SCO® Advanced Hardware Supplement (AHS)

Release 5.1.0 Release Notes

for SCO OpenServer™

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28 August 1995

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Welcome

Thank you for using the SCO Advanced Hardware Supplement Release 5.1.0. The SCO AHS program will continue to provide new hardware support for your SCO operating systems through a number of channels.

This new release enhances the SCO OpenServer Release 5 operating system products and can be installed using the SCO Software Managment facilities.

In addition to this aggregated release, SCO will be supplying additional new drivers on the SCO World Wide Web site at www.sco.com. You can access these with anonymous uucp, ftp, the Help command in your SCO OpenServer system, or another web browser of your choice. This site will be updated continuously with SCO supplied and vendor-contributed drivers.

SCO AHS will also be available in the SCOFORUM on Compuserve®.

Please read these Release and Install notes before installing this supplement.

We are interested in your feedback about SCO products. Please send electronic mail to comments@sco.com.

Thank you,

SCO Product Management

About this book

You will find the information you need more quickly if you are familiar with:

- "How this book is organized" (this page)
- "Related documentation" (page 4)
- "Typographical conventions" (page 5)

Although we try to present information in the most useful way, you are the ultimate judge of how well we succeed. Please let us know how we can improve this book (page 6).

How this book is organized

After introducing SCO system products, this book includes the following:

- Chapter 1, "Installing the AHS 5.1.0 software" (page 7)
- Chapter 2, "Graphics drivers: new features" (page 13)
- Chapter 3, "Graphics drivers: notes and known limitations" (page 23) This chapter is also available in the *Configuring Video Adapters* book that can be read online using the **scohelp**(XC) utility.
- Chapter 4, "Network drivers: new features for this release" (page 29)
- Chapter 5, "Network drivers: notes and known limitations" (page 39) This chapter is also available in the *Configuring Network Connections* book that can be read online using the **scohelp**(XC) utility.
- Chapter 6, "Mass storage drivers: notes and known limitations" (page 43)
- Chapter 7, "Multiprocessing drivers: notes and known limitations" (page 63)

about_book.s 16 September 1995 SCCS file: /f/source/about_book/s.ahs_books.s SCCS ID: 3250.2 Last delta: 95/08/16 15:42:42

Related documentation

The AHS documentation set includes printed *Release Notes* plus the following online books:

Configuring Network Connections
: Full information about configuring network drivers and new Advanced Hardware Supplement Release 5.1.0 network driver features.

Network Driver Configuration Notes
: List of all network adapters supported in Advanced Hardware Supplement Release 5.1.0 with configuration notes.

Configuring Video Adapters
: Full information about configuring graphics drivers and new Advanced Hardware Supplement Release 5.1.0 graphics driver features.

Graphics Adapters and Chip Set Configuration Notes
: List of all graphics adapters supported in Advanced Hardware Supplement Release 5.1.0 with configuration notes.

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Typographical conventions

This publication presents commands, filenames, keystrokes, and other special elements in these typefaces:

Example:	Used for:
lp or **lp**(C)	commands, device drivers, programs, and utilities (names, icons, or windows); the letter in parentheses indicates the reference manual section in which the command, driver, program, or utility is documented
/new/client.list	files, directories, and desktops (names, icons, or windows)
root	system, network, or user names
filename	placeholders (replace with appropriate name or value)
⟨Esc⟩	keyboard keys
`Exit program?`	system output (prompts, messages)
yes or **`yes`**	user input
"Description"	field names or column headings (on screen or in database)
Cancel	button names
Edit	menu names
Copy	menu items
File ➪ Find ➪ Text	sequences of menus and menu items
open or **open**(S)	library routines, system calls, kernel functions, C keywords; the letter in parentheses indicates the reference manual section in which the file is documented
$HOME	environment or shell variables
SIGHUP	named constants or signals
"adm3a"	data values
employees	database names
orders	database tables
`buf`	C program structures
`b_b.errno`	structure members

How can we improve this book?

What did you find particularly helpful in this book? Are there mistakes in this book? Could it be organized more usefully? Did we leave out information you need or include unnecessary material? If so, please tell us.

To help us implement your suggestions, include relevant details, such as book title, section name, page number, and system component. We would appreciate information on how to contact you in case we need additional explanation.

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Thank you.

Accessing SCO Services information online

If you are connected to the Internet and have a World Wide Web browser (such as NCSA Mosaic), the following URL (Uniform Resource Locator) will lead you to the SCO World Wide Web home page:

http://www.sco.com/

To access updated information about the AHDK and other topics of interest to the SCO development community, click on "Developer Info."

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Chapter 1

Installing the AHS 5.1.0 software

Install the Advanced Hardware Supplement Release 5.1.0 using the **Software Manager** (see "Installing software" in the *SCO OpenServer Handbook*). You can install the entire product or a single component. For the Mass Storage and Multiprocessing Drivers components, you can also install a single driver package.

AHS Release 5.1.0 can be installed only on SCO OpenServer Release 5 (5.0.0).

WARNING Note the following before installing Advanced Hardware Supplement Release 5.1.0:

- Do not install AHS 5.1.0 on a system that is a server for networked operating system installation (initial system load, or ISL). The AHS software modifies system files that are required for networked ISL, and after it is installed, networked ISLs will no longer be possible from that machine.
- If you remove the Graphics Drivers or Network Drivers components of the AHS software from the system after it is installed, you must reinstall some software from the original SCO OpenServer Release 5 release media. See "Restoring software after removing Advanced Hardware Supplement Release 5.1.0" (page 12).
- Do not select single driver or documentation packages from the Network Driver or Graphics Drivers components. Installing any single package from these components will delete all other drivers in that package from your system. If you install only the documentation package, you will delete all drivers of that type from your system. See "Note about SSOs and AHS 5.1.0" (page 11).

Installation

The following procedure installs the AHS software:

> **NOTE** The installation model for Advanced Hardware Supplement Release 5.1.0 favors installation from disk files that are available either locally or over the network. The Advanced Hardware Supplement Release 5.1.0 can also be installed directly from floppy disks but the installation will take considerably longer and cannot be left to run unattended.

1. Log in as *root*. Enter the following to bring your machine into system maintenance mode: **/etc/shutdown -i1**
2. If the AHS software is not yet accessible (on a local or remote machine), load it now into files in the */ahs5_1* directory or other directory of your choice.
   - **To load from floppy disks:**

     Copy the floppies to the local hard disk with these commands:

     ```
     mkdir /ahs5_1
     dd if=/dev/fd0  of=/ahs5_1/VOL.000.000 bs=36b
     dd if=/dev/fd0  of=/ahs5_1/VOL.001.000 bs=36b
     dd if=/dev/fd0  of=/ahs5_1/VOL.002.000 bs=36b
     dd if=/dev/fd0  of=/ahs5_1/VOL.003.000 bs=36b
     dd if=/dev/fd0  of=/ahs5_1/VOL.004.000 bs=36b
     ```

     The block size shown (**bs=36b**) is recommended for 3-1/2 inch floppies; for 5-1/4 inch floppies, use **bs=30b**.

     > **NOTE** The AHS installation files can be loaded into any directory you choose, but the actual file names **must** be the ones shown above.

   - **To load from SCO's Internet site using ftp:**

     Create a directory (such as */ahs5_1*) and **cd** into it. Then, transfer the files with these commands:

     ```
     ftp -i ftp.sco.com
             <log in as anonymous>
             <give your email address for the password>
     cd AHS/5.0/sco/5.1
     mget VOL*
     exit
     ```

     See the README file for additional information.
3. Run the **Software Manager** from the desktop, or enter **scoadmin software** from the command line. Select **Install New** from the **Software** menu.

4. Identify the installation source:
   - **To install from files on the local host**, select the current host and specify **Media Images** as the media device. Then, enter the name of the directory containing the media images (for example, */ahs5_1*).
   - **To install directly from floppy disks**, select the current host and specify the correct **Floppy Disk Drive**. Insert your floppy disk and click on **Continue**.
   - **To install from another host**, select **From another host**. Specify the host that contains the AHS software files, and enter the *swadmin* password for that host when prompted.
     - If AHS is installed on the remote host, specify **Hard Disk** as the media device, then select **SCO OpenServer Advanced Hardware Supplement**.
     - If the AHS images are loaded onto the remote host but not installed, specify **Media Images** as the media device. Then enter the full pathname of the directory containing the media images.

   It will take about one minute for a set of control files to be copied.
5. Choose a **Full** or **Partial** installation:
   - **To install the entire** Advanced Hardware Supplement Release 5.1.0 product, click on **Full**.
   - **To install only one component (such as Graphics Drivers, Network Drivers, or Mass Storage Drivers)**, click on **Partial**, then select the components you want from the list of available software and click on **Install**. The components are described in "AHS components" (page 10).
   - **To install one or more drivers from the Mass Storage or Multiprocessing Drivers component**, click on **Partial**, then expand the component that contains the drivers you want to install. From the list of available drivers, select the ones you want and click on **Install**.

   WARNING Do not select single driver or documentation packages from the Graphics Drivers component or the Network Drivers component. See "Note about SSOs and AHS 5.1.0" (page 11).
6. When the installation is complete, select **Exit** from the **Host** menu.
7. When the system prompt returns, you can delete the Advanced Hardware Supplement Release 5.1.0 volume image files from your system if they are not required for other installations.
8. If the kernel was relinked, you must reboot your system for the changes to take effect. Type **init 6**, then press ⟨Enter⟩ to reboot your system.

When the system comes up, the new drivers are installed. Store the distribution media in a safe place.

AHS components

Installing the Entire product requires approximately 8.5MB of disk space. You can choose to install one or more of the following packages and components:

Graphics Drivers

Includes graphics drivers, *grafinfo* files, and *moninfo* files for all supported graphics devices, plus an updated version of the **Video Configuration Manager**, a revised *Configuring Video Adapters* book, and new context-sensitive help for the video configuration software.

Installing this component will update any configured devices on your system. Additional devices can be configured with the **Video Configuration Manager** after the AHS software is installed.

See Chapter 2, "Graphics drivers: new features" (page 13) and Chapter 3, "Graphics drivers: notes and known limitations" (page 23).

Network Drivers

Driver binaries and support files for all supported network devices, plus an updated version of the **Network Configuration Manager**, a revised *Configuring Network Connections* book, and new context-sensitive help for the network configuration software.

Installing this component will update any configured devices on your system. Additional devices can be configured with the **Network Configuration Manager** after the AHS software is installed.

See Chapter 4, "Network drivers: new features for this release" (page 29) and Chapter 5, "Network drivers: notes and known limitations" (page 39).

AHS Upgrade Utility

Provides support for other AHS components. Do not select this component for installation; it is automatically installed by the other components that require it.

Mass Storage Drivers

Driver binaries and support files for SCSI host adapters and the SCSI jukebox peripheral driver. See Chapter 6, "Mass storage drivers: notes and known limitations" (page 43).

The boot-time loadable drivers that are included in the Mass Storage Drivers component can be installed directly at boot time using the **link**(HW) or **ahslink** commands; See "Using BTLDs at installation time" (page 45).

Multiprocessing Drivers

Software to support the Tricord PowerFrame platform. See Chapter 7, "Multiprocessing drivers: notes and known limitations" (page 63).

