

Server
SCSI Software User's Guide
for the AIC-7800
Family of Controllers

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627538-004 Printed version, February 1996.

631263-003 Acrobat version, February 1996.

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About This Manual

Introduction

This manual is divided into two parts.

- **Part I**—contains information about Adaptec[†] EZ-SCSI[†] for DOS and Microsoft[†] Windows[†] products, including Windows 3.1x, Windows for Workgroups, Windows[†] 95, and Windows NT[†].
- **Part II**—contains information about the Adaptec AIC-7800 SCSI Manager Set for Novell[†] NetWare[†], IBM[†] OS/2[†], Microsoft Windows NT, SCO[†] UNIX[†], and UnixWare[†] operating systems.

Part I: Adaptec EZ-SCSI

This part of the manual explains how Adaptec EZ-SCSI configures Adaptec host adapters and SCSI devices installed in your computer. After you install EZ-SCSI, your computer is ready to use all the features of SCSI.

This manual also includes Appendices of reference information about the EZ-SCSI device drivers and other programs, in case you need to adjust your computer's configuration.

Brief Descriptions of Each Chapter in Part I

Chapter 1	Adaptec EZ-SCSI Quick Reference—explains how to install and troubleshoot Adaptec EZ-SCSI.
Appendix A	Error Messages for EZ-SCSI—lists error messages that may be generated by EZ-SCSI programs and explains what they mean.
Appendix B	ASPI Manager Reference—lists complete reference information about the EZ-SCSI ASPI managers and their configuration options.
Appendix C	SCSI Device Driver Reference—describes the EZ-SCSI device drivers used to control CD-ROM drives, disk drives, scanners, and other SCSI devices.

Part II: Adaptec AIC-7800 Family Manager for Novell NetWare, IBM OS/2, Microsoft Windows NT, SCO UNIX, and UnixWare

This part of the manual provides all the information needed to install and use the Adaptec 7800 Family Manager Set.

First scan the remainder of this section to gain an overview of what the Adaptec 7800 Family Manager Set is. A list of each Adaptec supported host adapter for the 7800 Family is included, as well as the minimum requirements needed to install the software.

Next, turn to the appropriate chapter to begin driver installation. The remaining chapters are organized by operating system. All of the instructions needed to install and/or update a particular 7800 Family driver are contained within the chapter. Each chapter provides instructions on how to install the driver at the same time you install your operating system. If your operating system is already installed, instructions on updating or installing the driver are also included.

If you have problems installing the drivers, refer to the Troubleshooting sections, usually included at the end of each chapter.



Note

The instructions provided in this manual are intended for users who wish only to install and/or update the 7800 Family driver. When installing 7800 Family drivers, you should have on hand the software and documentation provided with your operating system. During some installations, you are asked to install the software or refer to the documentation.

Brief Descriptions of Each Chapter in Part II

Chapter 2	Novell NetWare Installation—provides instructions on installing the driver for NetWare v3.12 and v4.x.
Chapter 3	IBM OS/2 Installation—provides instructions on installing the driver for OS/2 v2.x and OS/2 Warp.
Chapter 4	Microsoft Windows NT Installation—provides instructions on installing the driver for Windows NT v3.5x.
Chapter 5	SCO UNIX Installation—provides instructions on installing the driver package for SCO UNIX 3.2 v4.2, SCO OpenDesktop 3.0, SCO OpenServer 3.0, and SCO OpenServer 5.
Chapter 6	UnixWare Installation—provides instructions on installing the driver package for UnixWare 1.x and 2.x.

Overview—Adaptec 7800 Family Manager Set

The Adaptec 7800 Family Manager Set is software (drivers), that allows your Adaptec 7800 Family host adapter to communicate with your computer. Different operating systems (e.g., NetWare, OS/2, Windows NT, etc.) usually require separate drivers. The Adaptec 7800 Family Manager Set contains drivers for the following operating systems:

- Novell NetWare
- IBM OS/2
- Microsoft Windows NT
- SCO UNIX
- UnixWare

Some operating systems embed (include) the 7800 Family driver as part of their installation software. These drivers work fine with your 7800 Family host adapter; however, the most recent version of the driver should be installed in order for your host adapter to perform at an even higher level.

Adaptec always ships the latest 7800 Family driver as part of the Adaptec 7800 Family Manager Set. The procedures in this document explain how to install and/or update your operating system with the latest 7800 Family driver.

Adaptec 7800 Family Host Adapters

The information in this manual applies to the following Adaptec PCI-to-SCSI host adapters, which are referred to collectively as the Adaptec 7800 Family host adapters:

- AHA-2910 PCI-to-Fast SCSI (non-bootable)
- AHA-2940 PCI-to-Fast SCSI
- AHA-2940W PCI-to-Fast and Wide Single-ended SCSI
- AHA-2944W PCI-to-Fast and Wide Differential SCSI
- AHA-2940*Ultra* PCI-to-Wide *Ultra*SCSI
- AHA-3940 MultiChannel SCSI-to-PCI
- AHA-3940W MultiChannel Wide SCSI-to-PCI
- AIC-7850 single-chip PCI-to-Fast SCSI
- AIC-7870 single-chip PCI-to-Fast and Wide SCSI
- AIC-7880 single-chip PCI-to-*Ultra*SCSI

Requirements

The following are the minimum and recommended requirements needed to install the 7800 Family Managers:

- A PCI computer, with an installed and configured Adaptec 7800 Family host adapter(s).
- An installed primary (boot) floppy diskette drive. The drive must be able to read your operating system diskettes. A 3.5-inch (1.44 MByte) or 5.25-inch (1.2 MByte) high-density floppy diskette drive is required.
- The diskettes included with your Adaptec 7800 Family Manager Set.
- *Optional*—an installed and configured CD-ROM drive for installing your operating system from a compact disc.
- The distribution software and documentation included with your operating system.
- The User's Guide for your host adapter, if you use an additional host adapter card.

Notational Conventions

These notational conventions are used throughout this manual.

ALL CAPITALS

Used for acronyms such as SCSI and CD-ROM.

Courier

Used for text that you must type exactly as shown

(...device=c:\scsi\aspidos.sys...), for screen messages (...Enter Password...), as a place holder for text you must determine and type in (...enter nn for number...). Also used for program and file names in body text (...the autoexec.bat file...).

<F1>

A letter, number, symbol, or word enclosed in < > represents a key on your keyboard. For example, the instruction “press <F1>” means press the key labeled “F1” on your keyboard.

Hexadecimal Numbers

Are followed by an “h”, e.g., 330h.

Italics

Used for emphasis (...is *only* supported...).

<Enter>

Other manuals refer to <Enter> as RETURN, CARRIAGE RETURN, <CR>, or use an arrow. All of these terms are interchangeable.

End Mark

The □ □ □ symbol marks the end of the text for each chapter.

Advisories

Advisories are brief notes that emphasize an important point or warn of a potential hazard to your system or your data. This manual uses three types of advisories:



Note

Text set off in this way presents reminders, tips, or suggestions that may make it easier for you to install and use EZ-SCSI, and to install, configure, and use your host adapter.



CAUTION

This kind of advisory cautions you about situations that might cause loss of data or damage to your system and installed devices.



WARNING

Failure to observe this kind of advisory could result in personal injury.

Use caution when handling any electrical equipment. Advisories in this manual can only cover the procedures contained here, and not all situations may have been addressed. Adaptec does not claim to have included every condition or situation that might require a Caution or Warning. You must refer to the documentation for your computer and peripheral when you are installing equipment or reconfiguring.



Part I

Adaptec EZ-SCSI

1 Adaptec EZ-SCSI Quick Reference

Appendices

A Error Messages

B ASPI Manager Reference

C SCSI Device Driver Reference

About This Chapter

Welcome to Adaptec EZ-SCSI, which lets you use your SCSI devices most effectively with Windows 95 and Windows NT. You can also use Adaptec EZ-SCSI on computers running DOS, Windows 3.1x, or Windows for Workgroups 3.1x.

To learn about Adaptec EZ-SCSI Windows applications, see their online Help. Use this Quick Reference to learn about Adaptec EZ-SCSI system requirements and installation procedures; it also has handy troubleshooting information and an explanation of the DOS device drivers and formatting utilities included with Adaptec EZ-SCSI.

System Requirements

You need at least these components in your system to do a complete installation of EZ-SCSI:

- A 386-based PC based on a Pentium® or Pentium Pro microprocessor with at least 8 MBytes of memory, over 10 MBytes of free disk space, and a 3.5-inch floppy drive
- An ASPI-compliant SCSI host adapter and a CD-ROM drive
- Microsoft Windows 95, Windows NT version 3.51 or above, Windows 3.1x, Windows for Workgroups 3.1x, or DOS 6.x or above

Quick Start Instructions

First, install your host adapter and other SCSI devices (see the hardware documentation for details). Then follow the instructions for your operating system software in one of the following sections.

We recommend that after you install Adaptec EZ-SCSI you run *SCSITutor* to learn more about the features of SCSI.

Windows 95 or Windows NT Installation

If you want to install Windows 95 or Windows NT on a new computer system, you may not be able to access your SCSI CD-ROM drive at first. (Usually, you install Windows 95 and Windows NT from a CD-ROM disc.) To gain access to your CD-ROM drive, follow the DOS Quick Start instructions below. Then reboot your computer and follow these instructions:

1. Install Windows 95 or Windows NT version 3.51 or above, and start it running on your server system.
2. Insert the Adaptec EZ-SCSI Setup Diskette in your floppy disk drive.
3. Click the Start button and select Run.
4. Type `a:\setup`. Then click OK.
5. Follow the instructions that appear on the screen.

Windows/Windows for Workgroups 3.1x Installation

1. Install Windows 3.1x or Windows for Workgroups 3.1x and start it running on your server system.
2. Insert the Adaptec EZ-SCSI Setup Diskette in your floppy disk drive.
3. Select File/Run from the Program Manager menu.
4. When the Run dialog box appears, type `a:\setup`. Then click OK.
5. Follow the instructions that appear on the screen.

DOS Installation

1. Install DOS 6.x or above and start it running on your server system.
2. Insert the Adaptec EZ-SCSI Setup Diskette in your floppy disk drive.
3. At the DOS prompt, type `a:\dosinst`. Then press <Enter>.
4. Follow the instructions that appear on the screen.

Troubleshooting Tips

SCSI Device Troubleshooting

Review this checklist if your newly-installed SCSI disk drives, CD-ROM drives, and other devices do not seem to work properly:

- Be sure that termination is correctly set for all devices on the SCSI bus, as described in your host adapter documentation.
- Be sure there are no hardware conflicts such as devices in your computer trying to use the same interrupts (IRQs) or DMA channels.
- Be sure the cables connecting the external and internal SCSI devices and the host adapter are attached securely. Also be sure the pin-1 orientation is correct for internal cables. See the host adapter documentation for more information.
- Be sure that each SCSI device connected to the host adapter has a unique SCSI ID.
- Be sure CD-ROM drives and other SCSI devices are attached to a power source and are turned ON.

Windows 95/Windows NT Troubleshooting

What is a miniport driver, and how do I make sure that the miniport driver for my host adapter is installed correctly?

Miniport drivers are a new kind of 32-bit protected mode device driver used by Windows 95 and Windows NT to control host adapters and other kinds of devices. Windows 95 and Windows NT include a set of miniport drivers for various types of SCSI host adapters. The host adapter miniport driver is automatically installed and configured during Windows 95 and Windows NT installation if your host adapter is already installed. To make sure the driver is installed correctly in systems running Windows 95, open the Control Panel, double-click on System, and click the Device Manager tab. Then double-click the SCSI Controllers icon; you should see the model name of the SCSI host adapter(s) installed in your system.

What if there is no SCSI controllers icon under Device Manager, or the model name of the host adapter does not appear under Device Manager?

If the SCSI controllers icon or your host adapter's model name do not appear, open Control Panel and double-click the Add New Hardware icon. Let Windows search for the host adapter by selecting Yes on the second screen of the Add New Hardware Wizard.

If Windows does not detect the host adapter, run the Add New Hardware Wizard again. This time, select No on the second screen of the wizard, then select SCSI controllers on the next screen. Select the name of your host adapter when it appears.

If the name of your SCSI host adapter does not appear, you may be able to find its miniport driver on the Windows 95 CD-ROM. Follow these steps:

1. Place the Windows 95 CD-ROM in your CD-ROM drive and run the Add New Hardware wizard.
2. Select No on the second screen, and select SCSI controllers on the next screen.
3. Click on the Have Disk button, then click the Browse button.
4. Look in the `\drivers\storage` directory of the CD-ROM and select the name of your SCSI host adapter if it appears.

What if a yellow exclamation point or a red X appears in Device Manager in front of my host adapter?

This means there is some kind of resource problem. First, see if the names of any host adapters appear that are not actually installed in your computer. If so, select the name and click Remove. If a red X appears in front of your host adapter name, remove all the host adapter references under SCSI Controllers and run Add New Hardware, as described in the previous question/answer. If a yellow exclamation point appears in front of your host adapter name, the resources that the driver uses probably do not match the resources used by the hardware. Double-click the host adapter name, then click on the Resource tab. Deselect the Use automatic settings box and edit the resources (Interrupt Request, Direct Memory Access, etc.) so they match those used by the host adapter. If the problem still remains, there is probably a hardware resource conflict between the host adapter and other hardware in your computer. You can fix this by changing the hardware resource settings. See your hardware documentation for more information.

What do I need to do if I change or upgrade my host adapter?

1. Open the Control Panel, double-click on System, and click the Device Manager tab.
2. Double-click the SCSI Controllers icon, select the name of the old host adapter, and click Remove.
3. Turn OFF the computer and physically remove the currently installed host adapter.
4. Install the new host adapter according to the instructions in the hardware documentation.
5. Turn the computer ON. If the new host adapter supports Plug and Play, Windows will install and configure it automatically. Otherwise, run Add New Hardware to make sure the new driver is loaded.

If I am running under Windows 95, do I need lines for the Adaptec real mode ASPI drivers and `mscdex` in my `config.sys` and `autoexec.bat` files?

Usually, you do not need to use these real mode ASPI drivers, because the new Windows miniport drivers support most SCSI host adapters and SCSI devices. However, you need to load the drivers (including `mscdex`, if you have a CD-ROM drive) if any of the following is true:

- You are running in MS-DOS[†] mode
- You are using a scanner or another SCSI device with `config.sys`- or `autoexec.bat`-based drivers, such as HP's `sjiix.sys`
- You have an older model SCSI-1 CD-ROM drive that Windows 95 does not support
- You are using a CD-Recorder drive (however, some newer models of CD-Recorder drives can use the embedded Windows miniport drivers)

To install the Adaptec EZ-SCSI DOS drivers, click the Start button and select Restart the computer in MS-DOS mode. When the DOS prompt appears, follow the Quick Start instructions for DOS on page 20.

My CD-ROM drive doesn't work properly under Windows 95.

Some older models of SCSI CD-ROM drives are not compatible with the embedded Windows 95 CD-ROM driver. You can add support for the CD-ROM drive by doing the following:

1. Click the Start button and select Restart the computer in MS-DOS mode.
2. When the DOS prompt appears, follow the Quick Start instructions for DOS on page 20.

3. When you are finished running Adaptec EZ-SCSI for DOS, find the file named `cdtsd.vxd` in the `windows\system\iosubsys` directory and rename it `cdtsd.sav`.

My CD-ROM drive shows up as more than one icon under My Computer.

The mapping between `mscdex`, which runs in real mode, and the Windows 95 CD-ROM driver does not match. You can correct this in one of two ways:

- Comment out the line that loads `mscdex.exe` in the `autoexec.bat` file.
- Change the `/L` switch on the line that loads `mscdex.exe` in the `autoexec.bat` file so it assigns the CD-ROM drive the next highest logical drive letter after the hard disk drives.

Information for DOS/Windows 3.1x Users

The following information may be useful if you install Adaptec EZ-SCSI on a computer running DOS, Windows 3.1x, or Windows for Workgroups 3.1x.



Note

The Windows 95/Windows NT Troubleshooting section on page 21 describes a few situations that require you to use the DOS/Windows 3.1x drivers and ASPI managers under Windows 95 or Windows NT.

DOS and Windows 3.1x Device Drivers

Device drivers are software programs that enable your computer to communicate with SCSI devices such as hard disk drives, CD-ROM drives, and scanners. Each kind of device requires a different device driver. Adaptec EZ-SCSI includes several DOS/Windows 3.1x device drivers that are copied to your hard disk during installation. Adaptec EZ-SCSI adds command lines to your `config.sys` and `autoexec.bat` files to load these device drivers if it finds these kinds of devices on your computer.

To learn more about the Adaptec EZ-SCSI device drivers, including their command line option information, see the online Adaptec EZ-SCSI Online Reference, a Windows Help application, or refer to Appendix C.

DOS and Windows 3.1x ASPI Managers

ASPI (Advanced SCSI Programming Interface) managers are software programs that enable the SCSI device drivers, your host adapter, and your SCSI devices to communicate with each other. ASPI managers are written for a specific operating system, such as DOS, and a specific family of Adaptec host adapters.

Adaptec EZ-SCSI includes several ASPI managers for DOS/Windows 3.1x. When you install Adaptec EZ-SCSI on these operating systems, it detects what kind of host adapter is installed in your computer and automatically configures your system with the correct ASPI manager. To learn more about these ASPI managers, including their command line option information, see the Adaptec EZ-SCSI Online Reference, a Windows Help application, or refer to Appendix B.

DOS Formatting Utilities

Adaptec EZ-SCSI includes several DOS-based formatting utilities:

scsifmt Low-level Formatter

Use the DOS-based `scsifmt` utility for low-level formatting of SCSI hard disk drives, removable media, Floptical[®] drives, and magneto-optical drives. You can also use it to scan a disk device for surface defects before you store data on it.

Run `scsifmt` from the DOS prompt, not from the Windows MS-DOS prompt. Before you run it, be sure the disk devices you want to format are connected to the host adapter and that they are powered. Then follow these steps:

1. Change to the directory where `scsifmt.exe` is located (usually `c:\scsi`), type `scsifmt` at the DOS prompt, and press <Enter>.



Note

If you are formatting a SCSI disk device that supports more than one LUN (for example, Iomega's Bernoulli[®] dual multidrive) type `scsifmt /L` at the command line.

2. When the first screen appears, read it and press <Enter> to continue. (Press <F1> at any time to view Help.) Information about your SCSI disk devices appears on the screen.
3. Use the arrow keys to move the highlight bar to a disk device you want to format or verify, then press <Enter>.

4. When the next screen appears, select either Format or Verify (to verify that the disk is free of surface defects), then press <Enter>.



CAUTION

Back up important data before you format the disk device. A low-level format erases all data from the disk.

5. If you select Format, confirm that you want to format the disk, then wait while the disk device is formatted. This may take a long time if the disk is large.

If you select Verify, you can press <Esc> at any time to stop the verification process. (This does not damage the disk.) If the utility finds bad blocks on the disk, it displays information about them. You can reassign the bad block(s) to prevent data from being stored there.

6. Repeat steps 3, 4, and 5, as needed, to format or verify other disk devices. When you are finished, press <Esc> to exit.

afdisk Formatter and Partitioner

Use the DOS-based `afdisk` utility to partition and format SCSI hard disk drives, Floptical drives, and magneto-optical drives. You can also use `afdisk` to remove DOS and non-DOS partitions from a disk drive and to format removable media in standard hard disk format, OS/2 floppy format, or DOS V (Japanese) format.



Note

Use `afdisk` only if the disk device is not controlled by the host adapter BIOS—that is, if the host adapter does not have a BIOS or if its BIOS is not enabled. If the disk device is controlled by the host adapter BIOS, use the DOS `fdisk` utility to partition and format the disk device. (See the MS-DOS documentation.)

Run `afdisk` from the DOS prompt only, not from the Windows MS-DOS prompt. Before you run it, be sure the disk devices you want to format and partition are connected to the host adapter and that they are powered. Then follow these steps:

1. Change to the directory where `afdisk.exe` is located (usually `c:\scsi`), type `afdisk` at the DOS prompt, and press <Enter>.

Information about your SCSI disk devices appears on the screen. (The number that appears after Target is the device's SCSI ID.)

2. Use the arrow keys to move the highlight bar to the disk device you want to partition, then press <Enter>.
 - If the selected disk device is controlled by the host adapter BIOS, you can view information about it but you cannot partition it with `afdisk`. You must use the DOS `fdisk` and `format` utilities when the device is controlled in this manner.
 - If the selected disk device is unpartitioned, you must partition it before you can format it. To do this, follow the instructions on the screen. (Press <F1> to see an explanation of the partitioning options.)

Information about the selected disk device appears in the lower left of the screen. Disks smaller than 1 GByte have 64 heads, 32 sectors per track, and cylinders equal to the number of MBytes of available capacity. Disks larger than 1 GByte have 255 heads, 63 sectors per track, and one cylinder per 8 MBytes of available capacity.

3. To create a new partition on the disk device, press <Ins>. A screen similar to this appears:

Adaptec SCSI Disk Setup Program v3.33

Select SCSI Device to Partition		Type	Start	End	Megs
HA #0 - Target 0	QUANTUM LP1				
HA #0 - Target 4	IOMEGA BET				

Logical Drive Info

64 head
32 sectors/track
85 cylinders
512 bytes/sector

85 megabytes
2AEEh blocks

Create a DOS Partition

Start Cylinder: 0
End Cylinder: 84

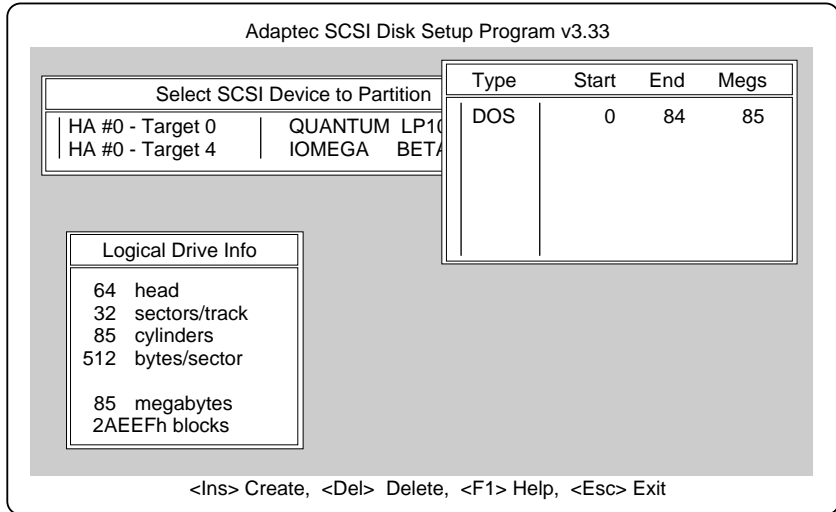
<Ins> Create, Delete, <F1> Help, <Esc> Exit

The Create a DOS Partition window suggests that you create one partition on the disk device, equal to its entire capacity. If this is what you want to do, skip to step 5.

