▾▾▾▾ Adaptec 7800 Family Manager Set

**for Windows NT, Windows 95,
Novell NetWare, IBM OS/2,
SCO UNIX,and SCO Unixware**

User's Guide

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Changes

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WARNING: Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy, and if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. However, if this equipment does cause interference to radio or television equipment reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between equipment and receiver.
- Connect the equipment to an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/television technician for help.

Use a shielded and properly grounded I/O cable and power cable to ensure compliance of this unit to the specified limits of the rules.

This device complies with part 15 of the FCC rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference and (2) this device must accept any interference received, including interference that may cause undesired operation.

Canadian Compliance Statement

This Class B digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numérique de la classe B respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

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Introduction

The Adaptec® 7800 Family Manager Set v3.x is a set of software drivers and other files that enable your Adaptec 7800 Family host adapter to communicate with your computer. The Adaptec 7800 Family Manager Set contains drivers for the following operating systems:

- Microsoft Windows NT®

- Microsoft Windows 95

- Novell NetWare

- IBM OS/2

- SCO UNIX

- SCO UnixWare

The remainder of this chapter includes a table that lists all Adaptec host adapters that make up the Adaptec 7800 Family, as well as the minimum requirements needed to install the software.

The remaining chapters are organized by operating system. 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 and using the driver, refer to the *Troubleshooting* sections, included at the end of each chapter.

Device Drivers

The 7800 Family Manager Set has two driver files for each operating system; one for Ultra SCSI and earlier devices and one for Ultra2 SCSI devices. This manual refers to both the Ultra SCSI and Ultra2 SCSI drivers when describing installation. Refer to the table below for a list of files for the drivers provided on your installation diskette or CD ROM. Use the columns in the table to determine the correct driver for your SCSI device.

Operating System	UltraSCSI Driver	Ultra2 SCSI Driver
Windows NT	aic78xx.sys	aic78u2.sys
Windows95	aic78xx.mpd	aic78u2.mpd
NetWare	aic7870.dsk	aic78u2.ham
OS2	aic7870.add	aic78u2.add
SCO UNIX	alad or alad325	blad or blad325
SCO UnixWare	adsl20 or adsl	adsb20 or adsb

For information on how to install the driver for your SCSI Adapter, refer to the section of this manual describing your specific operating system.

Adaptec 7800 Family Host Adapters

The following Adaptec PCI-to-SCSI host adapters are collectively referred to as the Adaptec 7800 Family host adapters:

Host Adapter	Description
AVA-2902I	PCI-to-Fast SCSI (non-bootable, internal)
AVA-2902E	PCI-to-Fast SCSI (non-bootable, external)
AVA-2904	PCI-to-Fast SCSI (non-bootable)
AHA-2910	PCI-to-Fast SCSI (non-bootable)
AHA-2930	PCI-to-Fast SCSI
AHA-2940	PCI-to-Fast SCSI
AHA-2940W	PCI-to-Fast and Wide SCSI
AHA-2940AU	PCI-to-Ultra SCSI
AHA-2940U	PCI-to-Ultra SCSI
AHA-2940UW	PCI-to-Wide Ultra SCSI
AHA-2940U2W	PCI-to-Ultra2 Wide Single-ended SCSI
AHA-2940U Dual	MultiChannel PCI-to-Ultra SCSI with Dual External Connectors
AHA-2940UW Dual	MultiChannel PCI-to-Wide Ultra SCSI with Dual External Connectors
AHA-2944W	PCI-to-Fast and Wide Differential SCSI
AHA-2944UW	PCI-to-Wide Ultra Differential SCSI
AHA-3940	MultiChannel PCI-to-Fast SCSI
AHA-3940W	MultiChannel PCI-to-Fast and Wide SCSI
AHA-3940U	MultiChannel PCI-to-Ultra SCSI
AHA-3940UW	MultiChannel PCI-to-Wide Ultra SCSI
AHA-3940UWD	MultiChannel PCI-to-Wide Ultra SCSI with Dual External Connectors
AHA-3940AU	MultiChannel PCI-to-Ultra SCSI
AHA-3940AUW	MultiChannel PCI-to-Wide Ultra SCSI
AHA-3940AUWD	MultiChannel PCI-to-Wide Ultra SCSI with Dual External Connectors
AHA-3944W	MultiChannel PCI-to-Fast and Wide Differential SCSI