Note about SSOs and AHS 5.1.0

The Network Drivers and Graphics Drivers components of Advanced Hardware Supplement Release 5.1.0 use the SCO OpenServer Software Storage Object (SSO) architecture. For SCO OpenServer Release 5, each of these components was contained in a single SSO. In Advanced Hardware Supplement Release 5.1.0, these large SSOs are replaced by a collection of smaller SSOs to allow for more flexible upgrades in future releases. Because of this paradigm switch, SCO recommends that you install the entire Network Drivers or Graphics Drivers components rather than installing single driver or documentation packages from these components.

The Mass Storage and Multiprocessing Drivers components are not affected by this paradigm switch so single driver packages can be installed from these components.

Removing the AHS software

The Advanced Hardware Supplement Release 5.1.0 software is not normally removed once it is installed from the system and full roll-back capability is not supported. The software can be removed using the **Software Manager**, but you will then need to reinstall portions of software from the original SCO OpenServer Release 5 media.

> **WARNING** The system should be in system maintenance mode when removing and restoring AHS software. Specifically, be sure that no NFS automounts are active when removing these components; during the removal process, TCP will be deconfigured, which can cause problems if there are active NFS mounts.

To remove the Advanced Hardware Supplement Release 5.1.0 software:

1. Log in as *root*. Enter the following to bring your machine into system maintenance mode: **/etc/shutdown -i1**
2. Select **Software Manager** from the Desktop or enter **scoadmin software** at the command line.
3. Select **SCO Advanced Hardware Supplement** from the list of installed software, then select **Remove** from the **Software** menu. Study the messages displayed; if you still want to remove the software, click on **OK** to confirm the removal.
4. Select **Exit** from the **Host** menu. The Advanced Hardware Supplement Release 5.1.0 software has now been removed.

Restoring software after removing Advanced Hardware Supplement Release 5.1.0

After removing the Graphics Drivers or Network Drivers packages from Advanced Hardware Supplement Release 5.1.0, you will need to restore files from the original SCO OpenServer Release 5 release media to return your system to the state it was in before installing the AHS software.

To do this, take the following steps after removing the AHS software as discussed in "Removing the AHS software" (page 11):

1. From the list of available software in the **Software Manager**, record which SCO OpenServer Release 5 system you are using (Enterprise, Host, or Desktop).
2. Select **Install New** from the **Software** menu. Select the current host, identify the media device (tape or CD-ROM), and insert your original SCO OpenServer Release 5 distribution media.
3. The media contains several SCO products. Select the SCO OpenServer Release 5 system that you already have installed (recorded from the main window of the **Software Manager**).
4. Specify a **Partial** installation.

   To restore the Graphics Drivers, expand the **SCO OpenServer Graphics** item and select **Graphics Drivers**.

   To restore the Network Drivers, expand the **SCO OpenServer Connectivity** item and select **Network Drivers**.

   Click on the **Install** button. The **Software Manager** will install just these two components, restoring your system to the original SCO OpenServer Release 5 versions.
5. Reconfigure your network and graphics software using **scoadmin video** and **scoadmin network**.

Chapter 2

Graphics drivers: new features

The Graphics Drivers component of Advanced Hardware Supplement Release 5.1.0 provides the following new capabilities:

PCI auto-detection
: The updated **Video Configuration Manager** provides automatic device detection for supported PCI graphics adapters.

High resolution graphics mode
: Advanced Hardware Supplement Release 5.1.0 enables you to configure your graphical system to 1600x1200 at 256 (or more) colors, which is significantly better than the resolutions supported in earlier releases. New adapters supporting this resolution are marked with an asterisk "*" in "New video adapters in AHS 5.1" (page 14). You must have enough DRAM or VRAM on the video adapter and you must use a compatible video monitor that supports this resolution.

When you install the Graphics Drivers component of Advanced Hardware Supplement Release 5.1.0, existing graphics adapters and monitors will be updated automatically. To configure new adapters and monitors, run the **Video Configuration Menu** after you complete the AHS installation. Changes will take effect when you restart the X server.

New video adapters in AHS 5.1

The following graphics adapters are newly supported in Advanced Hardware Supplement Release 5.1.0. The video adapters marked with an asterisk (*) support the 1600x1200 resolution at 256 or more colors.

Compaq ProLinea, Deskpro (CL GD5434, 1MB)
Compaq ProLinea, Deskpro (CL GD5434, 2MB)
Compaq QVision 2000 (2 MB)

Diamond Stealth 64 DRAM (S3 Vision868 chip set)
Diamond Stealth 64 VRAM (S3 Vision968 chip set)
Diamond Viper PRO*
Diamond Viper SE*

IBM Thinkpad (Western Digital 90C24)

Matrox MGA/Impression PCI Graphics Adapter*
Matrox MGA VLB Graphics Adapter*

Number 9 FX Motion 771*
Number 9 FX Vision 330

Updated video adapters in AHS 5.1

Some of the Graphics drivers have been enhanced and improved over the versions that were included in SCO OpenServer Release 5.

Improvements were made to the drivers for the following video adapters:

Compaq QVision 1024 (1 MB)
Compaq QVision 1280 (2 MB)

Note also that the X driver for the Cirrus Logic GD5434 chipset has been corrected for a hardware problem that caused many adapters based on this chipset to hang. Installing Advanced Hardware Supplement Release 5.1.0 provides the updated X driver; the change will take effect the next time you restart the X server. The new Driver resets the "blitter" if a hang is detected. Some drawing errors may be noticed if this reset occurs. This affects the following video adapters:

Cirus Logic GPS434
Orchid Kelvin 64

Other graphics adapters based on the Cirrus Logic GD5434 chip set may also be affected.

Supported video adapters listed by manufacturer

Appian

Appian Rendition III

AST

AST Power Premium 90C31
AST VGA Plus

ATI

ATI Ultra Pro or Ultra Plus
ATI Ultra Pro or Ultra Plus — Early 92
ATI Ultra or ATI Vantage
ATI VGA Wonder
ATI VGA Wonder Plus
ATI VGA Wonder XL
ATI Mach64 chip set based adapters

BOCA

BOCA Vortek-VL based on the AGX015 chip set
BOCA Voyager based on the CT6430x chip set

Bull

Bull Prostation 25i

Chips & Technology (C&T) Chip sets

Chips & Technology 451 chip set based adapters
Chips & Technology 452 chip set based adapters
Chips & Technology 655x0 chip set based adapters
Chips & Technology 6430x chip set based adapters

Cirrus Logic

Cirrus Logic VGA
Cirrus Logic GD 5426 chip set based adapters
Cirrus Logic GD 5428 chip set based adapters
Cirrus Logic GD 542x chip set based adapters
Cirrus Logic GD 5434 chipset based adapters

ColorGraphics

ColorGraphics TwinTurbo Accelerator

Compaq

Compaq Advanced VGA
Compaq LTE Elite (WD90C24)
Compaq LTE Lite (VGA LCD)
Compaq LTE Lite E, C (AVGA)
Compaq ProLinea, Deskpro (CL GD5434, 1MB)
Compaq ProLinea, Deskpro (CL GD5434, 2MB)
Compaq ProLinea MT (CL GD5428)
Compaq ProLinea Net1 (CL GD5420)
Compaq ProLinea 3 (WD 90C11)
Compaq ProLinea 4 (Tseng ET4000/AX)
Compaq ProLinea 4 (Tseng ET4000/W32)
Compaq Portable 486, 486C (AVGA)
Compaq ProSignia, ProLiant (CL GD5420/5424)
Compaq ProSignia (WD 90C11)
Compaq QVision 1024 (1 MB)
Compaq QVision 1280 (2 MB)
Compaq QVision 2000 (2 MB)
Compaq VGC
Compaq VGC-132

Cornerstone

Cornerstone Dual Page
Cornerstone Dual Page 150
Cornerstone Dual Page for Microchannel
Cornerstone PC1280
Cornerstone Single Page

DEC

DECpc 433W with DEC IGC
DECpc S3 86C805
DECpc S3 864/964
DECpc S3 86C924
DECpc S3 86C928 PCI
DECpc S3 86C928 VL Bus
Diamond Viper PRO
DECpc Viper PCI 2MB VRAM
Diamond Viper SE
DEC 90C30

Dell

Dell 90C30

Diamond

Diamond SpeedStar 24X
Diamond SpeedStar PRO
Diamond Stealth VRAM
Diamond Stealth 24
Diamond Stealth 64 DRAM (S3 Trio64 chipset)
Diamond Stealth 64 DRAM (S3 Vision864 chipset)
Diamond Stealth 64 DRAM (S3 Vision868 chip set)
Diamond Stealth 64 VRAM (S3 Vision964 chip set)
Diamond Stealth 64 VRAM (S3 Vision968 chip set)
Diamond Stealth Pro
Diamond Viper VLB (2MB VRAM)
Diamond Viper PCI (2MB VRAM)
Diamond Viper PRO
Diamond Viper SE

EIZO

EIZO MD-B07
EIZO MD-B10

Genoa

Genoa SuperVGA
Genoa SuperVGA 6000
Genoa SuperVGA 7000

Grid Systems

Grid Systems Grid 1530

Hercules

Hercules Monochrome Graphics Card

Hewlett-Packard

HP UltraVGA (D2325A)
HP Vectra 386/33NI (S3 86C801)
HP Vectra 486 N/NI Series (S3 86C805)
HP Vectra XU 5/90 and Vectra XM2
HP Vectra 486 XM Series (S3 86C928)
HP Vectra XP/60 (S3 86C928)

IBM

IBM VGA
IBM 8514A
IBM Thinkpad (Western Digital 90C24)
IBM graphics adapters using the S3 864 chip set
IBM graphics adapters using Tseng Labs ET4000/W32
IBM XGA
IBM XGA-2

Imagraph

Imagraph ITX

Intel

Intel Ultra Pro or Ultra Plus
Intel 90C30
Intel 90C31

Matrox

Matrox MGA/Impression PCI Graphics Adapter
Matrox MGA VLB Graphics Adapter
Matrox MWIN1280

Microfield

Microfield I8

MIRO

MIRO Crystal
MIRO Crystal 8S
MIRO Crystal 16SI
MIRO Crystal 20SD
MIRO Crystal 20SV
MIRO Crystal 32S
MIRO Crystal 40SV
MIRO Magic
MIRO Magic Plus

NCR

NCR 77C22 VGA chip
NCR 77C22E VGA chip

Number 9

Number 9 FX Motion 771
Number 9 FX Vision 330
Number 9 GXe BIOS 1.09
Number 9 GXe BIOS 1.1x
Number 9 GXe 64
Number 9 GXi

Oak

Oak OTI-077 VGA

Olivetti

Olivetti EVC
Olivetti LSX5015/25 VGA/SVGA
Olivetti m300-28 VGA/SVGA
Olivetti m300-30 VGA/SVGA
Olivetti m380-40 VGA/SVGA
Olivetti m386-25 VGA/SVGA
Olivetti M4-62/64/66 SVGA
Olivetti M400-60 VGA/ATI ULTRA
Olivetti M400-10/40 VGA/SVGA
Olivetti M480-10/20 VGA/SVGA
Olivetti OVC Graphics Controller
Olivetti GAM (2MB VRAM)

Orchid

Orchid Designer VGA
Orchid Fahrenheit 1280 (BIOS Version 1.x)
Orchid Fahrenheit 1280 (BIOS Version 2.x-3.x)
Orchid Fahrenheit 1280 Plus or Plus/VA
Orchid Kelvin 64
Orchid ProDesigner/e
Orchid ProDesigner II (Version 3.x)
Orchid ProDesigner II (Version 4.x)
Orchid ProDesigner II (Version 5.x)
Orchid ProDesigner IIs