4. To change the size of the partition, use the arrow keys to select Start Cylinder and End Cylinder, and type in the numbers you want. Partitions up to 2 GBytes are supported.

- When the number of cylinders is what you want, press <Esc>. When the confirmation prompt appears, select Yes and press <Enter> to create the partition.

To create more partitions on the same disk device, repeat steps 3, 4, and 5. As you create partitions on the disk, they are added to the window at the upper right of the screen, as shown here:



- Press <Esc> to return to the Select SCSI Device to Partition window. If you want to partition a different disk device, select the device from the list and repeat the earlier steps.
- To quit `afdisk`, press <Esc> and select Yes to confirm that you want to quit.

rmvtool Removable Media Manager

Your copy of Adaptec EZ-SCSI may include the DOS-based `rmvtool` utility. If you have this utility, you can use it to lock, unlock, and eject removable media—for example, a cartridge in a SyQuest removable cartridge drive. You run `rmvtool` by entering commands at the DOS prompt. Here are the commands for a removable drive installed at SCSI ID 5:

- To lock the disk media: `rmvtool /lock /ID=5`
- To unlock the disk media: `rmvtool /unlock /ID=5`
- To eject the disk media: `rmvtool /eject /ID=5`



Note

Some devices do not support the Eject command.

If the device is at another SCSI ID, type that number instead of 5. If you are not sure which device is at which SCSI ID, type `rmvtool /?` at the DOS prompt and press <Enter>. A list of SCSI devices appears. Devices that support removable media are marked.

If your server system has two or more host adapters, you need to add another number to the command. For example, if you have two host adapters, one of them is host adapter 0 and the other is host adapter 1. (This information appears when you type the `rmvtool /?` command.) So if the removable disk drive is at SCSI ID 3 on host adapter 1, you would enter this command to lock the disk media:

```
rmvtool /lock /ID=1:3
```

You can issue `rmvtool` commands for two or more devices, and you can add the commands to the `autoexec.bat` file. If you add this command line to your `autoexec.bat` file, `rmvtool` locks the media in the two devices when the computer boots. This prevents the disk media from being removed until another command is issued to unlock it.

```
rmvtool /lock /ID=4 /ID=5
```



Part II

Adaptec AIC-7800 Manager for NetWare, OS/2, Windows NT, SCO UNIX, and UnixWare

- 2 Novell NetWare Installation**
- 3 IBM OS/2 Installation**
- 4 Microsoft Windows NT Installation**
- 5 SCO UNIX Installation**
- 6 UnixWare Installation**

Novell NetWare Installation 2

About This Chapter

Read this chapter to find out about

- Calculating the Slot Number for each host adapter
- Installing and/or updating the 7800 Family driver for NetWare
- Using command line options that can be specified when the driver is loaded
- Automatic driver loading using `startup.ncf` and `autoexec.ncf`
- Booting a NetWare server from a SCSI drive, formatting media, and using removable media
- Error messages generated during initialization

Installation Overview

This chapter provides the information needed to install and use the Adaptec 7800 Family Manager (driver) for Novell NetWare v3.12 and v4.x. The 7800 Family driver for NetWare supports all Adaptec 7800 Family host adapters listed in “Adaptec 7800 Family Host Adapters” on page 14 of “About This Manual.”

Adaptec's 7800 Family drivers for Novell NetWare are fully Novell NetWare tested and approved. The two NetWare subdirectories (`\netware\v3_1x` and `\netware\v4_xx`) on the diskette titled “7800 Family Manager” for OS/2, Windows NT, and Netware contain the following files; however, the files in `\netware\v3_1x` can only be used with NetWare v3.12, and the files in `\netware\v4_xx` with NetWare v4.x.

- `readme.txt`—An ASCII text file describing Adaptec's drivers for NetWare.
- `aic7870.dsk`—Adaptec's 7800 Family driver for NetWare.
- `aspiTRAN.dsk`—Adaptec's ASPI transport layer driver for NetWare.
- `aspiCD.dsk`—ASPI driver for CD-ROM drives.
- `aic7870.ddi`—(For NetWare v4.x only) A driver definition information file to provide setup information to NetWare during installation; NetWare can then prompt you with parameters to be configured for the device driver during the installation process.

To begin driver installation, first calculate the Slot Number as described in “Calculating the Slot Number” below. Then, if you are performing a first time NetWare installation, see “Installing NetWare and the Driver” on page 36. If NetWare is already installed in your system, see “Updating NetWare With the Driver” on page 39.

Calculating the Slot Number

The Slot Number is used to uniquely identify each 7800 Family host adapter installed in your system. To properly load the driver for each 7800 Family host adapter, you will need to calculate the Slot Number in order to include it as part of the load command line.



Note

During NetWare installation, the slot number (a decimal number) calculated here is interpreted by NetWare as a hex number. This hex number is then added to the load command line in the startup.ncf file. To correctly identify the host adapter in the startup.ncf file, you must change the hex number back to the original decimal slot number calculated here.

In order to calculate the Slot Number, you must first obtain the `Bus:Device xx:xxh` values identified when running the *SCSISelect*[†] utility for your host adapter. This calculation is done manually, as described in the following steps:

1. Make sure your server system is properly set up and configured.
2. Run the *SCSISelect* utility for your host adapter. Refer to the Server Product Guide or to your host adapter's User's Guide for instructions.



Note

On add-in host adapter cards, the host adapter light is lit during activity. This light helps to determine which adapter *SCSISelect* is displaying information for. Some onboard controller chips may not have an associated light.

3. On the first screen of *SCSISelect*, the `Bus:Device xx:xxh` numbers are displayed in the upper right hand corner. Write down these number exactly as they appear.

`Bus` refers to the PCI bus on the system. The default for `Bus` is 0 if only one PCI bus is supplied with a system; however, systems may contain more than one PCI bus. `Device` refers to the physical slot number on the PCI bus. The Device number is in hex; you must convert it to a decimal number.



Note

The Device slot number identified through *SCSISelect* is not the same as the Slot Number needed to load the driver through the load command line.

4. Use the following formula to calculate the Slot Number:

`Slot Number = (Bus * 100) + Device + 16`

For example, if the `Bus:Device` number is 0:06h (i.e., 0:6), then the Slot Number is 22 ($22 = (0 * 100) + 6 + 16$).

Installing NetWare and the Driver

This section describes how to install the `aic7870.dsk` driver at the same time you install NetWare v3.12 or v4.x. If NetWare v3.12 or v4.x is already installed and you wish to install or update the `aic7870.dsk` driver, see “Updating NetWare With the Driver” on page 39.

Performing a NetWare v4.x Installation

Follow these instruction only if you are installing NetWare v4.x for the first time.

1. Make backup copies of all Novell and Adaptec 7800 Family Manager Set diskettes using `diskcopy`, and use those backup copies as your working diskettes.
2. Boot DOS on your computer.
3. Change to the directory where the installation files are found. For a CD-ROM, the subdirectory is similar to
`d:\netware.40\english\`
4. Type `install` and press <Enter>.
5. Select Install New NetWare v4.x if you are installing NetWare v4.x for the first time, or Upgrade NetWare v3.12 or v4.x if you are upgrading to NetWare v4.x.
6. Follow the instructions in the NetWare User's Manual for partitioning, creating a server name, and checking the IPX[†] Network number.
7. When a screen appears that asks you to select a disk driver, press <Ins>.
8. Insert the Adaptec 7800 Family Manager Set Diskette for NetWare into your disk drive.
9. Press <F3> and specify the path to the `aic7870.dsk` driver for NetWare (e.g., `a:\netware\v4_xx`).
10. Select `aic7870.dsk` and press <Enter>.



Note

Specific help text for each driver appears in the middle of the screen as you scroll down the list. The Loaded Drivers window below the list of available drivers displays the names of drivers that are loaded and operational. For a new install, this list is initially empty. For a selective install, the list shows the disk drivers already running.

11. Specify the server directory (usually `c:\server.40`) and press <Enter>. The install program copies the necessary files to this directory.
12. When the screen displays `Loading driver aic7870.dsk`, Please wait, switch to the System Console Screen (press <Alt+Esc> to switch screens).
13. You will see that the driver has prompted you for the Slot Number. Enter the Slot Number calculated for your host adapter and press <Enter> (see “Calculating the Slot Number” on page 34). You are automatically switched back to continue with the installation.
14. If you are using multiple host adapters in your server, you must load the driver again for each host adapter.

**Note**

If your system has multiple host adapters, each host adapter must have its own SCSI bus. Also, follow the instructions in the host adapter's User's Guide for properly configuring the hardware for use with multiple adapters.

Refer to the NetWare User's Manual for information on installing other NetWare Loadable Modules (NLMs). If an error message appears when you attempt to load the driver, see “Troubleshooting” on page 48.

16. Select Continue the Installation to create disk partitions and system volumes, and to specify volume names; follow the procedures listed in the NetWare User's Manual.
17. To load the driver automatically at server bootup, make sure the `startup.ncf` file includes the load command line and correct Slot Number for your host adapter. See “Using `startup.ncf` and `autoexec.ncf`” on page 42.

Performing a NetWare v3.12 Installation

Follow these instructions only if you are installing NetWare v3.12 for the first time.

1. Make backup copies of all Novell and Adaptec 7800 Family Manager Set diskettes using `diskcopy`, and use those backup copies as your working diskettes.
2. Boot DOS on your computer.
3. Change to the directory where the installation files are found. For a CD-ROM, the subdirectory is similar to
`d:\netware.312\english`
4. Type `install` and press <Enter>. Follow the procedures in your NetWare documentation for installing a new server or upgrading to a newer NetWare version.
5. When you see the NetWare colon prompt (:), use the `load` command to install the driver from the 7800 Family Manager Set Diskette for NetWare. You will also need the Slot Number described in “Calculating the Slot Number” on page 34.

The correct syntax to load the 7800 Family driver is

```
:load [pathname]aic7870.dsk [options] slot=x
```

Command line options are not case sensitive. Placing commas between command line options is optional. See “Using the Load Command Line Options” on page 40 for possible values.

⇒ **Note**

`aspitran.dsk` must reside in the same path as `aic7870.dsk`, because NetWare attempts to load this file automatically.

6. Load the driver once for each installed host adapter. If you have additional host adapters, you must load the driver again for each host adapter.

⇒ **Note**

To load the driver automatically at server bootup, copy the driver to the server's startup directory and modify the `startup.ncf` file. See Updating NetWare with the Driver below and “Using `startup.ncf` and `autoexec.ncf`” on page 42.

7. Load the NetWare install program from the NetWare colon prompt (`:load install`). Follow the instructions in the NetWare documentation to complete installation (e.g., creating disk partitions, system volumes, etc.) of your server system.

Updating NetWare With the Driver

This section describes how to update/install the `aic7870.dsk` driver if NetWare v3.12 or v4.x is already installed. If you are installing NetWare v3.12 or v4.x for the first time, see “Installing NetWare and the Driver” on page 36.

The instructions for updating/installing the driver are similar for both NetWare v3.12 and v4.x. Procedures that are specific to a NetWare version are noted below.

1. Make a backup copy of the old driver (if it exists) before installing the new driver.
2. Copy the `aic7870.dsk` driver and `aspitran.dsk` module from the 7800 Family Manager Set Diskette for NetWare, OS/2, and Windows NT into the server's startup directory (e.g., `c:\nwserver`) on your hard disk. This overwrites any existing version of the drivers in the directory.



Note

For NetWare v3.12, the `aic7870.dsk` and `aspitran.dsk` files are located in the `\netware\v3_1x` subdirectory on the diskette; for NetWare v4.x, the files are in `\netware\v4_xx`.

3. If necessary, modify the load command line in the `startup.ncf` file so that the proper path to the driver and the correct Slot Number is specified. See “Using `startup.ncf` and `autoexec.ncf`” on page 42.

The correct syntax to load the 7800 Family driver is

```
load [pathname]aic7870.dsk [options] slot=x
```

Command line options are not case sensitive. Placing commas between command line options is optional. See “Using the Load Command Line Options” on page 40 for possible values. To calculate the Slot Number for each host adapter, see “Calculating the Slot Number” on page 34.

4. Load the driver once for each installed host adapter. If you have additional host adapters, you must load the driver again for each host adapter.

Using the Load Command Line Options

You can specify several command line options when the driver is loaded. These are described in the following table:

Option	Values	Default	Description
slot=	16-41, 116-141, etc.	None	Defines host adapter device location. If none is given, you are prompted for one.
verbose=	y	n	Causes driver to display host adapter configuration information at load time.
removable= ¹	on, off	on	Enables support for removable media other than CD-ROMs, which are controlled by aspicd.dsk. By default, removable media is supported. You may want to disable removable disk support in order to load an ASPI Removable Disk Module.
fixed_disk=	on, off	on	Enables support for hard disks. By default, hard disks are supported. You may want to disable fixed disk support in order to load an ASPI Fixed Disk Module.
dev_enable=	00-FF ²	FF	Allows you to enable the driver's registration of SCSI devices on a per target basis. A bit value of 0 causes the target not to register under the operating system. These devices are still accessible via ASPI. This enable bit mask is entered in hex (see "Bit Mask Options" below).
start_unit=	00-FF ²	0	A bit mask to enable sending Start_Unit. Command is sent only if device responds with a Not Ready Status. This feature is not needed by most devices. This bit mask is entered in hex (see "Bit Mask Options" below).
tag_disable	0-FF ²	00	Disables tagged queuing for specific targets. Tagged queuing is enabled by default. If this bit mask is set, then tagged queuing for that particular device is disabled. This disable bit mask is entered in hex (see "Bit Mask Options" below).
lun_enable= ¹	00-FF ²	01	A bit mask to enable scanning for specific LUNs on all targets. (See "Bit Mask Options" below for details on creating bit masks.) For example, a value of 7 would cause the driver to scan for LUNs 0, 1, and 2 on all targets. The default value of 01 causes the driver to scan LUN 0 only. For multiple LUN CDs, use the lun_enable switch on aspicd.dsk, not aic7870.dsk. This enable bit mask is entered in hex (See "Bit Mask Options" below.)

Continued

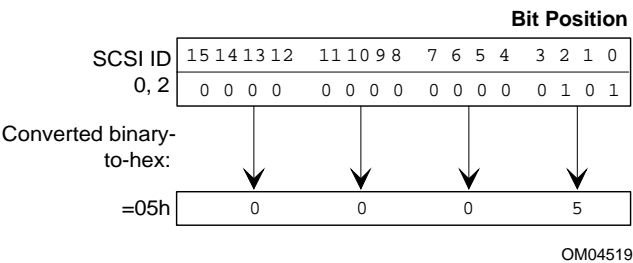
Option	Values	Default	Description
io_combine	1-32	32	Specifies maximum number of segments in a scatter/gather list.
max_sectors	1-256	256	Specifies maximum number of sectors in a single scatter/gather segment.
max_tags	1-32	16	Specifies maximum number of tagged commands per device.
max_nontags	1-2	2	Specifies maximum number of nontagged commands pending per device. Only 1 command is actually sent on the SCSI bus. A value of 2 allocates a control block where the next command waits for a previous command to complete..
read_after_write	0-1	1	Specifies default verify mode; 0 = No verify on writes, 1 = Hardware verify
instrumentation	0-1	0	If 1, enables instrumentation-variable updates at load time. The driver maintains internal instrumentation data for use by I/O Management applications. Instrumentation can also be enabled by the I/O management application, so inclusion of this option is not necessary.

¹ Many multiple-LUN and removable media devices are changers or magazines. Some of these are only supported by the aic7870.dsk driver through an ASPI driver provided by the hardware vendor.

² On the AHA-2940W and AHA-3940W, these values become FFFF.

Bit Mask Options

Use this example to aid in calculating bit-mask option hex values. Each SCSI device (ID 0-15) is enabled by a 1 in its corresponding bit position. In this example, dev_enable=05 enables driver registration of the devices at SCSI IDs 0 and 2.



Sample Load Command

Here is a sample load command with no option switches (if loaded from drive A):

```
load a:\netware\v3_1x\aic7870
```

Netware then displays a screen that shows supported slot values. Press <Enter> to accept the slot value(s) at the prompt. Slot values that already have another registered device do not appear. Only the slots available for use by the host adapter appear on the screen. If an error message appears when attempting to load the driver, refer to “Troubleshooting” on page 48.

Here is an example of the `aic7870.dsk` driver being loaded with command line options (if loaded from drive A):

```
load a:\netware\v3_1x\aic7870 verbose=y slot=22
```

Using startup.ncf and autoexec.ncf

The `startup.ncf` and `autoexec.ncf` files contain a set of commands that are executed at server bootup. The `startup.ncf` file contains the commands to load the disk drivers. Once `startup.ncf` loads disk drivers, control is passed to the `autoexec.ncf` file to complete the boot process. For additional information on the `startup.ncf` and `autoexec.ncf` files, refer to your NetWare documentation.

To automatically load the `aic7870.dsk` driver when the server boots, the `startup.ncf` file must contain a `load` command line that specifies the location of the driver on the hard disk, any command line options, and the slot number. (See “Using the Load Command Line Options” on page 40 and “Calculating the Slot Number” on page 34).



Note

To load the driver from your hard disk, the `aic7870.dsk` driver and `aspitran.dsk` module must be copied to your hard disk from the 7800 Family Manager diskette for NetWare. You typically copy the files to your server's startup directory (e.g., `c:\nwserver`).

The syntax to load the `aic7870.dsk` driver is

```
load [pathname]aic7870 [options] slot=x
```

For example, the command line to load the driver from the `c:\nwserver` directory, with the `verbose=` option on, and a Slot Number of 16 is

```
load c:\nwserver\aic7870 verbose=y slot=16
```



Note

For each 7800 Family host adapter installed, a separate load command line must be included in the `startup.ncf` file. The Slot Number (`slot=`) identifies the specific adapter.

To modify the `startup.ncf` file, follow these steps:

1. Type `load install` at the NetWare prompt and press <Enter>.
2. Select the appropriate menu choice that allows you to edit the `startup.ncf` file.
3. Make the necessary changes. When you are done, press <Esc>.

Using SCSI Devices

This section provides procedures and tips on the following topics:

- Booting from a SCSI Device
- Formatting Media
- Using Removable Media
- Using NetWare's Tape Backup
- Using a CD-ROM with NetWare
- Optimizing Performance

Booting from a SCSI Device

1. For the 7800 Family host adapter, use the *SCSISelect* utility to configure your preferred boot device. When the host adapter BIOS is enabled, the host adapter can be set to scan the SCSI bus; the system boots from the first drive encountered.
2. Modify your DOS `autoexec.bat` file to run `server` from your server's startup directory.
3. Reboot your server. NetWare should boot up at this point.
4. Enter your file server name and internal IPX number.

Formatting Media (NetWare v3.12 only)

NetWare's v3.12 `install.nlm` program lets you optionally format a disk drive for use with NetWare. When using SCSI, it allows you to low-level format several SCSI drives simultaneously. The NetWare format procedure

is not the same as using `fdisk` or `format` under DOS. You should not format a drive that contains partitions for other operating systems, as that information may be destroyed.

When you select a drive to format, `install` prompts you for an interleave from one to nine:

- What `install` does not say is that you can also enter an interleave value of zero.
- When formatting SCSI disks or removable drives on the 7800 Family host adapter SCSI bus, we recommend that you use an interleave value of zero. This zero interleave value instructs the drive to use its optimal interleave value. This option was unavailable in NetWare v3.0.

Using Removable Media

The `aic7870.dsk` driver module fully supports removable-media disk drives, including magneto-optical drives. Removable media is treated as a standard SCSI hard disk, with some exceptions:

- The driver only recognizes and registers media with 512 bytes/sector.
- NetWare allows you to mount/dismount the media, and to lock/unlock the media.

NetWare's `monitor.nlm` program supports several removable media options. Follow these steps to view and configure the options.

1. Load `monitor.nlm` to display the various options.
2. Select Disk Information. All system disk drives appear.
3. Select the removable-media device. The following drive status items appear:

Menu Choice	Default Value
1. Volume Segments On Drive ¹	(select for list)
2. Read After Write Verify ¹	Hardware Level
3. Drive Light Status ¹	Not Supported
4. Driver Operating Status ¹	Active
5. Removable Drive Mount Status ²	Mounted
6. Removable Drive Lock Status ²	Not Locked

¹ Valid for both removable and nonremovable types of SCSI drives.

² Valid for removable media only.

Mount Status

Mounting causes a drive to come online as a NetWare storage device. Dismounted drives are inactive and cannot be accessed.

Before you eject your current media, you should first dismount it (menu choice 5). When the media status is dismounted, you can eject the media. However, NetWare does not allow you to dismount it if the media is locked.

To insert your new media, wait for the drive to spin-up, and then select the Drive Mount option.

Lock Status

If your removable-media device supports the Lock/Unlock feature, you can lock the media (menu choice 6). The media must be in the Not Locked state before you can eject it. If the media is Locked, it cannot be ejected when you press the Eject button.

Verify

Read After Write Verify (menu choice 2) is set to Hardware Level by default. This option cannot be specified in the `startup.ncf` or `autoexec.ncf` files. However, the default can be set on the command line, see “Using the Load Command Line Options” on page 40.

The available options are defined as follows:

Read After Write Verify	
Option Setting	Function
Disabled	All writes to SCSI disk drives are with the SCSI Write command (2Ah)
Hardware Level	All writes to SCSI disk drives are with the SCSI Write and Verify command (2Eh). If not supported by the drive, behavior is the same as if Read After Write Verify is disabled.
Software Level	Not supported

Using the NetWare Tape Backup

Included with Novell NetWare is a server-based tape backup utility called `sbackup.nlm`. This utility allows backup of server disk drives to a server tape drive. `sbackup.nlm` supports Adaptec host adapters.

Novell NetWare documentation contains instructions for loading the server backup software. Refer to the NetWare Server Backup Manual to load the `tapedai`, `tsaxxx` and `sbackup` modules.

1. Once you have loaded `aic7870.dsk`, load `tapedai.dsk`, `tsaxxx.nlm` (`tsa312.nlm`, `tsa000.nlm`, or `tsa410.nlm`) and `sbackup` with these options:

```
:load tapedai
:load tsaxxx
:load sbackup
```

The appropriate driver that interfaces `sbackup` to ASPI is loaded automatically.

If you are duplexing the Adaptec 7800 Family host adapter with another host adapter, for NetWare drive mirroring, you must also load the appropriate ASPI manager (`.dsk`) for the second host adapter.

2. When `sbackup` is loaded, it asks for a login name. Enter the appropriate name.
3. If `sbackup` asks you to select the device driver, select the HP[†] DIBI-2 Tape Driver, regardless of the type of SCSI tape drive being attached (e.g., even if the tape drive is manufactured by Wangtek, do not select the Wangtek driver).



Note

Novell also includes a driver called `adaptec.nlm`. This driver is not needed and should not be loaded. Adaptec's `aic7870.dsk` driver module takes advantage of ASPI interface features bypassed by `adaptec.nlm`.

Novell publishes a list of SCSI tape drives supported by `sbackup.nlm`.

