Solaris™ 2.4
x86 Driver Update 4 Guide

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Contents

About This Book

This document provides information about x86 hardware devices that are now supported on the Solaris™ 2.4 computing environment. Typically, as new drivers become available, they will be bundled with releases on separate Driver Update diskettes. The drivers may support the following types of devices: SCSI Host Bus Adapters, Network Adapters, Video, and Other Adapters, such as for audio and tape devices. You can use the Driver Update diskettes to install a new system for the first time, or you can use them to update your installed Solaris 2.4 system with new drivers.

Note – Information regarding the availability of new drivers can be obtained by calling SunSoft's Automated Support System at (310) 348-6070 or by sending electronic mail to `support@cypress.West.Sun.COM`.

Before You Read This Book

This document contains additional device configuration information for newly supported hardware. The importance of properly configured hardware prior to installing Solaris is discussed in the *x86 Device Configuration Guide*. This document assumes you have fully read and understood that guide; Appendix A, "Device Configuration," in this document is an addendum to that guide. Likewise, the installation instructions for this Driver Update are very brief and serve only to supplement the instructions found in *x86: Installing Solaris Software*.

How This Book Is Organized

A brief description of the contents of the Driver Update diskettes is followed by installation instructions for the new drivers, and detailed configuration instructions for the hardware devices that are supported by the new drivers.

Note – Even though the instructions for installing the new drivers are presented first, read and follow the appropriate hardware configuration instructions in Appendix A, "Device Configuration," before installing the new drivers. The hardware must be configured properly for the Solaris software to install and run correctly.

Chapter 1, "Solaris 2.4 x86 Driver Update 4," provides information about what is new in this release and how to install it.

Chapter 2, "Solaris 2.4 x86 Driver Update 4 (Video)," provides information about the contents, installation instructions, and known problems for the video support in this Driver Update.

Appendix A, "Device Configuration," provides device configuration information for the hardware supported by the drivers in this Driver Update. This appendix should be read and the hardware configured *prior* to installing the Driver Update software.

Appendix B, "Supplementary Video Information," provides additional information about the video support in this release.

Related Books

You may need to refer to the following books when installing the Driver Update:

- *x86 Device Configuration Guide*
  Describes how to configure x86 devices before installing Solaris software.
- *x86: Installing Solaris Software*
  Describes how to install the Solaris software on x86 systems.
- *Solaris 2.4 Open Issues and Late-Breaking News*
  Describes late-breaking news about running Solaris software, including known problems with supported hardware or device drivers.

- *Solaris 2.4 x86 Hardware Compatibility List*
  Contains a list of supported hardware on Solaris 2.4 x86 systems.

Note – The *Solaris 2.4 x86 Hardware Compatibility List* is updated monthly and posted on CompuServe℠. If you don't have an account on CompuServe, you can send electronic mail to `x86hcl@Sun.COM` for an ASCII version of the document, or to `x86hcl.ps@Sun.COM` for a PostScript™ version. You can also call SunSoft's Automated Support System at (310) 348-6070, or send electronic mail to `support@cypress.West.Sun.COM` to request a copy.

Solaris 2.4 x86 Driver Update 4 1

Solaris 2.4 x86 Driver Update 4 adds new support for IDE CD-ROM, SCSI host bus adapters, network adapters, audio cards, and video display adapters. This chapter provides a brief description of the contents of Solaris 2.4 x86 Driver Update 4, followed by installation instructions for the IDE interface, SCSI HBA, network, and audio drivers.

Note – Before installing this Driver Update, the newly supported hardware devices should be installed and configured according to the instructions in Appendix A, "Device Configuration."

Chapter 2, "Solaris 2.4 x86 Driver Update 4 (Video)," contains additional information and installation instructions for the video display support in this release.

1

What's New?

New Device Drivers (SCSI HBA, Network)

Table 1-1 lists the new and updated device drivers in Solaris 2.4 x86 Driver Update 4 that contain new functionality not included in previous Driver Updates. For a complete list of drivers included in this release, see Table 1-3 on page 5.

Table 1-1 New or Updated Device Drivers in this Driver Update

SCSI HBA Drivers	
`adp`	Adaptec® AIC-7870/7850 driver that supports the AHA™-2940 and AHA-2940W PCI-to-Fast SCSI host bus adapters, and motherboards that integrate the Adaptec AIC-7870 and AIC-7850 controller chips, such as the DECpc™ XL 590 and the Samsung Magic Power SPC8500P
`blogic`	BusLogic SCSI HBAs (BT-440C, BT-445C, BT-445S, BT-542B®, BT-545C®, BT-545S®, BT-742A®, BT-746C, BT-747C, BT-747S®, BT-757S, BT-946C)
`ncrs`	Updated driver to add support for the NCR® 53C815 SCSI controller
`trantor`	Trantor® T348™ MiniSCSI Plus™ Parallel HBA
IDE Interface Driver	
`ata`	Updated IDE interface driver to support ATAPI-compliant CD-ROM drives
Network Driver	
`eepro`	Intel® EtherExpress™ PRO Ethernet

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 `/vars/sadm/patch/`<*patch number*>, where <*patch number*> is one of the following for Solaris 2.4 x86 Driver Update 4: `101936-03`, `101937-03`, `102061-01`, `102065-02`, and `102266-01`.

New Video Support

The following table contains a list of the new video display adapters supported in Solaris 2.4 x86 Driver Update 4 that were not supported in previous Driver Updates. For a complete list of video display adapters supported in this release, see Table 2-1 on page 14.

Table 1-2 New Video Display Adapters Supported in Solaris 2.4 x86 Driver Update 4

				Resolution and Color Depth									
				800x600		1024x768		1152x900		1280x1024		1600x1200	
Vendor	**Model**	**Bus**	**Chipset**	**8**	**24**	**8**	**24**	**8**	**24**	**8**	**24**	**8**	**24**
Intergraph	TD-2, TD-3; (G90)[1]	PCI	Weitek Power 9000	✓		✓		✓		✓			
	TD-2, TD-3, TD-4; (G91)	PCI	Weitek Power 9100			✓				✓			
Matrox	MGA Impression Plus	PCI	Matrox MGA-3	✓		✓		✓		✓			
Number Nine	Imagine 128	PCI	Imagine128	✓	✓	✓	✓	✓	✓	✓		✓	
Trident	TVGA 9000i		TVGA 9000i	✓									

1. The Intergraph G90 is synonymous with the Diamond Viper video card. When configuring an Intergraph Personal Workstation with a G90, select one of the Diamond Viper entries listed by the `kdmconfig` program. See Chapter 2, “Solaris 2.4 x86 Driver Update 4 (Video),” for information on “Enabling Video Support for Diamond Viper Accelerator Boards.”

Solaris 2.4 x86 Jumbo Kernel Patch

To avoid user-level program core dumps after installing the Solaris 2.4 x86 Driver Update 4, it is recommended that you install the latest revision of the Solaris 2.4 x86 jumbo kernel patch ID 101946. This patch is posted on:

- The WWW (`http://access1.Sun.COM`); click on “Solaris Driver Update.”
- The Internet server `sunsolve1.Sun.COM` in the directory `/pub/patches` via anonymous FTP.

At the minimum, install revision -01 of this patch which can be obtained from the `Patches` subdirectory of the Solaris 2.4 x86 installation CD. (Revision -08 is available on-line as of the printing of this document.) A `README` file and `installpatch` script provide a description and instructions for installing the patch on your system.

Driver Update Contents

Solaris 2.4 x86 Driver Update 4 contains three diskettes labeled: *Solaris 2.4 x86 Driver Update 4 Boot*, *Solaris 2.4 x86 Driver Update 4 Distribution*, and *Solaris 2.4 x86 Driver Update 4 Distribution (Video)*. The Boot and Distribution diskettes are intended to be used with a Solaris 2.4 x86 CD or network boot server. The *Solaris 2.4 x86 Driver Update 4 Distribution (Video)* diskette can only be used on systems that already have the Solaris 2.4 operating environment installed. The contents of the *Solaris 2.4 x86 Driver Update 4 Distribution (Video)* diskette are discussed in Chapter 2, "Solaris 2.4 x86 Driver Update 4 (Video)."

Driver Update Boot Diskette

Solaris 2.4 can be installed on x86 systems with a new boot diskette labeled *Solaris 2.4 x86 Driver Update 4 Boot*. This Multiple Device Boot (MDB) diskette contains scripts and configuration files that enable you to boot and install your system using one of the newly supported devices. During installation of the Solaris software, one or more of the Driver Update Distribution diskettes will be read.

Driver Update Distribution Diskette

The *Solaris 2.4 x86 Driver Update 4 Distribution* diskette is read when the *Solaris 2.4 x86 Driver Update 4 Boot* diskette is used to install Solaris. Alternatively, the Driver Update Distribution diskette can be used without the boot diskette to add new drivers to an existing x86 system running Solaris 2.4.

The *Solaris 2.4 x86 Driver Update 4 Distribution* diskette contains the drivers listed in Table 1-3. A new or updated Section 7 manual page for each of these drivers[1] will also be installed in the appropriate `man` page directory during installation.

Table 1-3 Device Drivers Supported in Solaris 2.4 x86 Driver Update 4

SCSI HBA Drivers	
`adp`	Adaptec AIC-7870/7850 driver that supports the AHA-2940 and AHA-2940W PCI-to-Fast SCSI host bus adapters, and motherboards that integrate the Adaptec AIC-7870 and AIC-7850 controller chips, such as the DECPC XL 590 and the Samsung Magic Power SPC8500P
`aic`	Adaptec AIC-6360 driver that supports the AHA-1530P, AHA-1532P, AHA-1522A, AHA-1520A, AHA-1510A, and the 6360-based SCSI controller embedded on the Sound Blaster 16™ SCSI-2
`blogic`	BusLogic SCSI HBAs (BT-440C, BT-445C, BT-445S, BT-542B, BT-545C, BT-545S, BT-742A, BT-746C, BT-747C, BT-747S, BT-757S, BT-946C).
`ncrs`	Updated driver to support the NCR 53C815 SCSI controller and the embedded NCR 53C710 SCSI host bus adapters on Siemens Nixdorf PCE-5S systems; also updated to support systems that use PCI Configuration Mechanism #1
`trantor`	Trantor T348 MiniSCSI Plus Parallel HBA
IDE Interface Driver	
`ata`	Updated IDE interface driver to support ATAPI-compliant CD-ROM drives
Network Drivers	
`eepro`	Intel EtherExpress PRO Ethernet
`iee`	Updated Intel EtherExpress 16 driver to fix a number of known problems

1. The manual page for the Solaris `ieef` driver (Intel EtherExpress Flash32) will also be installed with this Driver Update. The driver is included on the Solaris 2.4 x86 CD.

Table 1-3 Device Drivers Supported in Solaris 2.4 x86 Driver Update 4 *(Continued)*

smc	Updated driver to include support for the SMC® EtherEZ™ Ethernet adapter and to fix some known problems
Audio Drivers	
sbpro	Updated driver to add support for the Sound Blaster AWE32™ audio card and to fix some known problems

This Driver Update also includes an updated kernel module which fixes some problems on Intel MPSpec 1.1–compliant systems with more than two processors.[1]

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 `/vars/sadm/patch/`<*patch number*>, where <*patch number*> is one of the following for Solaris 2.4 x86 Driver Update 4: `101936-03`, `101937-03`, `102061-01`, `102065-02`, and `102266-01`.