Paradise

Paradise 8514A
Paradise VGA 1024
Paradise VGA Plus

Pixelworks

Pixelworks WhirlWIN

Quadram

Quadram QuadVGA

S3

S3 86C732 chip set based adapters
S3 Trio64 (86C764) chip set based adapters
S3 86C805 chip set based adapters
S3 Vision864 (86C864) and S3 Vision964 (86C964) chip set based adapters
S3 86C911 chip set based adapters
S3 86C928 chip set based adapters

Sigma

Sigma Legend

SNI

SNI 68800
SNI 86C805
SNI Ergo I
SNI Ergo II
SNI Ergo III

Spider

Spider 32 VLB

STB

STB EM 16
STB EM 16+
STB Extra-EM
STB PowerGraph X-24 and VL-24
STB Wind/X BIOS 1.0
STB Wind/X BIOS 1.1
STB Horizon VL
STB Pegasus

Tecmar

Tecmar VGA/AD

Toshiba

Toshiba Grid 758 Display
Toshiba Grid Plasma Display

Trident

Trident Impact II & III
Trident TVGA 8900B
Trident TVGA 8900B with 512k VRAM
Trident TVGA/TGUI

Tseng Labs

Tseng Labs ET3000 chip based adapters
Tseng Labs ET4000 chip based adapters

Tulip

Tulip P9000

UNISYS

UNISYS MPE Series Computers
UNISYS MPI Series Computers

Video Dynamics

Video Dynamics SprintGXU

Verticom

Verticom MX/AT

Video 7

Video 7 Fast Write
Video 7 VGA 1024i
Video 7 VRAM
Video 7 VRAM II

Western Digital

Western Digital 90C11 chip set based adapters
Western Digital 90C24 chip set based adapters
Western Digital 90C30 chip set based adapters
Western Digital 90C31 chip set based adapters
Western Digital 90C33 chip set based adapters

Weitek

Weitek P9000 with 1MB VRAM
Weitek P9000 with 2MB VRAM

XTEC

XTEC AGX

Zenith Data Systems

Zenith Data Systems 90C30
Zenith Data Systems 90C31
Zenith Data Systems WAM

Chapter 3

Graphics drivers: notes and known limitations

This chapter contains notes about the Graphics Drivers component of Advanced Hardware Supplement Release 5.1.0. Device-specific notes are provided in the context-sensitive help that is supplied with the **Video Configuration** Manager and in *Graphics Adapters and Chip Set Configuration Notes* in the *Graphics Adapters and Chip Set Configuration Notes*.

Discontinued or "legacy" drivers

The following graphics adapters, X drivers, grafinfo files and scripts are no longer included with this product (unless you performed an in-place upgrade). Support for these products may be available via the "Legacy" program. Contact SCO Support for more information on the Legacy program.

Graphics adapters

- Appian Rendition II
- DEC Intelligent Graphics Controller
- Dell PowerLine 450 DGX
- Matrox PG-1281/S
- Matrox PG-1281
- Microfield T8 T8/2 V8 V8/2
- Microfield X8
- MICRONICS MVC

X drivers

- /usr/lib/X11/dyddx/tms0/XDriver.o
- /usr/lib/X11/dyddx/mfgnfb/XDriver.o
- /usr/lib/X11/dyddx/mgxnfb/XDriver.o
- /usr/lib/X11/dyddx/mvc/XDriver.o
- /usr/lib/X11/dyddx/mpg/XDriver.o
- /usr/lib/X11/dyddx/jaws/XDriver.o

Grafinfo files

- /usr/lib/grafinfo/dell/powerline.xgi
- /usr/lib/grafinfo/matrox/pg1281-s.xgi
- /usr/lib/grafinfo/matrox/pg1281.xgi
- /usr/lib/grafinfo/micronics/mvc.xgi
- /usr/lib/grafinfo/microfield/x8.xgi
- /usr/lib/grafinfo/microfield/t8v8.xgi
- /usr/lib/grafinfo/dec/decigc.xgi
- /usr/lib/grafinfo/appian/renii.xgi
- /usr/lib/grafinfo/numbernine/n9gxi.tms0

Scripts

- tms340/renii.out
- tms340/renii-ini
- tms340/ags-ini
- tms340/ags.out
- tms340/decigc.out
- tms340/decigc-ini
- tms340/decigc-end

In addition, the entire */usr/lib/vidconf/ihv* directory has been removed.

aga.s 16 September 1995 SCCS file: /f/source/X/Video/s.vidcardlimits.s SCCS ID: 510.14 Last delta: 95/09/14 13:58:17

CAUTION If your system uses one of these graphics adapters or drivers, you should select the in-place upgrade during system installation to preserve your existing functionality. If you perform a fresh installation and later want to use one of these adapters or drivers, contact SCO Support for information about the "Legacy" program.

VGA and Super-VGA (mw) driver does not run if you switch multiscreens

If you are using a graphics adapter that uses the *mw* X driver (typically a VGA or Super-VGA-only card that does not contain a graphics acceleration chip), the driver stops running and the X server ceases to do graphics rendering when you switch to a different multiscreen. Activity is reinitiated when you return to the multiscreen on which the X server is running.

Drawing problems when moving Desktop icons

Occasionally, if Desktop icons are moved across the top of the Desktop under the menu bar, incorrect pixels are drawn. Using **Refresh** from the window manager **Root** menu clears the incorrectly drawn pixels.

Color problems when using TrueColor and DirectColor with SCO X clients

If you specify the **-cmap** option for the SCOcolor, SCOpaint, and SCOpaint clients, TrueColor and DirectColor visual types will not work. (DirectColor and TrueColor cards typically support 32K, 64K, and 16 Million colors). This problem also results if you start **Xsco** with the **-static** option. These are the visual types where the rgb values are stored directly in the display memory of the adapter. Consult the documentation accompanying your graphics adapter. If there are display modes that support 32K, 64K, or 16 Million colors, do not use these modes.

Also, the applications mentioned above do not work with fixed colormap graphics adapters.

Using grey-scale monochrome monitors with the X server

Running **startx** with some grey-scale monitors (sometimes incorrectly called monochrome) causes the system to crash. If this happens, you must ensure that the console ports are properly configured. To configure your ports automatically at boot-up complete the following:

1. As *root*, use an ASCII editor (such as **vi**) to open */etc/rc.d/8/userdef*.
2. Add the following lines:

```
vidi v80x25 < /dev/tty01
vidi v80x25 < /dev/tty02
vidi v80x25 < /dev/tty03
vidi v80x25 < /dev/tty04
vidi v80x25 < /dev/tty05
vidi v80x25 < /dev/tty06
vidi v80x25 < /dev/tty07
vidi v80x25 < /dev/tty08
vidi v80x25 < /dev/tty09
vidi v80x25 < /dev/tty10
vidi v80x25 < /dev/tty11
vidi v80x25 < /dev/tty12
echo "Screen devices set to color mode ..."
```

3. Save the file.
4. Use **shutdown**(ADM) or **init**(M) to reboot your machine.
5. Start the X server.

Problems exiting the X server

If you use **startx** to start the X server, you may notice problems when exiting your SCO system Desktop or X server. Sometimes, the screen remains in graphics mode or the keyboard does not function correctly after exiting.

To prevent the problem, use **/etc/clean_screen** along with **startx** by entering the following:

startx; /etc/clean_screen

If you log in via **scologin**, you should not encounter any problems.

WordPerfect limitations

If you use WordPerfect® with a non-VGA graphics adapter and you move a window or the cursor off the screen, the text screen does not display correctly.

If you run WordPerfect with a VGA-based adapter, and you move the WordPerfect cursor off the screen to the left and then type, you see multiple cursor images (to the right of the text you are typing).

In both cases, you can restore the correct screen display by selecting **Refresh** from the **Root** menu.

Error messages when running /etc/fontserv

If you run **/etc/fontserv start**, it may incorrectly produce the following error message:

```
TCP/IP must be running before starting the font server.
```

For the font server to run, you must modify the **/etc/fontserv** command.

Enter the following commands as *root*:

```
cp  /etc/fontserv  /etc/fontserv.bak
sed '/slink/,/fi/d'  /etc/fontserv > /tmp/fontserv
cat /tmp/fontserv > /etc/fontserv
```

Once this is done, start the font server:

```
/etc/fontserv  start
```

If you need to restore the old version of **fontserv**, enter the following command as *root*:

```
cat  /etc/fontserv.bak > /etc/fontserv
```

Maximum number of local X servers

SCO OpenServer Release 5 supports up to 8 local X servers.

Hardware conflicts and multi-monitor configuration

If you install two or more video adapters on the system, you must ensure that there are no hardware conflicts between them and other hardware in the system.

Problems when exiting the Video Configuration Manager in character mode

If the CHARM version of the **Video Configuration Manager** exits unexpectedly, you may be left in raw mode. To correct this problem, complete the following steps:

1. Type ⟨Ctrl⟩\ a few times to verify that CHARM has really stopped running.
2. Enter the following to restore your terminal setting:

   ⟨Ctrl⟩**J stty sane** ⟨Ctrl⟩**J**

Chapter 4

Network drivers: new features for this release

This section contains information about the new features found in the Network Drivers component of Advanced Hardware Supplement Release 5.1.0 including:

- the new features supported in this release of Advanced Hardware Supplement (this page)
- the network adapters supported in this release of Advanced Hardware Supplement (page 31)

New features

New and improved network adapters

Advanced Hardware Supplement Release 5.1.0 supports over 120 network adapters; see "Supported network adapters" (page 31) for the complete list. Advanced Hardware Supplement Release 5.1.0 supports all the adapters found in SCO OpenServer Release 5 and adds support for the new adapters listed in "New network adapters" (page 30). Support for a number of adapters has been enhanced for robustness and performance; see "Updated network adapters" (page 31).

Fast Ethernet

Advanced Hardware Supplement Release 5.1.0 provides support for several new 100 Mbps network adapters, including support for both 100VG and 100BaseT networking technologies. Some of the new and updated drivers also support full-duplex data transfer mode when used with full-duplex hubs.

Improved PCI support
: Advanced Hardware Supplement Release 5.1.0 also provides a much wider selection of network adapters for the high-performance PCI bus.

Multithreaded networking and network drivers
: Some of the network drivers included with Advanced Hardware Supplement Release 5.1.0 are multithreaded to provide better performance on multiprocessor configuration. These multithreaded drivers can execute both their task-level code and interrupt processing on any configured CPU. Single-threaded drivers (that have not been multithreaded) can be run on multiprocessor configurations; they will benefit from the multithreaded protocol stacks and STREAMS interface that are provided with SCO OpenServer but all driver execution will occur on one CPU. Consequently, single-threaded drivers may not realize the full performance benefits of the multiprocessing configuration.

  The drivers for the following network adapters are multithreaded:

  - Novell/Eagle NE3200
  - Novell/Microdyne NE3200T
  - Intel EtherExpress 32
  - Intel EtherExpress Flash 32

  Additional multithreaded drivers are under development for future releases of the Advanced Hardware Supplement.