Using a CD-ROM With NetWare v3.12 or v4.x

To use a CD-ROM with NetWare v3.12 or v4.x, follow these instructions:

1. Load `aic7870.dsk` by entering the following line:

```
:load [pathname]aic7870.dsk slot=x
```

2. Load `aspicd.dsk` by entering the following line:

```
:load [pathname]aspicd.dsk
```

For multiple LUN CDs, enable multiple LUN scanning with the `lun_enable` switch (e.g., `load aspicd lun_enable=FF`). The `lun_enable` switch is not needed for `aic7870.dsk`.

3. Load `cdrom.nlm` by entering the following line:

```
:load [pathname]cdrom.nlm
```

⇒ **Note**

For NetWare 4.01 and 4.02 only: You have to load `nwpa.nlm` before you can load `cdrom.nlm`.

4. Enter the following line at the prompt and then note the number and name of the CD:

```
:cd device list
```

5. Enter the number or volume name of the CD at the command line:

```
:cd mount [x] [name]
```

Optimizing Performance

The Adaptec 7800 Family SCSI Bus Master firmware increases the SCSI performance of the Adaptec 7800 Family host adapters under multitasking environments. The firmware uses a paging mechanism to handle up to 255 simultaneous SCSI commands. The sequencer can simultaneously manage up to 32 tagged, or two nontagged, SCSI commands for each SCSI device, up to a limit of 255 SCSI commands. The firmware can queue as many commands as the operating system is able to send to the host adapter. To set this feature, enter the following command:

```
max_tags=n
```

In general, a low number of `max_tags` gives better sequential performance, and a high value gives a better random performance. However, a

⇒ **Note**

A large number of `max_tags` can also cause starvation problems with some drives.

Troubleshooting

Any error that occurs while the driver is initializing prevents it from loading. If an error does occur, the driver first beeps the computer and then displays a numbered error message in this format:

```
ERR xxx:message
```

The `xxx` indicates the error code, and `message` is a descriptive line describing the error. The error codes are divided into these categories:

000-099 Nonhost Adapter specific

100-299 Host adapter specific

300-999 Reserved

Specific error codes only appear if you have installed the host adapters and drivers that generate them.

Nonhost Adapter Specific

000 Failed ParseDriverParameters call

A call to NetWare's ParseDriverParameters routine has failed for some unknown reason. The command line contains errors, or you pressed <Esc> at the port or slot prompt.

001 Unable to reserve hardware, possible conflict

The driver failed in its attempt to reserve the host adapter's hardware settings (i.e. DMA and IRQ settings). Another card in your system may be causing a conflict with the host adapter.

002 NetWare rejected card Failed AddDiskSystem call

The driver failed in its attempt to register the host adapter with NetWare. The file server may not have enough memory.

003 Invalid command line option entered > option

An invalid option was entered on the command line. The Option field displays the invalid option that was entered.

004 Invalid command line, please enter correctly

The driver was unable to understand the command line options you entered. Be sure you have entered these options correctly.

005 Unable to allocate resource tags from NetWare

NetWare was unable to allocate resource tags for memory allocation or other system functions.

006 Unable to register events with NetWare

NetWare is unable to register event routines needed to return to DOS.

Host Adapter Specific

200 No host adapter found for this driver to register

No Adaptec 7800 Family host adapter was found in your computer for the driver to register. Be sure the host adapter is properly configured and properly seated in the slot.

203 Invalid 'device' setting

You have entered an invalid slot setting on the command line. You can only enter Slot Numbers for valid host adapters. If you load without the slot option, you will be prompted to enter a valid value.

204 Invalid 'verbose' setting, use 'y'

You can only enter y for this option (e.g., `verbose = y`).

205 Invalid 'removable' setting, use 'off'

You can only enter off for this option (e.g., `removable = off`).

206 Invalid 'fixed_disk' setting, use 'off'

You can only enter off for this option (e.g., `fixed_disk = off`).

208 SCSI present but not enabled/configured for PCI

A host adapter is present, but its bus/device entry has not been enabled.

209 Invalid 'read_after_write' setting, use 0 (disable) or 1 (HW verify)

You can only enter 0 or 1 for this option (e.g., `read_after_write = 1`).

211 Unable to initialize host adapter

The host adapter failed the initialization routine.



About This Chapter

Read this chapter to find out about:

- Installing and/or updating the 7800 Family driver for OS/2
- Using command line options for the driver

Installation Overview

This chapter provides the information needed to install and use the Adaptec 7800 Family Manager (driver) for OS/2 v2.x and OS/2 Warp. The 7800 Family driver for OS/2 supports all Adaptec 7800 Family host adapters listed in “Adaptec 7800 Family Host Adapters” on page 14 of “About This Manual.”



Note

For CD-ROM installations, *do not* set the CD-ROM SCSI ID to 0 or 7.

The following OS/2 files are available on the diskette titled “7800 Family Manager” for OS/2, Windows NT, and Netware. They are in the `os2` directory.

- `readme.txt`—An ASCII text file describing the Adaptec 7800 Family driver for OS/2
- `aic7870.add`—Adaptec's 7800 Family driver for OS/2
- `aic7870.ddp`—Installation instructions for `ddinstal.exe`
- `7870pres.exe`—The program that searches for the 7800 Family host adapters

If you are performing a first time OS/2 installation, see “Installing OS/2 and the Driver” on page 52 to begin driver installation. If OS/2 is already installed in your system, see “Updating OS/2 With the Driver” on page 53.

Installing OS/2 and the Driver

This section describes how to install the `aic7870.add` driver at the same time you install OS/2 v2.x or OS/2 Warp. If OS/2 v2.x or OS/2 Warp is already installed and you wish to update/install the `aic7870.add` driver, see “Updating OS/2 With the Driver” on page 53.

Performing an OS/2 v2.x Installation

Follow these instructions only if you are installing OS/2 v2.x for the first time.

1. Use `diskcopy` to make backup copies of all IBM OS/2 and Adaptec supplied diskettes. Use the backup copies as your working diskettes.
2. Copy the `os2ldr` file from the “7800 Family Manager” diskette for OS/2, Windows NT, and Netware onto the OS/2 installation diskette.
3. Copy the `ibmint13.il13` and the `aic7870.add` files from the “7800 Family Manager” diskette for OS/2, Windows NT, and Netware onto the OS/2 installation diskette #1. This overwrites any existing version of the driver included on diskette #1.
4. Add the following line to the `config.sys` file on diskette #1:


```
basedev=aic7870.add /pcihw
```
5. Run the OS/2 v2.x installation program; follow the instructions in your OS/2 documentation.
6. At the end of the installation process, follow the onscreen instructions to remove the last OS/2 distribution diskette and reboot the computer.
7. After the computer has restarted, OS/2 displays a welcome screen. You have the option to view online information while the OS/2 desktop is building. Allow OS/2 to finish building.



Note

Refer to the `readme.txt` file for any additional information on installing OS/2 v2.x and driver.

Performing an OS/2 Warp Installation

Follow these instructions only if you are installing OS/2 Warp for the first time.

1. Use `diskcopy` to make backup copies of all IBM OS/2 and Adaptec supplied diskettes. Use the backup copies as your working diskettes.
2. Copy the `aic7870.add` driver from the 7800 Family Manager Set Diskette for NetWare, OS/2, and Windows NT (i.e., `\os2_3x\aic7870.add`) onto the OS/2 Warp installation diskette #1. This overwrites any existing version of the driver included on diskette #1.
3. Run the OS/2 Warp installation program; follow the instructions in your OS/2 documentation.
4. At the end of the installation process, follow the onscreen instructions to remove the last OS/2 distribution diskette and reboot the computer.
5. Once the computer has rebooted, any older versions of the `aic7870.add` driver existing on the hard drive must be overwritten with the newer version of the driver now available on the OS/2 Warp installation diskette #1.

Check the root and OS/2 directories, and any of the OS/2 subdirectories for older versions of the driver by comparing the dates of the files. If an older version is found, overwrite it with the newer version by copying the `aic7870.add` driver from diskette #1 to the hard drive.

6. Reboot the computer.

Updating OS/2 With the Driver

This section describes how to update or install the `aic7870.add` driver if OS/2 v2.x or OS/2 Warp is already installed. If you are installing OS/2 v2.x or OS/2 Warp for the first time, see "Installing OS/2 and the Driver" on page 52.

Follow these instructions only if OS/2 v2.x or OS/2 Warp is already installed. The instructions for updating or installing the driver are the same for either OS/2 v2.x or OS/2 Warp.

1. Use `diskcopy` to make backup copies of all IBM OS/2 and Adaptec supplied diskettes. Use the backup copies as your working diskettes.

2. If you are updating the driver, simply copy the `aic7870.add` driver from the 7800 Family Manager Set Diskette for NetWare, OS/2, and Windows NT (e.g., `\os2_3x\aic7870.add`) into the `\os2` directory on your hard disk. (Make a backup copy of the older driver before doing this.) This overwrites any existing version of the driver in the directory. Updating of the driver is complete; do not continue with Steps 3 through 5.

If OS/2 has been installed and does not recognize the Adaptec 7800 Family host adapter, or if you are adding your Adaptec 7800 Family host adapter to your OS/2 computer, you need to install the driver. To do so, continue with Step 3.

3. Run the program `ddinstal` by selecting the Device Driver Install icon within the system setup folder or by typing `ddinstal` at the OS/2 prompt.



Note

If you are running OS/2 v2.x, change to the directory containing `aic7870.add` and associated files, and run `ddinstal` from the OS/2 prompt.



CAUTION

If you are running OS/2 v2.x GA, *do not* run Device Driver Install from the System Setup folder. Instead, open a full screen OS/2 session and change to the drive with the 7800 Family Manager Set Diskette for NetWare, OS/2, and Windows NT. Then type `ddinstal` and press <Enter>.

4. Insert the Adaptec 7800 Family Manager Set Diskette for NetWare, OS/2, and Windows NT in the appropriate disk drive and follow the prompts from `ddinstal`.
5. The computer scans for the host adapter(s). If a host adapter is found, the Installing Device Drivers message appears. Another message appears when the driver is successfully installed. If no host adapters are found, an error message appears.

OS/2 Driver Command Line Options

The `aic7870.add` driver is normally installed automatically and does not require any modifications to its configuration. In certain situations, however, you may wish to modify the driver to meet your specific needs. The command line options described in this section apply to both OS/2 v2.x and OS/2 Warp.

- Turn to “Example 1” and “Example 2” on page 57 to see how the command line options can be used in specific installations.
- Refer to your OS/2 documentation for more information on using the command line options.



CAUTION

Your computer may not boot if you use the command line options incorrectly.

ADD Command Syntax

The standard command line syntax for the ADD command line switches is

```
basedev=aic7870.add [Universal Parameters] [Adapter ID]  
[Unit Parameters: [SCSI Target ID]]
```

The command and switches must be placed in the `config.sys` file. Switch settings take effect after the computer is rebooted. OS/2 command line switches are not case sensitive.

ADD Command Switches

The options listed in the following subsections apply to all host adapters controlled by the `aic7870.add` driver.

Replace the italicized letters (*x,y,z*, etc.) in the switch descriptions below with the SCSI Target ID(s) of the device(s) that you want to effect. The IDs must be separated by commas (*x,y*).

Universal Parameters

`/et`

Embedded targets allowed. Makes the driver assume that all targets have more than one Logical Unit Number (LUN) defined.

/!et

No embedded targets allowed. Makes the driver assume that all targets have only one LUN defined. (This is the default setting.)

/v

Verbose mode. Information such as the driver name, version number, and Adaptec copyright appears if the driver loads successfully. Also displays information about all targets found in the computer.

/pcihw

PCI configuration hardware registers. Enables driver to access PCI configuration hardware registers. This switch is available for some PCI systems that run into problems when trying to access PCI configuration space through PCI BIOS function calls.

Adapter ID

/a:n

Adapter numbers are assigned based on BIOS address (starting from the lowest first) and then Device number (PCI Device number in hex as seen at the upper right hand corner of the first *SCSISelect* screen) if the BIOS is disabled. Built-in single-channel host adapters are generally assigned ID 0 (zero), as the first found adapter.

Unit Parameters

/dm:x,y,z

Enables Direct Access Storage Device (DASD) manager support. Allows `os2dasd.dmd` to control the specified target(s) when they are identified as DASD devices. (This is the default setting.)

/!dm:x,y,z

Disables DASD manager support. Prevents `os2dasd.dmd` from controlling the specified target(s).



CAUTION

Do not remove DASD manager support from the boot drive, or the computer will not be able to boot.

/sm:x,y,z

Enables SCSI manager support for the target device(s) *x,y,z*. Allows `os2scsi.dmd` to control the specified target(s) if they are identified as non-DASD SCSI devices. All SCSI hard drives are controlled by `os2dasd.dmd`. (This is the default setting.)

/!sm:x,y,z

Disables SCSI manager support. Prevents `os2scsi.dmd` from controlling the specified target(s).

/tag:x

Specifies the maximum number of tagged commands for all target devices on the host adapter (1-16). A value of 1 disables tagged queuing. The maximum number allowed is 16. (The default is 8.)

/i

Ignores the host adapter. The driver ignores the host adapter so that another driver may control it.

/ur

Enables reporting of under runs.

/!ur

Disables reporting of under runs. (This is the default setting.)

Example 1

Suppose that you have a removable-media drive as target 3. Normally `os2dasd` allocates this device, treats it as a large floppy, and prevents you from sending any SCSI commands via another device manager. The command line below prevents `os2dasd.dmd` from accessing the target and allows `os2scsi.dmd` and `os2aspi.dmd` to share access to it:

```
basedev=aic7870.add /a:0 /!dm:3
```

Example 2

Suppose that you have a multidisk CD-ROM as target 4 and two DASD devices as targets 1 and 5. The command line below prevents `os2scsi.dmd` from accessing the CD-ROM and `os2dasd.dmd` from controlling the DASD devices. The driver searches for multiple LUNs on all devices.

```
basedev=aic7870.add /et /a:0 /!sm:4 /a:1 /!dm:1,5
```



Note

There are no switches for directly controlling `os2aspi.dmd`, the ASPI device manager.

Important Tips

- `os2scsi.dmd` only allocates devices when a device driver requests it, but this prevents `os2aspi` from accessing it. There is nothing in the ASPI specification regarding device allocation, so `os2aspi` must rely on other managers to fairly share targets. This should only be a problem if you have two drivers that use different managers and you want them both to access the same target at the same time: for example, if you have two tape applications, one is using `os2scsi`, the other is using `os2aspi`, and they are both trying to access the tape at the same time.
- Do not disable DASD manager access to the boot drive if you are booting from your SCSI host adapter. If you do, your computer will not be able to boot.



Note

The SCSI target ID is the target to which the Unit Parameters are applied. This parameter may be a single ID (d) or a list of IDs (d,d,d).

OS/2 and Drives Over 1 GByte

If you are using a SCSI disk drive larger than 1 GByte on your OS/2 system, we recommend that you leave the Extended BIOS Translation feature at the default setting of *Enabled*. If you format a partition using the FAT file system, it must be within the first 1024 cylinders of the drive to ensure compatibility with DOS. However, if you are running NetWare and UNIX on the same SCSI disk drive (that is larger than 1 GByte), *disable* the Extended BIOS Translation feature.

Any time you change this feature from *enabled* to *disabled*, or vice versa, be sure to repartition and high-level format the drive. This statement does not apply to drives smaller than 1 GByte. See your host adapter's User's Guide for more details on using drives over 1 Gbyte.



About This Chapter

Read this chapter to find out about

- Installing and/or updating the 7800 Family driver for Windows NT
- Removing a host adapter
- Swapping a host adapter
- Information on restoring a configuration if Windows NT fails to boot

Installation Overview

This chapter provides the information needed to install and use the Adaptec 7800 Family Manager (driver) for Windows NT v3.5x. The 7800 Family driver for Windows NT supports all Adaptec 7800 Family host adapters listed in “Adaptec 7800 Family Host Adapters” on page 14 of “About This Manual.”

The diskette titled “7800 Family Manager” for OS/2, Windows NT, and Netware contains the files needed for driver installation. Use the following files from subdirectory `\winnt\3_5` only with Windows NT v3.5x:

- `aic78xx.sys`—Adaptec's 7800 Family driver for Windows NT
- `oemsetup.inf`—A file used by Windows NT Setup for driver installation
- `readme.txt`—An ASCII text file describing the Adaptec 7800 Family driver for Windows NT

If you are performing a first time Windows NT installation, see “Installing Windows NT and the Driver” below to begin driver installation. If Windows NT is already installed in your system, see “Updating Windows NT With the Driver” on page 64.

Installing Windows NT and the Driver

This section describes how to install the `aic78xx.sys` driver at the same time you install Windows NT v3.5x. If Windows NT is already installed and you wish to install or update the `aic78xx.sys` driver, see “Updating Windows NT With the Driver” on page 64.



Note

Server platforms based on the Pentium Pro microprocessor do not support Windows NT v3.5. You must use Windows NT v3.51 or later.

Performing a Windows NT v3.5 Installation

These instructions apply only to installing Windows NT v3.5 for the first time. If you are installing Windows NT v3.51, see the instructions on page 62.

An older version of the `aic78xx.sys` driver is embedded (included) in the Windows NT 3.5x installation disks (or CD). We recommend first installing the embedded driver by following the instructions in your Windows NT v3.5x documentation for a normal Windows NT installation. Once the installation is complete, you can update the `aic78xx.sys` driver by following the instructions in Updating Windows NT with the Driver on page 64.



Note

During a normal Windows NT installation, the 7800 Family Host adapter is detected in your system and the embedded `aic78xx.sys` driver is automatically installed.

If you are booting from a 7800 Family host adapter and you are unable to install the embedded `aic78xx.sys` driver by performing a Windows NT installation, then follow the instructions here to complete a fresh Windows NT installation and install the `aic78xx.sys` driver from the 7800 Family Manager diskette for OS/2, Windows NT, and Netware.

You may install Windows NT from a floppy drive or from a CD-ROM drive; whichever you choose, make sure the hardware installation is completed prior to following these steps.

1. If you choose to install Windows NT from a floppy drive, locate the Windows NT Disk 1 for Floppy Installation.

If you are installing from a CD-ROM drive, locate the Windows NT Setup Disk 1 for CD-ROM Installation.

2. Put the diskette into drive A (not drive B) and turn on your computer.



Note

A special “Dual Pentium Processor Pre-Approval MP (Multiprocessing) Specification v1.4 for Microsoft Windows NT 3.5 HAL (Hardware Abstraction Layer)” diskette—verified to work with Windows NT 3.5—is shipped with each server system. It correctly scans the PCI PeerBus on the system board. If this HAL diskette is not properly loaded, you will not be able to use the onboard AIC-7870 SCSI controllers or any PCI add-in card located in the PCI-1 bus.

3. Install Windows NT 3.5 normally until the screen changes from a black to a blue background (Windows NT Setup). Then press <F5> (*you have only four seconds*). This allows installation of a nonstandard HAL.
4. When setup prompts you to specify a computer type, choose Other from the menu and press <enter>. Insert the “Dual Pentium Processor Pre-Approval MP Specification v1.4 for Microsoft Windows NT 3.5 HAL” diskette into drive A and follow the instructions.

If you don't see the pop-up window asking for the “manufacturer's diskette” and proceed to the second installation diskette for Windows NT 3.5, you must reboot the system and try Step 2 again.

5. After the HAL diskette has loaded, setup prompts for the install disk (DISK 1) again and then DISK 2. When prompted, insert Windows NT Disk 2.
6. From the Welcome to Setup screen, press <Enter> to set up Windows NT.
7. When prompted, select Custom setup.



Note

If you select Express setup, the embedded `aic78xx.sys` driver included with Windows NT will be loaded and not the most recent version of driver available from the 7800 Family Manager Set.

8. Press the S key to skip mass storage device detection. This allows you to manually select the driver for your host adapter.
9. Since mass storage device detection was skipped in the previous step, Windows NT Setup displays `none` in the list of recognized devices. Press the S key to configure additional SCSI adapters.

10. From the list of additional SCSI adapters, expand the list, select Other, and press <Enter>. (Requires a disk provided by the hardware manufacturer.)
11. Insert the Adaptec 7800 Family Manager diskette for OS/2, Windows NT, and Netware into drive A and press <Enter>.
12. Enter the path to the installation files by typing

a:\winnt\3_5

The screen displays the adapter drivers supported on the diskette. The Adaptec AHA-2940/AIC-78xx (PCI) NT v3.5x driver is highlighted by default; press <Enter>.

13. If you want to add other host adapters (that are not a part of the 7800 Family), do so at this time by repeating Step 10 for each additional adapter and inserting the appropriate disk provided by the hardware manufacturer. The Adaptec 7800 Family host adapters use the same driver, so this step is not necessary for them.
14. Press <Enter> to continue with the Windows NT operating system setup. Follow the instructions given onscreen and in the Windows NT installation documentation.

Performing a Windows NT v3.51 Installation

These instructions apply only to installing Windows NT v3.51 for the first time. If you are installing Windows NT v3.5, see the instructions on page 60.

An older version of the `aic78xx.sys` driver is embedded (included) in the Windows NT 3.51 installation disks (or CD). We recommend first installing the embedded driver by following the instructions in your Windows NT v3.51 documentation for a normal Windows NT installation. Once the installation is complete, you can update the `aic78xx.sys` driver by following the instructions in Updating Windows NT with the Driver on page 64.



Note

During a normal Windows NT installation, the 7800 Family Host adapter is detected in your system and the embedded `aic78xx.sys` driver is automatically installed.

If you are booting from a 7800 Family host adapter and you are unable to install the embedded `aic78xx.sys` driver by performing a Windows NT installation, then follow the instructions here to complete a fresh

Windows NT installation and install the `aic78xx.sys` driver from the 7800 Family Manager diskette for OS/2, Windows NT, and Netware.

You may install Windows NT from a floppy drive or from a CD-ROM drive; whichever you choose, make sure the hardware installation is completed prior to following these steps.

1. If you choose to install Windows NT from a floppy drive, locate the Windows NT Disk 1 for Floppy Installation.

If you are installing from a CD-ROM drive, locate the Windows NT Setup Disk 1 for CD-ROM Installation.
2. Put the diskette into drive A (not drive B) and turn on your computer. When prompted, insert Windows NT Disk 2.
3. From the Welcome to Setup Screen, press <Enter> to set up Windows NT.
4. When prompted, select Custom setup.



Note

If you select Express setup, the embedded `aic78xx.sys` driver included with Windows NT will be loaded and not the most recent version of driver available from the 7800 Family Manager Set.

5. Press the S key to skip mass storage device detection. This allows you to manually select the driver for your host adapter,
6. Since mass storage device detection was skipped in the previous step, Windows NT Setup displays `none` in the list of recognized devices. Press the S key to configure additional SCSI adapters.
7. From the list of additional SCSI adapters, expand the list, select Other, and press <Enter>. (Requires a disk provided by the hardware manufacturer.)
8. Insert the Adaptec 7800 Family Manager diskette for OS/2, Windows NT, and Netware into drive A and press <Enter>.
9. Enter the path to the installation files by typing

`a:\winnt\3_5`
10. The screen displays the adapter drivers supported on the diskette. The Adaptec AHA-2940/AIC-78xx (PCI) NT v3.5x driver is highlighted by default; press <Enter>.

