.6 *Intel Platform Edition*.

You can download Solaris 2.6 Device Configuration Assistant, Version 1.2 Diskette from `http://access1.sun.com/drivers`.

This diskette contains scripts and configuration files that enable you to boot and install your system using one of the newly supported devices.

Driver Update Diskettes

Solaris 2.6 Driver Update 3 diskettes are used when you use the new Solaris 2.6 Device Configuration Assistant, Version 1.2 Diskette to install the Solaris 2.6 operating environment. Alternatively, you can use the Driver Update diskettes without the Device Configuration Assistant diskette to add new and updated drivers to an existing x86 based system running the Solaris 2.6 release.

The Driver Update diskettes contain the drivers listed below. A new or updated Section 7D man page for each of the drivers that added new device support will also be installed in the appropriate `man` page directory during installation.

The Solaris 2.6 Driver Update 3 `ata` and Solaris 2.6 `ata` Recovery diskettes contain, respectively, the optional `ata` driver listed in the next table and an `ata` backout

script (for you to use if the updated `ata` driver on the Solaris 2.6 Driver Update 3 `ata` Diskette does not work).

TABLE 1–2 Device Drivers in This Driver Update

Disk Interface		
`ata`	Version 2.1	Fixed numerous CD-ROM problems, particularly with newer drives **Note -** If you are not currently having problems with your existing `ata` driver, you need not download and install this version of the driver. However, you are encouraged to do so and to provide feedback (positive or negative) by following the instructions at `http://access1.sun.com/drivers/DU3/feedback.txt`.
SCSI Host Bus Adapters		
`adp`	Version 2.4	Fixed a bug in SCSI reset processing where this driver would sometimes experience memory corruption or a panic; added the AHA-3940U and AHA-3940UW host bus adapters to the Device Reference Page; fixed bugs, added additional supported devices to the Device Reference Page, and added support for the AIC-7880 (Revision B) and AIC-7895 chips
`aha`	Version 2.1	Fixed bugs, among them one that prevented users from net installing using an AHA-1540 MCA card, one that caused a delay when scanning devices, and three that relate to stress tests; added support for inserting two AHA cards in the same PC at the same time
`cpqncr`	Version 3.0	Fixed bugs; added support for the Compaq Dual Channel Wide Ultra SCSI-3 (876) PCI controller
`eha`	Version 2.1	Removed some non-conforming code; functionality remains unchanged
`mcis`	Version 2.1	Cleaned up the code; functionality remains unchanged
`ncrs`	Version 2.1	Added support for new version of the BIOS that comes with the Symbios Logic (also NCR) controllers that are already supported by this driver

TABLE 1–2 Device Drivers in This Driver Update *(continued)*

`pcscsi`	Version 2.1	Fixed bugs, among them one that occurred when the target ID was greater than seven and another that occurred because the code did not check that DMA memory was set up correctly before packets were re-used; also fixed a framework usage correctness bug that did not affect functionality
SCSI Disk Arrays/RAID Controllers		
`mega`	Version 1.04	New American Megatrends MegaRAID 428 SCSI RAID controller to support the Solaris 2.6 operating environment; eliminated problems that occurred under heavy stress conditions
`mlx`	Version 2.3	Fixed bugs and added support for Mylex DAC960PG and DAC960PJ PCI-to-SCSI cards
SCSI Tape Driver		
`st.conf`		Added help text that explains how to submit new entries and where to find documentation about creating entries; uncommented entries so you can use these older tape drives without having to modify `st.conf`: Archive Python 28388, Conner CTD 8004H, Compaq DLT models 4000 and 7000, Sony SDT 7000 and SDT 9000, Wangtek 51000 and 52000, Tecmar TS-420, all shipping models of Sun DLT drives up to DLT 700, Quantum DLT 4000 and 7000, Hewlett-Packard SureStore T4 and 1557A DDS3 autoloader (requires third-party control software), WangDAT models 3400DX and 3800, Exabyte EXB-8900 Mammoth and 8705 Eliant, Tandberg TDC 4120
Ethernet Network Drivers		
`cnft`	Version 4.6	Fixed bugs
`dnet`	Version 2.1	Fixed bugs (in the media detection code) and added support for both Digital NIC 21142/21143 chips and for T4 media; fixed a bug that caused delays during start-up
`elx`		Updated Device Reference Page
`elxl`	Version 2.1	New driver to support 3Com EtherLink XL (3C90*x*, 3C90*x*B) cards