New network adapters

The following is a list of network adapters newly supported in Advanced Hardware Supplement Release 5.1.0:

HP J2973A 10Mbps PCI LAN Adapter
HP J2573A 10/100VG ISA LAN Adapter
HP J2577A 10/100VG EISA LAN Adapter
HP J2585A 10/100VG PCI LAN Adapter
HP J2585B 10/100VG PCI LAN Adapter

Intel EtherExpress PRO/100 EISA LAN Adapter
Intel EtherExpress PRO/100 PCI LAN Adapter

Standard Microsystems
  SMC8432T EtherPower PCI Ethernet Adapter
  SMC8432TA EtherPower PCI Ethernet Adapter
  SMC8432BA EtherPower PCI Ethernet Adapter
  SMC8432BT EtherPower PCI Ethernet Adapter
  SMC8432BTA EtherPower PCI Ethernet Adapter
  SMC8434T EtherPower2 Dual Channel PCI Ethernet Adapter
  SMC8434BT EtherPower2 Dual Channel PCI Ethernet Adapter
  SMC9332 EtherPower 10/100 PCI Ethernet Adapter

network.s 16 September 1995 SCCS file: /f/source/net/lli/s.rnfeat.s SCCS ID: 500.40 Last delta: 95/09/14 14:08:07

Updated network adapters

Some of the network drivers provided with Advanced Hardware Supplement Release 5.1.0 have been enhanced and improved over the versions that were included in SCO OpenServer Release 5. Improvements were made to the drivers for the following network adapters:

AMD Am2110-SM AT Ethernet 7998
AMD Am1500T/2 PCnet-ISA
AMD Am1500T PCnet-ISA
AMD PCnet-ISA+
AMD PCnet-PCI

Compaq Integrated NetFlex-2/ENET.

HP J2405A EtherTwist PC LAN Adapter NC/16 TP

IBM EtherStreamer MC32 Adapter
IBM LANStreamer MC32 Adapter
IBM Auto LANStreamer MC32 Adapter
IBM Auto LANStreamer PCI Adapter

Racal InterLan PCI-T2

Standard Microsystems
SMC8216 EtherCard Elite 16C Ultra
SMC8216T EtherCard Elite 16C Ultra
SMC8216C EtherCard Elite 16C Ultra
SMC82M32 EtherCard Elite 32C Ultra
SMC8416B EtherEZ
SMC8416T EtherEZ
SMC8416BT EtherEZ

Supported network adapters

This section contains two lists of network adapters supported by Advanced Hardware Supplement Release 5.1.0:

- arranged by manufacturer (page 32)
- arranged by media and bus type (page 35)

Supported network adapters by manufacturer

NOTE Card-specific information is provided in the context-sensitive help for the **Network Configuration Manager** and *Network Driver Configuration Notes* in the *Supported Network Driver Configuration Notes*.

3Com

3C501 EtherLink
3C503 EtherLink II & EtherLink II TP
3C503-16 EtherLink II/16 & EtherLink II/16 TP
3C507 EtherLink 16 & EtherLink 16 TP
3C509 & 3C509-TP EtherLink III
3C509-Combo EtherLink III
3C509B & 3C509B-TP EtherLink III
3C509B-Combo EtherLink III
3C523 & 3C523B EtherLink/MC
3C523 EtherLink/MC TP
3C529 & 3C529-TP EtherLink III
3C579 & 3C579-TP EtherLink III
3C589-TP & 3C589-Combo EtherLink III
3C589B-TP & 3C589B-Combo EtherLink III

AMD

AMD Am1500T PCNet-ISA
AMD Am1500T/2 PCNet-ISA
AMD Am2110-SM AT Ethernet 7998
AMD PCnet-ISA+
AMD PCnet-PCI

Compaq

Integrated NetFlex-2/ENET*

* The Integrated NetFlex-2/ENET is a network device which uses the AMD PCnet-32 built into the motherboard of Compaq Prosignia VS systems.

Hewlett-Packard

HP 27245A EtherTwist PC LAN Adapter/8 TP
HP 27247A EtherTwist PC LAN Adapter/16 TP
HP 27247B EtherTwist PC LAN Adapter/16 TP Plus
HP 27248A EtherTwist EISA LAN Adapter/32 TP
HP 27250A EtherTwist PC LAN Adapter/8 TL
HP 27252A EtherTwist PC LAN Adapter/16 TL Plus
HP J2405A EtherTwist PC LAN Adapter NC/16 TP
HP J2577A 10/100VG EISA LAN Adapter
HP J2973A 10Mbps PCI LAN Adapter
HP J2573A 10/100VG ISA LAN Adapter
HP J2585A 10/100VG PCI LAN Adapter
HP J2585B 10/100VG PCI LAN Adapter

IBM

Ethernet adapters

LAN Adapter for Ethernet
LAN Adapter for Ethernet TP & CX
Ethernet Adapter/A
EtherStreamer MC32 Adapter
PS/2 Adapter/A for Ethernet Networks
PS/2 Adapter/A for Ethernet TP Networks

Token Ring adapters

Auto 16/4 Token-Ring Network ISA Adapter
Token-Ring Network 16/4 ISA-16 Adapter
Token-Ring Network PC Adapter II
Token-Ring Network PC Adapter & Adapter/A
Token-Ring Network 16/4 Adapter & Adapter/A
Token-Ring Network 16/4 Busmaster Server Adapter/A
LANStreamer MC32 Adapter
Auto LANStreamer MC32 Adapter
Auto LANStreamer PCI Adapter

Intel

EtherExpress 16
EtherExpress 16 TP & C
EtherExpress 16 FlashC
EtherExpress 16 MCA & MCA TP
EtherExpress 32
EtherExpress Flash32
EtherExpress PRO/100 EISA LAN Adapter
EtherExpress PRO/100 PCI LAN Adapter

Microdyne (Excelan)

EXOS 205 and 205T
EXOS 205T/16

National SemiConductor Corporation

InfoMover NE2000plus

Novell

NE2000
NE3200
NE3200T

Racal InterLan

ES3210
NI6510
NI6510/2 InterLan EtherBlaster
NI6510SC-T2 InterLan EtherBlaster TP
PCI-T2

Standard Microsystems

SMC8003EP EtherCard PLUS Elite
SMC8003WC EtherCard PLUS Elite 10T
SMC8013EPC EtherCard PLUS Elite 16
SMC8013WC EtherCard PLUS Elite 16T
SMC8013EWC EtherCard PLUS Elite 16 Combo
SMC8013EP/A EtherCard PLUS Elite/A
SMC8013WP/A EtherCard PLUS Elite 10T/A
SMC8216 EtherCard Elite 16C Ultra
SMC8216T EtherCard Elite 16C Ultra
SMC8216C EtherCard Elite 16C Ultra
SMC82M32 EtherCard Elite 32C Ultra
SMC8416B EtherEZ
SMC8416T EtherEZ
SMC8416BT EtherEZ
SMC8432BA EtherPower PCI Ethernet Adapter
SMC8432BT EtherPower PCI Ethernet Adapter
SMC8432BTA EtherPower PCI Ethernet Adapter
SMC8432T EtherPower PCI Ethernet Adapter
SMC8432TA EtherPower PCI Ethernet Adapter
SMC8434T EtherPower2 Dual Channel PCI Ethernet Adapter
SMC8434BT EtherPower2 Dual Channel PCI Ethernet Adapter
SMC9332 EtherPower 10/100 PCI Ethernet Adapter

Western Digital

WD8003/WD8013 EtherCard PLUS series
WD8003/WD8013 EtherCard PLUS Elite series (ISA)
WD8013 EtherCard PLUS Elite series (MCA)

Supported network adapters by media and bus type

NOTE Card-specific information is provided in the context-sensitive help for the **Network Configuration Manager** and *Network Driver Configuration Notes* in the *Supported Network Driver Configuration Notes*.

Supported Ethernet adapters

ISA Ethernet adapters

3Com 3C501 EtherLink
3Com 3C503 EtherLink II & EtherLink II TP
3Com 3C503-16 EtherLink II/16 & EtherLink II/16 TP
3Com 3C507 EtherLink 16 & EtherLink 16 TP
3Com 3C509 & 3C509-TP Parallel Tasking EtherLink III
3Com 3C509-Combo EtherLink III
3Com 3C509B & 3C509B-TP EtherLink III
3Com 3C509B-Combo EtherLink III

AMD Am1500T PCnet-ISA
AMD Am1500T/2 PCnet-ISA
AMD Am2110-SM AT Ethernet 7998

HP 27245A EtherTwist PC LAN Adapter/8 TP
HP 27247A EtherTwist PC LAN Adapter/16 TP
HP 27247B EtherTwist PC LAN Adapter/16 TP Plus
HP 27250A EtherTwist PC LAN Adapter/8 TL
HP 27252A EtherTwist PC LAN Adapter/16 TL Plus
HP J2405A EtherTwist PC LAN Adapter NC/16 TP
HP J2573A 10/100VG ISA LAN Adapter

IBM LAN Adapter for Ethernet
IBM LAN Adapter for Ethernet TP & CX

Intel EtherExpress 16
Intel EtherExpress 16 TP & C
Intel EtherExpress 16 FlashC

Microdyne EXOS 205 and 205T
Microdyne EXOS 205T/16

NSC InfoMover NE2000plus

Novell/Eagle NE2000

Racal InterLan NI6510
Racal InterLan NI6510/2 InterLan EtherBlaster
Racal InterLan NI6510SC-T2 InterLan EtherBlaster TP

Standard Microsystems SMC8003EP EtherCard PLUS Elite
Standard Microsystems SMC8003WC EtherCard PLUS Elite 10T
Standard Microsystems SMC8013EPC EtherCard PLUS Elite 16
Standard Microsystems SMC8013WC EtherCard PLUS Elite 16T
Standard Microsystems SMC8013EWC EtherCard PLUS Elite 16 Combo
Standard Microsystems SMC8216 EtherCard Elite 16C Ultra
Standard Microsystems SMC8216T EtherCard Elite 16C Ultra
Standard Microsystems SMC8216C EtherCard Elite 16C Ultra
Standard Microsystems SMC8416B EtherEZ
Standard Microsystems SMC8416T EtherEZ
Standard Microsystems SMC8416BT EtherEZ

Western Digital WD8003 EtherCard PLUS series
Western Digital WD8003 EtherCard PLUS Elite series
Western Digital WD8013 EtherCard PLUS series
Western Digital WD8013 EtherCard PLUS Elite series

NOTE Most ISA adapters also can be used on EISA machines.