Host Adapter	Description
AHA-3944UWD	MultiChannel PCI-to-Wide Ultra Differential SCSI with Dual External Connectors
AHA-3944AUWD	MultiChannel PCI-to-Wide Ultra Differential SCSI with Dual External Connectors
AHA-4944W	Quad Channel PCI-to-Fast and Wide Differential SCSI
AHA-4944UW	Quad Channel PCI-to-Ultra Wide Differential SCSI
AIC-7850	Single-chip PCI-to-Fast SCSI
AIC-7855	Single-chip PCI-to-Fast SCSI
AIC-7856	Single-chip PCI-to-Fast SCSI
AIC-7860	Single-chip PCI-to-Ultra SCSI
AIC-7870	Single-chip PCI-to-Fast and Wide SCSI
AIC-7880	Single-chip PCI-to-Wide Ultra SCSI
AIC-7890	Single-chip PCI-to-Ultra2 SCSI (32 bit)
AIC-7891	Single-chip PCI-to-Ultra2 SCSI (64 bit)
AIC-7895	Single-chip PCI-to-MultiChannel Wide Ultra SCSI
AIC-7896	Single-chip PCI-to-MultiChannel Ultra2 SCSI (32 bit)
AIC-7897	Single-chip PCI-to-MultiChannel Ultra2 SCSI (32 bit)

Requirements

The following are the minimum and recommended requirements needed to install the Adaptec 7800 Family Manager Set:

- 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) 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 CD-ROM.

- The distribution software and documentation included with your operating system.

- The *User's Guide* for your host adapter.

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Microsoft Windows NT Installation

This chapter explains how to install the Adaptec 7800 Family Manager Set *aic78xx.sys* and *aic78u2.sys* drivers for Windows® NT. The *aic78xx.sys* driver supports all Adaptec 7800 Family Ultra SCSI (and earlier) host adapters, and the *aic78u2.sys* driver supports all Ultra2 SCSI adapters. Refer to the list on page 1-3.

If you are performing a first time Windows NT installation, see *Installing the Driver When Installing Windows NT* on page 2-2. If Windows NT is already installed in your system, see *Installing the Driver When Windows NT is Already Installed* on page 2-5.

Installing the Driver When Installing Windows NT

A version of the *aic78xx.sys* driver(Ultra SCSI) driver is embedded (included) in the Windows NT 3.5x and 4.0 installation disks (or CD-ROM). During a normal Windows NT installation, the 7800 Family host adapter is detected in your system and the embedded driver is automatically installed.

> **Note:** 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, follow the instructions for completing a *fresh* Windows NT installation.

The *aic78u2.sys* driver (Ultra2 SCSI) is not embedded on the Windows NT 3.5x and 4.0 installation disks (or CD-ROM) and must be installed after Windows NT has been installed. When completing the Windows NT installation, you can update the driver by following the instructions in *Installing the Driver When Windows NT is Already Installed* on page 2-5.

Completing a Fresh Windows NT 3.5x Installation

1   If you choose to install Windows NT from a floppy drive, locate the Windows NT Setup 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   Insert 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 are installing an Ultra2 SCSI host adapter such as the AHA-2940U2W, you cannot select **Express** setup, because the *aic78u2.sys* driver is not embedded. Selecting **Express** setup loads the embedded driver *aic78xx.sys* included with Windows NT which is for Ultra SCSI adapters only.