TABLE 1–2 Device Drivers in This Driver Update *(continued)*

`pcn`	Version 2.1	Fixed bugs (both realmode and protect-mode); added support for AMD PCnet-PCI II and PCnet-Fast cards and for Cabletron E-2210 cards
`spwr`	Version 2.1	New driver to support SMC 9432 cards
Token Ring Network Adapter		
`mtok`	Version 3.00.02	New Madge Smart 16/4 adapter
PC Card (PCMCIA) Hardware		
`pcata`	Version 2.1	Fixed a bug so tools like `format` won't try to access the Viper 8260pA or SanDisk Flash PC Card if it isn't inserted in the socket
Serial Ports Driver		
`asy`	Version 2.1	Fixed bugs

This table lists the MP kernel modules included in this Driver Update.

TABLE 1–3 MP Kernel Modules in This Driver Update

`pcplusmp`	Version 2.1	Fixed a bug that caused some Compaq MultiProcessor Specification v1.4 Compliant systems to hang (the ProLiant and Professional Workstation Series equipped with or without the Compaq Smart-2/P array controllers, for example) If your system is running an older version of Compaq's ROMPaq firmware, you may also need to upgrade your system with the latest version of ROMPaq firmware after installing this driver to prevent your system from hanging

Driver Update 3 Release Notes

For a complete list of the known problems that are fixed in this Driver Update, see the `README` files that get installed in the patch directories `/var/sadm/patch/`*patch-number*.

- Third-party drivers are provided for the convenience of Solaris customers and are tested to ensure that they meet acceptable standards of operability. SunSoft cannot be responsible for their inclusion in a given release or the timeliness of their availability.
- It is important that you configure your hardware according to the manufacturer's guidelines so, for example, there are no resource conflicts in IRQs or I/O address ranges. Configuring your hardware is discussed further in the Configuring Devices module in *Information Library for Solaris 2.6 (Intel Platform Edition)*.
- The Device Reference Pages specify the supported connector type where appropriate. All network devices are assumed to work at 10 Mbps only, unless otherwise specified in the Device Reference Pages in *Device Reference Manual for Solaris 2.6 (Intel Platform Edition)*. See the beginning of Chapter 1 in that manual for network connectors and the media they support.
- Due to conflicts, the IBM Micro Channel SCSI-2 Fast/Wide Adapter/A should not be installed until the Solaris Micro Channel `mcis` driver is disabled.
- To prevent conflicts with the `tr` driver, the `mtok` driver is disabled by default, and special steps must be taken to enable it. See the "Madge Smart 16/4 Token Ring (DU 1)" Device Reference Page.

Guidelines for Correct Operation of Ethernet Adapters

To ensure correct operation and optimal performance of Ethernet adapters, it is essential that both the adapter and its link partner operate at the same duplex settings. The link partner can be, for example, a hub, switch, or another network adapter connected via a crossover cable.

If both the adapter and the link partner support NWay media autonegotiation, then both devices should automatically select the optimal speed and duplex mode, without any additional configuration.

If either of the devices on a given link do not support, or are not configured to use, NWay autonegotiation, you must ensure that *both* devices are explicitly set to run at the same duplex mode. Generally, if a device cannot determine the duplex capabilities of its link partner, it will default to half-duplex operation.

In the case of a hub or switch that supports full-duplex operation, there is normally a mechanism to set the duplex mode either on a per-device or per-port basis. Setting the speed, duplex mode, or both in this manner generally disables NWay autonegotiation for the device or port.