Support for 3Com EtherLink III (3C509B) Network Adapter

This Driver Update also includes new device configuration information for the 3Com® EtherLink® III 3C509B network card. The Solaris `elx` driver included in Solaris 2.4 has been tested with this card. See Appendix A, "Device Configuration," for the necessary hardware configuration that must be done prior to installing the Solaris software.

Driver Update Distribution (Video) Diskette

See Chapter 2, "Solaris 2.4 x86 Driver Update 4 (Video)," for a complete list of the video display adapters supported in this release.

1. Installation of the Solaris operating environment may fail on systems with three or more processors until the new module is installed. To get around this problem, turn off all but the first two processors during installation of Solaris 2.4 or this Driver Update; after the new software is installed, shut down the system, and reboot with all processors powered on.

Installing Solaris Using the Driver Update Diskettes

To install Solaris 2.4 on an x86 system, follow the instructions in *x86: Installing Solaris Software* using the diskette labeled *Solaris 2.4 x86 Driver Update 4 Boot*.

The procedure for installing Solaris using the Driver Update *Boot* diskette is almost the same as that described in *x86: Installing Solaris Software*. There will be many times during the early booting process when the system will read data from the diskette, but the sequence of interaction with the user remains the same. Early in the boot process there will also be warning messages for each new driver whose device is not on the system being installed. The warning messages will look like the following:

```
Warning: forceload of drv/xxx failed.
```

Such warning messages are expected and can be ignored.

Before the installation program begins to install the Solaris software, you will be able to choose whether you want the system to reboot after installing the software.

Caution – If you have either a Sound Blaster 16 or Sound Blaster AWE32 audio card installed in your system, and *another* device is using IRQ 5, you should choose the option *not* to reboot so that you can edit the `sbpro.conf` file to reflect a different IRQ. Failure to do so may cause your system to hang after reboot. See “Enabling Support for Sound Blaster Audio Cards After Installing Solaris” on page 8 for further instructions.

Late in the install process, after all the standard packages have been installed, new driver packages will be installed from the Driver Update *Distribution* diskette. At the start of that phase of the installation, one of the install scripts will ask you to insert the Driver Update *Distribution* diskette into the drive. After the new driver packages have all been added, the script will ask you to remove the diskette from the drive. In each case, it will wait for you to perform the requested action and then press Enter.

After this is accomplished, the system will reboot as usual (unless you chose the option not to reboot after installing the software). When it comes up, the new device drivers should be completely installed and functional.

Note – If you have a Sound Blaster™ card, there may be additional steps you need to take after the Solaris software is installed on your system. See “Enabling Support for Sound Blaster Audio Cards After Installing Solaris” on this page for further instructions.

To install the new video display support, see Chapter 2, “Solaris 2.4 x86 Driver Update 4 (Video),” for instructions.

Enabling Support for Sound Blaster Audio Cards After Installing Solaris

To properly configure the audio cards supported in this Driver Update, it is sometimes necessary to manually edit the Solaris driver configuration file (`sbpro.conf`) to reflect the configuration of the card. (See “Sound Blaster Pro/Sound Blaster 16/Sound Blaster AWE32” on page 53, if you have not already done so.) This file is configured to support a Sound Blaster Pro card with factory default settings. If you have a Sound Blaster Pro card with nonstandard settings, or if you have a Sound Blaster 16 card or a Sound Blaster AWE32 card, you must edit the `sbpro.conf` file before your Sound Blaster card will operate correctly in the Solaris operating environment. The following explains how to do that.

Note – These instructions differ depending on whether you have rebooted your system after installing the software or not. Follow the instructions that apply to your configuration.

1. **Become superuser (if your system rebooted after installing).**
2. **Change directories to the location of the kernel configuration files.**

♦ **If your system did not reboot after installing the software:**

```
# cd /a/kernel/drv
```

♦ **If your system rebooted after installing the software:**

```
# cd /kernel/drv
```

3. **Edit the `sbpro.conf` kernel configuration file.**
   This is an ASCII file that can be edited using any text editor, such as `vi`.

♦ **If you have a SoundBlaster Pro card *only*:**
   If you changed the I/O address of the board, or the DMA channel of the board, of if you changed the IRQ of the board to a value other than IRQ 5 or IRQ 7, you must update the entry in the `sbpro.conf` file.

♦ **If you have a Sound Blaster 16 card or a Sound Blaster AWE32 card:**
   Comment out the Sound Blaster Pro entry in the `sbpro.conf` file, and uncomment the entry for the Sound Blaster 16/Sound Blaster AWE32.

   To uncomment a line, remove the leading #. To comment out a line, add a # character at the beginning of the line.

   The I/O address in the uncommented entry must match the I/O address jumpered on the card. The IRQ and DMA channels on the card will be programmed from the entry in the `sbpro.conf` file. Be sure to change the IRQ in the Sound Blaster 16/Sound Blaster AWE32 entry to reflect the different setting, if one is required.

4. **Save your changes and exit the editor.**

5. **Remove the diskette from the drive if you have not already done so.**

6. **Reboot the system as described below.**

♦ **If your system did not reboot after installing the software: reboot as usual.**

♦ **If your system rebooted after installing the software: Perform a reconfiguration boot to make your changes take effect.**

```
# touch /reconfigure
# reboot
```

Adding New Drivers After Solaris Is Installed

If you already have the Solaris 2.4 software installed, the simplest way to add one of the new drivers to your system is to obtain the *Solaris 2.4 x86 Driver Update 4 Distribution* diskette and install it as a patch on your Solaris 2.4 x86 system.

Note – Before adding new drivers, the newly supported hardware devices should be installed and configured according to the instructions in Appendix A, "Device Configuration."

Follow these procedures to install the new drivers:

1. **Insert the *Driver Update Distribution* diskette into drive 0.**

2. **Become superuser.**

3. **Use `cpio` to copy files off the diskette and run the installation script.**
   The following commands assume Volume Management is running on your system. If it isn't, `volcheck` should *not* be run and the device name of the diskette drive needs to be replaced with `/dev/diskette0`.

To see if Volume Management software is running, type: '`ps -e | fgrep vold`'. For more information about managing diskettes and drives, see *Solaris 2.4 Open Issues and Late-Breaking News*.

```
# mkdir /tmp/Drivers
# cd /tmp/Drivers
# volcheck &
# cpio -iduBI /vol/dev/aliases/floppy0
# ./installdu.sh
```

Caution – If you have either a Sound Blaster 16 or Sound Blaster AWE32 audio card installed in your system, and *another* device is using IRQ 5, you will need to update the `sbpro.conf` file to reflect a different IRQ before you reboot the system or attempt to use the audio device. Failure to do so may cause your system to hang after reboot. See "Enabling Support for Sound Blaster Audio Cards After Installing Driver Update" on page 11 for further instructions before proceeding to the next step.

4. **Remove the diskette from drive 0, and follow the instructions on the screen to shut down the system.**
   The instructions include how to restart the system.

5. **A second `reboot` may be required if you have installed new hardware that uses a new network driver.**

When the system comes up, the new device drivers should be completely installed and functional. However, there may be additional steps you need to take:

- If you are replacing a network card with a newly supported network card, see the next section,“Replacing a Network Card.”
- If you have a Sound Blaster Pro card with nonstandard settings, or if you have a Sound Blaster 16 card or a Sound Blaster AWE32 card, see the section, “Enabling Support for Sound Blaster Audio Cards After Installing Driver Update” on this page for instructions.

To install the new video display support, see Chapter 2, “Solaris 2.4 x86 Driver Update 4 (Video),” for instructions.

Replacing a Network Card

If you have replaced your network card with one that uses a different network driver (for example, `smc`), you will need to rename the `/etc/hostname.`*`olddriver`*`0` file to `/etc/hostname.`*`newdriver`*`0` before rebooting the second time. For example, if you have replaced a 3Com EtherLink III card with an SMC EtherEZ card, you would need to run the following command:

```
mv /etc/hostname.elx0 /etc/hostname.smc0
```

Enabling Support for Sound Blaster Audio Cards After Installing Driver Update

To properly configure the audio cards supported in this Driver Update, it is sometimes necessary to manually edit the Solaris driver configuration file (`sbpro.conf`) to reflect the configuration of the card. (See “Sound Blaster Pro/Sound Blaster 16/Sound Blaster AWE32” on page 53, if you have not already done so.) This file is configured to support a Sound Blaster Pro card with factory default settings. If you have a Sound Blaster Pro card with nonstandard settings, or if you have a Sound Blaster 16 card or a Sound Blaster AWE32 card, you must edit the `sbpro.conf` file before your Sound Blaster card will operate correctly in the Solaris operating environment. The following explains how to do that.

1. **Become superuser.**
2. **Change directories to** `/kernel/drv`**:**

```
# cd /kernel/drv
```

3. **Edit the** `sbpro.conf` **kernel configuration file.**
   This is an ASCII file that may be edited using any text editor such as `vi`.

- **If you have a SoundBlaster Pro card *only*:**
  If you changed the I/O address of the board, or the DMA channel of the board, of if you changed the IRQ of the board to a value other than IRQ 5 or IRQ 7, you must update the entry in the `sbpro.conf` file.

- **If you have a Sound Blaster 16 card or a Sound Blaster AWE32 card:**
  Comment out the Sound Blaster Pro entry in the `sbpro.conf` file, and uncomment the entry for the Sound Blaster 16/Sound Blaster AWE32.

  To uncomment a line, remove the leading #. To comment out a line, add a # character at the beginning of the line.

  The I/O address in the uncommented entry must match the I/O address jumpered on the card. The IRQ and DMA channels on the card will be programmed from the entry in the `sbpro.conf` file. Be sure to change the IRQ in the Sound Blaster 16/Sound Blaster AWE32 entry to reflect the different setting, if necessary.

4. **Save your changes and exit the editor.**
5. **Remove the diskette from the drive if you have not already done so.**
6. **Perform a reconfiguration boot to make your changes take effect.**

Note: ‘`touch /reconfigure`’ is not required if the system has not yet rebooted since installing the Driver Update software.

```
# touch /reconfigure
# reboot
```

Solaris 2.4 x86 Driver Update 4 (Video) 2

A brief description of the contents of the video support included in this Driver Update is followed by installation instructions and known problems. Appendix B, “Supplementary Video Information,” provides additional information about the video support in this release.

Read through the entire chapter once before installing the Solaris 2.4 x86 Driver Update 4 (Video).

Driver Update Video Contents

Solaris 2.4 x86 Driver Update 4 (Video) contains one diskette labeled: *Solaris 2.4 x86 Driver Update 4 Distribution (Video).* The Distribution diskette is intended to be used on Solaris 2.4 x86 systems only. Table 2-1 contains a list of video display adapters supported in Solaris 2.4 x86 Driver Update 4. While this table includes the resolution and color depth capabilities of each adapter, it is important to note that the resolution and color depth you select are also dependent on the capabilities of your monitor and the amount of video memory on the card. See “Determining Resolution and Color Depth” in Appendix B for more information.