11. If you want to add other host adapters (that are not a part of the 7800 Family), do so at this time by repeating Step 7 for each additional adapter and inserting the appropriate disk provided by the hardware manufacturer. The Adaptec 7800 Family host adapters use the same driver, so this step is not necessary for them.
12. Press <Enter> to continue with the Windows NT operating system setup. Follow the instructions given onscreen and in the Windows NT installation documentation.

Updating Windows NT With the Driver

This section describes how to update or install the `aic78xx.sys` driver if Windows NT v3.5x is already installed. If you are installing Windows NT v3.5x for the first time, see “Installing Windows NT and the Driver” on page 60.

Updating Windows NT v3.5x

Follow these instructions only if Windows NT v3.5x is already installed.

1. Select and start the Windows NT Setup program. (Its icon is usually found in the Main program group.) There is a brief pause while Windows NT Setup scans your hardware configuration.
2. Select the Options pull-down menu and then select Add/Remove SCSI Adapters. The SCSI Adapter setup program displays a list of all host adapters currently installed.

If you are updating the driver, continue with Step 3.

If you are installing the driver for the first time, skip to Step 5.

3. Before you can update the driver, you must first remove the existing driver. Select the host adapter you want to remove (i.e., Adaptec AIC-78xx SCSI Controller Driver), and click the Remove button. When the Windows NT Setup program asks you for confirmation, click OK.

Because SCSI device drivers are loaded during system bootup and because they may be needed to load Windows NT itself, the following warning message may appear:

Removing SCSI Adapters may prevent Windows NT from starting correctly.

4. If you are sure you are removing the correct host adapter driver, click OK.

5. Click the Add button to add another host adapter type to the list. A list of additional SCSI adapters appears.
6. Expand the list of additional SCSI adapters; select Other and press <Enter>. (Requires a disk provided by the hardware manufacturer.)
7. Insert the Adaptec 7800 Family Manager diskette for OS/2, Windows NT, and Netware into drive A; enter the following path to the installation files and then click OK.

a:\winnt\3_5

8. The screen displays the adapter drivers supported on the diskette. The Adaptec AHA-2940/AIC-78xx (PCI) NT v3.5x driver is highlighted by default; click OK. The driver is added to the list of SCSI adapters.
9. Select Adaptec AHA-2940/AIC-78xx (PCI) NT v3.5x from the list of SCSI adapters and click Install.

At this point, Windows NT Setup checks to see if the specified driver (in this example, aic78xx.sys) has already been copied to the system disk.

10. If the following message appears, click New to replace the existing driver and skip to Step 12.

The driver(s) for this SCSI Adapter are already on the system. Do you want to use the currently installed driver(s) or install new one(s).

If the following message appears, continue to Step 11:

Please <Enter> the full path to the Windows NT SCSI Adapter files

11. Change the path to the directory (i.e., a:\winnt\3_5) with the desired device driver, then click Continue.

The device driver is copied to your system disk and the Windows NT configuration is updated so that the new device driver loads when Windows NT reboots.

12. When the installation is complete, Windows NT Setup again displays a list of currently installed host adapter types. Verify that the new host adapter appears on the list; the string should look similar to

Adaptec AHA-2940/AIC-78xx (PCI) NT v3.5x

13. Add other types of host adapters if necessary (see Step 6 above), or click Close to exit the SCSI adapters portion of Windows NT Setup, and then close the program.

14. When you see this message, click OK to exit:

The changes you have made will not take effect until the computer is restarted

If this message does not appear, no changes have been made to the Windows NT system configuration.

15. Restart your computer and Windows NT. It is possible that some drive letter assignments may change from the previous configuration.

Removing a Host Adapter

Removing a host adapter can be as simple as physically removing it from the slot when your computer is shut down. Windows NT boots and functions properly in this configuration, but a warning message is generated every time you boot Windows NT.



CAUTION

If you have removed a host adapter but still have other host adapters of the same type installed in your computer, do not use Windows NT Setup to remove the device driver.

To eliminate the warning message, you must update the Windows NT software configuration, as described in these steps:

1. Select and start the Windows NT Setup program. There is a brief pause while Windows NT Setup scans your hardware configuration.
2. Select the Options pull-down menu and then select Add/Remove SCSI Adapters. The SCSI Adapter setup program displays a list of all host adapters currently installed.
3. Select the host adapter you want to remove and click the Remove button. When the Windows NT Setup program asks you for confirmation, click OK.

Because SCSI device drivers are loaded during system bootup and because they may be needed to load Windows NT itself, a screen may appear warning you that Windows NT may not start if you remove the SCSI adapter.

4. If you are sure you are removing the correct host adapter type, click OK.
5. Return to Step 3 if you want to remove driver support for other types of host adapters, or click Close to exit the SCSI adapters portion of Windows NT Setup.

6. Close the Windows NT Setup program. When the following message appears, click OK to exit:

The changes you have made will not take effect until the computer is restarted.

If this message does not appear, no changes have been made to the Windows NT system configuration.

7. Restart your server system.



Note

The Windows NT Setup does not delete the device driver from your system disk; it only updates Windows NT software configuration information so that the device driver is no longer loaded during system bootup.

Swapping a Host Adapter

Swapping one type of host adapter for another is similar to the procedure for adding a host adapter. The important distinction is that you make all software configuration changes while Windows NT is running and before you make the hardware changes.

1. Install the driver for the new host adapter by following the steps in “Updating Windows NT With the Driver” on page 64.

It is not essential to remove the device driver for the host adapter you are replacing. Windows NT dynamically detects the absence or presence of host adapter hardware, and no problems should arise if you leave the existing device driver installed. You may remove the device driver later, after you have successfully rebooted Windows NT.

However, if you leave the driver in, the system alerts you with an error message of the extra device driver every time you boot. See “Removing a Host Adapter” on page 66.

2. Once the new device driver is installed, shut down Windows NT and replace the existing host adapter.
3. Restart your server system and Windows NT. It is possible that some drive letter assignments may change from the previous configuration.

Troubleshooting

The boot manager for Windows NT contains recovery logic to allow you to return to the last known good configuration. If you have changed your host adapter configuration and Windows NT no longer boots, follow these steps to recover:

1. Undo any hardware changes you have made to the computer since it was last operational.
2. Reboot the computer. Watch the display carefully during bootup. If the following message appears, press the Spacebar and follow the instructions on the screen to continue booting with the last known good configuration:

Press spacebar NOW to invoke the Last Known Good menu

3. Once your computer is operational again, check all of the hardware and software configuration changes you want to make. Look specifically for conflicts with parts of the existing system configuration that are not being changed.

If you cannot determine the source of the error, contact Adaptec Technical Support for assistance at the telephone number listed in the front of this User's Guide.



SCO UNIX Installation 5

About This Chapter

Read this chapter to find out about

- Installing and/or updating the 7800 Family driver for SCO UNIX
- Adding devices with the `mkdev` command
- Using Wide SCSI host adapters and devices
- Using tunable parameters
- Information to assist you in troubleshooting problems that may occur during system bootup and after driver installation

Installation Overview

This chapter provides the information needed to install and use the Adaptec 7800 Family Manager (driver) for SCO UNIX 3.2 v4.2, SCO OpenDesktop 3.0 (ODT 3.0), SCO OpenServer 3.0, or SCO OpenServer 5. The 7800 Family driver for SCO UNIX supports all Adaptec 7800 Family host adapters listed in “Adaptec 7800 Family Host Adapters” on page 14 of “About This Manual.”



Note

If you are installing SCO UNIX products with a SCSI tape drive, set the tape drive to SCSI ID 2; if you are installing with a CD-ROM, set the CD-ROM drive to SCSI ID 5 as required by SCO.

The following driver package is available on the diskette titled “7800 Family Manager” for SCO UNIX and UnixWare:

- `alad`—Adaptec's 7800 Family driver for SCO 3.2 v4.2 based products (SCO UNIX 3.2 v4.2, SCO ODT 3.0, SCO OpenServer 3.0).
- `alad325`—Adaptec's 7800 Family driver for SCO OpenServer 5.

If you are performing a first time SCO UNIX installation, see “Installing SCO UNIX and the Driver” on page 70 to begin driver installation. If SCO UNIX is already installed in your system, see “Updating SCO UNIX With the Driver” on page 73.

The BTLD Process

The SCO UNIX BTLD (Boot Time Loadable Device) driver installation utility is used to install the driver package for SCO UNIX. The process allows SCO UNIX to use Adaptec products that have not been embedded into the SCO operating system. Without the BTLD process, new hardware could not be used until their device drivers were embedded in the next SCO product release. The steps to perform the BTLD process are described in the following section.



Note

SCO OpenServer 5 embeds the driver package for SCO UNIX and does not require the BTLD process.

Installing SCO UNIX and the Driver

This section describes how to install the `alad` driver at the same time you install SCO UNIX System V 3.2 v4.2, SCO ODT 3.0, or SCO OpenServer 3.0. If you are installing SCO OpenServer 5, follow the instructions provided with the SCO product to perform the initial installation (regular non-BTLD installation) of the embedded driver. If you then wish to update the embedded driver, follow the instructions in “Updating SCO UNIX With the Driver” on page 73.

If SCO UNIX System V 3.2 v4.2 or SCO OpenServer 3.0 is already installed and you wish to install or update the `alad` driver, see “Updating SCO UNIX With the Driver” on page 73.



Note

If you are changing the boot device from a non-SCSI hard disk to a SCSI hard disk attached to an Adaptec 7800 Family host adapter, you must reinstall SCO UNIX. If you are already booting from a SCSI hard disk and wish to boot from SCSI hard disk attached to an Adaptec 7800 Family host adapter, you may elect to either reinstall SCO UNIX with the new driver (as described in this section), or update SCO UNIX with the new driver (see “Updating SCO UNIX With the Driver” on page 73). If you have difficulty performing the driver installation or update, see “Booting the Computer from a SCSI Drive” on page 81.

At various points in the procedures you are instructed to follow the installation procedures in the SCO manuals. After completing those procedures, return to the instructions here and continue.



Note

For best results, the 7800 Family host adapter should be the *only* SCSI host adapter installed in your system when you perform the installation.

Follow these instructions only if you are installing SCO UNIX 3.2 v4.2, SCO ODT 3.0, or SCO OpenServer 3.0 for the first time. The instructions for installing the driver are the same for these SCO products.

1. Insert the SCO UNIX N1(Boot) floppy diskette into the primary floppy drive and turn on the computer.
2. When you see this message, type `link` and press <Enter>:

```
SCO UNIX System V/386
Boot
:
```

The screen then displays the following message:

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



Note

Remember that UNIX commands are *case sensitive*. Enter the commands exactly as shown in the instructions.

3. Type `alad` and press <Enter>. `alad` is the package name (or prefix) for the `alad` driver used with 7800 Family host adapters.
4. Next, this boot line and a series of prompts similar to the following appear:

```
fd(64)unix rootfd(96) swapram(0) swaplo32 ronly mem/p
link"alad" btldfd(x)
:
Loading kernel fd(x)unix .text.....
:
:
```

The `x` in the prompts above represents the minor number for your floppy boot drive. `x` is found by the operating system; you do not have to enter this minor number.

5. When you see this message

Please insert the fd(x)alad volume and press <Return>, or 'q' to quit:

insert the requested volume (7800 Family Manager diskette for SCO UNIX and UnixWare) and press <Enter>. Messages similar to the following appear until the driver is completely loaded.

```
alad.alad>Loading module fd(52)/alad/driver/alad/Driver.o
.text .....
:
:
alad: Driver "alad" successfully loaded.
```

6. When the following message appears, remove the 7800 Family Manager diskette for SCO UNIX and UnixWare, insert the UNIX N2 (Filesystem) diskette and press <Enter>:

Insert N2 (Filesystem) floppy and press <Return>

7. Turn to the appropriate SCO manual for instructions on completing an installation or upgrade of your operating system.



Note

For SCO UNIX 3.2 v4.2 *only*: When the run time installation is complete, make sure you select the Install Additional Software option. This ensures that the Link Kit is installed and available for later driver integration.

Follow the SCO manual installation instructions until you have reached and completed the Password procedure.

8. After completing the Password procedure, a message similar to the following appears:

```
The BTLD packages will now be added to the Link Kit.
The following packages are on this disk.
  Name  Description
  alad  Adaptec AIC-7870 Driver for SCO UNIX System
Please enter the names of the packages you
wish to install or q to quit:___
[default: alad]
```

9. Type `alad` and press <Enter>. The `alad` driver for your 7800 Family host adapter has been relinked to the SCO UNIX kernel.

Installation is complete.

Updating SCO UNIX With the Driver

This section describes how to update/install the 7800 driver for SCO UNIX if SCO UNIX 3.2 v4.2, SCO ODT 3.0, SCO OpenServer 3.0, or SCO OpenServer 5 is already installed. If you are installing SCO UNIX 3.2 v4.2 or SCO OpenServer 3.0 for the first time, see “Installing SCO UNIX and the Driver” on page 70. The instructions for installing/updating the driver are the same for all SCO products. Procedures that are specific to SCO versions are noted below.



CAUTION

Improper or corrupt driver updates might destroy your existing UNIX file system. Back up all important files before proceeding.



Note

If you are adding an additional 7800 Family host adapter to a system with a 7800 Family host adapter already present, skip to “Adding Devices with mkdev” on page 78. You may update the driver first by following steps 1 through 6.

The following summarizes the procedures needed to install or update the driver. Complete the procedures in the order the sections appear.



Note

To update/install the driver, you must first enter the Single User Mode (System Maintenance Mode).

- Performing a System Backup—Backs up the old UNIX kernel and any other important files.
- Using the Install Package—Uses `installpkg` to load the driver.
- Examining the `mcscli` File—If you want to change your primary host adapter to a 7800 Family host adapter, replace the string `spad`, `ad`, `arad`, `eiad`, or other string with `alad` for host adapter Number 0 (zero) in the `mcscli` (SCSI configuration master table) file. This replacement causes the driver to become a permanent part of the new boot kernel on rebuild.
- Rebuilding the UNIX Kernel—Rebuilds the kernel to reflect the new changes.
- Updating the Hardware Configuration—Configures the hardware using `SCSISelect` as explained in your host adapter's User's Guide.
- Booting the New Kernel—Reboots the computer with the new kernel.

Performing a System Backup

Back up all important files on the system by following these steps:



Note

Remember that UNIX commands are *case sensitive*. Enter the commands exactly as shown in the instructions. To back up the whole system, refer to your SCO manuals

1. Login as root.
2. (For SCO 3.2 v4.2 based UNIX) To back up the current kernel configuration, type the following and press <Enter>:

```
cp /unix /unix.orig
```

(For SCO OpenServer 5) To back up the current kernel configuration, type the following and press <Enter> after each line:

```
umount /stand
mount /etc/boot /stand
cp /stand/unix /stand/unix.orig
```



Note

If you ever need to bootup from the pre-update kernel, load the `unix.orig` backup kernel at the UNIX Boot: prompt. To do this, type `unix.orig` and press <Enter>.

3. This step is optional. For extra security, you may back up the `mdevice` file and the `sdevice.d` directory. Check the current directory sizes to help you decide if you want to devote the driver space to the backed-up files.

If you want to perform this extra backup, type the following and press <Enter>:

```
copy -rom /etc/conf /etc/conf.bak
```

If you ever want to restore the previous kernel configuration, the extra backup steps above ensure that the entire earlier system configuration can be restored. If you need to restore the previous configuration, boot up from the original kernel (see Booting from the Old Kernel on page 81), type the following and press Enter after each line:

```
mv /etc/conf /etc/conf.alad
mv /etc/conf.bak /etc/conf
```

Using the Install Package

1. At the UNIX system prompt, type `installpkg` and press <Enter>. The screen then displays these messages:

```
Confirm
Please insert the floppy disk
:
:
:
Strike ENTER when ready
or ESC to stop.
```

2. Insert the 7800 Family Manager diskette for SCO UNIX and UnixWare and press <Enter>. The screen then displays these messages:

```
Installation is in progress — do not remove the
floppy disk.
```

```
The following packages are on this disk:
```

Name	Description
alad	Adaptec AIC-7870 Driver v1.7 for SCO UNIX 3.2v4.2
alad325	Adaptec AIC-7870 Driver v1.7 for SCO OpenServer 5

```
Please enter the names of the packages you wish to
install, or q to quit:
```

3. At this point, type `alad` (type `alad325` for SCO OpenServer 5) and press <Enter>. The screen then displays this message and various installation status prompts:

```
Installing alad
```

When the driver is done loading, the following appears:

```
Installed alad
#
```

The `alad` driver has now been loaded into the Link Kit for kernel addition.

Examining the mscsi File

- 1. Enter this command:
`cd /etc/conf/cf.d`
- 2. Enter this command to copy the file:
`cp mscsi mscsi.org`
- 3. Use a text editor to edit this file. Enter the following command if using the vi editor:
`vi mscsi`
- 4. Search for all entries with the host adapter number 0 (zero). The host adapter number is the third column in each entry. For example:

Host Adapter Prefix	SCSI Device Driver	Host Adapter No.	Target ID	Logical Unit No.	Bus ¹
xx	Stp	0	2	0	0
xx	Sdsk	0	0	0	0
xx	Srom	0	5	0	0

¹ This field applies to SCO OpenServer 5 only.

- 5. Modify your mscsi file depending on your hardware configuration:
 - If you are booting from a 7800 Family host adapter, make sure the host adapter prefix for the host adapter number 0 is alad.
 - If you are not booting from a 7800 Family host adapter, make sure the host adapter prefix for the host adapter number 0 is the appropriate prefix for your primary Adaptec host adapter. See the table below:

Host Adapter Prefix	Type of Driver	Primary Adaptec Host Adapter
auto	embedded	AHA-1540/1640 family
auto	embedded	AHA-1740 family
auto	embedded	AIC-6260 family
arad	BTLD	AIC-7770 family
smad	BTLD	AIC-6260/630 family

- 6. Save the file and exit the text editor.

Rebuilding the UNIX Kernel

1. Type the following at the # prompt and press <Enter> after each line:

```
cd /etc/conf/cf.d  
./link_unix
```

Status messages appear.

2. When the kernel has been built, shut down the system by typing `haltsys` and pressing <Enter>.
3. Turn OFF the system power when you are prompted to do so.
4. Continue with the procedure “Updating the Hardware Configuration” below.

The UNIX kernel has been prepared for 7800 Family host adapter operation.

Updating the Hardware Configuration

Set up the proper switches and configuration using *SCSISelect* as explained in your host adapter's User's Guide.

Booting the New Kernel

1. Follow the onscreen instructions to reboot your system, usually by pressing <Enter>.
2. Check the host adapter BIOS messages to verify that all your installed SCSI devices are listed.
3. If some or all of your installed SCSI devices do not appear at this time your SCSI cables may be loose, or the SCSI device setup may not be complete. If so, go back and correct any problem before proceeding.
4. Wait for UNIX to complete bootup with the new kernel. Refer to “Troubleshooting” on page 80 if the system crashes or if panic (UNIX error) messages are displayed during bootup.

The `alad` driver for your 7800 Family host adapter should now be ready for use.

Adding Devices with `mkdev`

Follow the instructions in the SCO manuals for adding devices or a 7800 Family host adapter (to a system with a 7800 Family host adapter already present) using the `mkdev` command. Keep the following in mind:

`mkdev` asks for the device prefix. The 7800 Family driver package name, `alad`, is the prefix for the host adapter.

- When the system asks for the host adapter prefix, type `alad` and press <Enter>.
- Refer to the SCO UNIX Operating System Administration Guide for additional information on `mkdev` and adding devices to your system.

Using Wide SCSI Host Adapters and Devices

SCO UNIX 3.2 v4.2, SCO ODT 3.0, and SCO OpenServer 3.0 support SCSI IDs 0 to 7; SCSI IDs greater than 7 are not recognized. If your 7800 Family host adapter is a Wide SCSI adapter, only 7 SCSI devices (SCSI ID 0 to 6, with the host adapter set at SCSI ID 7) can be attached and supported.

SCO OpenServer 5 supports SCSI IDs 0 to 15. If your 7800 Family host adapter is a Wide SCSI adapter, up to 15 SCSI devices can be attached and supported.

Using Tunable Parameters for the `alad` Driver

For SCO UNIX, some parameters are defined in the following file:

```
/etc/conf/pack.d/alad/space.c
```

These parameters can be tuned for the `alad` driver (prefix for the 7800 Family driver). After modifying the `space.c` file, you must rebuild the kernel for the new parameters to take effect. The following section describes how to set the tunable parameters.

Setting Parameters

If the `space.c` file has not been modified, all the parameters are set according to the `SCSISelect` utility for your 7800 Family host adapter. However, you can override the parameters by modifying the `space.c` file. Changing the parameters is self-explanatory in the `space.c` file. Examples are provided in the following sections.

If you want to change the configured values, the first number indicates whether the default should be changed. If it is set to 0 (zero), the parameter is set to the default. If it is set to 1, the second number is used to override the default. For example:

```
char variable = {1,22};
```

The first number is 1 which overrides the default variable with the value 22.

Examples

- `alad_parity[SCSI_NALAD]`—specifies whether the host adapter checks parity on incoming SCSI data. If the second number is set to 0, parity checking is enabled. If it is set to 1, parity checking is disabled.
- `alad_parity[SCSI_NALAD]`—in this example you want the host adapter *not* to check parity on incoming SCSI data; define parameters as

```
alad_parity[SCSI_NALAD] = {1,0};
```

Other Information

The `alad` driver supports scatter/gather and tagged queuing. However, the `Sdsk` (SCSI disk module) driver controls whether these features are enabled and disabled. Look for the `Sdsk` driver controls in the `space.c` file. It is located at

```
/etc/conf/pack.d/Sdsk/space.c
```

Using Drives Over 1 GByte

SCO UNIX supports drives over 1 GByte. SCO UNIX has no limitation with drives over 1 GByte, and recognizes the drive whether Adaptec's Extended BIOS Translation feature is enabled or disabled in the `SCSISelect` utility. See the host adapter's User's Guide for more details on using drives over 1 GByte.

Troubleshooting

If your system crashes or displays panic messages during the boot-up procedure, try one of the following:

Checking Host Adapter BIOS Messages

- Make sure that BIOS messages appear for your primary 7800 Family host adapter. If not, the host adapter may not be properly configured; check the following:
 - The 7800 Family host adapter supports level-triggered interrupts and can share the same interrupt with another 7800 Family host adapter or PCI hardware that also supports level-triggered interrupts. Check your host adapter's User's Guide and your computer documentation for details in configuring IRQs and other parameters in the CMOS setup.
 - The Boot host adapters should be installed into the lowest PCI Device number. The Device number is determined by the slot number on the PCI bus.