In the case of devices controlled by the `elxl`, `iprb`, and `dnet` drivers, the duplex setting can be set explicitly, by editing the driver's `.conf` file. See the appropriate `man` page for more details.

Note that it is often possible to explicitly set the operating speed of an adapter via the driver's `.conf` file. Also note that if the device supports autonegotiation, explicitly setting the operating speed of an adapter in this way generally disables NWay autonegotiation.

Generally, a device is able to detect the operating speed of its link partner, even without NWay autonegotiation. This is not true of duplex mode.

Known Problems

On a Compaq ProLiant 5000, PCI network cards can fail to netboot due to spurious interrupts occurring during realmode operation. To date, failure has been observed only when the PCI network card uses IRQ 5.

Workaround: Use the Compaq System Configuration utility to change the assigned IRQ of the PCI network card to another free IRQ, and save the configuration.

Installing Solaris Using the Driver Update

The procedure to install the Solaris operating environment using a Driver Update is changed with the Solaris 2.6 release. Solaris 2.6 Device Configuration Assistant, Version 1.2 Diskette includes a Configuration Assistant program that finds and configures devices for you. Use this diskette to boot the Solaris 2.6 operating environment and Driver Update diskettes to install and update device drivers.

Follow these steps:

1. **Insert Solaris 2.6 Device Configuration Assistant, Version 1.2 Diskette into your machine's diskette drive (Version 1.2 replaces the Version 1.1 diskette and the diskette provided with Solaris 2.6 *Intel Platform Edition*).**
2. **Turn on your machine.**
3. **When the Solaris Device Configuration Assistant screen is displayed, press F4_Driver Update.**

The message "Enumerating buses ..." is displayed. The Install Driver Update screen is then displayed.

4. **Remove Solaris 2.6 Device Configuration Assistant, Version 1.2 Diskette from the diskette drive and insert Solaris 2.6 Driver Update 3 Diskette 1.**

Note - Do not insert a Solaris 2.6 Video Driver Update diskette in the diskette drive at this point. You are prompted to do this later.

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5. **Press F2_Continue.**

   The Select Solaris System Version screen is displayed.

6. **Select Solaris OS 2.6 and press F2_Continue.**

   The Loading Driver Update Software screen is displayed, along with a progress bar that shows the percentage of drivers that have been extracted from the diskette. Drivers are read into memory and survive long enough for the system to successfully boot to its installation program. When all the new drivers on the diskette have been processed, the Continue Driver Update Installation screen is displayed.

7. **Remove the Solaris 2.6 Driver Update 3 diskette from the diskette drive and insert the next Solaris 2.6 Driver Update 3 diskette.**

8. **Press F2_Continue.**

   The Loading Driver Update Software screen is displayed, along with a progress bar that shows the percentage of drivers that have been extracted from the diskette. Drivers are read into memory and survive long enough for the system to successfully boot to its installation program. When all the new drivers on the diskette have been processed, the Continue Driver Update Installation screen is displayed.

9. **Repeat Step 7 on page 9 through Step 8 on page 9 until all Solaris 2.6 Driver Update 3 diskettes are installed.**

10. **When all the drivers are processed, remove the Solaris 2.6 Driver Update 3 diskette from the diskette drive and reinsert Solaris 2.6 Device Configuration Assistant, Version 1.2 Diskette.**

    Important: Do *not* remove Solaris 2.6 Device Configuration Assistant, Version 1.2 Diskette from the diskette drive until you see the following message displayed in a dialog box:

```
If you want to bypass the device configuration and boot screens when
the system reboots, eject the Device Configuration Assistant/Boot
diskette now
```

11. **Press F2_Continue.**

    The Solaris Device Configuration Assistant screen is displayed.

12. **Press F2_Continue.**

The following message is displayed:

```
Enumerating buses ...
```

The Scanning Devices screen is then displayed. System devices are scanned. When scanning is complete, the Identified Devices screen is displayed.