Table 2-1 Video Display Adapters Supported in Solaris 2.4 x86 Driver Update 4

Vendor	Model	Bus	Chipset	Resolution and Color Depth									
				800x600		1024x768		1152x900		1280x1024		1600x1200	
				8	24	8	24	8	24	8	24	8	24
Acer	ET4000/W32[1]	ISA	ET4000/W32	✓		✓							
ATI	Graphics Pro Turbo	VLB	ATI Mach64	✓	✓	✓	✓	✓		✓			
	Graphics Pro Turbo	PCI	ATI Mach64	✓	✓	✓	✓	✓		✓			
	GRAPHICS ULTRA+	ISA	ATI Mach32	✓		✓		✓		✓			
	GRAPHICS ULTRA PRO	ISA	ATI Mach32	✓		✓		✓		✓			
	GRAPHICS ULTRA PRO	PCI	ATI Mach32	✓		✓		✓		✓			
	GRAPHICS ULTRA PRO	VLB	ATI Mach32	✓		✓		✓		✓			
	GRAPHICS XPRESSION	PCI	ATI Mach64	✓		✓		✓		✓			
	GRAPHICS XPRESSION	VLB	ATI Mach64	✓		✓		✓		✓			
	WINTURBO[2]	PCI	ATI Mach64	✓	✓	✓		✓		✓			
Compaq	QVision 2000	PCI	Matrox MGA-2	✓	✓	✓		✓		✓			
Dell	Poweredge SP5*xx*		ATI Mach32			✓							
Diamond	SpeedStar 64 ISA	ISA	Cirrus Logic 5434	✓	✓	✓		✓		✓			
	SpeedStar 64 PCI	PCI	Cirrus Logic 5434	✓	✓	✓		✓		✓			
	Stealth 32	VLB	Tseng Labs W32p	✓	✓	✓		✓		✓			
	Stealth 32	PCI	Tseng Labs W32p	✓	✓	✓		✓		✓			
	Stealth 64 DRAM	VLB	S3 Vision 864	✓	✓	✓		✓		✓			
	Stealth 64 DRAM	PCI	S3 Vision 864	✓	✓	✓		✓		✓			
	Stealth 64 VRAM	VLB	S3 Vision 964	✓	✓	✓	✓	✓	✓	✓			
	Stealth 64 VRAM	PCI	S3 Vision 964	✓	✓	✓	✓	✓	✓	✓			
	Viper VLB	VLB	Weitek Power 9000	✓		✓		✓		✓			
	Viper PCI	PCI	Weitek Power 9000	✓		✓		✓		✓			
ELSA	Winner 1000	VLB		✓		✓		✓					
	Winner 2000	VLB		✓		✓		✓		✓			
	Winner 1000Pro-VL[3]	VLB	S3 Vision 864	✓	✓	✓		✓		✓		✓	
	Winner 2000Pro-VL	VLB	S3 Vision 964	✓	✓	✓	✓	✓	✓	✓		✓	
	Winner 2000Pro-PCI	PCI	S3 Vision 964	✓	✓	✓	✓	✓	✓	✓		✓	
IBM	PC Series 300-486		Cirrus Logic 5430	✓		✓		✓		✓			
	PC Series 300		S3 Vision 864	✓	✓	✓		✓		✓			

Table 2-1 Video Display Adapters Supported in Solaris 2.4 x86 Driver Update 4 *(Continued)*

				Resolution and Color Depth									
				800x600		1024x768		1152x900		1280x1024		1600x1200	
Vendor	**Model**	**Bus**	**Chipset**	**8**	**24**	**8**	**24**	**8**	**24**	**8**	**24**	**8**	**24**
IBM	PC Series 700		S3 Vision 864	✓	✓	✓		✓		✓			
	PS/ValuePoint Performance Series		S3 Vision 864	✓	✓	✓		✓		✓			
Intel	Professional/GX High Resolution		ATI Mach32	✓		✓		✓		✓			
Intergraph	TD-1[4]		S3 928	✓		✓		✓		✓			
	TD-2, TD-3; (G90)[5]	PCI	Weitek Power 9000	✓		✓		✓		✓			
	TD-2, TD-3, TD-4; (G91)	PCI	Weitek Power 9100			✓				✓			
Matrox	MGA Impression	VLB	Matrox MGA-1	✓	✓	✓	✓	✓		✓		✓	
	MGA Impression Plus		Matrox MGA-3										
	MGA Ultima	VLB	Matrox MGA-2	✓	✓	✓		✓		✓			
	MGA Ultima Plus	PCI	Matrox MGA-2	✓	✓	✓		✓		✓		✓	
	MGA Ultima Plus 200	PCI	Matrox MGA-2	✓	✓	✓	✓	✓	✓	✓		✓	
miro	miroCRYSTAL 20SD	PCI	S3 864, S3 SDAC	✓	✓	✓		✓		✓			
	miroCRYSTAL 20SD	PCI	S3 Vision 864	✓	✓	✓		✓		✓			
	miroCRYSTAL 40SV	PCI	S3 Vision 964	✓	✓	✓	✓	✓	✓	✓			
Number Nine	#9GXE[6]	ISA	S3 928	✓		✓		✓		✓			
	#9GXE[6]	VLB	S3 928	✓		✓		✓		✓			
	#9GXE64	PCI	S3 Vision 864	✓	✓	✓		✓		✓		✓	
	#9GXE64 Pro	PCI	S3 Vision 964	✓	✓	✓	✓	✓	✓	✓		✓	
	Imagine 128	PCI	Imagine128	✓	✓	✓	✓	✓	✓	✓		✓	
Orchid	Fahrenheit 1280 Plus VL	VLB		✓		✓							
	Kelvin 64	PCI	Cirrus Logic 5434	✓	✓	✓		✓		✓			
	Kelvin 64[7]	VLB	Cirrus Logic 5434	✓	✓	✓		✓		✓			
S3	Vision 864+SDAC chipset			✓	✓	✓		✓		✓			
STB	LIGHTSPEED VL	VLB	Tseng Labs W32p	✓	✓	✓		✓		✓			
	NITRO PCI	PCI	Cirrus Logic 5434	✓	✓	✓		✓		✓			
	POWERGRAPH PRO PCI	PCI		✓	✓	✓		✓		✓			
Trident	TVGA 9000i		TVGA 9000i	✓									

1. The ET4000/W32 video cards that are shipped with Acer machines are not all the same; if you encounter any display problems when the OpenWindows environment is running, try using a different add-on board that is compatible with the Solaris operating environment.
2. The ATI WINTURBO™ model is equivalent to the Gateway ATI GX Mach64 PCI video card.
3. The ELSA Winner 1000Pro with the ATT20C49 8 RAMDAC is supported.
4. To support 1152x900 or 1280x1024 resolution on the Intergraph TD-1 display adapter, you must select an interlaced monitor type when configuring the Solaris window system. Choose "`Multifrequency 56KHz (up to 1280x1024 interlaced)`" as the monitor type. See "Installing Driver Update (Video)" later in this chapter for information about configuring the window system.
5. The Intergraph G90 is synonymous with the Diamond Viper video card. When configuring an Intergraph Personal Workstation with a G90, select one of the Diamond Viper entries listed by the `kdmconfig` program. Be sure to follow all of the instructions and notes in this chapter that pertain to the Diamond Viper video cards.
6. The Number Nine #9GXE video display adapters (ISA and VESA local bus) support 24-bit color in 640x480 mode *only*.
7. Older versions of the Orchid Kelvin64 VLB card have memory addressing limitations that may cause problems if your system contains 32 Mbytes or more of RAM. See "Known Problems" on page 22 for further information.

Additional Notes About the Contents of Driver Update (Video)

- If your video adapter contains the S3 Vision 864 chip, but is not in the above list of supported adapters, it may work with one of the "`S3 Vision 864`" entries listed by the `kdmconfig` program.
- If your video adapter contains the S3 Vision 864 video chip with S3 SDAC, but is not in the above list of supported adapters, it may work with one of the "`S3 Vision 864 with S3 SDAC`" entries listed by the `kdmconfig` program.
- If your video adapter contains the Trident TVGA® 9000i chip it may work with the "`Trident TVGA9000i(512k)`" entry listed by the `kdmconfig` program.
- New software in this Driver Update replaces the support for the Number Nine™ #9GXE™ ISA and VLB display adapters included in the Solaris 2.4 release. If you have one of these video boards, you will need to reconfigure your window system as described in "Installing Driver Update (Video)."
- This Driver Update adds new software support for the following display adapters that were supported in the Solaris 2.4 release:

  ATI® GRAPHICS ULTRA+™ ISA
  ATI GRAPHICS ULTRA PRO™ (ISA, PCI, and VLB)

  If you have one of these video boards, and you want to use the new software support, reconfigure your window system as described in "Installing Driver Update (Video)." The `kdmconfig` program now has specific entries for these cards that you can select. (Prior to this Driver Update, you had to select one of the "`ATI 68800`" entries in order to use one of these cards.)

- This Driver Update also includes software fixes to some known problems. For a list of the known problems fixed in Solaris 2.4 x86 Driver Update 4 (Video), see the `README` files in the directories: `/var/sadm/patch/102058-01` and `/var/sadm/patch/102059-01`.

Installing Driver Update (Video)

The contents of the *Solaris 2.4 x86 Driver Update 4 Distribution (Video)* diskette is installed as patches on your Solaris 2.4 x86 system. To do this, you must already have Solaris 2.4 installed and running on your x86 system.

Note – When installing the Solaris 2.4 software on a system that contains one of the newly supported video cards listed in Table 2-1, if you choose to configure the window system, your card will not be included yet in the list of supported display adapters. However, you can still use a graphics-based interface to the Solaris installation program by choosing the standard 16 colors, 640x480 VGA. Alternatively, you can use a character-based interface by choosing not to configure the window system when asked.

After installing the Driver Update software, the installation script will give you the option of configuring the window system by running the `kdmconfig` program. If you choose to do this, you will be asked to configure keyboard, mouse, and video card again; however, this time you will be able to select from a list that includes the newly supported video cards.

1. **Insert the *Solaris 2.4 x86 Driver Update 4 Distribution (Video)* diskette into drive 0.**

2. **Become superuser.**

3. **Use `cpio` to copy files off the diskette and run the installation script.** The following commands assume Volume Management is running on your system. If it isn't, `volcheck` should *not* be run and the device name of the diskette drive needs to be replaced with `/dev/diskette0`.

To see if Volume Management software is running, type: ‘`ps -e | fgrep vold`‘. For more information about managing diskettes and drives, see *Solaris 2.4 Open Issues and Late-Breaking News*.

```
# mkdir /tmp/Drivers
# cd /tmp/Drivers
# volcheck &
# cpio -iduBI /vol/dev/aliases/floppy0
# ./installdu.sh
```

4. **Configure the window system.**
   After the Driver Update software has been installed, the installation script asks if you want to configure the window system. If you do not want to configure the window system at this time, you must run the following commands after the installation script ends *and* before you start the OpenWindows™ software:

```
# kdmconfig -u
# kdmconfig -cf
```

Note – If you have one of the Number Nine #9GXE video cards installed and running on your Solaris 2.4 system, and you want to use the new software included in this Driver Update to support them, it is necessary to configure the window system at this time. If, for some reason you do not want to use the new Number Nine #9GXE video support in this Driver Update, you must back out the Driver Update Video patches. See the `README` files in `/var/sadm/patch/`102058-01 and `/var/sadm/patch/`102059-01 for instructions on how to back out these patches.