EISA Ethernet adapters

3Com 3C579 & 3C579-TP EtherLink III

Compaq Integrated NetFlex-2/ENET

HP 27248A EtherTwist EISA LAN Adapter/32 TP
HP J2577A 10/100VG EISA LAN Adapter

Intel EtherExpress 32
Intel EtherExpress Flash32
Intel EtherExpress PRO/100 EISA LAN Adapter

Novell/Eagle NE3200
Novell/Microdyne NE3200T

Racal InterLan ES3210

Standard Microsystems SMC82M32 EtherCard Elite 32C Ultra

MCA Ethernet adapters

3Com 3C523 & 3C523B EtherLink/MC
3Com 3C523 EtherLink/MC TP
3Com 3C529 & 3C529-TP EtherLink III Parallel Tasking

IBM Ethernet Adapter/A
IBM EtherStreamer MC32 Adapter
IBM PS/2 Adapter/A for Ethernet Networks
IBM PS/2 Adapter/A for Ethernet TP Networks

Intel EtherExpress 16 MCA & MCA TP

Standard Microsystems SMC8013EP/A EtherCard PLUS Elite/A
Standard Microsystems SMC8013WP/A EtherCard PLUS Elite 10T/A

Western Digital WD8003 EtherCard PLUS series
Western Digital WD8013 EtherCard PLUS Elite series

PCMCIA Ethernet adapters

3Com 3C589-TP & 3C589-Combo EtherLink III
3Com 3C589B-TP & 3C589B-Combo EtherLink III

PCI Ethernet adapters

AMD PCnet-PCI

HP J2973A 10Mbps PCI LAN Adapter
HP J2585A 10/100VG PCI LAN Adapter
HP J2585B 10/100VG PCI LAN Adapter

Intel EtherExpress PRO/100 LAN Adapter

Racal InterLan PCI-T2

Standard Microsystems
SMC8432BA EtherPower PCI Ethernet Adapter
SMC8432BT EtherPower PCI Ethernet Adapter
SMC8432BTA EtherPower PCI Ethernet Adapter
SMC8432T EtherPower PCI Ethernet Adapter
SMC8432TA EtherPower PCI Ethernet Adapter
SMC8434BT EtherPower2 Dual Channel PCI Ethernet Adapter
SMC8434T EtherPower2 Dual Channel PCI Ethernet Adapter
SMC9332 EtherPower 10/100 PCI Ethernet Adapter

Supported Token-Ring adapters

ISA Token-Ring adapters

IBM Token-Ring Network 16/4 Adapter
IBM Token-Ring Network 16/4 ISA-16 Adapter
IBM Token-Ring Network PC Adapter
IBM Token-Ring Network PC Adapter II
IBM Auto 16/4 Token-Ring ISA Adapter
IBM Token-Ring Network EISA Adapter

MCA Token-Ring adapters

IBM LANStreamer MC32 Adapter
IBM Auto LANStreamer MC32 Adapter
IBM Token-Ring Network PC Adapter/A
IBM Token-Ring Network 16/4 Adapter/A
IBM Token-Ring Network 16/4 Busmaster Server Adapter/A

PCI Token-Ring adapters

IBM Auto LANStreamer PCI Adapter

Chapter 5

Network drivers: notes and known limitations

The Network Drivers component of Advanced Hardware Supplement Release 5.1.0 has the following notes and limitations.

STRMAXBLK kernel parameter changes

The STREAMS implementation in SCO OpenServer Release 5 has changed from that of earlier releases so that the memory within a single data block is not guaranteed to reside in a single, physically-contiguous block. This creates problems for STREAMS drivers that control devices with DMA transfer functions. All SCO-provided network drivers have been modified for compatibility with the new STREAMS architecture; non-SCO LLI drivers for DMA-based network adapters (such as ZYNX) may not work correctly with the default SCO OpenServer Release 5 **STRMAXBLK** setting.

The new **STRMAXBLK** kernel parameter defines the maximum size of STREAMS buffers. The default value of the **STRMAXBLK** parameter is 524288, but it can be set to any value that is a power of two between 4096 and 524288 (4KB to 512KB). Setting **STRMAXBLK** to 4096 has the effect of ensuring that all buffers allocated from STREAMS will be located in a physically contiguous block, which enables older LLI drivers to work properly with SCO protocol stacks and other networking products. Note that changing **STRMAXBLK** to 4096 does not ensure that LLI drivers can work with non-SCO protocols that map in private data blocks.

If you are using a DMA-based network adapter with a non-SCO provided LLI driver, use the **configure**(ADM) command to set the value of STRMAXBLK to 4096 bytes, then relink the kernel and reboot the system.

Using Plug-and-Play devices on SCO OpenServer systems

SCO OpenServer Release 5 does not support the ISA Plug-and-Play standard. However, Plug-and-Play devices should work correctly if you follow these steps:

1. Run the DOS setup program to locate the card.
2. Disable the Plug-and-Play logic.
3. Set the network adapter to an unused I/O address.
4. Boot the UNIX system, run the **Network Configuration Manager** and configure the driver normally. The **Network Configuration Manager** can successfully configure the hardware settings on the Plug-and-Play adapter if the driver configuration routine provides the ability to program those settings.

Problems when searching for ISA cards

Because of limitations in ISA architecture, when using the **Search** option in the **Network Configuration Manager** to search for an ISA network adapter, your system may hang or fail to respond after the search. If this happens, restart **netconfig** and do not use the **Search** option to locate network adapters. This is more likely to happen if you have more than one ISA network adapter installed in your system.

Using command line options with netconfig

- Do not use capital letters when using **netconfig** to configure network connections.
- **netconfig** does not support the following command line options: **-m -C -L**.

Network adapter performance with large data transfers

If a networking adapter is not fast enough to keep up with the data it is asked to transfer, network products such as NFS and LAN Manager can experience delays, timeouts, and error messages when engaged in large data transfers. If this happens with NFS, the following message appears:

```
NFS timeout
```

If this happens with LAN Manager client, LAN Manager prints the following message:

`terminating read ahead with server` ***server_name*****.**

Other networking services and applications that use unreliable transports (like UDP) can also suffer from this problem. For example, because the 3Com 3C501 adapter has a limited buffering capability, the timeout error occurs when using NFS and a large (2KB or more) buffer size. It can also occur when transferring data over a 16MB Token-Ring between a machine with a fast Token-Ring adapter and a machine with a slow one. A similar error can occur with LAN Manager over a Novell/Eagle NE2000 adapter, yielding an "Unexpected network error" message.

You can solve the problem in the following ways:

- For NFS, specify a smaller read/write buffer size in your NFS mount options. 1024 is a reasonable value for slower adapters. For more information about configuring this option, see Read.write buffer size in the *Networking Guide*.
- For the LAN Manager client, specify a smaller read/write buffer size in your LAN Manager client filesystem mount options. 1024 is a reasonable value for slower adapters. For more information about configuring this option, see "LMC filesystem mount options" in Chapter 4, "Administering and using LAN Manager Client" in the *Guide to Gateways for LAN Servers*.
- For LAN Manager servers, configure smaller values for the **maxreadsize** and **maxwritesize** keywords in the *lanman.ini* file. For additional details, consult your Microsoft LAN Manager for SCO Systems *Administering LAN Manager* guide.

OSI and Token-Ring incompatibility

Token-Ring drivers do not work properly for the OSI protocol stack because OSI uses illegal Token-Ring multicast addresses.

Token-Ring source routing and IPX/SPX

Token-Ring source routing may not work with the IPX/SPX protocol stack.

Token-Ring hardware addresses

The **Hardware address** parameter for IBM Token-Ring adapters does not set the new MAC address properly.

Multiple SCOhelp clients spawned by the Network Configuration Manager

netconfig configures many different types of hardware and software, so if you ask for help first from one part of **netconfig**, and then from another, your graphical environment may become littered with **SCOhelp** windows. If you do (and you find it annoying), you can simply close the windows you are not currently using. All the **SCOhelp** windows will close when you exit the manager.

Chapter 6

Mass storage drivers: notes and known limitations

This chapter describes the Mass Storage Drivers component of the Advanced Hardware Supplement Release 5.1.0. These drivers are boot-time loadable and provide support for SCSI host adapters that may need to be link-edited into the SCO OpenServer™ kernel during the booting process. Supported SCSI host adapter drivers are:

- Adaptec 7770 (**arad**)
- Adaptec 7870 and 7850 (**alad**)
- Adaptec AIC-6x60 Host Adapter Driver (**smad**)
- Advanced Micro Devices (**ams**)
- DPTR (**dptr**)
- EIDE (**wd**)
- IBM Fixed Disk Adapter/A (**esdi**)
- Symbios Logic (**bhba**)
- Tricord 4-bus (**iiop**)

The supported SCSI device (which is not boot-time loadable) is:

- SCSI jukebox (**Sjk**)

This documentation also explains how these drivers can be installed after installation of the SCO OpenServer system.

Contents of the Mass Storage Drivers component

This component contains one Boot-Time Loadable Drivers' disk containing the software. You should keep the floppy disk until the next release of the SCO OpenServer system. If you upgrade the software or hardware on your system, you may need to install or reinstall the Boot-Time Loadable Drivers.

After some introductory notes, this chapter describes the installation procedure for the Mass Storage Drivers component followed by some release notes for each of the host adapters. The release notes list supported hardware and known limitations.

Definition of Boot-Time Loadable Drivers

Boot-Time Loadable Drivers are drivers which can be link-edited into the SCO OpenServer system kernel during the booting process. The link-editing is done by **link**(HW) or **ahslink** after the driver is loaded into memory (RAM) but before the kernel is started. A BTLD enables SCO OpenServer to be installed either onto, or using, new hardware as soon as a driver for the hardware is available.

The disk provided in this package is all you need to use this facility; no additional software is required to use BTLDs since **link**(HW) and **ahslink** are part of the SCO OpenServer system.

Installation requirements

The drivers in this Mass Storage Drivers component are only valid for SCO OpenServer Release 5.

Before installing a driver, you should read the relevant release notes for the driver in this document. The release notes contain configuration notes and known limitations for the drivers in this package.

Installation procedure

There are two possible scenarios in which you may need to install the Mass Storage Drivers component:

1. For installing new hardware which is required for your system at installation time. In this case, you need to add one of the drivers included in the Mass Storage Drivers component before you can install the SCO OpenServer system. To follow this procedure, you should proceed to "Using BTLDs at installation time" (page 45).

2. For installing new hardware which you wish to add to your system after the installation of the SCO OpenServer system. In this case, the Mass Storage Drivers component is treated as a package of drivers to be added to the Link Kit by the **Software Manager**. To follow this procedure, proceed to Chapter 1, "Installing the AHS 5.1.0 software" (page 7).

Using BTLDs at installation time

This section describes how to install the new driver which is required for the installation of the SCO OpenServer system. If you need to use your BTLD disk at installation time, you should have already inserted your boot disk. After inserting the boot disk, the boot prompt is displayed; this is the point at which you begin the installation procedure for this SCO BTLD package. At this stage the boot floppy disk should be in the drive, and the system should be displaying:

```
SCO OpenServer(tm) Release 5

Boot
:
```

1. What you enter at the prompt depends on which driver you are installing. Enter **link** at the ":" prompt if you are installing **ams**, **bhba**, or **iiop** drivers. If you are installing **alad**, **arad**, **dptr**, **esdi** or **wd** drivers, enter **ahslink**. If you are installing **smad**, enter **defbootstr link disable=spad** (the **smad** driver replaces the older **spad** driver).
2. The screen displays the following prompt:

   ```
   What packages do you need linked in the system,
   or 'q' to quit? :
   ```

   Available packages in this SCO BTLD package are:

   alad Adaptec 7870 and 7850 Host Adapter Driver

   ams Advanced Micro Devices

   arad Adaptec 7770 Host Adapter Driver

   bhba Symbios Logic Host Adapter Driver

   dptr DPT - entire card line

   esdi IBM Fixed Disk Adapter/A

   iiop Tricord ES5000 Motherboards

   smad Adaptec AIC-6x60 Host Adapter Driver

   wd EIDE Driver

   To install the **Sjk** SCSI device (SCSI jukebox driver) use the **Software Manager** as described in Chapter 1, "Installing the AHS 5.1.0 software" (page 7).

Enter *only* the packages which are required by the installation. If you want to install the other packages on the disk, you should use the post-installation procedure as described in Chapter 1, "Installing the AHS 5.1.0 software" (page 7).

3. Next, you will see a boot line similar to the following example:

```
fd(64)unix ramdisk=f(64) rootfs root=ram(7) ram.preload=7 swap=none
dump=none nbuf=100 link=pkg btld=fd(x)

Memory found: 0k - 640k, 1m - 9600k
```

   pkg in the line above is replaced by the actual name of the driver package for boot-time loading and ***x*** is replaced by the minor number for your floppy device.