5 Press **S** 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 **S** to configure additional SCSI adapters.

7 From the list of additional SCSI adapters, expand the list, select **Other,** and press **Enter** (requires disk provided by a hardware manufacturer).

8 Insert the Adaptec 7800 Family Manager Set diskette for Windows NT into drive *A* and press **Enter**.

The screen displays the adapter drivers supported on the diskette. For Windows NT 3.5x, the following is displayed:

Adaptec AHA-290x/291x/294x/4944/AIC-78xx PCI SCSI Controller (NT 3.5x)

or

Adaptec AHA-294xu2/AIC-7890/91 PCI Ultra2 SCSI Controller (NT 3.5x)

9 Highlight the driver and press **Enter.**

10 To add other host adapters that are not a part of the 7800 Family, do so at this time by repeat from step 7 for each additional adapter and insert the appropriate driver disk. The Adaptec 7800 Family host adapters use the same driver; it is not necessary to install the driver again.

11 Press **Enter** to continue with the Windows NT operating system setup. Follow the instructions given onscreen and in the Windows NT installation documentation.

Completing a Fresh Windows NT 4.0 Installation

1 Start your system with the Windows NT Boot Diskette in the floppy drive.

2 When prompted, insert diskette #2 in your floppy drive. After a few moments you will see a blue screen. To setup Windows NT now, press **Enter**.

3 Press **S** to skip auto-detection of your SCSI host adapter.

4 Press **S** again to specify an additional device.

5 Press **Enter** to select Others; insert the 7800 Family Manager Set diskette for Windows NT in your floppy drive.

6 Select from the following drivers:

Adaptec AHA-290x/291x/294x/394x/4944 ⁄ AIC-78xx PCI SCSI Controller (NT 4.0)

or

Adaptec AHA-294xu2/AIC-7890/91 PCI Ultra2 SCSI Controller (NT 4.0)

7 Highlight a driver and press **Enter**.

8 To add other host adapters that are not part of the 7800 Family, press **S** and repeat from Step 4 for each additional adapter and insert the appropriate driver disk. The Adaptec 7800 Family host adapters use the same driver; it is not necessary to install the driver again.

9 Press **Enter** to continue with the Windows NT operating system setup. Follow the instructions onscreen and in the Windows NT documentation to complete the installation.

Installing the Driver When Windows NT is Already Installed

To update or install the *aic78xx.sys* or *aic78u2.sys* driver if Windows NT is already installed, follow the instructions below for the version of Windows NT you are installing.

Updating Windows NT 3.5x

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.

3   Click the **Add** button to add another host adapter type to the list. A list of additional SCSI adapters appears.

4   Expand the list of additional SCSI adapters; select **Other** and press **Enter**. (Requires disk provided by the hardware manufacturer.)

5   Insert the Adaptec 7800 Family Manager Set diskette for Windows NT into drive *A;* enter one of the following paths to the installation files and then click **OK**.

    a:\winnt\3_5)

The screen displays the adapter drivers supported on the diskette:

Adaptec AHA-290x/291x/294x/4944/AIC-78xx PCI SCSI Controller (NT 3.5x)

Adaptec AHA-294xu2/AIC-7890/91 PCI Ultra2 SCSI Controller (NT 3.5x)

6   Highlight a driver, then click **OK**. The driver is added to the list of SCSI adapters.

7   Select the driver from the list of SCSI adapters and click **Install**.

At this point, Windows NT Setup checks to see if the specified driver has already been copied to the system disk.

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

> 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 with Step 9.

> Please enter the full path to the Windows NT SCSI Adapter files.

9 Change the path to the a:\winnt\3_5 directory, 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.

10 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 text string should look similar to:

Adaptec AHA-290x/291x/294x/4944/AIC-78xx PCI SCSI Controller (NT 3.5x)

or

Adaptec AHA-294xu2/AIC-7890/91 PCI Ultra2 SCSI Controller (NT 3.5x)

11 Add other types of host adapters if necessary (see step 4 on page 2-5), or click **Close** to exit the SCSI adapters portion of Windows NT Setup, and then close the program.