If you want to configure the window system at this time, the `kdmconfig` program will be started for you. The `kdmconfig` program will ask you to configure your keyboard, mouse, and display adapter. The list of display adapters will appear alphabetically by vendor. To quickly scroll through the list, type the first letter of the vendor name. For example, type 'M' to get to the first Matrox® MGA™ entry. (This shortcut can only be done to scroll down the list, not up.) Some of the names of display adapters on the list may be followed by the amount of video memory on the card. For example, 'Diamond Stealth 64 (2MB)' indicates 2 Mbytes of memory on the Diamond Stealth 64™ card. Be sure to select an entry that matches your configuration.

Note – To choose one of the Diamond Viper video card entries displayed by `kdmconfig`, you will need to select an entry that matches your monitor. For a complete list of supported monitors, see "Supported Diamond Viper Monitor Configurations" in Appendix B.

Note – To choose the Intergraph® G91 entry displayed by `kdmconfig`, you will need to select an entry that matches your monitor. For a list of supported monitors, see "Supported Intergraph G91 Monitor Configurations" in Appendix B.

After you have selected your display adapter, you may be asked additional questions about screen size, color depth, display resolution, and monitor type.

5. **Select the Correct Screen Size, Color Depth, Resolution, and Monitor from the list displayed by** `kdmconfig`**.**
   Selecting '8' for color depth means your adapter is capable of 8-bit color (256 colors), whereas '24' means 24-bit color (2^{24} or 16,777,216 colors). After choosing the monitor's screen size, color depth, and resolution, you will be shown a list of supported monitors (unless you have already chosen one of the Diamond Viper card entries). If you have a multisync/multifrequency monitor, check the manufacturer's documentation to find out the maximum horizontal synchronization rate supported by the monitor. For example, if you have a ViewSonic® 17 monitor, which has a maximum horizontal sync rate of 82kHz, select 'MultiFrequency-80kHz (up to 1600x1200@60 Hz)' as the monitor type.

Note – In order to support 1152x900 or 1280x1024 resolution on the Intergraph TD-1 display adapter, you must select an interlaced monitor type when configuring the Solaris window system or it will not function properly. Choose: "`Multifrequency 56KHz (up to 1280x1024 interlaced)`" as the monitor type.

6. **Remove the diskette from drive 0.**

7. **Clean up the temporary workspace.**

```
# cd /
# rm -fr /tmp/Drivers
```

- If your system contains one of the newly supported Diamond Viper video cards, there are additional steps you must take to enable the Solaris `p9000` device driver. This driver is disabled by default and must be enabled before it can be used under the Solaris computing environment. Proceed to the next section, "Enabling Video Support for Diamond Viper Accelerator Boards."
- If your system does not have one of the Diamond Viper display adapters, the installation of the Solaris 2.4 x86 Driver Update 4 (Video) is complete and you can now run the `openwin` command to start the window system.

Note – Be sure to read "Known Problems" on page 22 if you have not already done so.

Enabling Video Support for Diamond Viper Accelerator Boards

Note – These instructions are *only* for systems with the Diamond Viper VLB™ or the Diamond Viper PCI™ video cards.

If you have one of the Diamond Viper video cards supported in this Driver Update, you must edit a kernel configuration file to enable the `p9000` Solaris kernel driver and select a memory address for the Diamond Viper card, followed by a reconfiguration boot. The following section describes how to do this.

▼ How to Enable the Solaris `p9000` Kernel Driver

Note – If you previously installed a Driver Update on Solaris 2.4 for x86 and enabled the Solaris `p9000` kernel driver, you do *not* need to follow these instructions again.

Before proceeding with these instructions, the following conditions must be met:

- The Diamond Viper card must be installed in your system. It is *not* necessary to run the manufacturer's configuration program `VPRMODE` under MS-DOS® (DOS).
- Solaris 2.4 x86 Driver Update 4 must be installed on your system.

- The kdmconfig program must have been run as part of the installation of the Driver Update to allow the window system under Solaris to know about the card and the desired monitor.

Note – If you have not already run kdmconfig to select the Diamond Viper card and the desired monitor, do so now. Run 'kdmconfig -u' followed by 'kdmconfig -cf'.

---

1. **Become superuser.**
2. **Change directories to** /kernel/drv**.**

```
# cd /kernel/drv
```

3. **Edit the** p9000.conf **kernel configuration file.**
   This is an ASCII file that can be edited using any text editor, such as vi. As distributed, all of the lines in this file begin with the comment character #. To enable the p9000 Solaris driver, uncomment one of the lines containing 'name=p9000' by removing the leading #. Each entry lists a different memory location. The first one in the file contains the default hardware configuration, which puts the Diamond Viper at memory location 0xA0000000. This should work for most systems. Only *one* line should be uncommented. Save your changes and exit the text editor.
4. **Remove the diskette from drive 0 if you have not already done so.**
5. **Run the** reboot **command to reconfigure the system.**
6. **Type:** b -r **at the 'Select (b)oot or (i)nterpreter:' prompt.**
   As the system is being rebooted, the first menu that appears on your screen will ask you to select the boot device. After this will be the prompt 'Select (b)oot or (i)nterpreter:'. When this appears, quickly type (within 5 seconds) 'b -r' to proceed with the reconfiguration boot. If this opportunity is missed, reset the processor and try again. The -r option causes the system to reconfigure itself during the reboot.

Do *not* use the commands: touch /reconfigure;reboot to perform a reconfiguration boot. If the memory location selected in Step 3 fails, the system will not be able to be rebooted unless the card is replaced.

Note – Due to hardware conflicts, on some VESA Local Bus (VLB) systems, the Diamond Viper VLB card will not function when configured at particular memory addresses. If your system fails to come up after the reconfiguration boot (Step 6), or appears hung at a blank screen, power the system down, then on to reboot. This time, simply press Enter at the prompt: `'Select (b)oot or (i)nterpreter:'`. After the system comes up, start again at Step 1, but this time select one of the other memory addresses for the Diamond Viper card in your system.

Known Problems

Caution – (1161494) Under the Solaris operating environment, the Diamond Viper video card is not compatible with a motherboard that has a Symphony chipset. This combination may cause the system to panic or reboot. If the Symphony chipset is present on the motherboard, do not use the Diamond Viper video card.

- The Diamond Viper VLB adapter does not work on some systems that have both PCI and VESA Local Bus support on the motherboard. The OpenWindows software will fail with an error message when you attempt to start it. The Solaris `p9000` driver expects a PCI version of the Diamond Viper board if the system supports PCI.
  Workaround: Use the Diamond Viper PCI adapter on those systems that support both bus types.
- Some VESA Local Bus motherboards do not properly support the default address range used by the Diamond Viper VLB adapter. To find a workable address for a particular system may require some experimentation. See "Enabling Video Support for Diamond Viper Accelerator Boards" on page 20 for instructions.
- **(1183956)** The Number Nine Imagine 128 video card configured with a "MultiFrequency-64 kHz" monitor and a resolution of 1152x900 does not work under the OpenWindows environment (it will not display on the screen). This problem occurs on both 8-bit and 24-bit mode.
  Workaround: Use a different resolution or monitor.
- **(1183990)** The Matrox MGA Impression Plus™ video card fails under the OpenWindows environment when configured with a "MultiFrequency-64 kHz" monitor at a resolution of 1280x1024, in 8-bit color mode.
  Workaround: Use a different resolution or monitor.
- **(1179142)** Using a monitor frequency of 64 kHz with a Diamond Stealth 64 DRAM video card configured for 24-bit color depth and a resolution of 800x600 causes noise (sparkles) on the screen whenever the screen has to be

repainted (for example, when moving a window, or scrolling within a window).
Workaround: Use a different monitor frequency.

- **(1179339)** The ATI GRAPHICS ULTRA PRO VLB video card with a Mach32™ graphics chip, a TI68875 BFN RAMDAC™, and 2 Mbytes of DRAM may not work properly if the "`ATI Graphic Ultra Pro (2MB)`" entry is selected when configuring the window system. Vertical bars get displayed on the screen.
Workaround: If you have this version of the card, choose the "`ATI Graphic Ultra Pro (1MB)`" entry when configuring the window system but note that you will not be able to use a resolution of 1280x1024. Note also that the ATI GRAPHICS ULTRA PRO VLB video card with VRAM does not have this problem.

- **(1179340)** Using the Intel Professional GX High Resolution system in 1280x1024 with 256 colors mode and an 80 kHz monitor causes problems when returning to text mode after exiting the OpenWindows environment. The foreground color is set to purple and the background color is set to blue.
Workaround: Select either a different resolution, or a different monitor frequency when configuring the window system.

- **(1178899)** On systems with video cards that use a hardware cursor, only one icon is shown when selecting multiple icons to drag and drop. This problem may be seen on video cards that contain the following chipsets: Imagine128, S3 864, S3 964, ATI Mach64, ATI Mach32, and Matrox MGA-1 and MGA-2. (See Table 2-1 on page 14 for the make and models of video cards associated with these chipsets.) Even though the multiple icons are not shown while being dragged and dropped, they are being selected and will be copied correctly.

- **(1176285)** Programs that use the PEX extension may fail if a user's `XGLHOME` variable is set incorrectly. If the `XGLHOME` shell environment variable points to a nonexistent path (or one that doesn't contain the XGL™ runtime binaries), then any program that uses the PEX extension (including XGL programs on most display adapters), will cause the server to abort.
Workaround: Users should be careful when setting `XGLHOME` prior to starting the OpenWindows environment. Prior to running the '`openwin`' command, make sure your `XGLHOME` environment variable is either not set, or points to a valid path for the system you are using.

- Some versions of the Orchid™ Kelvin 64™ VLB video card have memory addressing limitations that may cause problems if your system contains 32 Mbytes or more of RAM. A newer revision of this board addresses these problems. Unfortunately, there is no distinction made between revisions of this card. If your system has 32 Mbytes or more of RAM and you observe symptoms such as a fuzzy display or random vertical lines in the OpenWindows environment, contact Orchid Technology to request a newer revision of this card.
- The Number Nine Imagine 128™, the Number Nine #9GXE64™, and the Number Nine #9GXE64 Pro™ video cards do not support interlaced mode. Consequently, configuring the window system using a monitor type of "`MultiFrequency-38kHz (up to 1024x768 interlaced)`" or "`MultiFrequency-56kHz (up to 1280x1024 interlaced)`," will cause the window system to fail.
  Workaround: Use a monitor that can support 1024x768 or 1280x1024 in non-interlaced mode.
- **(1177581)** On systems with the Orchid Kelvin 64 PCI video card or one of the Diamond Speedstar 64 video cards installed, a few horizontal dashes may be observed on the left side of the screen during graphical operations.
  Workaround: Refresh the screen.
- **(1173469)** On systems with the Diamond Stealth 64 video card installed, occasionally the mouse cursor will appear as two images that move in unison when the cursor is moved. This may last for a short period of time before the two images become one again. These same symptoms occur on systems with the Number Nine #9GXE, Number Nine #9GXE64, Number Nine #9GXE64 Pro, or the Elsa Winner 2000Pro cards.
- **(1173773)** After running `xlock`, there may be a white border around the screen on systems with video cards that use the Tseng Labs W32p chipset (see Table 2-1). This border disappears after the screen is unlocked.
- **(1174387)** On systems with the Diamond Stealth 32™ VLB/PCI cards, you may lose control of the mouse pointer when `xfontsel` is used to select a font in the Lucide font family, and a point size of 180 or above. Reset the system, if this occurs.