   After a moment, a series of prompts are displayed with trailing dots; these messages progress as software is loaded.

4. Next you see:

```
Please insert the fd(x)pkg volume and press <Return>:
```

   Insert the requested volume (the SCO BTLD disk). The system prompts for and extracts the contents of the package.

   If the wrong volume is inserted or the drive is empty, the system displays the following:

```
Sorry, that volume does not contain the pkg package
```

   followed by the insertion request again:

```
Please insert the fd(x)pkg volume and press <Return>:
```

5. **link**(HW) and **ahslink** perform the linking of the extracted drivers into the kernel in core and may require more information for the extracted drivers. If the system prompts you for more information about configuring in these drivers, refer to the **link**(HW) manual page in the *Operating System Administrator's Reference Volume 2* .

   NOTE If there are any errors during this extraction (linking) process, the process is aborted and you are forced to reboot.

6. After a series of messages culminating in a message such as:

```
arad: Driver "arad" successfully loaded
```

   you will see a message prompting you to re-insert the boot disk.

   NOTE If the message:

```
... Characteristic '...' not supported;
```

   is displayed, you can safely ignore it.

The Mass Storage Drivers component has been installed; you should now return to the installation procedure for SCO OpenServer.

During the installation of the SCO OpenServer system you will be asked whether you want to customize your operating system. At the very least, you must install the SCO OpenServer Run Time System (RTS) and the BASE and LINK packages of the SCO OpenServer Extended Utilities.

Warning: installing over previously-installed BTLDs

If a different version of a driver with the same name as an AHS driver is found during installation using the **Software Manager**, you will be asked whether you want to keep the driver already installed or overwrite it with the AHS version.

You will see the following message:

```
Driver <driver name> is already installed.
Do you want to overwrite the installed driver (note: it will
not be backed up)?"
```

If you answer yes, the third-party driver and its configuration information is overwritten. The new AHS driver will not be configured into the kernel. You will need to turn on the driver by changing 'N' in the driver's entry in */etc/conf/sdevice.d* to 'Y'. Relink the kernel before rebooting.

Installing BTLDs after initial installation

NOTE BTLD drivers installed at ISL are not visible to the **Software Manager** even though they are installed in the link kit. It is possible to custom-install a driver that has already been BTLD-installed and this may become recommended practice in future releases of AHS.

To install the SCO BTLD package when the SCO OpenServer system is already installed, follow the steps described in Chapter 1, "Installing the AHS 5.1.0 software" (page 7).

Removal procedure

To remove the SCO BTLD package, follow the steps described in "Removing the AHS software" (page 11).

Adaptec AIC-7770 host adapter driver (arad)

The **arad** driver directly supports the following host adapters:

EISA bus

AHA-2740/2742	(Single channel)
AHA-2740/2742 A	(Single channel)
AHA-2740/2742 T	(Twin channel)
AHA-2740/2742 A-T	(Twin channel)
AHA-2740/2742 W	(Wide channel)

VL bus

AHA-2840/2842VL	(VL Bus)

This driver also supports the AIC-7770 chip in SCO Certified System platforms. Please refer to the *SCO Hardware Compatibility Handbook* to determine the support status of your host adapter, or contact your system supplier.

BIOS notes

The following notes apply to the Adaptec host adapter BIOS:

- If multiple 2740T host adapters are being used, under certain conditions, disable all BIOSs except for the boot host adapter.
- If the BIOS of the 2740T/2742T or the 2740A/A-T/2742/A/A-T is disabled, the driver will use the default setting configuration.

Configuration utility notes

The following notes apply to the card's configuration utility:

- You must save the configuration information before attempting to use the configuration utility.
- When termination on Channel B is not set up properly or if the 2740T/2740A-T/2742A-T is not seated properly in the EISA slot, the configuration utility might falsely detect those adapters as 2740/42 or as 2740W/2742W host adapters.

The following general notes apply.

- The AHA-2740T/2742T and the 2740A/A-T/2742A/A-T do not support a synchronous rate lower than 3.6MB/s.
- The system may display a warning message if you try to do a fresh install of the driver at IRQ 10; this is because of the possibility of an interrupt collision. Do not use IRQ 10 for a fresh installation. The IRQ can be changed to 10 for a driver previously installed.

- When adding a host adapter, the lowest BIOS address must correspond to the lowest EISA slot.
- Some hard disk drives which initiate synchronous negotiation will not be installed during BIOS scan when synchronous negotiation is disabled on the host adapter. It is recommended that synchronous negotiation be left enabled (default) for hard disks.

Adaptec AIC-7870 and AIC-7850 host adapter driver (alad)

The **alad** driver directly supports the AHA-2940 and AHA-2940W host adapters.

This driver also supports the AIC-7870 and AIC-7850 chip in SCO Certified System platforms. Please reference the *SCO Hardware Compatibility Handbook* to determine the support status of your host adapter or contact your system supplier.

Configuration feature

Host adapter configurations may be changed by editing the driver's *space.c* file. This file is located under the appropriate directory of */etc/conf/pack.d* for the host adapter driver. In the case of the AHA-2940x, the relevant entry is in the directory */etc/conf/pack.d/alad*. You can alter the value of a number of parameters in this file including the SCSI ID, I/O port address, scatter/gather, tag queuing and connect/disconnect.

Known problems

The alad driver may not talk to a tape device. If a **tape**(C) command or data transfer is attempted on a SCSI tape device at any time after power up, the command will hang and all access to the SCSI bus is denied (you cannot access any other device on the SCSI bus the tape is on).

The tape is holding the SCSI bus BUSY waiting for an acknowledgement of data it has previously sent. The adapter driver has become confused about the Synchronous Transfer parameters negotiated previously and does not realize it needs to send an acknowledgement.

To avoid this problem, disable Synchronous Negotiation for the tape device in the Adaptec SCSI-Select BIOS.

The data transfer rate to the tape device may be decreased slightly.

This problem has only been observed on Apricot machines with Tandberg 4200c and Archive Viper 525 tape drives.

Adaptec AIC-6x60 host adapter driver (smad)

The **smad** driver directly supports:

AHA-1510

AHA-1510 A

AHA-1520

AHA-1520 A

AHA-1522

AHA-1522 A

This driver supports both the AIC-6260 and AIC-6360 chipsets, and replaces the older and less efficient **spad** driver (which only supported the AIC-6260 chipset). You can type **defbootstr link disable=spad** at the boot prompt to disable the **spad** driver in the installation kernel.

Advanced Micro Devices host adapter driver (ams)

This is a PCSCSI™ 2.3.0 BTLD which provides fixes to limitations with previous releases of this driver.

This driver is compatible with any of the following AMD devices:

PCSCSI (part number Am53C974)

PCSCSI II (part number Am53C974A)

PCnet*-SCSI™ (part number Am79C970)

DPT SCSI host adapter driver update with RAID, multi-channel, wide SCSI and PCI support (dptr)

This driver updates the **dptr** SCSI host adapter driver and adds multi-channel, wide SCSI and PCI support.

The SCO DPT RAID driver (**dptr**) will support all SmartCache III products, SmartCache Plus products, and SmartRAID products. For technical support, upgrades, purchases, or product information, you can contact DPT at (407) 830-5522 in the US.

Currently there is a curses version of **Storage Manager** available for the SCO OpenServer system that will allow you to configure and monitor your RAID system. This is obtainable direct from DPT. If you want to install the SCO OpenServer system, you will have to create the RAID system first by running

Storage Manager for DOS. Once you have configured your RAID system using **Storage Manager**, you can add RAID to an existing system or install **RAID** on a new system using the **dptr** driver.

EIDE and ATAPI CD-ROM (wd)

This BTLD provides support for MP and MicroChannel systems, and for ATAPI CD-ROM. It replaces the ATAPI BTLD on the SCO OpenServer Release Supplement.

Note that if you do not have a DPT RAID in your system, you should type **defbootstr ahslink=wd disable=dptr** at the boot prompt. This is because the DPT driver can have an adverse affect on some IDE chipsets.

IBM Fixed Disk Adapter/A (esdi)

This driver is for MicroChannel machines only.

The installation will fail when it tries to link the kernel. Type **i** to ignore this, and continue. When you reboot, put the boot diskette in, and type **hd(40)unix.install ahslink=esdi btld=fd(60)**. Then you go into system maintenance mode and edit the line in */etc/conf/pack.d/hd/space.c*:

```
extern nodev();
```

to read

```
extern nodev(), nulldev;
```

The installation will then succeed. You will need to relink the kernel.

Symbios Logic (bhba)

BTLDPCI-3.04.ME is a boot-time loadable driver that is link-edited into the SCO OpenServer kernel. This BTLD supports the 8xx family of Symbios Logic SCSI controllers, specifically the 53C810, 810A, 815, 825, 825A, 860 and 875. This driver dynamically maps interrupts, supports Fast and Wide SCSI, scatter/gather, and multiple host bus adapters (HBAs). In addition, this driver fully supports either single or multiple processor systems (multiple processor systems must also have the SCO Symmetrical Multiprocessing Support package installed).

New features of this driver are:

- Supports Multiple Processors
- Negotiates for Fast 20 devices (860 & 875)

Hardware requirements

This SCO UNIX BTLD works with all Symbios Logic 53c8xx SCSI I/O Processors. The 53C810, 815 and 825 are fully supported. The 53C810A and 825A are supported in legacy mode of 53C810 and 825, respectively. The Fast20 negotiation feature of the 53C860 and 875 are also supported. The SCRIPTs RAM operation of the 53C825A and 875 are not currently supported.

After installation, if additional Symbios Logic SCSI host bus adapters are added to the system, use the appropriate **mkdev** command for each device attached to the new host bus adapter. After this has been done, the kernel has to be rebuilt, and the system needs to be rebooted for the change to take effect.

Software requirements

This driver fully supports either single or multiple processor systems (multiple processor systems must also have the SCO Symmetrical Multiprocessing Support package installed).

Known problems

Shutting off power to an active CD-ROM drive may hang the shell which is utilizing the CD-ROM.

There is a known problem which will cause a system hang if a disk drive capable of Fast-20 operation is attached to a Symbios Logic host bus adapter containing a SCSI chip that is not capable of Fast-20 operation. The Symbios Logic chips which support Fast-20 operation are the 53c860 and 53c875. This deficiency has been identified and will be corrected in a later version of the Driver.

This driver defaults to not issuing Queue Tag messages to any SCSI devices, since at least one SCSI disk drive with a certain firmware level exhibits problems during high I/O operations with Queue Tagging. The driver does implement Queue Tagging. If QueueTagging is desired, an administrator can edit the file */etc/conf/pack.d/bhba/space.c*, change the **bhba_do_tagged** to 1 (near the end of the file), link edit the kernel and reboot the system. Some increase in I/O speed has been observed but this change should be implemented in a non-critical system until the SCSI devices are proven to correctly implement Queue Tagging.

This driver defaults to not implementing an OS feature known as "do_buffer". A system hang occurs on multiprocessor systems during bootup. It is advised that this feature remain OFF until the driver problem is corrected in a later version.

SCSI juke box driver (Sjk)

NOTE This driver should be installed using the **Software Manager**. It is not boot-time loadable.