To find out the Device number of your 7800 Family host adapter(s), run the *SCSISelect* utility (by pressing a key combination displayed onscreen at bootup). Look on the first screen of *SCSISelect* in the upper right hand corner for Bus:Device xx:xxh (given in hex).

If the Device number is high, move the 7800 Family host adapter to a PCI slot at the other end of the motherboard and rerun *SCSISelect* to see if the number is lower.

The host adapter LED lights during activity. This light helps to determine which adapter *SCSISelect* displays information for. Refer to your system documentation for further details on determining the PCI slot number and slot number order in the system.

- If booting from a 7800 Family host adapter and using ISA/EISA-based host adapters as secondary devices, you must disable the BIOS on all ISA/EISA-based host adapters.
- If booting from ISA/EISA-based host adapters and using a 7800 Family host adapter as a secondary device, see your ISA/EISA-based host adapter documentation to ensure the host adapter is at the lowest BIOS base address. ISA/EISA-based host adapters boot before the 7800 Family host adapters.

- Check the BIOS messages to verify that all installed SCSI devices are listed. If some or all devices do not appear, possible reasons are as follows:
 - SCSI cables may be loose.
 - Installed devices on the host adapter may have SCSI ID conflicts.
 - SCSI termination may be set incorrectly.
 - Some older SCSI peripherals, especially CD-ROM drives, do not properly respond to synchronous negotiation. As a result, these peripherals may lock or reset the SCSI bus. To solve this problem, turn off synchronous negotiation for this device ID through the *SCSISelect* utility for the host adapter. See the host adapter's User's Guide.

Booting From the Old Kernel

- Reboot the system.
- At the `Booting UNIX System...` prompt, type `unix.orig` and press <Enter>. Your system should now boot from the backup kernel you created prior to the driver update.

Booting the Computer from a SCSI Drive

- Make sure your host adapter is installed and configured correctly, as described in your host adapter's User's Guide. Here are some of the things you should check:



Note

If both SCSI and non-SCSI (e.g., IDE) disk drives are installed, then the non-SCSI disk drive is always the boot device.

- Be sure the Drives setting (in your computer's CMOS setup program) that corresponds to the SCSI boot drive is set to None or No Drives Installed, as is required for SCSI hard disk drives. (See your computer's documentation.)
- Be sure the Host Adapter BIOS setting in the *SCSISelect* utility is enabled.
- Be sure the Extended BIOS Translation feature in the *SCSISelect* utility is disabled. This feature is used only with MS-DOS 5.0 or above. You do not need to enable this option for SCO UNIX.

- Examine the SCO UNIX `mcsbi` file to make sure the correct host adapter and device are specified as the boot entry. The boot entry is the first all zero entry in the `mcsbi` file (see page 76 for additional information).

For SCO 3.2v4.2 based UNIX, the boot entry looks like this:

```
alad    Sdsk  0      0      0
```

For SCO OpenServer 5, the boot entry looks like this:

```
alad    Sdsk  0      0      0      0
```

⇒ Note

Each field is separated by a tab (do not use the spacebar to separate fields).

The meaning of each field is as follows:

Host Adapter Prefix	SCSI Device Type	Host Adapter No.	Target ID	Logical Unit No.	Bus ¹
alad	Sdsk	0	0	0	0

¹ This field applies to SCO OpenServer 5 only.

- Host Adapter Prefix—Identifies the name of the host adapter driver. If you are booting from a 7800 Family host adapter, the Host Adapter Prefix must be `alad`.
- SCSI Device Type—Identifies the type of SCSI device. For example, `Sdsk` indicates that the device is a hard disk; `Srom` indicates a CD-ROM drive; and `Stp` indicates a tape drive.
- Host Adapter Number—Identifies the SCSI host adapter that the SCSI device is attached to. For example, the first 7800 Family host adapter is 0, the second 7800 Family host adapter is 1.
- ID—Identifies the SCSI ID of the SCSI device.
- Logical Unit Number—Identifies the Logical Unit Number of the SCSI device. This field is usually 0.
- Bus—Identifies the SCSI bus that the SCSI device is attached to. For most single channel devices such as the AHA-2940/2940W, the Bus number is 0.

If you need to edit the `mcsbi` file, use the `vi` editor. You must build a new kernel in order for any changes to take effect (see page 77).



About This Chapter

Read this chapter to find out about

- Installing and/or updating the 7800 Family driver for UnixWare
- Using multiple host adapters with UnixWare
- Removing the driver
- Information to assist you in troubleshooting problems that may occur after driver installation

Installation Overview

This chapter provides the information needed to install and use the Adaptec 7800 Family Manager (driver) for UnixWare 1.x and 2.x. The 7800 Family driver for UnixWare supports all Adaptec 7800 Family host adapters listed in “Adaptec 7800 Family Host Adapters” on page 14 of “About This Manual.”

The following driver packages are available on the diskette titled “7800 Family Manager” for SCO UNIX and UnixWare.

- `ads1`—Adaptec's 7800 Family driver for UnixWare 2.x.
- `ads10`—Adaptec's 7800 Family driver for UnixWare 1.x.

If you are performing a first time UnixWare installation, see “Installing UnixWare and the Driver” on page 84 to begin driver installation.

If UnixWare is already installed in your system, see “Updating UnixWare With the Driver” on page 89.

Driver Installation Process

The 7800 Family driver for UnixWare is installed in one of two ways: linked-and-integrated with the UnixWare kernel, or loadable to start running after the kernel has loaded into memory.

For installations on computers that boot from a SCSI device connected to an Adaptec 7800 Family host adapter, the driver must be linked directly to the kernel. If the computer does not boot from a device connected to an Adaptec 7800 Family host adapter, the driver may be installed as loadable. Linked and loadable driver installations are done as follows:

- When performing a *new* UnixWare installation, the operating system determines whether your computer boots from the host adapter SCSI bus. The driver is automatically installed as loadable, or link-edited with the kernel to suit your computer.
- When performing a driver update installation, UnixWare assumes that your computer does not boot from a device connected to the host adapter SCSI bus. If your computer should boot from the host adapter SCSI bus, you must perform the simple edit described in “Modifying the New System File” on page 91.

UnixWare and Drives Over 1 GByte

UnixWare 1.x and 2.x do not support Extended BIOS Translation. If you have a hard drive larger than 1 GByte, you *must* disable this feature on your host adapter before installing or updating the driver.



Note

After changing the setting of the Extended BIOS Translation feature, be sure to partition and high-level format the drive. See the host adapter's User's Guide for more details on using drives over 1 GByte.

Installing UnixWare and the Driver

This section describes how to install the 7800 Family driver at the same time you install UnixWare 1.x or 2.x. If UnixWare 1.x or 2.x is already installed and you wish to install or update the `ads1` driver, see “Updating UnixWare With the Driver” on page 89.

Performing a UnixWare 1.x Installation

Follow these instructions only if you are installing UnixWare 1.x for the first time. Be sure to read the installation documentation included with your UnixWare distribution package and complete the following procedures in the order they appear:

- Setting the SCSI controller interrupt to IRQ 10
- Installing UnixWare 1.x
- Loading the Drivers onto the Hard Disk



Note

The UnixWare 1.x operating system allows for only eight SCSI buses in the computer system. This means you can install no more than eight host adapters.

Setting the SCSI Controller Interrupt to IRQ 10

Follow these instructions to ensure that the onboard controller is at IRQ 10. Although you could perform these steps by using the Advanced CMOS Setup, it is preferable to use the System Configuration Utility:

1. Insert the System Configuration Utility (SCU) diskette in drive A: and reboot the server system.
2. Use the SCU to ensure that the primary AIC-78x0 SCSI controller is set to IRQ 10.



Note

When installing UnixWare 1.x, all installed 7800 Family host adapters must use IRQ 10 and will not work with other IRQs. When installing UnixWare 2.x, any IRQ can be used.

When initial installation of UnixWare 1.x is complete, the IRQ can be changed to another supported IRQ as long as there are no conflicts with the IRQ of another host adapter. The IRQ in the SCU (or CMOS setup) must correspond to the IRQ in the configuration table.

3. Save the configuration changes, exit the SCU and reboot, making sure to remove the SCU diskette before the system boots.
4. If you need to change the host adapter configuration, follow the instructions given in the host adapter's User's Guide for using the *SCSISelect* utility.

Installing UnixWare 1.x

Follow these instructions to load the UnixWare operating system and `adslo` driver into memory from the UnixWare distribution media and the IHV HBA diskette (or the 7800 Family Manager diskette for SCO UNIX and UnixWare). Refer to the UnixWare Installation Guide for more information.

1. Insert Diskette 1 of the UnixWare 1.x Boot Package into the floppy boot drive. Turn on the computer.
2. Follow the onscreen instructions to boot (usually by pressing <F1>). The UnixWare operating system starts to load.
3. When prompted to insert the Host Bus Adapter Drivers Diskette, insert the IHV HBA driver diskette (or 7800 Family Manager diskette for SCO UNIX and UnixWare) into the primary floppy drive and press <Enter>. As the `adslo` driver loads, a message identifying the located host adapter briefly appears on screen.



Note

You cannot load the `adslo` driver from a secondary floppy drive.

4. Follow the onscreen instructions to load the UnixWare operating system. Refer to the operating system documentation and onscreen help files for help in choosing options.
 - The installation program instructs you to load the second and third UnixWare boot and Foundation Set diskettes.
 - Then the installation program instructs you to choose a media format for the Foundation Set software. If the media type for the device you connected for the Foundation Set software media does not appear as a choice, the device may not have been recognized when the driver was loaded into memory.
 - The UnixWare 1.x optional online explanation of the installation process can be accessed at this time. If this is your first time, the information may be valuable to you.
5. At the end of this part of the installation process you are prompted to insert the HBA Diskette(s) that you used before. Continue with the next section.

Loading the Drivers Onto the Hard Disk for UnixWare 1.x

Follow these instructions to copy the drivers to the hard disk, and relink the kernel:

1. Insert the IHV HBA driver diskette (or 7800 Family Manager diskette for SCO UNIX and UnixWare), and press <Enter>.
2. Follow the instructions onscreen to finish the installation. Refer to the operating system documentation for help in choosing options.
3. Remove the IHV HBA diskette (or 7800 Family Manager diskette for SCO UNIX and UnixWare) when prompted to do so.
4. After the installation, restart the computer, login, set the user-level, etc. The UnixWare operating system E-mail utility notifies you that there are messages in your mailbox.
5. Check your UnixWare mailbox for an E-mail message on the status of the installed `ads10` driver package.

Your UnixWare installation should now be complete.



Note

If your installation fails, do not attempt to use the update installation `pkgadd` procedure to fix the installation. Follow the instructions in the UnixWare 1.x documentation and this document to retry the installation.

Performing a UnixWare 2.x Installation

Follow these instructions only if you are installing UnixWare 2.x for the first time.

1. Insert the Install Diskette of the UnixWare 2.x package into the floppy boot drive. Reboot your computer.
Wait for the first UnixWare 2.x installation screen and prompt and then follow the onscreen instructions.
2. When prompted to either Install Host Bus Adapter Drivers or Continue Installation, first remove the Install Diskette, then select Install Host Bus Adapter Driver and press <Enter>.
3. Insert the HBA driver diskette (or 7800 Family Manager diskette for SCO UNIX and UnixWare) into the primary floppy drive and press <Enter>. As the driver loads, a message identifying the located host adapter briefly appears on screen. The installation process determines which device drivers on the diskettes are needed.

⇒ **Note**

You cannot load drivers from a secondary floppy drive.

4. If you have additional HBA diskettes, insert the next HBA diskette, select Install Another HBA Diskette, and press <Enter>.
If all of your HBA diskettes have been installed, remove the last HBA diskette, select Continue Installation, and press <Enter>.
5. If necessary, enter the DCU (Device Configuration Utility) to review/change the UnixWare device driver configuration data.
6. Follow the onscreen instructions to continue with the installation. Refer to the operating system documentation and onscreen help files for help in choosing options.
7. When prompted, you are asked to reinsert the specific HBA Diskette(s) that you used before.
8. Follow the onscreen instructions to complete the UnixWare installation.

⇒ **Note**

If your installation fails, do not attempt to use the update installation `pkgadd` procedure to fix the installation. Follow the instructions in the UnixWare documentation and in this document to retry the installation.

Updating UnixWare With the Driver

This section describes how to update/install the `ads1` driver if UnixWare 1.x or 2.x is already installed. If you are installing UnixWare 1.x or 2.x for the first time, see “Installing UnixWare and the Driver” on page 84. The instructions for updating the driver are similar for both UnixWare 1.x and 2.x. Procedures that are specific to a UnixWare version are noted below.



CAUTION

Improper or corrupt driver updates might destroy your existing UnixWare file system. Back up all important files before proceeding. Consult your UnixWare manuals for proper backup procedures.

The following is an overview of the procedures needed to update/install the driver. Complete the procedures in the order the sections appear:

- **Backing Up the Computer**—Backs up the old UnixWare kernel and any other important files.
- **Loading the Package**—Uses `pkgadd` to load the 7800 Family driver package.
- **Modifying the New System File**—For computers booting from a device connected to a 7800 Family host adapter, modifies the new driver that was loaded in the previous procedure. Loading the driver causes the driver to become a permanent part of the new boot kernel on rebuild.
- **Building the Loadable Modules (UnixWare 1.x Only)**—Builds the loadable modules for the driver(s).
- **Rebuilding the UnixWare Kernel**—Rebuilds the kernel with the new driver.
- **Booting the New Kernel**—Reboots with the new kernel.



Note

Remember that UnixWare commands are *case sensitive*. Enter the commands exactly as shown here.

Backing Up the Computer

If you have not already done so, back up all important files on the computer. Consult your UnixWare documentation for proper UnixWare file system backup procedures.

1. Login as root at the UnixWare # system prompt.
2. To back up the old UnixWare kernel, type the following and press <Enter>:

```
cp /stand/unix /stand/unix.work
```

Loading the Package

1. *For UnixWare 1.x Only:* Delete the old driver by typing the following and pressing <Enter>:

```
/etc/conf/bin/idinstall -d adslo
```

For UnixWare 2.x Only: Delete the old driver by typing the following and pressing <Enter>:

```
/etc/conf/bin/idinstall -d adsl
```

2. At the system prompt, type the following and press <Enter>:

```
pkgadd -d diskette1
```

Follow the instructions onscreen to insert the IHV HBA diskette (or 7800 Family Manager diskette for SCO UNIX and UnixWare) into the floppy boot drive.

3. *For UnixWare 1.x:* Select the `ihvhba` package from the onscreen menu and press <Enter>. The package is loaded into your UnixWare operating system.

For UnixWare 2.x: Select the `adsl` package from the onscreen menu and press <Enter>. The package is loaded into your UnixWare operating system.

4. When the package has loaded, you may be prompted to install the diskette again.

Do not reinsert the IHV HBA diskette (or 7800 Family Manager diskette for SCO UNIX and UnixWare). Instead, type `q` (quit) and press <Enter>.

5. Type `mail` and press <Enter>. The mail messages tell you if the installation was successful.

If a mail message informs you that the installation has failed, turn to “Troubleshooting” on page 96.

6. Type `pkginfo` and press <Enter>.
7. Verify that the driver is now listed. The host adapter driver appears among the other installed packages.

If the host adapter does not appear in the `pkginfo` listing, turn to “Troubleshooting” on page 96.

For UnixWare 1.x: The listing should be similar to

```
system  ihvhba  Adaptec AIC-7870 PCI SCSI IHV HBA
```

For UnixWare 2.x: The listing should be similar to

```
system  adsl   Adaptec AIC-7870 PCI SCSI IHV HBA
```

Modifying the New System File

If your computer *is to boot* from a device connected to a 7800 Family host adapter, follow these steps to modify the new driver system file that was loaded in the previous section.

If your computer *is not to boot* from the host adapter SCSI bus, and you wish to leave the driver as a loadable module, skip to “Building the Loadable Modules (UnixWare 1.x Only)” on page 92 for UnixWare 1.x and Rebuilding the UnixWare Kernel” on page 92 for UnixWare 2.x.

1. Back up the `adsl` or `adslo` UnixWare configuration file. To do this, type the following and press <Enter> after each line:

```
cd /etc/conf/sdevice.d
cp adslo /save/adslo.org      For UnixWare 1.x
cp adsl  /save/adsl.org       For UnixWare 2.x
```

2. *For UnixWare 1.x:* Use the `vi` text editor to remove the following line from the `adslo` configuration file:

```
$loadable adslo
```

For UnixWare 2.x: Use the `vi` text editor to add the following line immediately below the `$version 2` line in the `adsl` configuration file:

```
$static
```

3. Display the contents of the edited `adsl` or `adslo` file by typing the following and pressing <Enter>:

```
cat adslo      For UnixWare 1.x
cat adsl       For UnixWare 2.x
```

For UnixWare 1.x: Verify that the line `$loadable adslo` is not present.

For UnixWare 2.x: Verify that the line `$static` is present immediately below the line `$version 2`.

Building the Loadable Modules (UnixWare 1.x Only)

If your computer *is to boot* from a device on the host adapter SCSI bus, skip to Rebuilding the UnixWare Kernel below.

If your computer *is not to boot* from a device on the host adapter SCSI bus and you left the `$loadable adsl` line in the `adslo` file, type these commands to build the loadable modules for the driver(s).

```
cd /etc/conf/bin
./idbuild -M adslo
```

Rebuilding the UnixWare Kernel

1. Type the following at the `#` prompt and press `<Enter>` after each line:

```
cd /etc/conf/bin
./idbuild -B
```

Status messages appear.

2. When the kernel has been built, type the following and press `<Enter>` after each line (0 in `-g0` is zero, not the letter O):

```
cd /etc/conf/cf.d
cp unix /stand/unix
cd /
shutdown -g0
```

3. Type `<y>` and press `<Enter>` when the computer asks if you really want to shut down. System Is Down should appear on the screen.

The UnixWare kernel is now ready for host adapter operation.

Booting the New Kernel

1. Follow the onscreen instructions (usually by pressing <Enter>) to reboot your computer.
2. Check the bootup messages to verify that all your installed SCSI devices are listed. If some or all of your installed SCSI devices do not appear at this time your SCSI cables may be loose, or the SCSI device setup may not be complete. Refer to your computer's troubleshooting and SCSI configuration documentation.
3. Wait for UnixWare to complete bootup with the new kernel. Refer to "Troubleshooting" on page 96 if the computer crashes or if panic (UnixWare error) messages appear during bootup.

Your updated driver for UnixWare should now be ready to use.

Using Tunable Parameters

For UnixWare, some parameters are defined in the following files:

```
/etc/conf/pack.d/adslo/space.c    (for UnixWare 1.x)
/etc/conf/pack.d/adsl/space.c      (for UnixWare 2.x)
```

These parameters can be tuned for the `adsl` and `adslo` drivers. Please refer to the comments in the appropriate `space.c` file for a description of these parameters. After modifying the `space.c` file, you must rebuild the kernel for the new parameters to take effect.



Note

The `adsl` and `adslo` drivers support tagged queuing and reinitialization.

Using Multiple Host Adapters

When using multiple host adapters, consider the following:

- When installing UnixWare 1.x and multiple host adapters, make sure all PCI channels are set to IRQ 10. All 7800 Family host adapters must use IRQ 10 and will not work with other IRQs. When installing UnixWare 2.x, any IRQ can be used.



Note

When initial installation of UnixWare is complete, the IRQs can be changed to another supported IRQ as long as there are no conflicts with the IRQ of another host adapter. The IRQ in the CMOS setup must correspond to the IRQ in the configuration table.

- Configure the hardware for multiple host adapters as explained in the host adapter's User's Guide.
- For booting from the 7800 Family host adapter, set the host adapter to the lowest PCI Device number. See your host adapter's User's Guide.
- *For UnixWare 1.x:* If you skip a host adapter in a PCI slot, disable the host adapter BIOS (see the host adapter's User's Guide). Enable the channel in the `sdevice.d` file by selecting Y at the line
`/etc/conf/sdevice.d/adsl.`
- UnixWare 2.x supports auto-configuration. When adding multiple host adapters to an existing UnixWare 2.x system, simply install the board and reboot; the system automatically reconfigures and rebuilds the kernel. If you want to choose a host adapter to boot from, simply disable the BIOS on all other host adapters.

Removing the Driver

If you no longer need the `adsl` or `adslo` driver, you can use the following procedure to remove it completely:

1. Back up all important computer files.
2. *For UnixWare 2.x:* At the UnixWare root prompt, type the following:

```
/etc/conf/bin/idinstall -d adsl
```

These files will be deleted:

```
/etc/conf/mdevice.d/adsl  
/etc/conf/pack.d/adsl/Driver.o  
/etc/conf/pack.d/adsl/space.c  
/etc/conf/pack.d/adsl/disk.cfg  
/etc/conf/sdevice.d/adsl
```

For UnixWare 1.x: At the UnixWare root prompt, type the following:

```
/etc/conf/bin/idinstall -d adslo
```

These files will be deleted:

```
/etc/conf/mdevice.d/adslo  
/etc/conf/pack.d/adslo/Driver.o  
/etc/conf/pack.d/adslo/space.c  
/etc/conf/pack.d/adslo/disk.cfg  
/etc/conf/sdevice.d/adslo
```

3. Then, rebuild the kernel (0 in `-g0` is zero, not the letter O):

```
/etc/conf/bin/idbuild -B -K  
cp /etc/conf/cf.d/unix /unix  
cd /  
shutdown -g0
```

4. Reconfigure your computer for your alternate or replacement drive controller, and reboot the computer.

Troubleshooting

If your computer crashes or displays panic messages during the bootup procedure, try one of the following:

Boot From the Old Kernel

1. Reboot the computer.
2. At the `Booting UNIX System...` prompt or loading UnixWare graphics, press the `<Spacebar>`.
3. For UnixWare 1.x: The computer asks which kernel you want to boot. Type the name of the old kernel (e.g., `unix.work`) and press `<Enter>`. Your computer should now boot from the backup kernel created earlier in “Updating UnixWare With the Driver” on page 89.

For UnixWare 2.x: From the `[boot]#` prompt, first type `KERNEL=<old_kernel>` (e.g., `KERNEL=unix.work`) and press `<Enter>`. Then type `go` and press `<Enter>`. Your computer should now boot from the backup kernel created earlier in “Updating UnixWare With the Driver” on page 89.

Repeat the Update Installation

1. Follow the instructions in “Removing the Driver” on page 95 to delete the driver from your computer.
2. Perform the driver update procedure again. See “Updating UnixWare With the Driver” on page 89.