The following problems apply only to 24-bit depth color:

- **(1172443)** Applications that use XIL™ display the wrong colors when used with a 24-bit display adapter. Image Tool is an example of such an application. The problem is that XIL does not handle the byte ordering of

24-bit displays correctly; thus the colors are wrong in the displayed image. *Workaround*: Use an application that does not use XIL but that can display 24-bit images correctly. `xv` is an example of a shareware application that is available over the Internet™.

Note – 8-bit displays are not affected by this problem, and Image Tool works correctly with PostScript files on any display depth.

- **(1173985)** Icon Editor dies when saving a 24-bit image to a file.
- **(1174561)** The STB LIGHTSPEED VL™ video card used in 800x600 resolution, 24-bit color mode does not work properly with the Sony® CPD 1604S monitor.
  Workaround: Do not use this particular monitor type at that resolution and color depth.
- Wabi™ will not run under 24-bit depth mode.
- The IslandPaint® application does not work properly under 24-bit mode. All of the button icons on the left side of the window are either missing images or have incorrect ones displayed.

Device Configuration A

This appendix supplements Appendix B, "Device Reference Pages," in the *x86 Device Configuration Guide*. It includes necessary device configuration for hardware supported by the new or updated drivers.

Use the following table to locate information about your hardware and proceed directly to those pages.

IDE Interface	**Solaris Driver**	
IDE Disk and CD-ROM Interface	`ata`	*page 29*
SCSI Host Bus Adapters		
Adaptec AIC-6360/AHA-1522A/AHA-1520A/AHA-1510A/ AHA-1530P/1532P	`aic`	*page 31*
Adaptec AIC-7870/AHA-294x PCI SCSI HBA	`adp`	*page 35*
BusLogic SCSI HBAs	`blogic`	*page 37*
NCR 53C710 (Siemens Nixdorf PCE-5S SCSI)	`ncrs`	*page 41*
NCR 53C8xx PCI SCSI HBA (53C810, 53C815, 53C820, 53C825)	`ncrs`	*page 42*
Sound Blaster 16 SCSI-2 (SCSI)	`aic`	*page 31*
Trantor T348 MiniSCSI Plus Parallel HBA	`trantor`	*page 44*
Network Adapters		
3Com EtherLink III (3C5x9, 3C509B)	`elx`	*page 46*

Network Adapters (*Continued*)	Solaris Driver	
Intel EtherExpress 16, 16C, 16TP, MCA, MCA TP	`iee`	*page 47*
Intel EtherExpress PRO	`eepro`	*page 49*
SMC EtherEZ, EtherCard Elite16 Ultra, EtherCard PLUS Elite16, EtherCard PLUS (8416, 8216, 8013, 8003)	`smc`	*page 50*
Audio Cards		
Sound Blaster Pro/Sound Blaster 16/Sound Blaster AWE32	`sbpro`	*page 53*

- IDE Interface -

IDE Disk and CD-ROM Interface

Description

An IDE disk drive contains a disk controller and drive electronics. An IDE adapter supports up to two IDE drives.

Device Configuration

Preparing for Configuration

- Set up the system BIOS drive type parameters to use factory values for the number of heads, cylinders, and sectors for the IDE hard disk drive.
- If you have both a SCSI and an IDE hard disk, the system can only be configured to boot from the IDE hard disk.
- If you have two IDE drives on the same adapter, one must be set to "master" and the other to "slave." Typically, if you have both an IDE hard disk drive and IDE CD-ROM drive, the CD-ROM drive is the slave, and the hard disk drive is the master. If you only have one drive on an adapter, it must be set to master.
- Support for large IDE disk drives (greater than 520 Mbytes) requires special configuration. See "Configuration Requirements for Large IDE Drives (>520 Mbytes)" on the next page.

Configuring the Device

1. **If you have an IDE CD-ROM drive installed, the system BIOS "Drive Type" parameters should be set to "`not installed`" for that device, since they only apply to IDE hard disks.**
2. **Verify that the configuration recorded on your Device Configuration Worksheet for your IDE adapter is set within the parameters listed under "Valid Configurations" below.**

Configuration Requirements for Large IDE Drives (>520 Mbytes)

In order to support IDE hard disk drives of over 520 Mbytes in size, the BIOS must be configured as follows:

1. **The BIOS setting for the Cylinder/Head/Sector must match that of the physical drive.**

2. **On systems with a newer BIOS, both the "IDE LBA Translations" and the "IDE Multiple sector mode" must be turned off.**
   These settings help DOS deal with larger drives but do not allow the Solaris `ata` driver to work properly with large disks.

Note – Disabling these options will prevent DOS from seeing the entire hard disk drive; if you have a DOS `fdisk` partition, be sure to place it within the first 1024 cylinders.

Valid Configurations

Following are the IDE adapter parameter ranges:

• IRQ	14 or 15
• I/O Address	0x1F0 or 0x170

Warnings

- The Solaris Volume Management software does not fully support the IDE CD-ROM interface in this Driver Update. For example, the `vold` program does not always automatically mount CDs that are installed in the drive after booting (as it does for SCSI drives), and the '`eject cdrom`' command will not work.
  Workaround: You can still access the IDE CD-ROM drive manually as the root user by specifying the device name when invoking commands. For example:

```
# mount -F hsfs -r /dev/dsk/c0d1p0 /mnt
```

- **(1185559)** The Sony CDU-55E CD-ROM drive can not be configured as the master. It must be configured as the slave.

- SCSI Host Bus Adapters -

Adaptec AIC-6360/AHA-1522A/AHA-1520A/AHA-1510A/ AHA-1530P/1532P

Sound Blaster 16 SCSI-2 (SCSI)

Description

The Adaptec AHA-1522A, AHA-1520A, AHA-1530P/1532P, and AHA-1510A cards are SCSI controllers for ISA bus systems. The AHA-1510A, AHA-1520A, and AHA-1530P provide an interface between the computer's system bus and a SCSI bus. The AHA-1522A and AHA-1532P provide floppy drive support as well. All are based on the Adaptec AIC-6360 SCSI controller chip.

The Solaris `aic` driver also supports the SCSI-2 interface of the Sound Blaster 16 SCSI-2 audio card, which utilizes the AIC-6360 chip. The Sound Blaster 16 SCSI-2 adapter is a 16-bit ISA card, providing audio functions and a SCSI-2 interface. The `aic` driver can be used to drive *only* the SCSI controller on these cards.

Note – Neither the Adaptec AHA-1510A adapter nor the SCSI interface on the Sound Blaster 16 SCSI-2 audio card can be used as a primary (boot) disk controller (as they have no BIOS). Thus, the system will have to boot from a disk attached to another controller.

The audio portion of the Sound Blaster 16 SCSI-2 card requires a separate Solaris device driver (`sbpro`) for operation. See "Sound Blaster Pro/Sound Blaster 16/Sound Blaster AWE32" on page 53 for specific device configuration information for the audio capabilities.

Device Configuration

Preparing for Configuration

- The SCSI subsystem of the Sound Blaster 16 SCSI-2 needs its own I/O (port) address and an IRQ, distinct from those of the audio subsystem.

- For the AHA-1520A and AHA-1522A, you will need to configure the BIOS base address, the I/O (port) address, and the IRQ on the controller. The AHA-1510 needs an I/O (port) address and an IRQ only.
- For the AHA-1530P and AHA-1532P, you will need to configure the BIOS base address, the I/O (port) address, and the IRQ on the controller using the on-board utility. (Use Ctrl-A to enter the on-board utility at boot time.)
- Refer to the documentation that comes with the Adaptec adapter or Sound Blaster 16 SCSI-2 adapter to find out what settings the device supports.
- See "Valid Configurations" on the next page for address and IRQ settings that the Solaris `aic` driver supports.
- Determine which of the supported IRQs, I/O (port) addresses, and memory (BIOS) addresses supported by the card and the Solaris driver are available. Choose settings for the card which do not conflict with any of the other devices in your system.
- The SCSI bus must be configured correctly, and terminated correctly to prevent problems. Depending on your configuration, you may need to remove the terminating resistors on the controller. Refer to the *x86 Device Configuration Guide* for SCSI configuration information.

Note – The Sound Blaster 16 SCSI-2 will never need to have its resistors removed (and they are not removable).

- The AHA-1522A, AHA-1520A, AHA-1530P, and the AHA-1532P support booting from disks with over 1 gigabyte. On the AHA-1530P and AHA-1532P, use the on-board utility (entered via Ctrl-A at boot time) to enable this option under the "Advanced Features" menu. On the AHA-1522A and AHA-1520A, add a jumper to pin 0 (rightmost pin) of jumper block J5.

Avoiding Possible Configuration Conflicts

- Choosing settings for the adapter which do not conflict with any other device in your system, or with the motherboard, will avoid a multitude of problems.
- ISA cards can be used in EISA slots but not vice versa. If you are using the device in an EISA slot, you should obtain the appropriate EISA configuration file from the manufacturer of the device. Use the EISA configuration utility that comes with your system to inform it of the presence of and settings used by the device. Be sure to "lock" the

configuration of this device in the EISA configuration utility, or it may attempt to *change* the settings on the device through software–which isn't possible. Conversely, if the EISA configuration program doesn't know about your ISA device, it may set up another EISA card using the settings of your ISA card, which would cause conflicts.

- The Adaptec AHA-1510A host bus adapter and the Sound Blaster 16 SCSI-2 SCSI interface can be run *only* on IRQ 11. Because of this requirement, only one AHA-1510A or Sound Blaster 16 SCSI-2 controller can be installed in a system.

Configuring the Device

Note – For the Sound Blaster 16 SCSI-2, make sure you are setting the jumpers for the SCSI interface and not for the audio.

---

1. **Set the I/O address jumper to select the desired value.**
2. **For 1520A, 1522A, 1530P, and 1532P *only*: Set the IRQ jumper to select the desired value.**
3. **For 1520A, 1522A, 1530P, and 1532P *only*: Set the BIOS base memory address jumpers to select the desired value.**
4. **For 1520A, 1522A, 1530P, and 1532P *only*: If necessary, enable support for disks greater than 1 gigabyte.**
   On the 1530P and 1532P, use the on-board utility (entered via Ctrl-A at boot time) to select this option under the "Advanced Features" menu. On the 1522A and 1520A, this option is set by adding a jumper to pin 0 (the rightmost pin) of jumper block J5.
5. **For 1510A, 1520A, and 1522A *only*: If necessary for your SCSI configuration, remove the three terminating resistors from the controller.**
6. **For the 1530P and 1532P *only*: termination is set using the on-board utility.**
7. **For the Sound Blaster 16 SCSI-2 *only*: Disable any DMA channel that may be selected.**

Valid Configurations

- IRQ 9, 10, 11, 12

- I/O Address 0x140, x340

Note – The Adaptec AHA-1510A host bus adapter and Sound Blaster 16 SCSI-2 interface can be run at IRQ 11 only.

Note – For booting, the I/O address on the 1520A and 1522A can be set to 0x140 only with a special BIOS available from Adaptec.

- Adaptec 152x devices *only*: The BIOS base address can be any available value. The default is DC000.
- Sound Blaster 16 SCSI-2 *only*: No DMA channel should be selected. The driver does not support DMA.
- All other settings should be set to the default factory settings (unless changes are necessary to avoid conflicts).