12 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.

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

Updating Windows NT 4.0

1 Start Windows NT.

2 Click the **Start** button on the Windows NT task bar, and then point to Settings.

3 Click the **Control Panel**.

4 Double-click the **SCSI Adapters** icon.

5 Click the **Drivers** tab, and then click the **Add** button.

6 In the Install Driver window, click the **Have Disk** button.

7 Insert the 7800 Family Manager Set diskette for Windows NT into drive A.

8 From the *Copy Manufacturer's File From* text box, type a:\winnt\4.0, and click **OK**.

9 In the Install Driver window, Click **OK**.

10 Click the **New** button when asked if you want to use the currently installed driver(s) or install new one(s).

11 Type a:\winnt\4_0 again, and click **Continue**. The driver is now installed.

12 You must restart your computer for the changes to take effect. Click **Yes** to restart your computer. Click **No** to return to the SCSI Adapters window.

Using Advanced Configurable Parameters

Advanced users may use software parameters to alter the configuration of the Windows NT device drivers supplied by Adaptec. All Windows NT configuration information is stored in a data structure called the Registry. You can edit this information through a tool called the Registry Editor.

Caution: Do not edit your registry unless it is absolutely necessary. If there is an error in your registry, your computer may become nonfunctional.

Using Windows NT SCSI Parameters

Follow the instructions below to enter the registry values that affect how the Windows NT SCSI manager interprets the generic configuration information of SCSI device drivers. All SCSI host adapters installed in your system are affected by the values you enter here. A list of valid values follows.

Note: The following value keys are case-sensitive and must be entered exactly as shown.

- **DisableTaggedQueuing**—A nonzero value indicates that the SCSI host adapter disables tagged queueing for SCSI devices. The data type for this value is REG_SZ.

- **DisableSynchronousTransfers**—A nonzero value indicates that the SCSI host adapter is not to initiate synchronous negotiations (but it may still accept negotiations initiated by a SCSI target). The data type for this value is REG_SZ.

- **DisableDisconnects**—A nonzero value indicates that targets are not permitted to disconnect during the execution of a SCSI command. The data type for this value is REG_DWORD.

- **MaximumLogicalUnit**—This can limit the scan for connected devices on the SCSI bus. Valid values are 1 to 8. If 1 is specified, the Windows NT SCSI manager assumes that no SCSI targets support LUNs other than 0. Otherwise, LUNs from 0 to 8 are scanned during system initialization. The data type for this value is REG_DWORD.

■ **Maximum SGList**— Specifies the maximum number of scatter-gather elements. Valid values are 17-255. The data type for this value is REG_DWORD.

To enter Windows NT parameters, follow these steps:

1   Select **Run** from the File menu (Windows NT 3.5x), or **Run** from the Start button (Windows NT 4.0).

2   Type regedt32 and press **Enter**.

3   Open the registry list to the following location:

\HKEY_LOCAL_MACHINE\System\CurrentControlSet\
Services\aic78xx\Parameters\Device

or

\HKEY_LOCAL_MACHINE\System\CurrentControlSet\
Services\aic78u2\Parameters\Device

If the *\Parameters\Device* keys already exist, skip to step 8 below to begin entering values. If the keys do not yet exist, you will need to create them by continuing with step 4.

4   Click on the aic78xx or aic78u2 key.

5   Select **Add Key** from the Edit menu; Type Parameters in the Key Name edit box. Leave the Class edit box blank.

6   Click on the Parameters key.

7   Select **Add Key** from the Edit menu; Type Device in the Key Name edit box. Leave the Class edit box blank.

To specify a certain host adapter, append Device with the number of the host adapter. For example, type Device0 for the first host adapter, Device1 for the second, etc. If you omit the host adapter number, the configuration information applies to all 7800 Family host adapters.