Error Messages for EZ-SCSI

A

About This Appendix

Read this appendix to find out

- The meaning of error messages generated by EZ-SCSI software programs
- How to understand and correct the problems that cause the error messages

Error message entries are listed alphabetically. The filename(s) in parentheses at the end of each error message entry indicates which program generates the error message.

aspindos.sys Installation Failed

The ASPI manager was not loaded. This message usually follows some other message, such as Not enough memory available to load driver. Check /q setting, /p setting, termination, I/O port address, and IRQ settings. Disconnect all SCSI devices from the SCSI bus and try to boot the computer. If the ASPI manager still does not load, the problem is with the host adapter. If it does load successfully, reconnect the SCSI devices one at a time, rebooting after each device until you identify which one is causing the problem. (aspi4dos, aspi2dos, aspi7dos, aspi8dos)

aspiedos.sys Installation Failed

aspiedos was not loaded. This message usually follows some other error message, such as Not enough memory available to load driver. Ensure that the AHA-1740/1742 is running in Enhanced Mode, as set by the system configuration utility. Check termination, I/O port address, and IRQ/DMA settings. Disconnect all SCSI devices from the SCSI bus and try to boot the computer. If aspiedos still does not load, the problem is with the host adapter. If aspiedos does load successfully, reconnect the SCSI devices one at a time, rebooting after each device, until you identify which one is causing the problem. (aspiedos)

CD-ROM driver NOT LOADED: no valid devices present

The `aspidcd` device driver did not find any installed CD-ROM drives on the SCSI bus. Be sure that the CD-ROM drive is powered, check SCSI termination, and be sure the CD-ROM drive's SCSI ID is not the same as some other device's SCSI ID. (`aspidcd`)

Command line arguments are incorrect

You did not enter the `aspidisk` command line options correctly. See “Command Line Options” on page 127. (`aspidisk`)

Driver load aborted by user

When you booted your computer you prevented the ASPI manager from loading by taking one of the actions described in “Preventing the ASPI Manager from Loading” on page 105 in Appendix B. (`aspi4dos`, `aspi8dos`, `aspi2dos`, `aspi7dos`, `aspi8dos`)

Error: Adaptec ASPI device driver not available

CD-ROM driver NOT LOADED: no valid Adaptec host adapter

`aspidcd` cannot load because no ASPI manager is installed on your computer. (`aspidcd`)

Error in Adaptec Host Adapter Inquiry request

CD-ROM driver NOT LOADED: no valid Adaptec host adapter

`aspidcd` could not find an installed host adapter. Verify that the host adapter is seated firmly in the slot, the SCSI bus is terminated correctly, and the cables are connected securely. (`aspidcd`)

Error issuing SCSI Inquiry command

`aspidisk` cannot load because it got no response when it issued a SCSI Inquiry command. Check the SCSI bus termination, SCSI parity settings, and cable connections. (`aspidisk`)

Failed checking for scatter/gather mode

`aspi4dos` could not determine whether your host adapter supports Scatter/Gather. Check for hardware conflicts in your system. Be sure that the host adapter is configured correctly and that it is seated firmly in the slot. Try setting the host adapter to the lowest possible DMA transfer rate. (`aspi4dos`)

Failed scanning for SCSI devices

The driver did not find any SCSI devices on the SCSI bus. Be sure that all SCSI devices are powered up, that the SCSI bus is properly terminated, and that cables are securely connected. (aspi4dos, aspiedos, aspi7dos, aspi8dos)

Failed to hard reset the host adapter

aspi4dos was unable to issue a hard reset to the host adapter. Be sure that there are no system conflicts with IRQ, DMA, port address, or BIOS address. Be sure the host adapter is configured correctly, and that it is firmly seated in the slot. Set the host adapter to the lowest possible DMA transfer rate. Check SCSI bus termination, SCSI parity, and cable connections. (aspi4dos)

Failed to read, or invalid, boot record.

aspidisk could not read data from a disk, or the data read from the disk was invalid. This may occur if the drive is not partitioned, not formatted, or defective. Run scsifmt to low-level format the drive, or run afdisk. (aspidisk)

Host Adapter N1, Target SCSI ID=N2 [CD-ROM drive make and model] (for Data-Mode only)

aspidc detected a nonsupported model of CD-ROM drive connected to host adapter N1 with a SCSI ID of N2. This drive can be used in data mode, but not for audio CD play. (aspidc)

Host adapter at port address xxx failed diagnostics.

The aspi2dos diagnostic failed at port address xxx (140h or 340h). Possible reasons for the error include the following:

- The port address specified by the /p option does not match the hardware jumpers.
- There is no host adapter at the specified port address, or the host adapter is not seated firmly in the slot.
- The I/O port used by the host adapter is also used by another board in the system or by the system board itself. (The host adapter uses I/O address 140h-15Fh for /p140 and I/O address 340h-35Fh for /p340.)
- The host adapter is defective.

If the host adapter jumpers are set to 340h, change the command line option to /p340. If the jumpers are set to 140h, change the option to /p140. Check SCSI bus termination, SCSI parity, and cable connections. (aspi2dos)

Host adapter diagnostics failed - "foreign" adapter may be present

You are trying to use `aspi4dos` with a non-Adaptec host adapter.
`aspi4dos` only works with Adaptec products. (`aspi4dos`)

Host adapter not found at user entered slot location

The `/s` option you entered does not match the host adapter's physical slot location. Verify the host adapter's slot number and correct the `/s` option. Host adapter slot numbers are included in the ASPI manager message that appears on the screen when you boot your computer. (`aspiedos`, `aspi7dos`, `aspi8dos`)

Invalid /ccbs count

You have entered an invalid `/ccbs` setting on the command line. Only numeric characters are valid. (`aspi4dos`, `aspiedos`)

Invalid command line entered

You have entered an invalid command line setting. Correct the entry and boot the computer again. (`aspiedos`, `aspi7dos`, `aspi8dos`)

Invalid DOS version.

`aspidisk` was not loaded because you are using a version of DOS that is not supported. Obtain a current version of DOS 6.22 or higher and install it on your server system. See "System Requirements" on page 19. (`aspidisk`)

Invalid entry for 'command line option' setting

You have entered an invalid setting or value for this command line option. (The name of the option, such as `/b` or `/n`, appears between the single quotes, in place of the words command line option.) Check the entry for typing errors. (`aspi2dos`, `aspi4dos`, `aspiedos`, `aspi7dos`, `aspi8dos`)

No SCSI logical drives to support.

`aspidisk` was not loaded because it did not find any logical disk drives to support. (`aspidisk`)

The possible reasons for this error are as follows:

- No SCSI disk drives are connected to the SCSI bus.
- All SCSI disk drives are controlled by the host adapter BIOS.
- The SCSI disk drives are not partitioned.

Not enough memory available to load driver

This error occurs under DOS 5.0 or above when an ASPI manager is loaded high with the `devicehigh=` statement and not enough upper memory is available. Use `device=` to load the driver into conventional (low) memory. (`aspi2dos`, `aspi4dos`, `aspi8dos`, `aspi7dos`, `aspi8dos`)

Not handled by aspidisk.sys.

You are trying to format a disk device, such as a Floptical disk, that is controlled by another device driver. Floptical disks cannot be formatted with `aspidisk`. (`aspidisk`)

SCSI present but not enabled/configured for slot # xx.

Your system does not recognize the host adapter because you did not run the system configuration utility after you installed it. Run the system configuration utility and then reboot your system. (`aspi7dos`)

Unable to find any AIC-7770

No AIC-7770 SCSI host adapter chip was found in your computer. Be sure that the chip is properly installed, then reboot your system. (`aspi7dos`)

Unable to find any AIC-78xx

No AIC-7870 or AIC-7880 SCSI host adapter chip was found in your computer. Be sure that the chip is properly installed, then reboot your system. (`aspi8dos`)

Unable to find any enhanced mode AHA-1740/1742/1744 host -adapter(s)

No AHA-1740/1742/1744 host adapter running in Enhanced Mode was found in your system. Reconfigure the host adapter to Enhanced Mode with the system configuration utility. (`aspi8dos`)

Unable to find host adapter in POS registers

No AHA-1640 host adapter was found in your system. Install the host adapter and reboot your system. (`aspi4dos`)

Unable to initialize host adapter mailboxes

`aspi4dos` was unable to initialize the host adapter's mailbox base address. Be sure there are no hardware conflicts within your system, that the host adapter is correctly configured, and that it is firmly seated in the slot. Check SCSI bus termination, SCSI parity, and cable connections. (`aspi4dos`)

Unable to open ASPI Manager!

No ASPI manager is loaded. Be sure that the ASPI manager is loaded before `aspidisk` in `config.sys` and that the command line options are entered correctly. Be sure the path is entered correctly in the `device=` statement. (`aspidisk`)

Unable to read configuration from host adapter

`aspi4dos` could not read the host adapter's configuration settings. Be sure there are no hardware conflicts in your computer, that the host adapter is configured correctly, and that it is firmly seated in the slot. Check SCSI bus termination, SCSI parity, and cable connections. (`aspi4dos`)

Unable to set Bus Master transfer rate

The driver could not set the host adapter's Bus Master DMA transfer rate. Be sure that there are no hardware conflicts in your computer, that the host adapter is configured correctly, and that it is firmly seated in the slot. Check SCSI bus termination, SCSI parity, and cable connections. (`aspi4dos`)

Unable to set bus on/off timing

`aspi4dos` could not set the host adapter's bus-on or bus-off time. Be sure that there are no hardware conflicts in your computer, that the host adapter is configured correctly, and that it is firmly seated in the slot. Check SCSI bus termination, SCSI parity, and cable connections. (`aspi4dos`)

WARNING: Maximum number of DOS logical drives (A: to Z:) reached.

Your system has reached the maximum of 24 drive letters (c through z) allowed for logical hard drives. This warning does not prevent the driver from loading. (`aspidisk`)

Warning!!! Slot # xx AHA-1740/1742/1744 - Not configured for enhanced mode

Configure the host adapter(s) to operate in Enhanced Mode, and use the `/s` command line option to indicate which host adapter(s) should be installed when the computer boots. (`aspiedos`)



About This Appendix

Read this appendix to find out

- What an ASPI manager does
- Which Adaptec host adapters are supported by each ASPI manager
- How to use the ASPI managers with Windows
- Which command line options are available for each ASPI manager

Introduction to ASPI Managers

ASPI (Advanced SCSI Programming Interface) managers are software modules that enable communication between ASPI device drivers, a host adapter, and the SCSI devices connected to the host adapter. ASPI managers are written for a specific operating system, such as DOS, and a specific family of Adaptec host adapters.

Adaptec EZ-SCSI includes several ASPI managers for DOS/Windows. The following table shows which Adaptec products each ASPI manager supports:

ASPI Manager	Supported Host Adapters
<code>aspi4dos.sys</code>	AHA [†] -1540B/1542B AHA-1540C/1542C AHA-1540CF/1542CF AHA-1540CP/1542CP AHA-1640 AHA-1740/1742/1744 (in Standard Mode) AHA-1740A/1742A (in Standard Mode) AMM-1540CM

Continued

ASPI Manager	Supported Host Adapters
<code>aspiedos.sys</code>	AHA-1740/1742/1744 (in Enhanced Mode) AHA-1740A/1742A (in Enhanced Mode)
<code>aspi2dos.sys</code>	AVA-1505/1515 AHA-1510/1520/1522 AHA-1510A/1520A/1522A AHA-1530P/1532P AHA-2820/2822/2825 AIC-6260/AIC-6360 AMM-1510M AMM-1570 APA-1460 Adaptec SlimSCSI
<code>aspi7dos.sys</code>	AHA-2740/2742/2740T/2742T AHA-2740A/2742A/2740AT/2742AT AHA-2740W/2742W AHA-2840A/2842A AHA-2840VL/2842VL AIC-7770
<code>aspi8dos</code>	AHA-2940/2940W AHA-3940/3940W AIC-7850/AIC-7870/AIC-7880 APC-7850
<code>ma160</code>	T160/T260
<code>ma348</code>	APA-348 Adaptec MiniSCSI Plus, Trantor T348
<code>ma358</code>	APA-358 Adaptec MiniSCSI EPP, Trantor T358
<code>ma460</code>	APA-460 Adaptec SlimSCSI

EZ-SCSI detects what kind of host adapter is installed in your computer and automatically configures your system with the correct ASPI manager. You will probably not need to change the ASPI manager configuration. If you do, however, you can find complete information in this appendix about all the configuration options.

Reasons for Using ASPI Managers

You can use Adaptec host adapters without an ASPI manager, even if you have more than two SCSI hard disk drives in a server system (assuming you use recent versions of DOS). However, you need an ASPI manager if you want to:

- Install and use two or more host adapters in your computer.
- Control SCSI devices that are not under host adapter BIOS control.
- Install and use a CD-ROM drive, SCSI tape drive, or removable-media drive.
- Change the host adapter configuration with the command line options described in this appendix.

Displaying ASPI Manager Information

When you install Adaptec EZ-SCSI it detects what kind of host adapter is installed in your computer and adds a line to the `config.sys` that loads the appropriate ASPI manager in memory when you boot your computer.

When you boot your computer the ASPI manager displays information about your computer's host adapter and installed SCSI devices on the screen. The information that appears on your monitor may differ, depending on what kind of host adapter and SCSI devices you have.

This information appears because EZ-SCSI automatically added a `/d` option at the end of the line in your `config.sys` file that loads the ASPI manager.

If you remove the `/d` option a brief ASPI manager message appears at bootup, but it does not include information about your SCSI devices. We recommend that you not remove the `/d`, because the information in the more detailed boot-time message is helpful in understanding your system configuration.

Preventing the ASPI Manager From Loading

If you wish, you can prevent the ASPI manager from loading into memory when you boot your computer. Use this method with DOS 6.0 and above:

1. When the words `Starting MS-DOS ...` appear on the screen, press `<F8>`. MS-DOS displays the following text:

MS-DOS will prompt you to confirm each `CONFIG.SYS` command.

2. Read each line of the `config.sys` file as it appears on the screen. Press `<Y>` each time you are prompted, until you see a line similar to this:

```
device=c:\scsi\aspi4dos.sys /d
```

or

```
devicehigh=c:\scsi\aspi2dos.sys /d
```

3. Press `<N>` to skip this line and prevent the ASPI manager from loading into memory.
4. Press `<Y>` to accept any other lines of the `config.sys` file.
5. When MS-DOS finishes processing the `config.sys` file, it displays the following prompt:

```
Process AUTOEXEC.BAT [Y, N]?
```

Press `<N>` to bypass the `autoexec.bat` file. Your computer now continues to boot.

Using ASPI Managers With Windows

The EZ-SCSI ASPI managers are fully compatible with Microsoft Windows 3.1 and above.

When you install EZ-SCSI for Windows, the two files `winaspi.dll` and `vaspid.386` are copied to the `Windows\system` subdirectory. These files form the ASPI-to-Windows interface.

The aspi4dos ASPI Manager

The table on page 103 lists the host adapters that `aspi4dos` supports.

Adaptec EZ-SCSI includes the `aspibuf` double-buffering driver. You can use `aspibuf` with `aspi4dos` to overcome the 16 MByte memory addressing limitation of the ISA bus, if your computer has more than 16 MBytes of memory. For more information, see “Device Driver for Double Buffering” on page 132.

“Displaying ASPI Manager Information” on page 105 explains the `aspi4dos` information that appears on your monitor when you boot your computer. “Preventing the ASPI Manager From Loading” on page 105 explains how you can temporarily prevent `aspi4dos` from loading into memory without changing the `config.sys` file.

Command Line Options

You can type command line options in lowercase or uppercase letters. Start each option with a forward slash, and leave at least one blank space between options on the same line. Here is an example:

```
device=c:\scsi\aspi4dos.sys /d /pause
```

/d

This option, which is entered automatically by EZ-SCSI, displays information about the host adapter and attached SCSI devices when you boot your computer.

/L

This option enables `aspi4dos` to recognize all eight possible LUNs associated with each SCSI ID. Otherwise `aspi4dos` can only recognize LUN 0 for each SCSI ID. Use this option only if your computer has a disk device such as Iomega's Bernoulli Dual multidrive that supports multiple LUNs.

/p<port address>

This option, which is not valid for AHA-1640 host adapters, is used to change the `aspi4dos` I/O port address from the default (330h) to another valid address (130h, 134h, 230h, 234h, or 334h). Here is an example:

```
device=c:\scsi\aspi4dos.sys /d /p130
```

If you use the `/p<port address>` option, you may also need to change jumper or switch settings. Read the host adapter documentation.



Note

You must disable the host adapter BIOS on some host adapter models if you change the I/O port address, because the BIOS only works at the default address. Read the host adapter documentation for more information.

/pause

This option makes your computer pause after loading `aspi4dos` at boot time so you can read the message on the screen. After you read the message, press any key to continue booting the computer.

/s<slot number>

This option, which is valid only for AHA-1640 host adapters, specifies the slot number where you want `aspi4dos` to look for the host adapter. Valid slot numbers are 1, 2, 3, 4, 5, 6, 7, and 8.

If you do not use this option, `aspi4dos` scans all slots starting with slot 1 and installs all AHA-1640 host adapters that it finds. Use the `/s` option if your computer has multiple AHA-1640s and you want to install some, but not all, of them. Here is an example:

```
device=c:\scsi\aspi4dos.sys /d /s3 /s5
```

Advanced Command Line Options

`/ccbs<count>`

This option specifies the maximum number of concurrent ASPI commands that can be supported. The valid range is between 1 and 16 commands. The default is 4. If you increase this value, the size of the ASPI manager also increases. Use this option only if you want to run an ASPI program that specifies a higher number of concurrent commands. Here is an example:

```
device=c:\scsi\aspi4dos.sys /d /ccbs8
```

`/f<bus-off time>`

This option, which is used only with AHA-1540/1542 host adapters, sets the `bus-off` time. (`Bus-off` time is the time the host adapter allows between data bursts on the SCSI bus.) Valid `bus-off` times are 1 to 64 microseconds. The default is 4 microseconds.

If it takes a very long time to back up your system with a tape drive or a floppy disk backup program, change the `bus-off` time to 12 microseconds and the `bus-on` time (`/n`) to 4 microseconds. Be sure to change both settings. Here is an example:

```
device=c:\scsi\aspi4dos.sys /d /f12 /n4
```

`/n<bus-on time>`

This option, which is used only with AHA-1540/1542 host adapters, sets the `bus-on` time. (`Bus-on` time is the time the host adapter spends transferring data bursts on the SCSI bus.) Valid `bus-on` times are 2 to 15 microseconds. The default is 11 microseconds. (See the `/f` entry for more information.)

`/norst`

This option prevents the device driver from issuing a hard reset to the host adapter during initialization, if the BIOS is disabled. If the BIOS is enabled, the driver does not issue a hard reset, because the BIOS resets the host adapter board during its initialization phase. If you do not use this option and the host adapter BIOS is disabled, all devices on the SCSI bus are reset during system installation.

`/x<speed>`

This option changes the data transfer speed of AHA-1540/1542 host adapters. It overrides speed settings defined by jumpers, switches, or software configuration. The default transfer speed is 5.0 MBytes/sec. There are six predefined transfer speeds:

Value	Speed (MBytes/sec)	Value	Speed (MBytes/sec)
00	5.0	03	10.0
01	6.7	04	5.7
02	8.0	FF	3.3

Here is an example:

```
device=c:\scsi\aspi4dos.sys /d /xFF
```



CAUTION

Some computers do not support data transfers faster than 5.0 MBytes/sec. Your computer may hang if you set the transfer speed too high.

Sample config.sys File

Adaptec EZ-SCSI automatically adds lines to your `config.sys` file to load the ASPI manager and the device drivers when you boot your computer. The following example shows a typical `config.sys` file. (Your `config.sys` entries may be different, depending on your software and hardware configuration.)

```
device=c:\scsi\aspi4dos.sys /d
buffers=20
files=20
device=c:\windows\himem.sys
device=c:\scsi\aspidisk.sys
```

After you install EZ-SCSI you can change the configuration to load `aspi4dos` and the ASPI device drivers (e.g., `aspidisk`) in DOS high memory. To do this, change the `device=` to `devicehigh=` on the command lines that load these programs.

EZ-SCSI loads the ASPI manager (`aspi4dos`) before it loads any device drivers. You do not need to load `himem.sys` if you are using a memory manager such as QEMM[†]-386 or 386Max[†]. `himem.sys` or a third-party memory manager is, however, required for Windows.

The aspiedos ASPI Manager

The table on page 103 lists the host adapters that `aspiedos` supports.

“Displaying ASPI Manager Information” on page 105 explains the `aspiedos` information that appears on your monitor when you boot your computer.

“Preventing the ASPI Manager From Loading” on page 105 explains how you can temporarily prevent `aspiedos` from loading into memory without changing your `config.sys` file.

Command Line Options

You can type command line options in lowercase or uppercase letters. Start each option with a forward slash, and leave at least one blank space between options on the same line. Here is an example:

```
device=c:\scsi\aspiedos.sys /d /pause
```

`/ccbs<count>`

This option specifies the maximum number of concurrent ASPI commands that can be supported. The valid range is between 1 and 16 commands. The default is 4. If you increase this value the size of the ASPI manager also increases. Use this option only if you want to run an ASPI program that specifies a higher number of concurrent commands. Here is an example:

```
device=c:\scsi\aspiedos.sys /d /ccbs8
```

`/d`

This option, which is entered automatically by EZ-SCSI, displays information about the host adapter and attached SCSI devices when you boot your computer.

`/L`

Use this option only if your computer has a disk device such as Iomega's Bernoulli Dual multidrive that supports multiple LUNs. This option enables `aspiedos` to recognize all eight possible LUNs associated with each SCSI ID. Otherwise `aspiedos` can only recognize LUN 0 for each SCSI ID.

`/pause`

This option pauses your system after loading `aspiedos` at boot time so you can read the message on the screen. After you read it, press any key to resume the booting process.

`/s<slot number>`

This option specifies the EISA slot number where you want `aspiedos` to look for the host adapter(s). Valid slot numbers are 1 through 15.

If you do not use this option, `aspiedos` scans all slots starting with slot 1 and installs all AHA-1740/1742/1744 host adapters that it finds. Use the `/s` option if your computer has multiple AHA-1740/1742/1744 host adapters and you want to install some, but not all, of them. Here is an example:

```
device=c:\scsi\aspiedos.sys /d /s3 /s5
```

Sample config.sys File

Adaptec EZ-SCSI automatically adds lines to your `config.sys` file to load the ASPI manager and the device drivers when you boot your computer. The following example shows a typical `config.sys` file. (Your `config.sys` entries may be different, depending on your software and hardware configuration.)

```
device=c:\scsi\aspiedos.sys /d
buffers=20
files=20
device=c:\windows\himem.sys
device=c:\scsi\aspidisk.sys
```

After you install EZ-SCSI you can change the configuration to load `aspiedos` and the ASPI device drivers (e.g., `aspidisk`) in DOS high memory. To do this, change the `device=` to `devicehigh=` on the command lines that load these programs.

EZ-SCSI loads the ASPI manager (`aspiedos`) before it loads any device drivers. You do not need to load `himem.sys` if you are using a memory manager such as QEMM-386 or 386Max. `himem.sys` or a third-party memory manager is, however, required for Windows.

The aspi2dos ASPI Manager

The table on page 103 lists the host adapters that `aspi2dos` supports.

“Displaying ASPI Manager Information” on page 105 explains the `aspi2dos` information that appears on your monitor when you boot your computer.