13. **Press F2_Continue.**

    The message "Loading driver `com.bef` ..." is displayed followed by messages about the drivers that are required to boot your system. After a few seconds, the Boot Solaris screen is displayed.

14. **At the Boot Solaris screen, select the device controller attached to the device that contains your install medium.**

15. **Press F2_Continue.**

    Drivers for the device controller you selected are displayed. Your system boots to run the install program. The install program starts and your machine begins booting the complete Solaris 2.6 operating environment. Then, after some time, the following messages are displayed:

```
Installing unbundled device driver support
Extracting driver list from tree..
distribution-diskette-name driver-name...

Please insert the Driver Update diskette labeled distribution-diskette-name
Press <ENTER> when ready.
```

16. **Remove Solaris 2.6 Device Configuration Assistant, Version 1.2 Diskette and reinsert Solaris 2.6 Driver Update 3 Diskette 1 into the diskette drive.**

17. **Press Enter.**

    Patches that contain the new drivers are installed from the diskette onto your machine. Messages about the patches being installed are displayed.

    - If drivers on other Solaris 2.6 Driver Update 3 diskettes are required for your machine, this prompt is displayed:

```
Please insert the Driver Update diskette labeled distribution-diskette-name
Press <ENTER> when ready.
```

    - Otherwise, this prompt is displayed:

```
If you have additional Update diskettes to install
(such as video), please insert diskette now.
Additional Update diskettes to install? (y/n) [y]
```

18. **If drivers on other Solaris 2.6 Driver Update 3 diskettes are required, remove the Solaris 2.6 Driver Update 3 diskette from the diskette drive, insert the next Solaris 2.6 Driver Update 3 diskette you are prompted to insert, press Enter, and repeat until all drivers you need are installed.**

    If you want to install video drivers, remove the Solaris 2.6 Driver Update 3 Diskette 1 from the diskette drive, insert a Solaris 2.6 Video Driver Update diskette, type `y` for yes or press Enter, and then follow the directions displayed on your screen.

    If you don't want to install video drivers, type `n` for no.

    Note - *Video Driver Update 3 Guide for Solaris 2.6 (Intel Platform Edition)* contains additional information about video drivers.

19. **Press Enter.**

    When installation is complete, the message "Installation complete" is displayed.

20. **Remove the diskette from the diskette drive.**

21. **Reboot your machine.**

    When the Solaris operating environment is finished booting and running, the new devices whose drivers you installed are available for use.

Note - If you install a video device driver, you may need to run `kdmconfig` after your system reboots.

Adding New or Updated Drivers to an Existing Solaris System

Note - Before adding new or updated drivers, the newly supported hardware devices should be installed and configured according to the instructions in the corresponding Device Reference Page, if any. See *Device Reference Manual for Solaris 2.6 (Intel Platform Edition)*.

When the Solaris 2.6 *Intel Platform Edition* software is already installed, the simplest way to add new or updated drivers is to install the Driver Update diskettes as patches on your system.

Follow these steps:

1. **Become root.**
2. **Type** `ps -ef | grep vold` **to see if the Volume Management software is running on the machine you are updating.**

   For more information about managing diskettes and drives, see *System Administration Guide*.
3. **If Volume Management is running, temporarily stop it:**

```
# /etc/init.d/volmgt stop
```

4. **Insert Solaris 2.6 Driver Update 3 Diskette 1 into the diskette drive.**
5. **Mount Solaris 2.6 Driver Update 3 Diskette 1 at the** `/mnt` **mount point:**

```
# mount -F pcfs /dev/diskette /mnt
```

Note - You must mount Solaris 2.6 Driver Update 3 Diskette 1 at this point in the file structure to update your system successfully.