Note – Neither the Adaptec AHA-1510A adapter, nor the SCSI interface on the Sound Blaster 16 SCSI-2 audio card can be used as a primary (boot) disk controller (as they have no BIOS). Thus, the system will have to boot from a disk attached to another controller.

Alternative Custom Configuration

- If you have a second SCSI controller on your system, ensure that the two devices are not configured to the same IRQ, I/O address, or memory (BIOS) address.
- There are special considerations when two different types of disk controllers (such as SCSI and IDE) are present on a system. Refer to the *Solaris 2.4 Open Issues and Late-Breaking News* for more information.

Warnings

(1167300) The Adaptec devices have proven sensitive to the total length of the SCSI bus. (The SCSI specification defines the maximum length of the SCSI bus, including all cables, to be 6 meters (19.6 ft.)) In configurations with long cables and/or multiple external devices, this could cause random bus hangs under heavy loads.
Workaround: Use shorter cables, or fewer external devices.

Adaptec AIC-7870/AHA-294*x* PCI SCSI HBA

Description

The Adaptec AHA-2940 and AHA-2940W cards are PCI-to-Fast SCSI controllers based on the Adaptec AIC-7870 and AIC-7850 chips.

Device Configuration

Preparing for Configuration

To avoid user-level program core dumps on heavily loaded systems, install patch ID 101946. See "Solaris 2.4 x86 Jumbo Kernel Patch" on page 3 for information on how to obtain this patch.

Configuring the Device

1. **Ensure that the SCSI bus is properly terminated.**
2. **Set up the IRQ for the controller using the CMOS setup utility supplied with the motherboard (if this feature is available for your computer).**
   If you have more than one controller (or an embedded controller), use one IRQ per controller.
3. **If you have more than one PCI SCSI board, be sure to attach the CD-ROM drive to the primary controller.**
4. **Run the vendor-supplied configuration utility by pressing Ctrl-A at boot time.**
5. **Ensure that support for more than two DOS drives is disabled.**
   For older drives, tapes, and most CD-ROM devices, ensure that the maximum SCSI data transfer speed is set to 5.0 Mbytes/second.

Warnings

- On some PCI systems with an Adaptec 294*x* card installed, user-level programs may core dump under heavy system load (such as during installation). The problem is *not* with the Adaptec hardware. However, if you have installed patch ID 101946, and you continue to see user-level programs dumping core, disable write-back caching (or all caching if there is no control over the caching algorithm) via the CMOS. This problem has been observed on a number of PCI motherboards, including the following:

- PCI motherboards with a 60MHz Pentium™ chip, with PCI chipset numbers S82433LX Z852 and S82434LX Z850. The part number of the Intel motherboard is AA616393-007.
- PCI motherboards with a 90MHz Pentium chip, with PCI chipset numbers S82433NX Z895, S82434NX Z895, and S82434NX Z896. The part number of the Intel motherboard is 541286-005. (Gateway 2000 uses this motherboard.)

- The Adaptec 2940 SCSI adapter does not recognize the Quantum Empire™ 1080S SCSI disk drive nor the HP 3323 SE SCSI disk drive.

BusLogic SCSI HBAs

Description

The BusLogic SCSI host bus adapters are controllers for common disk/tape/I/O subsystem.

The following models are supported:

Model	Bus
BT-742A, BT-746C, BT-747C, BT-747S, BT-757S	EISA
BT-542B, BT-545C, BT-545S	ISA
BT-440C, BT-445C, BT-445S	VESA
BT-946C	PCI

Device Configuration

Preparing for Configuration

- Set the I/O address to any valid BusLogic host bus adapter I/O address except 0x330. This applies to all models of EISA, ISA, PCI, and VESA Local Bus BusLogic boards. If you use the default I/O port address, 0x330, the board will be run in Adaptec emulation mode.
- If your BusLogic board model ends in ‘C’, you must enter the AutoSCSI configuration utility and check the termination.

Configuring the Device

For EISA Models:

1. **Run the EISA configuration utility and change the factory-set I/O port address.**
   Do *not* use the default 0x330 I/O address.

2. **If a board has a model name ending with a "C", such as the BT-746C and the BT-747C, run the BusLogic AutoSCSI configuration utility.**
   To run the AutoSCSI utility, type Ctrl-B after you see the "`BusLogic Utility Banner`" on your screen.

   a. **Check termination.**

   b. **The Advanced option "**`BIOS Support for > 2 Drives (DOS 5.0 or above)`**" should be set to No.**

For ISA and VESA Local Bus Models:

1. **Set the I/O address and BIOS address with the dip switches.**
   Do *not* set the I/O address to 0x330.

2. **If a board has a model name ending with a "C", such as the BT-545C and the BT-445C, run the BusLogic AutoSCSI configuration utility to set the IRQ and check termination.**
   To run the AutoSCSI utility, type Ctrl-B after you see the "`BusLogic Utility Banner`" on your screen.

   a. **Set the IRQ.**

   b. **Check termination.**

   c. **The Advanced option "**`BIOS Support for > 2 Drives (DOS 5.0 or above)`**" should be set to No.**

3. **Older ISA and VESA Local Bus models of BusLogic boards, such as the BT-545S, BT-542B, and BT-445S, must have their IRQ set in two places—with switches and jumpers.**
   The Host Interrupt Request switch and the Host Interrupt Channel jumper must have settings that match, or the board will not work.

For PCI Models:

1. **The BusLogic BT-946 board should be put into the Bus Master slot.**

2. **Enter the AutoSCSI utility.**

3. **Select "Advanced option."**

4. **Set the value for "**`Set Host Bus Adapter IO Port Address as Default`**" to No.**
5. **The Advanced option "**`BIOS Support for > 2 Drives (DOS 5.0 or above)`**" should be set to No.**
6. **Set termination.**
7. **Save the changes.**
8. **Reboot the system.**
9. **Enter the AutoSCSI utility again and check the value of the option "**`Select Adapter`**".**
   It should now be 334.
10. **If your PCI motherboard is not fully PCI-specification compliant, you may have to manually configure the IRQ and BIOS address values. If the system hangs while installing the Solaris operating environment, do the following:**
    - Check the IRQ jumpers on the motherboard, if any.
    - Run the CMOS utility to set IRQ and BIOS address, if any.
    - Run the BusLogic AutoSCSI utility.

    All the settings should match each other. On the BT-946C adapter, the jumpers JP4 and JP5 are for configuring the BIOS address. If you need to manually configure the BIOS address, you may have to check these jumpers.
11. **If you still experience problems while installing the Solaris software, set the Interrupt Pin number of the "configure Adapter" option in the BusLogic AutoSCSI utility as follows:**

Slot	Interrupt Pin
0	A
1	B
2	C

For more information, see the "Configuration for Non-Conforming PCI Motherboards" and the "Handling Motherboard Variations" sections of the documentation that comes with your PCI BusLogic board.

Valid Configurations

- IRQ 9, 10, 11, 12, 14, 15
- I/O Address 0x334, 0x230, 0x234, 0x130, 0x134

Multiple Controller Configuration

If you have multiple BusLogic boards in the system, follow these general rules to configure multiple BusLogic controllers:

- If one of the installed boards is a 'C' model, it must be the primary controller.
- If one of the installed boards is a PCI bus model, it must be the primary controller.
- The primary controller must have an I/O address that precedes the secondary controller in the above list of Valid Configurations (as listed from left to right). For example, the primary controller may use an I/O address of 0x234, as long as the secondary controller uses either 0x130 or 0x134.
- The BIOS must be disabled on the secondary controller.

Warnings

- Using an I/O address of 0x330 will cause the Solaris `aha` driver to be selected instead of the `blogic` native mode driver. These cards have not been tested in Adaptec 1540-mode.
- **(1180577)** Systems with a BusLogic card installed may panic when tape access occurs on a system with heavy disk I/O.
  Workaround: Do tape backups on an idle system.

NCR 53C710 (Siemens Nixdorf PCE-5S SCSI)

Description

These configuration notes are for the two NCR 53C710 SCSI host bus adapters embedded on Siemens Nixdorf PCE-5S systems.

Device Configuration

Note – Because the Siemens Nixdorf BIOS and the Solaris `fdisk` program are not compatible, use the DOS version of FDISK (or equivalent utility) to create an entry in the FDISK partition table before installing the Solaris software. Create at least a 1-cylinder DOS partition starting at cylinder 0. If the DOS partition is not created, the system will fail to reboot after Solaris installation.

Preparing for Configuration

See the manufacturer's documentation for setup and cabling requirements.

Configuring the Device

Use the motherboard CMOS setup utility to make sure that the controllers are enabled and that the IRQ settings do not conflict with another system device.

Warnings

The SCSI Tagged Queuing option is not supported.

NCR 53C8*xx* PCI SCSI HBA (53C810, 53C815, 53C820, 53C825)

Description

The device configuration information for the NCR 53C8xx PCI SCSI host bus adapters has been updated to include support for the NCR 53C815.

These configuration notes are for the NCR 53C810, 53C815, 53C820, and 53C825 PCI SCSI controllers, which are found on add-in adapters or integrated on a system motherboard. Systems may be configured with multiple controllers.

Device Configuration

Note – Because the NCR BIOS and the Solaris `fdisk` program are not compatible, use the DOS version of FDISK (or equivalent utility) to create an entry in the FDISK partition table before installing the Solaris software. Create at least a 1 cylinder DOS partition starting at cylinder 0. If the DOS partition is not created, the system will fail to reboot after Solaris installation.

Preparing for Configuration

An add-in card with the 53C815, 53C820, or 53C825 controller can only be used in a bus-mastering PCI slot. On motherboards with only two PCI slots usually both of the PCI slots are bus-master capable. On motherboards with three or more PCI slots, and on motherboards with several embedded PCI controllers, some of the PCI slots may not be bus-master capable. Refer to the motherboard or system documentation to determine how to set up or configure which PCI slots are bus-master capable.

Avoiding Possible Device Conflicts

Some PCI motherboards with the NCR SDMS™ BIOS and an embedded 53C810 controller do not work correctly with 53C815 or 53C82*x* add-in cards which also have an NCR SDMS BIOS. Some PCI motherboards with NCR SDMS BIOS but without the 53C810 controller also may not work correctly with 53C815 or 53C82*x* add-in cards which do not have an NCR SDMS BIOS. If you have a combination that does not work correctly, you may be able to work around these conflicts by upgrading the motherboard BIOS or the add-in card BIOS or both.

Configuring the Device

Run the motherboard CMOS setup or the EISA configuration utility to make sure that the controller and the bus master options are enabled and that the IRQ setting does not conflict with another system device.

Warnings

- The SCSI Tagged Queuing option is not supported.
- Some very early PCI systems with the 53C810 chip on the motherboard do not have the interrupt pin on the chip connected. Such a system cannot be used with the Solaris software. The Solaris `ncrs` driver requires a correctly functioning interrupt line for the 53C810 chip.
- The Wide SCSI option is not supported under the Solaris Operating environment. Some add-in 53C8*xx* cards include connectors for both narrow cables (in other words, 8-bit SCSI A cables) and wide cables (that is 16-bit SCSI P cables.) You can connect devices to the SCSI Wide connectors using SCSI P cables, but the Solaris `ncrs` driver will not initiate or accept the Wide Data Transfer option. The attached devices will function in 8-bit narrow mode.