“Preventing the ASPI Manager From Loading” on page 105 explains how you can temporarily prevent `aspi2dos` from loading into memory without changing your `config.sys` file.

Command Line Options

You can type command line options in lowercase or uppercase letters. Start each option with a forward slash, and leave at least one blank space between options on the same line. Here is an example:

```
device=c:\scsi\aspi2dos.sys /d /pause
```

`aspi2dos` command line options are divided into two groups:

- Group 1 options, which are only used with AHA-1510/1510A, AVA[†]-1505, and AMM-1510M host adapters
- Group 2 options, which may be used, as needed, with any host adapter supported by `aspi2dos`

Group 1 Options

Group 1 command line options are seldom used, because Adaptec EZ-SCSI automatically configures AHA-1510/1510A, AVA-1505, and AMM-1510M host adapters with default settings suitable for almost all computers. This brief explanation will help you understand these options, in case you do need to use them.

Unlike other Adaptec host adapters, the AHA-1510/1510A, AVA-1505, and AMM-1510M have no onboard ROM to store configuration settings. A jumper block sets the IRQ channel and I/O port address. All other configuration settings, such as host adapter SCSI ID and parity checking, are undefined until EZ-SCSI defines them in the `config.sys` file. Here is how EZ-SCSI does this.

When you install EZ-SCSI, it reads IRQ and I/O port address settings from the jumper block. If these settings are the defaults (IRQ 11 and 340h) EZ-SCSI adds this line to the `config.sys` file:

```
device=c:\scsi\aspi2dos /d /z
```


The `/z` option defines default values for SCSI disconnect, parity checking, synchronous negotiation, host adapter SCSI ID, and IRQ channel. (These defaults are listed in the table on page 114.) Do not remove the `/z` option from the command line.

You use Group 1 options only if you want to change a default setting defined by the `/z` option. If you do use a Group 1 option, you add it to the end of the command line, following the `/z` option, as shown here:

```
device=c:\scsi\aspi2dos /d /z /y
```

The `/y` option disables parity checking. This overrides the default setting (enable parity checking).

The meaning of each Group 1 command line option is as follows:

`/c` and `/c-`

The `/c` option prevents SCSI target devices (e.g., disk drives and CD-ROM drives) from disconnecting during command execution; the `/c-` option allows (enables) SCSI target devices to disconnect during command execution. Adaptec EZ-SCSI automatically enables disconnection.

You may need to disable disconnection by adding `/c` to the end of the command line if multiple SCSI devices are connected to the host adapter.

`/hx`

This option lets you specify the host adapter SCSI ID. The value `x` must be a decimal number from 0 through 7. Adaptec EZ-SCSI automatically sets the host adapter SCSI ID to 7.

The host adapter SCSI ID is seldom changed from the default of 7. If, for some reason, you need to change it, add the `/hx` option to the end of the command line. Here is an example:

```
device=c:\scsi\aspi2dos.sys /d /z /h5
```

`/u` and `/u-`

The `/u` option allows (enables) the host adapter to initiate negotiation with the SCSI target device for synchronous data transfer. The `/u-` option prevents synchronous negotiation. If synchronous negotiation is disabled the host adapter defaults to asynchronous data transfer, and it negotiates for synchronous data transfer if a target device initiates the negotiation.

Adaptec EZ-SCSI automatically enables synchronous negotiation, because data moves faster on the SCSI bus in synchronous mode. You may need to disable synchronous negotiation if you have a CD-ROM drive that does not support it.

If the host adapter does not recognize a CD-ROM drive, or if the drive does not work properly, add the `/u-` option to the end of the command line in `config.sys`. Then, to assure the best system performance, enable synchronous negotiation on all SCSI devices that do support it, such as hard disk drives.

`/y` and `/y-`

The `/y` option prevents (disables) the host adapter from checking SCSI bus parity. The `/y-` option enables host adapter parity checking. Adaptec EZ-SCSI automatically enables parity checking. If you need to disable parity checking, add the `/y` option to the end of the command line.

If parity checking is enabled on the host adapter, be sure that all your SCSI devices support it and that it is enabled on those devices. (Most SCSI devices have a jumper that enables or disables parity.)

`/z`

The `/z` option is a convenient abbreviation that sets all Group 1 options, plus the `/qx` Group 2 option, to their default values. Adaptec EZ-SCSI automatically adds `/z` to the command line in `config.sys`. The `/z` option is equivalent to these five individual options:

aspi2dos	Default Setting	Value
<code>/c-</code>		Allow SCSI target devices to disconnect
<code>/y-</code>		Enable host adapter parity checking
<code>/u</code>		Enable synchronous negotiation
<code>/h7</code>		Set host adapter SCSI ID to 7
<code>/q11</code>		Set host interrupt request channel to 11

Do not remove the `/z` option from the command line. See page 113 to learn how to override the `/z` default settings.

Group 2 Options

Except for the `/q` option, which is used only with AHA-1510/1510A, AVA-1505, and AMM-1510M host adapters, you may use Group 2 command line options with any host adapter supported by `aspi2dos`. The meaning of each Group 2 option is as follows (the options are listed alphabetically):

`/b` and `/b-`

The `/b` option tells `aspi2dos` to wait 250 milliseconds when it receives a busy status from a SCSI target device and then try to access the device again. It keeps trying until the device is available. The `/b-` option tells `aspi2dos` to notify the program that called it that it received a Busy status from the target device. `aspi2dos` does not try to access the device again unless the calling program tells it to do so. If neither option is specified, the default setting is `/b-` (notify the calling program and do not try to access the device again).

You may need to use the `/b` option if you upgrade from an earlier version of `aspi2dos`, because this default is handled differently in the newer version. For example, a tape backup program may stop working or hang because `aspi2dos` tried to access the device while it was rewinding, received no response, and did not try again. To solve the problem, add the `/b` option to the command line in `config.sys`; then `aspi2dos` keeps trying to access the device until it succeeds.

`/d`

This option, which is entered automatically by EZ-SCSI, displays information about the host adapter and attached SCSI devices when you boot your computer.

`/i`

This option disables the loading of the Int 13 driver. It is used only for debugging.

`/L`

This option enables `aspi2dos` to recognize all eight possible LUNs associated with each SCSI ID. Otherwise `aspi2dos` can only recognize LUN 0 for each SCSI ID. Use this option only if your computer has a disk device such as Iomega's Bernoulli Dual multidrive that supports multiple LUNs.

/norst

This option prevents the device driver from issuing a hard reset to the host adapter during initialization, if the BIOS is disabled. If the BIOS is enabled, the driver does not issue a hard reset, because the BIOS resets the host adapter board during its initialization phase. If you do not use this option and the host adapter BIOS is disabled, all devices on the SCSI bus are reset during system installation.

/p<port address>

Use this option to change the `aspi2dos` I/O port address from the default (340h) to the alternate address, 140h. Here is an example:

```
device=c:\scsi\aspi2dos.sys /d /p140
```

If you change the I/O port address with the `/p140` option, you must also change the I/O port address jumper block setting. See your host adapter documentation.

/pause

This option makes your system pause after loading `aspi2dos` at boot time so you can read the message on the screen. After you read it, press any key to resume the booting process.

/qx

This option, which is used only with AHA-1510/1510A, AVA-1505, and AMM-1510M host adapters, lets you change the interrupt request (IRQ) channel. The value `x` is a decimal number between 9 and 12. Adaptec EZ-SCSI automatically configures the host adapter for IRQ 11.

You may need to change the host adapter IRQ channel if another board in your computer, such as a sound board, uses the same IRQ. Here is an example:

```
device=c:\scsi\aspi2dos.sys /d /z /q12
```

If you change the channel with the `/qx` option, you must also change the IRQ jumper block setting. See your host adapter documentation.

/xn

This option enables or disables the Fast SCSI data transfer rate. The `/x5` setting disables Fast SCSI and sets the initial data transfer rate to 5 MBytes/sec. The `/x10` setting enables Fast SCSI and sets the initial data transfer rate to 10 MBytes/sec.

Sample config.sys File

Adaptec EZ-SCSI automatically adds lines to your `config.sys` file to load the ASPI manager and the device drivers when you boot your computer. The following example shows a typical `config.sys` file. (Your `config.sys` entries may be different, depending on your software and hardware configuration.)

```
device=c:\scsi\aspi2dos.sys /d
buffers=20
files=20
device=c:\windows\himem.sys
device=c:\scsi\aspidisk.sys
```

After you install EZ-SCSI you can change the configuration to load `aspi2dos` and the ASPI device drivers (e.g., `aspidisk`) in DOS high memory. To do this, change the `device=` to `devicehigh=` on the command lines that load these programs.

EZ-SCSI loads the ASPI manager (`aspi2dos`) before it loads any device drivers. You do not need to load `himem.sys` if you are using a memory manager such as QEMM-386 or 386Max. `himem.sys` or a third-party memory manager is, however, required for Windows.

The aspi7dos ASPI Manager

The table on page 103 lists the host adapters that `aspi7dos` supports.

“Displaying ASPI Manager Information” on page 105 explains the `aspi7dos` information that appears on your monitor when you boot your computer. If you have an AHA-2740T/2742T or AHA-2740AT/2742AT host adapter running in Dual-channel mode, two blocks of host adapter information appear on the screen—one for each SCSI channel.

“Preventing the ASPI Manager From Loading” on page 105 explains how you can temporarily prevent `aspi7dos` from loading into memory without changing your `config.sys` file.

Command Line Options

You can type command line options in lowercase or uppercase letters. Start each option with a forward slash, and leave at least one blank space between options on the same line. Here is an example:

```
device=c:\scsi\aspi7dos.sys /d /pause
```

/ccbs<count>

This option specifies the maximum number of concurrent ASPI commands that can be supported. The valid range is between 1 and 16 commands. The default is 4. If you increase this value the size of the ASPI manager also increases. Use this option only if you want to run an ASPI program that specifies a higher number of concurrent commands. Here is an example:

```
device=c:\scsi\aspi7dos.sys /d /ccbs8
```

/d

This option, which is entered automatically by EZ-SCSI, displays information about the host adapter and attached SCSI devices when you boot your computer.

/L

This option enables `aspi7dos` to recognize all eight possible LUNs associated with each SCSI ID. Otherwise `aspi7dos` can only recognize LUN 0 for each SCSI ID. Use this option only if your computer has a disk device such as Iomega's Bernoulli Dual multidrive that supports multiple LUNs.

/pause

This option pauses your system after loading `aspi7dos` at boot time so you can read the message on the screen. After you read it, press any key to resume the booting process.

/s<slot number>

If you do not use this option, `aspi7dos` scans all slots starting with slot 1 and installs all host adapters that it finds. Use the `/s` option if your computer has multiple host adapters and you want to install some, but not all, of them.

If you have multiple AHA-2840VL/2842VL host adapters, be sure the slot number corresponds to the I/O address for each board. For example, use `/s1` if the board is assigned I/O address 1C00h (the default); use `/s2` for I/O address 2C00h; use `/s3` for I/O address 3C00h, etc. See the host adapter documentation for more information. Here is an example:

```
device=c:\scsi\aspi7dos.sys /d /s3 /s5
```

Sample config.sys File

Adaptec EZ-SCSI automatically adds lines to your `config.sys` file to load the ASPI manager and the device drivers when you boot your computer. The following example shows a typical `config.sys` file. (Your `config.sys` entries may be different, depending on your software and hardware configuration.)

```
device=c:\scsi\aspi7dos.sys /d
buffers=20
files=20
device=c:\windows\himem.sys
device=c:\scsi\aspidisk.sys
```

After you install EZ-SCSI you can change the configuration to load `aspi7dos` and the ASPI device drivers (e.g., `aspidisk`) in DOS high memory. To do this, change the `device=` to `devicehigh=` on the command lines that load these programs.

EZ-SCSI loads the ASPI manager (`aspi7dos`) before it loads any device drivers. You do not need to load `himem.sys` if you are using a memory manager such as QEMM-386 or 386Max. `himem.sys` or a third-party memory manager is, however, required for Windows.

The aspi8dos ASPI Manager

The table on page 103 lists the host adapters that `aspi8dos` supports.

“Displaying ASPI Manager Information” on page 105 explains the `aspi8dos` information that appears on your monitor when you boot your computer. “Preventing the ASPI Manager From Loading” on page 105 explains how you can temporarily prevent `aspi8dos` from loading into memory without changing your `config.sys` file.

`aspi8dos` uses the same command line options as `aspi7dos`. For more information, see “The `aspi7dos` ASPI Manager” on page 117.

The ma160 ASPI Manager

The table on page 103 lists the host adapters that `ma160` supports.

“Preventing the ASPI Manager From Loading” on page 105 explains how you can temporarily prevent `ma160` from loading into memory without changing your `config.sys` file.

Command Line Options

`/in`

Use this option only if you want to run your host adapter using interrupts instead of in polled mode (the default). The number `n` selects the host adapter interrupt (IRQ) channel. If you use this option, you must set the jumper on the host adapter to the same IRQ. Here is an example:

```
device=c:\scsi\ma160.sys /i3
```

`/Wn`

This option determines whether the computer pauses when SCSI devices are detected. The valid values for `n` are as follows:

Value	Meaning
0	Pause until a key is pressed, if no SCSI device is detected. (Default)
2	Pause until a key is pressed if a SCSI device is detected.
3	Do not pause at all. This setting is useful if you often boot your computer with no SCSI devices attached.

The ma348 ASPI Manager

The table on page 103 lists the host adapters that `ma348` supports.

“Preventing the ASPI Manager From Loading” on page 105 explains how you can temporarily prevent `ma348` from loading into memory without changing your `config.sys` file.

Command Line Options

`/Wn`

This option determines whether the computer pauses when SCSI devices are detected. The valid values for `n` are as follows:

Value	Meaning
0	Pause until a key is pressed, if no SCSI device is detected. (Default)
2	Pause until a key is pressed if a SCSI device is detected.
3	Do not pause at all. This setting is useful if you often boot your computer with no SCSI devices attached.

`/Mn`

Use this option to change the mode configuration, which controls the amount of additional time that the host adapter read and write cycles are delayed. Parallel ports on some computers require these delays.

The allowable values for `n` are the numbers 0 through 7. The default of 0 inserts no cycle delays. A value of 7 adds 875 ns of delay to the host adapter's read and write cycles.

The ma358 ASPI Manager

The table on page 103 lists the host adapters that `ma358` supports.

“Preventing the ASPI Manager From Loading” on page 105 explains how you can temporarily prevent `ma358` from loading into memory without changing your `config.sys` file.

Command Line Options

`/in`

Use this option only if you want to run your host adapter using interrupts instead of in polled mode (the default). The number `n` selects the host adapter interrupt (IRQ) channel. Here is an example:

```
device=c:\scsi\ma358.sys /i3
```

`/Wn`

This option determines whether the computer pauses when SCSI devices are detected. The valid values for `n` are as follows:

Value	Meaning
0	Pause until a key is pressed, if no SCSI device is detected. (Default)
2	Pause until a key is pressed if a SCSI device is detected.
3	Do not pause at all. This setting is useful if you often boot your computer with no SCSI devices attached.

`/Mnm`

Use this option to change the mode configuration, which controls the amount of additional time that the host adapter read and write cycles are delayed. Parallel ports on some computers require these delays. You must specify values for both `n` and `m`.

The allowable values for `n` are the numbers 0 through 7. The default of 0 inserts no cycle delays. A value of 7 adds an 875 ns delay to the read and write cycles.

The `m` parameter controls the way in which the mode configuration is handled. The allowable values for `m` are as follows:

Value	Meaning
0	Auto-port detect (Default)
2	Force unidirectional
4	Force non-EPP; auto detect unidirectional or bidirectional
6	Force non-EPP and force unidirectional
8	Force EPP

Here is an example:

```
device=c:\scsi\ma358.sys /M02
```

The ma460 ASPI Manager

The table on page 103 lists the host adapters that `ma460` supports.

“Preventing the ASPI Manager From Loading” on page 105 explains how you can temporarily prevent `ma460` from loading into memory without changing your `config.sys` file.

Command Line Options

`/Wn`

This option determines whether the computer pauses when SCSI devices are detected. The valid values for `n` are as follows:

Value	Meaning
0	Pause until a key is pressed, if no SCSI device is detected. (Default)
2	Pause until a key is pressed if a SCSI device is detected.
3	Do not pause at all. This setting is useful if you often boot your computer with no SCSI devices attached.



About This Appendix

Read this appendix to find out

- How the `aspidisk` device driver controls SCSI disk drives and removable-media drives
- How the `aspicd` device driver controls SCSI CD-ROM drives in audio, data, and video modes and supports multisession Photo CD-compatible drives
- How the `sjix` device driver supports HP ScanJet II scanners
- How the `aspiibuf` double-buffering device driver lets you address memory beyond 16 MBytes on ISA-bus computers

Introduction to ASPI Device Drivers

ASPI device drivers are software programs that enable your computer to communicate with SCSI peripheral devices such as hard disk drives, CD-ROM drives, and scanners. Each kind of device requires a different driver. When you boot your computer, command lines in the `config.sys` file load these programs into memory.

The Adaptec device drivers are copied to your hard disk when you install EZ-SCSI. EZ-SCSI adds command lines to your `config.sys` file to load these device drivers if it finds the appropriate kinds of devices on your computer.

This appendix explains how the ASPI device drivers are used and includes information about command line options.

Device Driver for Disk Devices

The `aspidisk` device driver is used for SCSI disk devices. This device driver supports

- Floptical drives.
- Removable-media devices, such as Iomega drives and magneto-optical drives.
- Disk devices with 512 bytes per sector and removable media with 512 or 1024 bytes per sector.
- Any standard DOS partition.
- Japanese DOS/V format.
- SCSI disk drives larger than the 1 GByte.
- Multiple Logical Unit Numbers (LUNs), which are required for devices like Iomega's Bernoulli[†] dual drive external.
- Up to 24 SCSI drives per computer system.

You can load `aspidisk` in high memory by using the `devicehigh=` syntax in the `config.sys` file.

`aspidisk` is compatible with Windows 3.x and with DOS memory managers such as the `emm386` utility, `QEMM`, and `386Max`.

Disk devices controlled by `aspidisk` are not cached by the version of SMARTDrive shipped with Windows 3.0 and MS-DOS 5.0. Disk devices controlled by `aspidisk` are properly cached by the version of SMARTDrive shipped with Windows 3.1 and above and MS-DOS 6.x.

Managing DOS-partitioned SCSI Drives

`aspidisk` controls DOS-partitioned SCSI disk drives that are not controlled by the host adapter BIOS. A drive is not managed by the host adapter BIOS if

- The host adapter BIOS is disabled, or
- Two hard disk drives are already installed in a computer using DOS 4.x or earlier (DOS 5.0 or above allows support for more than two hard disk drives), or
- The SCSI ID of the disk drive is *not* 0 or 1

The last restriction does not apply to AHA-1740/1742/1744 and AHA-1740A/1742A host adapters running in Enhanced Mode or AHA-1540C/1542C (or CF) host adapters on which the Dynamic Scanning option is enabled. These host adapters can find hard disk drives at SCSI IDs other than 0 and 1. (Dynamic Scanning is enabled by default on AHA-2740/2742 and AHA-2840VL/2842VL host adapters.)

Using DOS-compatible Disk Partitions

`aspidisk` uses DOS-compatible disk partitions. This means that you do not have to reformat a drive if you change it from host BIOS control to `aspidisk` control, or vice versa.

If a drive is under host BIOS control, you can use the DOS `fdisk` utility to create DOS partitions that can later be transferred to the control of `aspidisk`. If the drive is not under host BIOS control, you can do the same thing with the EZ-SCSI `afdisk` utility. (See `afdisk` on page 26.)

Using Removable Media

Removable media such as Iomega Bernoulli disks should be controlled by `aspidisk`, not by the host adapter BIOS.



CAUTION

If a removable-media drive is installed at SCSI ID 0 or 1 and the host adapter BIOS is enabled, do not change media while the computer is running. If you do, you may lose data on the media! To avoid this problem, change the removable-media drive SCSI ID to 2, 3, 4, 5, or 6 (see your server product guide). Then use `afdisk` to format and partition the removable media, and use `aspidisk` to control the drive.

If `aspidisk` finds a removable-media drive that is not controlled by the host adapter BIOS, it loads itself into memory at boot time. It reserves, by default, one DOS logical drive per removable-media device.

Command Line Options

The `/d` and `/pause` command line options are often used to display information on the screen. Other `aspidisk` command line options are seldom used.

You can type command line options in either lowercase or uppercase letters. Leave at least one blank space between options on the same line. Here is an example:

```
device=c:\scsi\aspidisk.sys /d /pause
```

`/d`

This option, which is entered automatically by EZ-SCSI, displays information about `aspidisk` when you boot your computer.

/id={...}

This option lets you specify which disk devices you want `aspidisk` to control. By default, `aspidisk` controls all SCSI drives that are not controlled by the host adapter BIOS.

Here are three examples: command line syntax appears on the left and an explanation on the right. The second and third examples assume that the computer has two host adapters. (If your computer has one host adapter, it is host adapter #0.)

Command Line	Explanation
<code>/id=0+4+6</code>	Support device at SCSI ID 0 on host adapter #0 Support device at SCSI ID 4 on host adapter #0 Support device at SCSI ID 6 on host adapter #0
<code>/id=0+1:4+2\x12</code>	Support device at SCSI ID 0 on host adapter #0 Support device at SCSI ID 4 on host adapter #1 Support device at SCSI ID 2 on host adapter #0
<code>/id=0+1+2+1:1</code>	Support device at SCSI ID 0 on host adapter #0 Support device at SCSI ID 1 on host adapter #0 Support device at SCSI ID 2 on host adapter #0 Support device at SCSI ID 1 on host adapter #1

/nospin

This option prevents `aspidisk` from sending a command to spin up the disk drive during initialization.

/pause

This option makes your system pause after loading `aspidisk` at boot time so you can read the message on the screen. When you have read the message, press any key to continue.

/r<reserve count>

This option sets the number of DOS logical drives reserved for removable media. The system ignores it if only nonremovable hard disks are installed in your computer. One logical drive is reserved by default if you do not specify a number. Valid reserve count values are the decimal numbers 1 to 24. Here is an example:

```
device=c:\scsi\aspdisk /r2
```

The `/r` option addresses a problem unique to removable media. Suppose that when you boot your computer a removable disk with one partition is in the drive. Later, you remove it and insert media with two partitions. You cannot access the second partition because only one partition has been defined to DOS.

The solution is to use the `/r` option to reserve logical drive letters for a removable-media drive. If you reserve four logical drives for two removable-media drives, this means eight logical drives total are allocated to your removable-media drives.

Onscreen Messages

When you boot your computer, `aspdisk` loads into memory and displays a message. The message contents will vary depending on the disk device(s) in your computer.

This message appears because EZ-SCSI automatically added a `/d` option at the end of the `config.sys` line that loads `aspdisk`.