8   Click on the Device key.

9   Select **Add Value** from the Edit menu. In the Value Name edit box, enter one of the valid parameter values. Make sure to enter the appropriate Data Type for the value. To enter additional values, repeat steps 8-9.

> **Note:** Changes made with the Registry Editor do not take effect until you shut down and then restart your system.

Using Driver-specific Parameters

To use the Registry Editor to enter *aic78xx.sys* or *aic78u2.sys* driver-specific parameters that affect the configuration information for Adaptec SCSI PCI device drivers, follow the instructions below. A list of valid parameters follows.

> **Note:** The following parameters are case-sensitive and must be entered exactly as shown. When entering multiple parameters, each parameter must be separated by a space.

- **/INSTRUMENTATION**—enables recording of I/O statistics and errors. If this option is not specified, instrumentation defaults to disabled. The data type for this value is REG_SZ.

- **/INSTR_ERRLOG_Z=*nnn***—sets the maximum number of error log entries, if /INSTRUMENTATION is enabled. If a number is not specified, the maximum number or error log entries defaults to 32. Valid values are 0-128. The data type for this value is REG_SZ.

- **/MAXTAGS=*nnn***—specifies the tagged command queue depth. If a number is not specified, the tagged queue depth defaults to 128. Valid values are 1-255. The data type for this value is REG_SZ.

To enter driver-specific parameters, follow these steps:

1 Select **Run** from the File menu (Windows NT 3.5x), or **Run** from the Start button (Windows NT 4.0).

2 Type regedt32 and press **Enter**.

3 Open the registry list to the following location:

\HKEY_LOCAL_MACHINE\System\CurrentControlSet\ Services\aic78xx\Parameters\Device\DriverParameters

or

\HKEY_LOCAL_MACHINE\System\CurrentControlSet\ Services\aic78u2\Parameters\Device\DriverParameters

If the *\Parameters\Device\DriverParameters* keys already exist, skip to step 10 below to begin entering parameters. If the keys do not yet exist, you will need to create them by continuing with step 4.

4 Click on the aic78xx or aic78u2 key.

5 Select **Add Key** from the Edit menu; Type Parameters in the Key Name edit box. Leave the Class edit box blank.

6 Click on the Parameters key.

7 Select **Add Key** from the Edit menu; Type Device in the Key Name edit box. Leave the Class edit box blank.

To specify a certain host adapter, append Device with the number of the host adapter. For example, type Device0 for the first host adapter, Device1 for the second, etc. If you omit the host adapter number, the configuration information applies to all 7800 Family host adapters.

8 Click on the Device key.

9 Select **Add Value** from the Edit menu; type DriverParameters in the Key Name edit box. Enter REG_SZ as the Data Type and press **Enter**.

10 A String Editor text box appears. Enter valid parameters in the text box. When entering multiple parameters, each parameter must be separated by a space.

Note: Changes made with the Registry Editor do not take effect until you shut down and then restart your system.

Using Windows NT and the Host Adapter

This section contains useful information on using Windows NT and your host adapter.

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 below:

Removing a Host Adapter in Windows NT 3.5x

1 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 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 the computer.

Note: 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.

Removing a Host Adapter in Windows NT 4.0

1 From the Control Panel, double-click the **SCSI Adapters** icon.

2 Click the **Drivers** tab.

3 Select the driver you are planning to remove. The driver appears as one of the following:

For Ultra SCSI:

Adaptec AHA-294X/AHA-394x/AHA-4944 or AIC-78xx PCI SCSI Controller (NT 4.0)

or

Adaptec AHA-294x/AHA-394x or AIC-78xx PCI SCSI Controller (NT 4.0)

or

Adaptec AHA-294x/AHA-394x or AIC-78xx PCI SCSI Controller

For Ultra2 SCSI

Adaptec AHA-294Xu2/AIC-7890\91 PCI Ultra2 SCSI Controller (NT 4.0)

4 Click the **Remove** button.

5 If you are sure you are removing the correct host adapter type, click **Yes**.

6 Click **Yes** to restart the computer and initialize changes. Click **No** to return to the SCSI Adapters window.

Note: 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 a 7800 Family host adapter for a non-7800 Family host adapter 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.