Trantor T348 MiniSCSI Plus Parallel HBA

Description

The Trantor T348 Parallel SCSI HBA is easy to install—it has no switches, no software-settable options, and does not require any manual configuration. However, the MiniSCSI Plus adapter may require special cabling to obtain electrical power and to connect to certain devices.

Device Configuration

Preparing for Configuration

Note – The Trantor MiniSCSI Plus host adapter obtains its electrical power from the TERMPWR signal on the SCSI cable. The adapter will not receive power and will not work unless the first (or only) device connected to it supplies TERMPWR. If you have difficulty using the adapter with Solaris, see the "Troubleshooting Notes" section of the *MiniSCSI Plus User Guide* or consult your Trantor dealer.

The Trantor MiniSCSI Plus HBA ends in a male SCSI-1 connector, suitable for plugging into a SCSI-1 device. If you want to connect it to a SCSI-2 device, you will need a SCSI-1 to SCSI-2 cable (which has a male SCSI-1 connector on one end and a male SCSI-2 connector on the other end) and a SCSI-1 female-to-female adapter (to connect the male end of the T348 to the male end of the SCSI-1 to SCSI-2 cable).

Configuring the Device

To install the Trantor T348 adapter:

1. **Shut down the Solaris operating environment (if it is already installed) and power down the computer.**
2. **Plug the T348 adapter into the selected (or only) parallel port.**
3. **Attach all required SCSI devices to the T348.**
4. **Turn on the power to all the SCSI devices.**

5. **Turn on the power to the computer.**

Warnings

- The Solaris `trantor` driver is intended primarily to support the use of SCSI CD-ROM drives for software installation, and SCSI tape drives for backup and file transfer. Because of low data transfer rate, simultaneous use of multiple SCSI devices is not recommended.
- If you need to reconfigure the system later to add other devices, make sure the T348 and all its devices are plugged in and powered up; otherwise they will be removed from the configuration. If you accidentally reconfigure without the T348 plugged in, plug the T348 in and repeat the reconfiguration process.
- The T348 and attached devices must also be plugged in and powered on at boot time to be available during that session.
- The Solaris operating environment does not support concurrent use of other parallel devices on the same port as the Trantor T348 or on the T348 pass-through port. If you want to switch between the T348 and some other parallel port device, such as a printer or Ethernet adapter, shut down the Solaris operating environment and power off the computer and any SCSI devices attached to the T348. With the power turned off, disconnect the old device and connect the new one. If switching to the T348, power up any SCSI devices you intend to use. Turn on the power to the computer and do a reconfiguration boot.

To perform a reconfiguration boot, type the commands: touch /reconfigure; reboot

- If the SCSI devices attached to the T348 fail to respond after a reconfiguration boot, and the parallel port had previously been used for a different device, it might be necessary to do a second reconfiguration boot. This situation occurs when the driver from the previous device interferes with the T348 driver's attempt to detect the presence of the T348 device.
- The Trantor T338 andT358 are not supported.
- **(1185362)** The Exabyte EXB-8500 and EXB-8200 tape drives do not work under the Solaris operating environment when connected to the Trantor T348 MiniSCSI Plus parallel host bus adapter.

- Network Adapters -

3Com EtherLink III (3C5*x*9, 3C509B)

Description

The 3Com EtherLink III (3C5*x*9) controllers are Ethernet controllers for the connectionless Data Link Provider Interface providing multithreaded, loadable STREAMS functionality that can be cloned.

The device configuration information for the 3Com EtherLink III has been updated to include information about the 3C509B model.

Device Configuration

Preparing for Configuration

- Configuring the 3C509 (ISA bus) adapter for EISA addressing when installed in an EISA bus system is preferred. This configuration is done by the setup software that comes with the card.
- The 3C509B model is configured differently than the other models. The information under “Configuring the Device” applies only to that model. If you are not sure whether you have this model, check the packaging material that comes with your card. The “3C509B” designation should be on the outside of the box, and the network card should be labeled “Rev. B.”

Configuring the Device

The following information applies only to the 3C509B model of the EtherLink III cards.

1. **Configure the card to use a specific network interface using the configuration program that is supplied with the card. Do *not* use the “Auto Select” option of the configuration program.**
   Since the “Auto Select” option is the factory default, the card must always be reconfigured.

2. **The Plug and Play option should be disabled.**
   This is particularly important on Plug and Play–capable systems.

Intel EtherExpress 16, 16C, 16TP, MCA, MCA TP

Description

The Intel EtherExpress16 is an Ethernet controller for the connectionless Data Link Provider Interface providing multithreaded, loadable STREAMS functionality that can be cloned.

Device Configuration

Preparing for Configuration

When using any version of the EtherExpress 16 adapter, you must use the SOFTSET configuration utility to manually configure the appropriate connector. This DOS program is supplied by the network card manufacturer and is contained on a diskette that comes with the board.

Avoiding Possible Device Conflicts

The Intel EtherExpress 16 conflicts with the SMC 8013 card. If both the SMC 8013 and Intel EtherExpress 16 cards are installed in your system, data to and from the Intel EtherExpress 16 card will be randomly corrupted.

Configuring the Device

The Micro Channel® versions of this adapter (Intel EtherExpress MCA and Intel EtherExpress MCA TP) can be configured to use IRQs 12 and 15, but these IRQs are *not* supported by the Solaris `iee` driver. Run the SOFTSET configuration utility in manual mode to make certain a valid IRQ is selected.

Warnings

- Autodetect is not supported.
- On some fast systems, the Solaris `iee` driver occasionally does not correctly initialize when the system reboots. If this occurs, the network connection will not be usable.
  Workaround: If this situation occurs, there are two options to get around this problem: 1) reboot the system, or 2) activate the network manually by

stopping and then starting the affected `iee` interface using the `ifconfig` command. For example, if the `iee0` interface fails to start up, log in as root and type the following commands:

```
# ifconfig iee0 down
# ifconfig iee0 up
```

Intel EtherExpress PRO

Description

The Intel EtherExpress PRO is an Ethernet controller for the connectionless Data Link Provider Interface providing multithreaded, loadable STREAMS functionality that can be cloned. The Intel EtherExpress PRO Ethernet interface card for the ISA bus is supported.

Device Configuration

Configuring the Device

1. **The Intel EtherExpress PRO can be configured to any I/O address that does not conflict with another device.**

2. **Choose one of the valid IRQ values listed below.**

3. **For all other settings, use the defaults.**

Valid Configurations

• I/O Address	Any I/O address that does not conflict with another device. 0x300 is recommended.
• IRQ	3, 5, 9, 10, 11 (10 is recommended)

SMC EtherEZ, EtherCard Elite16 Ultra, EtherCard PLUS Elite16, EtherCard PLUS (8416, 8216, 8013, 8003)

Description

The SMC 8416, 8216 and 80*x*3 family of cards are Ethernet adapters for ISA and Micro Channel bus architectures. An updated Solaris `smc` driver is provided to support the SMC EtherEZ (8416) Ethernet adapter. This updated driver supersedes the existing `smc` driver and will continue to support the SMC EtherCard Elite16 Ultra™ (8216) family of ISA bus Ethernet adapters and all the previous SMC/WD 8013 EtherCard PLUS Elite16 and EtherCard PLUS Elite/A™ families of ISA and Micro Channel architecture Ethernet adapters, and the EtherCard™ PLUS (8003) family of Ethernet adapters. The same device configuration information supplied for the SMC 8216 and 80*x*3 network adapters in the *x86 Device Configuration Guide* is repeated here for your convenience. The one exception is that the SMC EtherEZ (8416) adapter must have the Plug and Play setting disabled using the software setup program.

Device Configuration

Preparing for Configuration

Since memory is shared, it is necessary to disable the motherboard cache in the region where the Ethernet shared memory is mapped.

Avoiding Possible Device Conflicts

- AST® systems that have DPT boards with the AST BIOS installed are known to conflict with SMC cards set to I/O port 0x300. For these system configurations, set the SMC card to a valid setup that does not use I/O port 0x300.
- Wyse Decision systems are known to conflict with SMC cards set to I/O port 0x300. For these system configurations, set the SMC card to a valid setup that does not use I/O port 0x300.
- The EtherCard PLUS (8003) board has a limited amount of on-board memory, which causes very poor NFS® system performance. To avoid this problem, it is essential that NFS system mounts over the 8003 interface use a 4-Kbyte read/write buffer size. See the `mount_nfs(1M)` manual page for

more details on configuring NFS. This problem can also impact installation of Solaris for x86 over the network, causing occasional NFS complaints (which can be ignored).

- Since Solaris for SPARC® has 8-Kbyte defaults, SPARC NFS file servers will interact poorly with 8003 adapters until the buffer sizes are reduced.

Configuring the Device

Software Procedure

1. **Consult your Device Configuration Work Sheet to see if your SMC network adapter needs to be reconfigured.**
2. **If necessary, reconfigure using the software setup program provided by SMC.**
3. **If using the SMC EtherEZ (8416), make sure the Plug and Play mode is disabled using the supplied software setup program.**

Hardware Procedure

1. **Consult your Device Configuration Work Sheet to verify that your SMC network adapter does not need to be configured.**
2. **If you must set jumpers, refer to the SMC documentation for the procedure.**

Valid Configurations

SMC EtherCard Elite16 Ultra (8216*xxx)* and SMC EtherEZ (8416*xxx*) network adapters use software procedures to configure the following:

Shared Memory Address	Between 0xC0000 and 0xDE000

The information in the following table is only used for EtherCard PLUS (WD/SMC 8003*xxx)* cards that use jumpers to set the configuration:

IRQ	I/O Address	Base Memory Address (Board RAM)
3	0x280	0xD0000
5	0x2A0	0xD4000
5	0x300	0xD4000

Warnings

- The SMC EtherCard Elite16 Ultra cards (8216*xxx*) should be installed in a 16-bit slot. Data corruption may occur if an 8-bit slot is used.
- A client desktop computer with an SMC EtherCard PLUS (8003) cannot be booted from a network.

- Audio Cards -

Sound Blaster Pro/Sound Blaster 16/Sound Blaster AWE32

Description

The Creative Labs Sound Blaster family of audio cards comprises DMA-capable ISA bus plug-in cards that provide 8/16 bit mono/stereo digitized sound recording and playback over a wide range of sampling rates. Each card includes a digital sound processor and mixing capability. Some of the cards also support more advanced audio features, such as FM synthesis, advanced signal processing, advanced wave effects, and MIDI capability; however, the `sbpro` driver does not currently support these advanced features. The features and interfaces that are supported by the Solaris `sbpro` driver are described in `audio(7)` and `sbpro(7)`.

Some Sound Blaster cards support optional non-audio capabilities such as SCSI interfaces and CD-ROM interfaces. These interfaces are not supported by the `sbpro` driver. The Sound Blaster 16 optional SCSI-2 interface is supported by the Solaris `aic` driver. Configuration information for the SCSI-2 interface is maintained in the `aic.conf` file. See “Adaptec AIC-6360/AHA-1522A/AHA-1520A/AHA-1510A/ AHA-1530P/1532P” on page 31 for device configuration information for the SCSI controller on this card.

Device Configuration

Preparing for Configuration

For the `sbpro` driver to successfully operate your Sound Blaster card, it is essential that it be configured properly. Configuration information for the driver is stored in the `sbpro.conf` file, usually in the directory `/kernel/drv`. As shipped, the `sbpro.conf` file is configured to support a Sound Blaster Pro card with factory default jumper settings.