If you remove the `/d` option a brief `aspdisk` message appears at bootup, but it does not include information about your SCSI devices. We recommend that you not remove the `/d`, because the information in the more detailed boot-time message is helpful in understanding your system configuration.

Device Driver for CD-ROM Drives

The `aspicd` device driver for DOS/Windows supports

- Up to 24 SCSI CD-ROM drives on one computer system
- Multisession Photo CD-compatible drives
- Audio and data modes including Photo CD for all CD-ROM drives that support SCSI-2
- Generic data-only mode for nearly all CD-ROM drive models
- High Sierra and ISO-9660 CD formats
- Video CD and CD-I on drives that support these features

Command Line Options

You can type `aspicd` command line options in either lowercase or uppercase letters. Leave at least one blank space between options on the same line.

`/d:<name>`

This option, which is required in the `config.sys` command line, assigns a name to the CD-ROM drive so that `mscdex` (the Microsoft CD-ROM Extensions) can install the CD-ROM as a logical drive letter. EZ-SCSI automatically enters this option in the `config.sys` file. It also adds the option, using the same name, to the `autoexec.bat` file. Here is an example:

```
device=c:\scsi\aspicd.sys /d:aspicd0
```

`/id={...}`

This option lets you specify which CD-ROM drives you want `aspicd` to control. By default, `aspicd` controls all drives. The following examples show the command line syntax on the left and an explanation on the right. The second example assumes that the computer has two host adapters. (If your computer has one host adapter, it is host adapter #0.)

Command Line	Explanation
<code>/id=2+4+6</code>	Support device at SCSI ID 2 on host adapter #0
	Support device at SCSI ID 4 on host adapter #0
	Support device at SCSI ID 6 on host adapter #0
<code>/id=3+1:4+5</code>	Support device at SCSI ID 3 on host adapter #0
	Support device at SCSI ID 4 on host adapter #1
	Support device at SCSI ID 5 on host adapter #0

/L

This option enables `aspicd` to recognize all eight possible LUNs associated with each SCSI ID. If the option is not entered, `aspicd` can only recognize LUN 0 for each SCSI ID. You should add the `/L` option to the command line if you have a CD-ROM drive that can access multiple discs.

If your computer system includes a Pioneer DRM-600 or DRM-604X multiple-disc CD-ROM drive, you do not need to add the `/L` option. The `aspicd` device driver automatically scans multiple LUNs if it detects one of these devices on the SCSI bus.

/norst

This option prevents `aspicd` from issuing a SCSI Bus Reset message as part of its power-on routine. The default is to issue it. The Bus Reset message, which is supported only by Toshiba[†], Hitachi, and NEC[†] drives, resets drives that are playing audio CDs when the computer is rebooted.

/pause

This option makes your system pause after loading `aspicd` at boot time so you can read the message on the screen. After you read the message, press any key to resume the booting process.

/type:<drive vendor>

This option allows `aspicd` to support audio play mode for CD-ROM drives that are not included on the list of supported drives, but which are compatible with a supported drive type. (`aspicd` supports data mode for nearly all models of CD-ROM.)

Suppose you want to play audio CDs on your Frammel CD-ROM drive. Although the Frammel is not on the list of supported drives, it has a Sony[†]-compatible SCSI interface. If you add `/type:sony` to the command line in the `config.sys` file, `aspicd` interfaces with your Frammel drive as if it were a Sony drive, allowing you to play audio CDs. Here is an example:

```
device=c:\scsi\aspicd.sys /d:aspicd0 /type:sony
```

If you use the `/type:<drive vendor>` option, `aspicd` assumes that all CD-ROM drives on the SCSI bus are made by this vendor. This means that you cannot combine different brands of CD-ROM drives on the bus. The valid entries for this option are as follows:

Drive Vendor Options				
chinon	denon	hitachi	lms	nec
panasonic	sony	texel	toshiba	

Device Driver for Scanners

Adaptec EZ-SCSI includes the Hewlett-Packard[†] `sjiix` device driver for HP SCSI ScanJet II scanners. If EZ-SCSI detects a scanner on the SCSI bus it installs `sjiix` in a command line in your `config.sys` file. You can then install HP's DESKSCAN II software if it is not already installed.

The `sjiix` device driver supports a wide variety of applications using TWAIN or the application's scanning utility. TWAIN is an image acquisition standard, jointly developed by several companies, that lets you bring image data directly into a working application from external devices such as scanners and digital cameras. See the EZ-SCSI `readme` file for a complete list of supported applications.

Device Driver for Double Buffering

`aspibuf` is an ASPI double-buffering driver that may be useful if your ISA-bus computer uses an AHA-1540/1542 host adapter and has more than 16 MBytes of memory.

The ISA bus can access only 16 MBytes of RAM memory. To overcome this limitation, `aspibuf` intercepts ASPI and Int 13h commands and double buffers them so the data transfers occur within the first 16 MBytes of memory. (`aspibuf` does not double buffer if the ASPI or Int 13h buffer is already within the first 16 MBytes of memory.)

Configuring `aspibuf`

`aspibuf` is copied to your hard disk when you install EZ-SCSI, but it is not automatically configured. If you want to use `aspibuf`, you must manually configure it by following these steps:

1. Open your `config.sys` file in a text editor.
2. Add this line immediately after the command line that loads `aspi4dos`:
`device=c:\scsi\aspibuf.sys`
(You can also use the `/size=` option described below.)
3. If `aspi4dos` is loaded in DOS high memory with a `devicehigh=` command, change this to `device=`. Neither `aspibuf` nor `aspi4dos` should be loaded in DOS high memory.
4. Save the `config.sys` file as ASCII text and reboot the computer.

Keep these points in mind if you plan to use `aspibuf`:

- Only use `aspibuf` with the `aspi4dos` ASPI manager and with AHA-1540/1542 host adapters.
- `aspibuf` works with the `aspidisk` and `aspid` device drivers and with Int 13h commands. It may not work with other ASPI device drivers and applications.
- ASPI for Windows is disabled if you install `aspibuf`.

Command Line Option

`aspibuf` has a command line option to change the size of the buffer. By default, `aspibuf` allocates a 16 KByte buffer for double buffering. You can specify a different size ranging from 2 KBytes to 64 KBytes by adding the `/size=` option to the command line. For example, this entry sets the buffer to 8 KBytes:

```
device=c:\scsi\aspibuf.sys /size=8
```



Adaptec EZ-SCSI

A software program that automatically configures your computer to use the Adaptec SCSI host adapter and SCSI devices connected to it. EZ-SCSI copies applications and device drivers to the computer's hard disk drive. In nearly every case, the computer and SCSI devices are configured correctly when the default values are accepted. There are DOS and Windows versions of EZ-SCSI.

Advanced SCSI Programming Interface

See ASPI.

AHA-2940/2940W

Adaptec's PCI-to-Fast SCSI host adapters. The AHA-2940W is used with a 16-bit (Wide) SCSI bus, and the AHA-2940 is used with an 8-bit SCSI bus. These two host adapter models are designed for computers with a +5-volt PCI bus slots.

AHA-3940/3940W

Adaptec's Multichannel SCSI-to-PCI host adapters. The AHA-3940 is used with an 8-bit SCSI bus, and the AHA-3940W is used with a 16-bit (Wide) SCSI bus. These two host adapter models are designed for computers with +5-volt PCI bus slots.

AIC-7850

Adaptec's PCI bus master 8-bit single-chip SCSI host adapter, supporting Fast and single-ended SCSI data transfer rates, Tagged Queuing, and Scatter/Gather. The AIC-7850 has a smaller FIFO than the AIC-7870 and does not support external memory resources.

AIC-7870/AIC-7880

Adaptec's PCI bus master 16-bit single-chip SCSI host adapter, supporting Fast, Wide, single-ended, and differential SCSI data transfer rates; Tagged Queuing, and Scatter/Gather features.

ASPI

Advanced SCSI Programming Interface. A standard SCSI software interface that acts as a liaison between host adapters and SCSI device drivers. ASPI enables host adapters and device drivers to share a single SCSI hardware interface.

ASPI for Windows

A part of Adaptec EZ-SCSI that enables ASPI programs such as the Adaptec SCSI Interrogator to run in the Windows environment. Two EZ-SCSI files, `winaspi.dll` and `vaspid.386`, form the ASPI-to-Windows interface.

ASPI Manager

A software module that provides an interface between ASPI modules, a host adapter, and the SCSI devices connected to the adapter. A single ASPI manager can handle multiple input/output requests from multiple ASPI modules. ASPI managers are written for a specific operating system—such as DOS, OS/2, or NetWare—and for a specific family of host adapters. Adaptec EZ-SCSI includes several ASPI managers for DOS/Windows.

ASPI Module

See SCSI Device Driver.

AT[†] Bus

See ISA.

BIOS

Basic Input/Output System. Software coded into computer chips for various purposes. The BIOS on the motherboard of a computer is the special program used to boot the computer. Most Adaptec host adapters have an onboard BIOS stored in ROM chips. This BIOS initializes the SCSI bus, performs bootup diagnostics, and performs other functions.

Bus

A pathway for data in a computer system. All PC's have an expansion bus, which is designed to host add-on (expansion) devices such as modems, host adapters, and video adapters. Expansion devices use the bus to send data to and receive data from the PC's CPU or memory. ISA, EISA, and Micro Channel[†] are the major bus standards used in computers. (Also see VL-Bus[†] and PCI-bus.)

Bus Mastering

A high-performance method of data transfer in which the host adapter's onboard processor handles the transfer of data directly to and from a computer's memory without intervention from the computer's microprocessor. This is the fastest method of data transfer available for multitasking operating systems. (Also called Bus Master DMA or First Party DMA.)

Byte

An 8-bit unit of data. A byte is normally the smallest addressable unit of memory and the smallest unit of data transfer on the SCSI bus.

CD-ROM

Compact Disk Read Only Memory. A high-capacity disc medium for storing data files and software programs. Like the audio CDs used in consumer CD players, the data on CD-ROM discs cannot be changed once it is encoded. A single CD-ROM can hold 600 MBytes or more of data.

CD-ROM Drive

A disk device used to retrieve data and software programs from CD-ROMs (compact disks) for use on computer systems. Some CD-ROM drives are installed internally in the computer case, others are used as external devices. Most CD-ROM drives can also play audio CDs.

Conventional Memory

The first 640 KBytes of computer memory. DOS uses this memory area to run software applications.

CPU

Central Processing Unit. The microprocessor computer chip that provides the actual computational power of a computer. The Pentium and Pentium Pro microprocessors are widely used types of CPUs.

Cylinder

A pair of tracks that lie over each other on the opposite sides of a disk. The heads in a disk device can write data to the tracks in a cylinder without moving. Cylinders are arranged in concentric circles radiating from the center of the disk device. You specify start cylinder and end cylinder values when creating disk partitions with the EZ-SCSI formatting utilities.

Data Mode

For CD-ROM drives, the mode of operation in which data is read from the CD-ROM disc.

Device Driver

A software program that enables a computer to communicate with peripheral devices such as hard disk drives and CD-ROM drives. Each type of device requires a different driver. Device driver programs are stored on a computer's hard disk and are loaded into memory at boot time.

Differential SCSI

A hardware standard for connecting SCSI devices. Differential SCSI uses two wires per signal, which improves noise immunity and allows the SCSI bus to be up to 25 meters long. 7800 Family host adapters *do not* support differential SCSI devices.

Direct Memory Access

A mechanism that allows hardware control of the transfer of streams of data to or from the main memory of a computing system. The mechanism may require setup by the host software. After initialization, it automatically sequences the required data transfer and provides the necessary address information.

DMA

See Direct Memory Access.

DOS

Disk Operating System. A machine language program developed by Microsoft Corporation and used on most personal computers.

DOS Partition

A section of a disk storage device in which data and/or software programs are stored. Computers have a primary DOS partition that contains the special files needed to boot the computer. A computer's disk devices may also have extended DOS partitions. Each DOS partition is assigned a unique drive letter, such as C or D. A single disk device can have multiple partitions.

Double Buffering

A feature of the Windows SMARTDrive utility. The Windows Setup program usually enables SMARTDrive's double buffering option if it detects a SCSI disk drive in your computer. Double buffering means that the driver keeps one data buffer in the area between 0 KByte and 640 KBytes (for compatibility with older disk drive software) and another identical buffer in the memory area above 1 MByte.

Driver

See Device Driver.

EISA

Extended Industry Standard Architecture. A kind of computer bus. EISA, an extension of the 16-bit ISA bus standard, allows expansion devices like network cards, video adapters, and modems to transfer data to and over the computer bus 32 bits at a time.

Enhanced Mode

The operation mode of the AHA-1740A/1742A/1744 that takes full advantage of the EISA addressing range and register set.

External SCSI Device

A SCSI device such as a hard disk drive or tape drive installed outside the PC case. External SCSI devices are connected to the SCSI bus with round cables that has layered twisted pair assemblies with proper electrical shielding.

EZ-SCSI

See Adaptec EZ-SCSI.

Fast SCSI

A SCSI data transfer rate standard that allows a rate of up to 10 MBytes/sec on an 8-bit SCSI bus and up to 20 MBytes/sec on a 16-bit (Wide) SCSI bus. 7800 Family host adapters support Fast SCSI data transfers.

FAT

See File Allocation Table.

File Allocation Table

A table, stored on disk media, that DOS uses to locate the blocks in which it writes data to a disk. A single computer file, such as a text file, is usually broken up in segments and stored in various locations on the disk. DOS needs to read the FAT in order to find these segments when the file is retrieved.

Firmware

The software that controls and manages the host adapter. It is called firm as opposed to soft because it is designed into the host adapter and cannot be modified by the user. The 7800 Family host adapter BIOS is firmware.

Floppy Format

A type of formatting used with removable media. Floppy format causes removable media to be treated as a very large floppy disk. You cannot create DOS partitions on the media if you use this format.

GByte

A measure of computer storage. One gigabyte (GByte) equals a thousand MBytes, or approximately one billion bytes. (A byte is the amount of storage needed to hold one character.)

High Memory

See Upper Memory Block.

High Sierra Format

The de facto standard for CD-ROM file-format structure. This standard enables a high degree of intersystem compatibility for CD-ROM disks.

Host

A microcomputer in which a host adapter is installed. The host directs the host adapter to transfer information to and from peripheral devices attached to the SCSI bus connector of the host adapter.

Host Adapter

A printed circuit board that installs in a standard microcomputer and provides a SCSI bus interface to SCSI devices that are connected to the microcomputer. The 7800 Family host adapter provides a connection between the SCSI bus and the PCI-Bus.

Initiator

A SCSI device that requests an operation to be performed by another SCSI device (the target). The initiator provides all the command information and parameters required to perform the operation, but the details of the operation are actually sequenced by the target. The host adapter is sometimes called the initiator.

Internal SCSI Device

A SCSI device such as a hard disk drive or a CD-ROM drive installed inside a PC case. Internal SCSI devices are connected to the SCSI bus with a flat ribbon cable.

I/O Operating Environment Software

Additional software that may be required in certain operating system environments in order to use some kinds of SCSI devices with the 7800 Family host adapter. For example, you need additional software in order to install and use CD-ROM drives on the SCSI bus in the DOS/Windows environment.

IRQ

Interrupt request lines. Hardware lines over which devices, such as the host adapter, can send signals to get the attention of the processor when the device is ready to accept or send information. Typically, each device communicating to the computer uses a separate IRQ.

ISA

Industry Standard Architecture expansion bus. A type of computer bus used in most PCs. ISA enables expansion devices like network cards, video adapters, and modems to send data to and receive data from the computer's CPU and memory 16 bits at a time. Expansion devices are plugged into sockets in the computer's motherboard. ISA is sometimes called the AT bus, because it was introduced with the IBM PC AT[†].

ISO 9660

A standard for CD-ROM file format structure used by most producers of CD-ROM disks. This standard is based on the High Sierra format, with minor modifications.

KByte

Kilobyte. A measure of computer storage. One KByte equals 1024 bytes. (A byte is the storage needed to hold one character.)

Local Bus

An internal control and data path in a computer that connects peripherals like video boards or disk drives directly to a computer's CPU and memory. Local buses bypass the slower ISA and EISA expansion buses and allow much faster data transfer rates. PCI is an example of a local bus standard.

Logical Drive

A computer disk storage device that can be addressed as a specific drive letter, such as C or D. A single physical disk device, such as a hard disk drive, can be partitioned into two or more logical drives with different drive letters.

Logical Unit

A physical or virtual device addressed through a target—for example, a CD-ROM in a CD-ROM drive.

LU

See Logical Unit.

Manager

See ASPI Manager.

MByte

Megabyte. A measure of computer storage. One MByte equals 1,048,576 bytes. (A byte is the storage needed to hold one character.)

Micro Channel

A 32-bit computer bus standard introduced by IBM with the PS/2 series of computers. The Micro Channel bus allows expansion devices to move data 32 bits at a time on the computer bus. (Also called Micro Channel architecture.)

Microsoft MS-DOS CD-ROM Extensions

A software program (file name `mscdex.exe`) from Microsoft that enables a computer system to recognize a CD-ROM drive as a single logical drive letter under DOS.

mcscli

The SCSI configuration master table file used by SCO UNIX.

Multisession

A CD-ROM drive that is multisession capable can read CD-ROMs containing data written in more than one session. For example, if you have 36 photographic exposures stored on a Photo CD and later add 36 more exposures from another roll of film, you must have a multisession capable CD-ROM drive in order to read the disk.

NetWare Loadable Module (NLM)

A driver or short program that can load and execute under Novell NetWare.

Partition

See DOS Partition.

PCI Bus

Peripheral Component Interconnect. A local bus technology that allows SCSI host adapters, video cards, and other peripherals to send data directly to and receive data directly from the computer's CPU. This is much faster than transferring data on the computer's ISA or EISA bus.

Peripheral

A SCSI device installed on a computer system.

PIO

See Programmed Input/Output.

Port I/O Address

A window through which software programs send commands to an installed host adapter.

Programmed Input/Output

A method of data transfer in which the host microprocessor transfers data to and from memory via the computer's I/O ports. PIO enables very fast data transfer rates, especially in single-tasking operating systems like DOS.

Removable Media

Disk media such as the cartridges used with Iomega's Bernoulli drives that can be removed from a disk drive after data is copied to them. The media can then be stored or can be inserted in another removable-media drive.

ROM

Read-Only Memory. A type of computer memory chip used to store computer firmware, such as the BIOS and the SCSI*Select* configuration program used by some Adaptec host adapters. The data on ROM chips can be read but cannot be changed without special equipment.

Scatter/Gather

A feature of SCSI device drivers that allows the host adapter to modify the transfer data pointer. This lets a single host adapter transfer many segments of memory in a single transfer operation, thereby minimizing interrupts and overhead.

SCSI

Small Computer Systems Interface. A computer bus interface standard that defines standard physical and electrical connections for devices. SCSI provides a standard interface that enables many different kinds of devices, such as disk drives, magneto-optical disks, CD-ROM drives, and tape drives to interface with the host computer.

SCSI-2

A computer bus interface standard that adds features to the SCSI-1 standard. Included among these features are 32-bit data transfer, command queuing, Fast SCSI, and support for a wider variety of peripheral devices.

SCSI Bus

One or more SCSI peripheral devices and the host adapter(s), connected by cables in a daisy-chain configuration. The bus may include both internal and external SCSI devices. In a computer that has more than one host adapter, each adapter has its own separate SCSI bus.

SCSI Device

A device such as a host adapter, hard disk drive, or CD-ROM drive that conforms to the SCSI interface standard and is attached to a SCSI bus cable. The device may be an initiator (e.g., the host adapter), or a target, or it may be capable of both kinds of operation.

SCSI Device Driver

A software program that enables a computer to communicate with SCSI peripheral devices such as hard disk drives, CD-ROM drives, and scanners. Each kind of device requires a different device driver. Device drivers are stored on the computer's hard disk. When the computer boots, command lines in the `config.sys` file load these programs into memory, where they remain as long as the computer is turned on. EZ-SCSI includes several device drivers.

SCSI ID

An identifier assigned to SCSI devices that enables them to communicate with a computer when they are attached to a host adapter via the SCSI bus. Each SCSI host adapter has eight, 0 through 7, available SCSI IDs (or 16 IDs, 0 through 15, for Wide SCSI). Usually the host adapter itself is assigned SCSI ID 7, and hard disk devices are assigned to SCSI IDs 0 and 1.

Setup Program

A CMOS-resident configuration utility built into every computer that is used to configure the computer's motherboard and option boards. You typically run the setup program after you install new peripherals, upgrade the computer memory, etc. Configuration information is stored on an EEPROM which retains the data when the computer power is turned OFF. With 7800 Family host adapters, the *SCSISelect* utility handles most of the system configuration tasks.

Single-ended SCSI

A hardware standard for connecting SCSI devices. Single-ended SCSI references each signal to a common ground carried on the cable between the attached SCSI components. Most SCSI devices use single-ended grounding. This standard allows a maximum SCSI bus length of 6 meters (19.7 feet). 7800 Family host adapters support single-ended SCSI devices; they do not support differential SCSI devices. (Differential SCSI is another hardware standard for connecting SCSI devices.)

Small Computer Systems Interface

See SCSI.

Standard Mode

The operation mode of the AHA-1740A/1742A/1744 that allows software drivers written for AHA-1540/1542/1640 host adapters to operate fully on the board. Standard Mode does not allow DOS addressing beyond 16 MBytes.

Synchronous Mode

A mode of transferring data at high speeds on the SCSI bus. Data transfers are synchronized with fixed-length, fixed-frequency strobe pulses from the system clock.

Synchronous Negotiation

A SCSI feature that allows the host adapter and SCSI peripherals to communicate with each other and establish the parameters for the transfer of data in synchronous mode on the SCSI bus.

Target (or Target Device)

A SCSI device that performs an operation requested by an initiator. The target is usually a peripheral device such as a disk drive performing a service for an initiator, such as a host adapter.

Termination

A physical requirement of the SCSI bus. The first and last devices on the SCSI bus must have terminating resistors installed, and the devices in the middle of the bus must have terminating resistors removed. Termination on some Adaptec host adapters is software-controlled.

Upper Memory Block (UMB)

A block of available memory in the area of a computer's memory between 640 KBytes and 1 MByte. If you have a computer based on an Intel386™ or later processor, you can load software programs such as Adaptec's ASPI managers and ASPI modules in upper memory blocks. This frees up more conventional memory (0 KBytes to 640 KBytes) for other programs to run and generally improves system performance.

VL-Bus

VESA[†] local bus. A bus technology that enables a computer's CPU to communicate directly with peripherals without using the expansion bus. This enables much faster data transfer than what is possible with the slower ISA and EISA buses. VL-Bus is frequently used to achieve better system performance with high-resolution video, full-motion video, and high-fidelity sound.

Volume Label

A name that you can assign to any disk device or disk media by using the DOS label command. Volume labels can be up to 11 characters long.

Wide SCSI

A SCSI-2 enhancement that allows data to be transferred 16 or 32 bits at a time on the SCSI bus instead of 8 bits at a time. Wide SCSI allows data to be transferred much more quickly.



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