The **Sjk** driver supports media changer or "juke box" devices. These allow the selection of a data medium (such as a tape or CD) from a carousel, tape holder or magazine containing similar data media. This is then transported to an embedded SCSI device for reading or writing, and finally replaced in the magazine. These devices are useful for remote and unattended mass data storage, retrieval, or backup purposes, where a single data medium could not contain enough data for the task required.

This driver supports juke boxes which implement the SCSI-2 Medium Changer model definition. This is a set of SCSI commands which control the selection of media from the magazine and transport to and from the SCSI drive that reads and writes the data. Refer to the **juke**(C) manual page for a description of SCSI-2 Medium Changer model.

Configuring a SCSI juke box

Before running the **mkdev juke** program, refer to the juke box documentation to find out how embedded SCSI devices (referred to as the data transfer elements) and the other parts of the juke box should be configured for their SCSI addresses (host adapter, bus number, ID, and LUN).

Typically, simple juke box devices, containing one SCSI data transfer element such as a CD-ROM, would be configured with the same host adapter, SCSI ID, and bus number, as the juke box. However, the SCSI device would have a SCSI LUN (logical unit number) of 0, and the juke box would have a SCSI LUN of 1.

First configure each of the embedded SCSI data transfer elements using the appropriate **mkdev** scripts (for example, **mkdev tape** for tape, **mkdev cdrom** for CD-ROM). Defer relinking the kernel. Then configure the juke box device using **mkdev juke**, and relink and reboot the kernel.

Juke box operation

Refer to the juke box's documentation for details of the drive and mechanisms that it contains, and how it transfers media to and from magazines to the embedded drives. You should also read the **juke**(C) manual page and familiarize yourself with the terminology used there.

Each juke box configured with **mkdev juke** is associated with a control device node. The device node is named */dev/Sjk**N***, where ***N*** takes a value from 0 to 255. Use the included **juke**(C) command to control movement of media inside the juke box.

Use the normal device nodes for the embedded SCSI data transfer elements to control, read or write to the currently selected data media.

The following example is based on a system containing a juke box with two SCSI DAT tape drives as data transfer elements, eight storage elements, two medium transport elements, and one import/export element.

Two SCSI tape drives were first configured using **mkdev tape**.

```
/dev/rStp0    /dev/nrStp0    /dev/xStp0
/dev/rStp1    /dev/nrStp1    /dev/xStp1
```

This created rewind, non-rewind and control devices for the first and second tape drives: **tape**(C) and backup commands such as **cpio**(C), **tar**(C), **dd**(C), can be used to access and control these devices assuming that they have data media loaded.

The juke box was configured using **mkdev juke**. This created the device node */dev/Sjk0*. The **juke**(C) command is used with this device. The available elements on the device can be displayed using the **juke elem** command.

```
Valid elements for device /dev/Sjk0:
Import/Export Elements:        ie0
Medium Transport Elements:     mt0 mt1
Storage Elements:              st0 st1 st2 st3 st4 st5 st6 st7
Data Transfer Elements:        dt0 dt1
```

In this listing, **dt0** refers to the first SCSI DAT tape, **mt1** is the second medium transport mechanism, and **st1** is the second slot in a tape magazine.

Assuming that each storage element contains a DAT tape, the following procedure will read from the DAT tape in the second storage element. First move the tape from the second storage element (**st1**) to one of the medium transport elements (**mt0**);

juke move st1 mt0

Next place the DAT tape into one of the DAT drives (dt0) by moving the medium transport element to the DAT drive.

juke move mt0 dt0

This has the effect of loading the tape into the drive; The tape can be read from or written to the drive using the */dev/rStp0* device node.

Once finished, the DAT tape can be replaced back in its slot using the commands:

juke move dt0 mt0
juke move mt0 st1

Note that the tape is usually replaced from where it came, although you could place it in another free slot. To replace the media in the second storage element (st1), move it to the import/export element;

juke move st1 ie0

The DAT tape can then be taken out of the tape loader or access panel and replaced. To place the new media in the second storage element:

juke move ie0 st1

Simpler devices without import/export elements or media transport elements may operate as follows. To move the media in the second storage element to the first drive:

juke move st1 dt0

To move it back again:

juke move dt0 st1

Tricord 4-bus (iiop)

This BTLD is used to install machines configured with an Intelligent I/O Processor Board (IIOP), an Enhanced IIOP (EIIOP) with PowerRAID or an Intelligent Storage Subsystem (ISS) with PowerRAID. This BTLD supports the following PowerFrame models:

- PowerFrame Models 30/40
- PowerFrame Models 300/400
- PowerFrame Models ES3000/4000/5000

Throughout these release notes the term SCSI controller will be used to reference the IIOP, EIIOP, or ISS.

The IIOP and EIIOP controller boards control two SCSI buses. The ISS controller board controls two or four SCSI buses depending on the model.

IIOP/EIIOP SCSI subsystem

The IIOP/EIIOP manages two SCSI buses, numbered 0 and 1. On each SCSI bus, the IIOP itself reserves ID 0; therefore, SCSI IDs 1 through 7 may be used for devices. One IIOP/EIIOP can support a maximum of 14 SCSI devices. The IIOP/EIIOP driver can support a maximum of 2 IIOPs/EIIOPs (numbered 0 and 1) and therefore a maximum of 28 SCSI devices. An additional IIOP or EIIOP can be added to your system by configuring the additional board with the EISA Configuration Utility. The IIOP/EIIOP driver will automatically recognize the new board when the system is booted. You cannot mix IIOPs and EIIOPs in the same machine. If you are installing two IIOP/EIIOPs in a machine, they must have the same firmware revision number. IIOP/EIIOPs and ISSs cannot co-exist in the same machine.

ISS SCSI subsystem

The ISS manages two or four SCSI buses, depending on the model. These buses are numbered 0 and 1 or 0, 1, 2 and 3 respectively. On each SCSI bus, the ISS itself reserves ID 0; therefore, SCSI IDs 1 through 7 may be used for devices. The maximum number of ISSs that can be configured into your ES3000/4000/5000 depends on the number of available system slots. Additional ISS boards can be added to your system using the EISA configuration utility. The ISS driver will automatically recognize the new board when the system is booted. Multiple ISSs in the same machine must have the same firmware revision number. The firmware revision can be determined by booting the PowerRAID diskette. IIOP/EIIOPs and ISSs cannot co-exist in the same machine.

Using the iiop BTLD diskette

The BTLD diskette is used to link the IIOP/EIIOP/ISS driver into the SCO OpenServer kernel during installation.

The default configuration expected on a Tricord PowerFrame is a hard disk configured on SCSI controller 0, bus 0, with SCSI ID 1. Mirroring of the boot drive is allowed if you have an EIIOP or ISS SCSI controller. Check your hardware manuals and the *Release Notes* for more information.

To install using the BTLD:

1. Familiarize yourself with installation procedures covered in the *SCO OpenServer Handbook*.
2. If you wish to mirror your boot drive, boot the system using the PowerRAID Administrator diskette and create a mirrored boot drive. Installation on logical drives is allowed. Logical identifier 0 will always represent the boot drive.

3. The installation device (cartridge tape or CD-ROM) may be configured on a secondary controller such as an Adaptec 2740. The BIOS for these controllers must be disabled using the EISA configuration utility. Do not put hard drives on a secondary controller as the kernel will get confused about the boot controller and panic the system. You can use tapes and CD-ROMs on a secondary controller without any problem.
4. Insert the boot diskette and reboot the machine.
5. At the boot prompt (Boot:) type **link** and press <Enter>.
6. When asked to enter the package name type **iiop** and any other package you need to link at boot-time, and press <Enter>, regardless of which SCSI controller is present.
7. Follow the installation instructions.

Fresh installation

A fresh installation of SCO OpenServer Release 5 is the only installation type supported by this BTLD. If you are upgrading from a SCO® UNIX® Release 3.2v4 system to SCO OpenServer Release 5 and you would like to take advantage of the new High Throughput File System (HTFS™), you must save your filesystem data to tape or another backup media and restore them to the new filesystems after they are created. If you are currently using the U/FT RAID 1 product, refer to "Upgrading U/FT RAID 1 mirrors" (page 59).

If you wish to retain your current AFS or EAFS filesystems you can move your hard drives intact to your SCO OpenServer Release 5 system. The following procedure will work for physical drives or logical drives created with the PowerRAID utility:

1. Create configuration entries for your drive(s) under SCO OpenServer Release 5 by using the **mkdev** utility **hd_iiop**. The first time the utility is run, an entry is created in the file */etc/conf/cf.d/mscsi*. *Do not* create these entries by editing the *mscsi* file. You must use **mkdev hd_iiop**.
2. Relink the kernel, and reboot the system.
3. Now run **mkdev hd_iiop** for the second time to create a device node for the drive. You will see the following message displayed on the console:

```
During installation you may choose to overwrite all
or part of the present contents of your hard disk

Do you wish to continue (y/n)
```

Answer 'y' to this question to preserve the disk's contents. You will see the following message displayed on the console:

```
The hard disk installation program will now invoke /etc/fdisk.
Entering 'q' at the following menu will exit /etc/fdisk,
and the hard disk installation will continue.

If you wish to exit the entire installation at this menu,
press the <DEL> key

     1). Display Partition Table
     2). Use Entire Disk for UNIX
     3). Use Rest of Disk for UNIX
     4). Create UNIX Partition
     5). Activate Partition
     6). Delete Partition
     7). Create Partition

Enter your choice or 'q' to quit:
```

There should already be a partition table on your hard disk, so enter 'q'. You will then see the following message displayed on the console:

```
Choose one of the following options below or quit

   'y' to create a division table on the active partition
   'n' to avoid creating a division table

Enter 'y', 'n' or 'q' to quit:
```

There should already be a division table defined for this drive so answer 'y' to this question and the division table will be displayed on the system console. Name the divisions that have filesystems on them. Do not create new filesystems on any divisions that contain valid data. After naming the divisions, enter 'q' to quit. Install the division table by entering 'i' at the next menu.

4. Installing the division table creates block and character device nodes in */dev* for your divisions. You can now create filesystem mount entries in */etc/default/filesys* by running the utility **mkdev fs** on the Filesystem Manager.

Using the Software Manager after a BTLD installation

We recommend that you do not install using the **Software Manager** after the BTLD installation. If you do use the **Software Manager**, your kernel relink will fail, and you will need to follow the steps below. You will not be able to remove the driver subsequently.

When you see the message:

```
Driver <driver name> is already installed.
Do you want to overwrite the installed driver (note: it will
not be backed up)?"
```

Answer no for each of the drivers in the Tricord package. If you do not, it will not be possible to relink the kernel.

If the kernel relink fails:

1. Switch to another multiscreen.
2. Enter

   cp /var/opt/K/SCO/OS_drivers/perm_save_dir/tpic/space.c /etc/conf/pack.d/pic/space.c.

3. Switch to the original multiscreen to proceed with the installation.
4. Type **r** to retry the kernel link and finish the installation.

Upgrading U/FT RAID 1 mirrors

The U/FT RAID 1 product is not supported under SCO OpenServer. SCO now supports a **Virtual Disk Manager** product that includes the functionality of U/FT RAID and much more. The virtual disk system is incompatible with disk divisions created with **divvy**, meaning that existing filesystems cannot be directly used with the virtual disk product. If you have filesystem data that resides on a U/FT mirror and you intend to restore the data to a virtual disk RAID device, save the filesystem data to a backup device and restore it to the virtual disk RAID after it is created.