If you have a Sound Blaster Pro card with nonstandard settings, or if you have a Sound Blaster 16 card or a Sound Blaster AWE32 card, you must edit the `sbpro.conf` file before your Sound Blaster card will operate correctly under the Solaris operating environment. This must be done *after* the Solaris 2.4 x86 Driver Update 4 is installed on your system. See “Enabling Support for Sound

Blaster Audio Cards After Installing Solaris” on page 8 or “Enabling Support for Sound Blaster Audio Cards After Installing Driver Update” on page 11 for instructions.

Before beginning configuration, you must know the following information:

- What kind of Sound Blaster card is installed in your system? Is it a Sound Blaster Pro, Sound Blaster 16, or Sound Blaster AWE32?
- The audio subsystem of the Sound Blaster 16 needs its own I/O (port) address and an IRQ, distinct from those of the SCSI subsystem.
- What I/O address is your Sound Blaster card jumpered to? The default setting is I/O address 0x220.
- If your card is a Sound Blaster Pro card, you also must know the jumper settings for the interrupt request (IRQ) and the DMA channel. (If your card is a Sound Blaster 16 or Sound Blaster AWE32, the audio IRQ and DMA channels will be programmed using the values specified in the `sbpro.conf` file; any IRQ and DMA jumpers will be ignored.)

Avoiding Possible Device Conflicts

- Be sure the I/O address jumper setting on your Sound Blaster card does not conflict with any other card in your system. If it conflicts, you will have to reconfigure the I/O address jumper setting.
- The `sbpro.conf` file shipped with the Solaris software is configured to support Sound Blaster Pro cards configured to either IRQ 5 or IRQ 7. However, the Sound Blaster Pro card cannot share IRQ settings with any other card installed in your system. If you have a Sound Blaster Pro card, and its hardware-jumpered IRQ setting conflicts with any other device, change the IRQ jumper setting on the Sound Blaster card to one of the valid configurations listed under “Valid Configurations” on page 57. The most common conflicts occur with the LPT1 parallel port, a serial port, or network card.
- If your Sound Blaster card has both an audio and a SCSI-2 interface, select an I/O address for each interface to prevent conflicts with other configured devices.

- It is recommended that you use IRQ 5 for the Sound Blaster 16 or Sound Blaster AWE32. If for some reason you cannot use this IRQ because another device needs it, you must edit the `sbpro.conf` file before your system gets rebooted. Failure to do so may cause the system to hang because the `sbpro` driver will assume your audio card is using IRQ 5.

Configuring the Device

Note – Make sure you are setting the jumpers for the audio interface and *not* for the SCSI, if your Sound Blaster card has both an audio and a SCSI-2 interface.

1. **Consult your Device Configuration Work Sheet to see if your Sound Blaster card needs to be reconfigured.**
   If the Sound Blaster card's I/O address conflicts with another device, remove the card and change the I/O address according to the manufacturer's instructions. (If you change the I/O address, you must also update the entry in the `sbpro.conf` file after Solaris 2.4 x86 Driver Update 4 is installed on your system.) Record the change on your Device Configuration Work Sheet.

2. **If you have a Sound Blaster Pro card, and the jumpered IRQ conflicts with another device, change the IRQ parameter using the manufacturer's instructions.**
   If you change the IRQ to a value other than IRQ5 or IRQ7, you must also update the entry in the `sbpro.conf` file after Solaris 2.4 x86 Driver Update 4 is installed on your system. Record the change on your Device Configuration Work Sheet.

3. **If you have a Sound Blaster Pro card, and the jumpered DMA channel conflicts with another device, change the DMA parameter using the manufacturer's instructions.**
   If you change the DMA channel, you must also update the entry in the `sbpro.conf` file after Solaris 2.4 x86 Driver Update 4 is installed on your system. Record the change on your Device Configuration Work Sheet.

4. **If you have a Sound Blaster 16 card or a Sound Blaster AWE32 card, you must edit the `sbpro.conf` file to comment out the entry for the Sound Blaster Pro, and uncomment the entry for the Sound Blaster 16/AWE32.**
   The I/O address in the uncommented entry must match the I/O address jumpered on the card. The IRQ and DMA channels on the card will be programmed from the entry in the `sbpro.conf` file after Solaris 2.4 x86 Driver Update 4 is installed on your system. Record the change on your Device Configuration Work Sheet. Be sure that the specified DMA channel does not conflict with any other device on the system. System performance will be better if the IRQ does not conflict with any other device.

Note – On the Sound Blaster 16 card, the IRQ and DMA channel jumpers on the card are ignored, in favor of the entries in the `sbpro.conf` file. The Sound Blaster AWE32 card does not have any IRQ or DMA channel jumpers; the entries in the `sbpro.conf` file are used.

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5. **If you have a Sound Blaster 16 SCSI-2 and you intend to use the SCSI interface, you may have to set the jumper that controls the SCSI I/O address.**
   See "Sound Blaster 16 SCSI-2 (SCSI)" on page 31 for additional configuration information regarding the SCSI-2 interface of the Sound Blaster 16 SCSI-2 card.

6. **Record any change in IRQ setting or DMA channel on your Device Configuration Work Sheet.**

If you have a Sound Blaster Pro card with nonstandard settings, or if you have a Sound Blaster 16 card or a Sound Blaster AWE32 card, you must edit your `sbpro.conf` file before your Sound Blaster card will operate correctly under the Solaris operating environment. This must be done *after* the Solaris 2.4 x86 Driver Update 4 is installed on your system. See "Enabling Support for Sound Blaster Audio Cards After Installing Solaris" on page 8 or "Enabling Support for Sound Blaster Audio Cards After Installing Driver Update" on page 11 for instructions.

Valid Configurations

The possible settings for the Sound Blaster cards are listed here. Defaults are underlined.

Sound Blaster Pro:

- I/O Address 0x220, 0x240
- IRQ 2, 5, 7, 10
- DMA Channel 0, 1, 3

Sound Blaster 16/Sound Blaster AWE32:

- I/O Address 0x220, 0x240, 0x260, 0x280
- IRQ 2, 5, 7, 10
- 8-bit DMA Channel 0, 1, 3
- 16-bit DMA Channel 5, 6, 7

Sound Blaster 16 SCSI-2 ports:

- I/O Address 0x140, 0x340
- IRQ 11
- DMA Channel (not used) 0, 5, 6, 7

Limitations and Warnings

- Under the Solaris `sbpro` driver, output volume is controlled by software. Be sure the volume thumbwheel on the back of the card is turned all the way up to the maximum volume setting; otherwise, you may not hear any sound.
- Microphone input is treated as a mono source; however, all the jacks on the back of the Sound Blaster cards are stereo jacks. If your microphone has a mono plug, you should convert it to stereo using an appropriate adapter.
- **(1147171)** Only one Sound Blaster card can be supported in the system by the `sbpro` driver. Multiple cards cannot be configured.
- **(1166385)** The driver currently does not distinguish between a Sound Blaster 16 card and a Sound Blaster AWE32 card. It will report both of them as Sound Blaster 16 cards.
- The Sound Blaster 16 optional SCSI-2 interface cannot be used as the primary disk controller because it has no BIOS. The system must be booted from a disk attached to another controller.

Supplementary Video Information B

This appendix includes supplementary information about the video support provided in this Driver Update.

Determining Resolution and Color Depth

The resolution and pixel color depth supported by video display adapters is dependent on the amount of video memory on the card. Table B-1 shows the minimum amount of video memory that is needed to support the resolutions and pixel color depth shown. This should only be used as a general reference, however, as the modes supported by your card may differ. Check the documentation that comes with your video card and monitor for the specific modes supported.

Table B-1 Minimum Memory Requirements to Support 8-Bit and 24-Bit Color Depth

	Color Depth	
Resolution	**8-Bit**	**24-Bit**
640x480	1 Mbyte	2 Mbytes
800x600	1 Mbyte	2 Mbytes
1024x768	1 Mbyte	3 Mbytes
1152x900	1 Mbyte	4 Mbytes
1280x1024	2 Mbytes	5 Mbytes
1600x1200	2 Mbytes	8 Mbytes

Supported Diamond Viper Monitor Configurations

Table B-2 lists the monitors that can be used with the Diamond Viper graphics cards supported in this Driver Update. When configuring the video adapter (`kdmconfig`), select only resolutions and frequencies that are supported by your monitor. If your monitor is not listed, you may be able to select a supported one that has the same resolution and synchronization rates as yours. In the following table, only the maximum resolution and horizontal and vertical frequencies supported by the monitor are listed.The `kdmconfig` program will display the lower resolutions supported by the monitor.

Table B-2 Supported Monitors With the Diamond Viper Graphics Card

Monitor	Maximum Resolution	Hfreq (kHz)	Vfreq (Hz)
CS1024	800x600	35.4	56.1
CS1024ni	1024x768	48.4	60.0
CS1572 FS	1280x1024	64.4	60.2
CTX 5468NI	1024x768	48.4	60.0
Fixed Frequency	800x600	35.4	56.1
HL 6955 SETK	1280x1024	64.4	60.2
IBM 8514	800x600	35.4	56.1
IBM 9515	1024x768	61.2	75.8
IBM 9517	1024x768	58.1	72.1
InterVue 20	1280x1024	81.2	76.0
MAG 17F	1152x900	56.8	60.3
NCR 3298-0240/0241	1024x768	48.4	60.0
NCR 3298-0261	1024x768	56.5	70.1
NCR 3298-0271/0272	1024x768	56.5	70.1
NEC 3FG	1024x768	48.4	60.0
NEC 3FGe	1024x768	48.4	60.0
NEC 3FGx	1024x768	48.4	60.0
NEC 4FG	1152x900	56.8	60.3
NEC 4FGe/5FGe	1152x900	56.8	60.3
NEC 5FG	1280x1024	64.4	60.2
NEC 6FG	1280x1024	78.9	74.0

Table B-2 Supported Monitors With the Diamond Viper Graphics Card *(Continued)*

Monitor	Maximum Resolution	Hfreq (kHz)	Vfreq (Hz)
Nanao 9070u	1024x768	48.4	60.0
Nanao 9080i	1152x900	56.8	60.3
Nanao 9500	1152x900	56.8	60.3
Nanao T550i	1280x1024	64.4	60.2
Nanao T560i	1152x900	56.8	60.3
PS/V 2414-A04	1024x768	56.5	70.1
PS/V 2414-A07	1024x768	58.1	72.1
SONY 1304	1024x768	48.4	60.0
SONY 1304S	1152x900	56.8	60.3
SONY 1604S	1152x900	56.8	60.3
ViewSonic 6	1024x768	48.4	60.0
ViewSonic 7	1152x900	56.8	60.3

Supported Intergraph G91 Monitor Configurations

Table B-3 lists the supported Intergraph G91 monitor configurations in this Driver Update. When configuring the video adapter (`kdmconfig`), select only resolutions and frequencies that are supported by your monitor. In the following table, only the maximum resolution and horizontal and vertical frequencies supported by the monitor are listed.The `kdmconfig` program will display the lower resolutions supported by the monitor

Table B-3 Supported Intergraph G91 Monitor Configurations

Monitor	Maximum Resolution	Hfreq (kHz)	Vfreq (Hz)
InterVue 20	1280x1024	81.25	76.00
InterVue 21	1280x1024	100.96	76.02
InterVue 27	1280x1024	80.07	60.25