---

6. **Execute the install script on the diskette by typing:**

```
# /mnt/DU/sol_26/i86pc/Tools/install.sh -i
```

   The `install.sh` script searches for all new or updated drivers on the diskette. When a new or updated driver is found, the following prompt is displayed:

```
Install patch driver-name? [y]
```

7. **If the driver is the one you want to install, at the prompt, type** `y` **for yes or press Enter. If the driver is not the one you want to install, type** `n` **for no.**

   If you specify yes, the `install.sh` script installs the driver you indicated.
8. **When you're done and the** `install.sh` **script exits, unmount the diskette by typing the following command at the system prompt:**

```
# umount /mnt
```

9. **Remove Solaris 2.6 Driver Update 3 Diskette 1 from the diskette drive.**
10. **Repeat Step 4 on page 12 through Step 9 on page 13 for each subsequent Driver Update 3 diskette in the set until the driver you want is loaded onto your machine.**
11. **Halt your machine.**
12. **Turn your machine off.**
13. **If you haven't already, add the new hardware.**
14. **Turn your machine on.**
15. **When the autoboot sequence prompt is displayed, quickly press Escape.**

    The autoboot sequence is interrupted. The Solaris Device Configuration Assistant screen is displayed.
16. **Press F2_Continue.**

    The message "Enumerating buses ..." is displayed. The Scanning Devices screen is then displayed. System devices are scanned. When scanning is complete, the Identified Devices screen is displayed.
17. **Press F2_Continue.**

    The message "Loading driver `com.bef` ..." is displayed. The Boot Solaris screen is then displayed.
18. **On the Boot Solaris screen, select the device controller attached to the device that contains your install medium, in this case the main system disk.**

    The `/etc/bootrc` script is displayed.
19. **At the prompt, type `b -r`.**

    Your machine boots. You can now use your new hardware.

100-Mbps Ethernet Performance Problem on Some Intel Motherboard Chipsets

Some PCI motherboards contain DMA chipsets that are unable to support 100-Mbps Fast Ethernet. Because of this problem, the Solaris operating environment does not support 100-Mbps PCI network operation on systems containing the slow chipsets. This problem affects PCI cards only. Other buses are not affected.

The following chipsets are known to exhibit this problem:

- 82430LX (Mercury)
- 82450GX (Orion) (A and B steppings only)

The following chipsets do *not* exhibit this problem:

- 82430NX (Neptune)
- 82430FX (Triton)
- 82430HX (Triton II)
- 82440FX (Natoma)
- 82450GX (Orion) (C0 stepping and later)

Some slow PCI motherboard chipsets do not support long data burst DMA transfers and are unable to transfer data from PCI cards to system memory sufficiently fast to sustain 100-Mbps throughput. When systems with these chipsets are connected to a 100-Mbps network, data can arrive at a PCI Ethernet card faster than DMA can transfer it from the card to system memory. When this happens, the card's FIFO begins to fill. If this condition persists long enough, the card's FIFO will overflow, causing loss of incoming network data.

When incoming data is lost, higher-level protocols such as TCP or NFS™ will time out and retransmit the lost data. These protocols ensure that all data is transferred, but performance is lowered. If only a few packets are lost, the performance impact may be small or moderate, but if many packets are lost, a very substantial and severe performance loss can arise.

In some cases, a drop in network FTP performance of two orders of magnitude has been seen when using such chipsets, rendering the network unusable. This case occurs when using 100-Mbps cards containing relatively small FIFOs. The cards are designed to be able to hold only a couple of packets, and they depend on the DMA mechanism to transfer data out of the FIFO in a timely way.

In other cases, cards with larger FIFOs are not as severely impacted by the problem, and under normal conditions perform as well on machines with slow chipsets as they do on speedy ones. However, under sustained 100-Mbps operation, this cannot continue indefinitely.

Because of this problem, the Solaris environment does not support 100-Mbps PCI network operation on systems containing the slow chipsets.

In particular, the PCI cards supported by the `dnet`, `iprb`, and `elx` drivers will not provide good performance on machines with the problem chipsets. If 100-Mbps operation is required on such a machine, it is best to use a non-PCI Ethernet controller. It is also possible that the PCI cards supported by the `ieef` driver, which have larger FIFOs, may function adequately. You must decide whether the performance on a particular machine is adequate for the intended purpose.