SCSI configuration viewing utility

The **rview** utility provides a visual representation of SCSI devices attached to the SCSI controller. To run **rview**:

/usr/bin/rview

Adding SCSI devices

The SCO OpenServer Release 5 BTLD diskette contains modified **mkdev** scripts for configuring SCSI devices on a Tricord SCSI controller. Use **mkdev hd_iiop** for configuring disk devices, **mkdev tape_iiop** for configuring tape devices and **mkdev cdrom_iiop** for configuring Compact disk devices. These **mkdev** scripts use the SCSI configuration viewing utility (**rview**) to display SCSI devices for selection.

Kernel message logging daemon (imsd)

This release of the BTLD includes a message logging daemon, **imsd**. This daemon provides the following major functions:

- Generic, high speed, kernel message logging.
- Management Console remote shutdown (for systems configured with an Intelligent Management Subsystem).

imsd is started up when the system enters multiuser mode. If for any reason this daemon is killed when in multiuser mode, it can be restarted by entering:

/bin/sh /etc/idrc.d/ims

Remote console feature

For systems configured with an Intelligent Management Subsystem, the Management Console software supports a remote console window. All output to the console will appear on this Management Console window. The last 4KB of console output are buffered by the Intelligent Management Processor and are available when the remote console window is brought up.

The remote console window also supports limited functionality for issuing shell commands. Since the window emulates a dumb terminal, no UNIX commands requiring ANSI terminal support can be successfully issued (for example **vi**). Since this interface provides a direct pipeline into console input and output, system administrators with security concerns may wish to disallow any input from this Management Console window.

Both input and output to this window are configurable by modifying variables in the file */etc/conf/pack.d/ims/space.c* according to the following bit defines, and relinking:

`IMS_REMOTE_CON_KIN 1 /* Bit 0 */`
: If set to a 1 (default), kernel input is enabled. If set to a 0, kernel input is disabled.

`IMS_REMOTE_CON_KOUT 2 /* Bit 1 */`
: If set to a 2 (default), then all kernel output is forwarded to the Management Console. This includes all system error messages. If set to 0 then no output generated by the kernel will be forwarded to the Management Console.

`IMS_REMOTE_CON_UIN 4 /* Bit 2 */`

If set to a 4 (default), then all input from the Management Console will be forwarded to the operating system for processing. Since this is the mechanism for logging into the operating system from the Management Console setting this to a 0 will disable the issuing of all administration commands.

`IMS_REMOTE_CON_UOUT 8 /* Bit 3 */`

If set to a 8 (default), then all console output originating from the operating system will be forwarded to the remote Management Console. If set to 0, then all process level console output will not be sent to the management console.

The remote console window also supports an option for local echo. A suggested setting for local echo is off if running the debugger and on when not in the debugger.

Chapter 7

Multiprocessing drivers: notes and known limitations

This chapter documents the SCO® Multiprocessing Drivers component of the Advanced Hardware Supplement Release 5.1.0. This component contains the driver for the Tricord PowerFrame (TPF) platform.

After some introductory notes on installation, this chapter contains notes about the Tricord driver.

Installation requirements

Before installing the multiprocessing component, you must have the SCO OpenServer system installed with SCO Symmetrical Multiprocessing Support (SMP®) (this product can be found on the original installation media tape or CD-ROM and accessed via the **Software Manager**). The **iiop** BTLD package must also be installed and configured. If it is not, the MP component will be installed but the TPF driver will be disabled. In this case, install the **iiop** package, and then enable the TPF driver by setting the second field of */etc/conf/sdevice.d/tpf* from ***N*** to ***Y***.

You can install on one of the following configurations:

- A clean distribution (SCO OpenServer and no MP drivers).
- A distribution which already has a vendor EFS (it is not generally necessary to remove the EFS prior to installing the SCO Multiprocessing Drivers Release 5.1.0).

The AHS Multiprocessing Drivers component can be removed and any vendor EFS/SCO OpenServer files will be restored (if you want to save them).

Installation procedure

To install the AHS Multiprocessing Drivers component on your system, follow the steps in Chapter 1, "Installing the AHS 5.1.0 software" (page 7)

Removal procedure

To remove the AHS Multiprocessing Drivers component from your system, follow the steps in "Removing the AHS software" (page 11)

Tricord

This version of the AHS supports the following PowerFrame models:

- PowerFrame Models 30/40
- PowerFrame Models 300/400
- PowerFrame Models ES3000/4000/5000

You need to remove any previous Tricord EFS prior to installing.

When you install the TPF package, you will automatically disable the a15k driver. If you have a Tricord box this does not affect you and may cause problems if it was not disabled. If you have any machine that uses the a15k driver (the ACER FRAME 15000/17000), you should either reenable the a15k driver, or remove the TPF package. If you are not running on a Tricord machine, there is no problem having both enabled.

Appendix A

Manual pages

These manual pages are for device drivers that are new in Advanced Hardware Supplement Release 5.1.0. They are supplied in printed form only and are not available online at this point.

juke

operate a SCSI media changer

Syntax

juke *operation* [*device*]

Description

The **juke** utility sends a command to a SCSI media changer (or "juke box") device to move data media between its various elements. The ***device*** argument defaults to **/dev/Sjk0**, the first media changer defined in the system.

Supported ***operations*** are:

elem List the internal elements of the media changer. (The SCSI-2 media changer model defines four physical parts, or "elements", for juke box devices. The physical configuration of these elements should be defined in the hardware manual supplied with the device.)

The **elem** operation displays elements using the following codes:

`dt`***N*** Data transfer element; an embedded SCSI peripheral device (such as a tape or CD-ROM drive) which is capable of reading or writing a data medium. Medium changer devices normally contain one or more data transfer elements.

`ie`***N*** Import/export element; a special storage location where a human operator or another media changer can insert or remove a data medium via an access door or external loader mechanism. A media transport element moves data media between an import/export element and storage elements and data transfer elements which are usually not accessible externally. A media changer device may have zero or more import/export elements.

`mt`***N*** Medium transport element; a robotic mechanism which moves data media between storage elements, data transfer elements, and import/export elements. If a media changer device defines one or more media transport elements, these may be used as temporary holding places for data media. If a media changer device does not define a media transport element, data media are transferred directly between storage elements and data transfer elements.

`st`***N*** Storage element; a location or "slot" in a carousel, tape holder or magazine which can contain a data medium. It is not a data medium (such as a tape or a CD). Medium changer devices typically contain four or more storage elements.

N is a number from 0 to 255 representing different elements of a given type within a media changer device. If no entries are shown for an element type, the media changer does not contain such an element.

lock Disable the front panel controls of the media changer.

move ***source destination***
Move data medium from a ***source*** element to a ***destination*** element.

pos st*N*
Position medium transport element "mt0" in front of "st***N***". This places the media transport ready to retrieve a data medium from the specified storage element. It does not transfer any data medium to the media transport.

reset Perform a hardware reset on the media changer.

unlock
Enable the front panel controls of the media changer.

Configuration

Each data transfer element is configured and operated as a separate SCSI peripheral device. Storage, data transfer, and import/export elements are configured and operated as part of the media changer device.

For example, a juke box containing one SCSI CD-ROM drive (the data transfer element) is configured as two entities:

- A CD-ROM drive using the **mkdev cdrom** command. If this is the first such device configured in the system, its block and character device nodes are */dev/cd0* and */dev/rcd0*.
- A media changer device using the **mkdev juke** command. If this is the first such device configured in the system, its control device node is */dev/Sjk0*.

Data transfer elements usually have the same SCSI host adapter name, bus number, and ID as the other elements in the juke box, but their LUNs (logical unit numbers) differ. For example, the LUNs of the data transfer element and the media changer device may be 0 and 1 respectively.

Refer to the documentation supplied with the juke box for details of the SCSI configuration of its elements.

Files

/dev/Sjk0
media changer control device

/usr/bin/juke
juke executable

/usr/include/sys/Sjk.h
Sjk include file

See also

backup(ADM), **cpio**(C), **dd**(C), **jukebox**(HW), **mkdev**(ADM), **restore**(ADM), **tape**(HW), **tar**(C), **xbackup**(ADM), **xrestore**(ADM)

Standards conformance

juke is not part of any currently supported standard; it is an extension of AT&T System V provided by The Santa Cruz Operation, Inc.

jukebox: juke, Sjk

media changer devices

Description

Sjk is the SCSI peripheral driver for media changer devices (juke boxes).

The command **mkdev juke** is used to configure the media changer driver interactively. This defines the SCSI host adapter, bus number, controller target ID, and device LUN in the SCSI configuration file *mscsi*(F). The data transfer elements of a media changer (for example, DAT or CD-ROM drive) must be defined as separate SCSI peripherals using an appropriate command such as **mkdev tape** or **mkdev cdrom**.

The **juke** command can be used to control a media changer device. See **juke**(C) for more information.

The device file */dev/SjkN* may be used to control the associated media changer device. *N* corresponds to the minor number of the device. The minor device number determines which media changer will be accessed; minor number 0 accesses the first device, 1 the second device and so on, up to minor number 255.

ioctl commands

The following **ioctl**(S) commands, defined in */usr/include/sys/Sjk.h*, may be used to control a media changer (the argument ***arg*** to **ioctl** is set to 0 unless otherwise indicated):

SJK_GETJUKEADDR
: Return the details of the media changer's internal elements in the `struct Sjk_address` pointed to by ***arg***.

SJK_MOVEJUKE
: Move a data medium (tape, CD) from a ***source*** storage element to a ***destination*** storage element. The argument ***arg*** is coded as:

  (***source*** << 16) | ***destination***

  where ***source*** and ***destination*** are of type `unsigned short`.

SJK_NOJUKEREMOVE
: Disable the front panel controls of the media changer.

SJK_OKJUKEREMOVE
: Enable the front panel controls of the media changer.

SJK_POSITIONJUKE
: Position medium transport element "mt0" in front of storage element "st***N***", where ***N*** is the value of ***arg*** of type `unsigned int`.

SJK_RESET
: Perform a hardware reset on the media changer.

Diagnostics

The following SCSI sense error messages may be displayed on the console. See **messages**(M) for general information about kernel error messages, including a list of generic device driver errors.

`NOTICE: Sjk: Destination Element Full`

A data medium could not be placed in a given element because that element was already occupied.

`NOTICE: Sjk: Invalid CDB Field`

A SCSI command data block field was not understood by the media changer's controller.

`NOTICE: Sjk: Invalid Command Code`

A SCSI command was not understood by the media changer's controller.

`NOTICE: Sjk: Invalid Element Address`

A specified element was not found to be present in the media changer.

`NOTICE: Sjk: Logical Unit Not Supported`

A SCSI command addressed a non-existent element of the media changer.

`NOTICE: Sjk: Manual Intervention Required`

A hardware error occurred in the media changer which requires the intervention of a human operator.

`NOTICE: Sjk: Mechanical problem`

A hardware failure occurred in the media changer.

`NOTICE: Sjk: Media Removal Prevented`

A data medium could not be removed from a specified element because of a physical obstruction.

`NOTICE: Sjk: Power-on Reset, or Bus Reset`

A hardware reset was performed on the media changer.

`NOTICE: Sjk: Source Element Empty`

A data medium could not be removed from a given element because it was not present there.

Files

*/dev/Sjk**N*** control special device for media changer with minor device number ***N***

/usr/include/sys/Sjk.h
header definitions file

See also

cdrom(HW), **juke**(C), **mkdev**(ADM), **mscsi**(F), **scsi**(HW), **scsitape**(HW)

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