Note: If you do not install the driver that comes with the new host adapter, it may result in a Windows NT boot failure.

To swap adapters, follow these steps:

1 Install the driver for the 7800 Family host adapter by following the steps in *Installing the Driver When Windows NT is Already Installed* on page 2-5.

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 installed, the system alerts you with an error message of the extra device driver every time you boot. See *Removing a Host Adapter* on page 2-12.

2 Once the new device driver is installed, shut down Windows NT and replace the existing host adapter with the 7800 Family host adapter.

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

Troubleshooting

Problems and Solutions

I made changes to the host adapter configuration and Windows NT no longer boots!
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.

Error Codes

Error codes generated by the *aic78xx.sys* or *aic78u2.sys* driver can be viewed by opening the Windows NT Event Viewer error logs.

To view events generated by the driver, follow these steps:

1 Double-click the **Event Viewer** icon in the Administrative Tools program group.

Error codes generated by the driver show up as Event ID 11. Error codes generated by the SCSIPort show up as Event ID 9.

2 To view event details, select **System** from the Log menu. Double-click the *aic78xx.sys* or *aic78u2.sys* driver event that has an Event ID of 11. (There may be none or multiple driver events.)

The top portion of the Event Detail dialog box displays information such as the time that the event was generated, the computer on which the event occurred (in case of remote

monitoring) and the description of the event. The Data section of the Event Details dialog box displays the error codes generated.

3 Click the **Words** radio button.

In the Data section of the dialog box, the entry in the second row and second column (to the right of the 0010: entry) lists the error code generated by the driver. The common error codes for the driver are described below.

> **Note:** The entry in the third row of the last column identifies the SCSI ID of the device originating the error.

aic78xx.sys or aic78u2.sys Error Codes
The following error codes are listed sequentially according to the last three digits of the code. For example, [xxxxx010], [xxxxx011], [xxxxx012], etc.

> **Note:** When reporting problems to Customer Support, be sure to include the complete error code in your problem description.

[xxxxx004]
[xxxxx005]
[xxxxx006]
Command completed with error. A request issued to a target device completed with indication that there is an error. In most cases, the error is recovered and normal operations continues.

[xxxxx010]
Error issuing command. An error has occurred while the driver was setting up its internal data structures.

[xxxxx011]
Error issuing command. The requested command is not supported by this driver.

[xxxxx012]
[xxxxxx99]
Error issuing command. The driver does not recognize the target device.

[xxxxx021]
Device protocol error. An unexpected event occurred during data transfer between the adapter and target device. Normally, this indicates a faulty or noncompliant target device.

[xxxxx022]
Adapter or target device protocol error. The adapter or target device has broken the communication protocol. A badly behaving device could be cause this message to appear. Normally this is not a serious problem. If you get this message frequently over a short period of time, it could indicate that the device or system is malfunctioning. Unplug or power down unused devices to see if the problem persists.

[xxxxx023]
Target device parity error. The driver has detected a parity error by the target device.

[xxxxx024]
Data overrun or underrun. The adapter was given more or less data than the expected amount of data.

[xxxxx031]
Target device queue full. The target device internal buffer is full.

[xxxxx032]
Target device busy. The target device reports a busy status. Another program may already be using this device.

[xxxxx050]
[xxxxxx9A]
Host adapter failure. Your host adapter may not be properly installed or is defective. Try re-seating the adapter in the PCI slot, or try installing it a different PCI slot.

[xxxxx081]
[xxxxxx8A]
[xxxxxx83]

Adapter initialization failure. An error has occurred while the driver was setting up its internal data structures. Verify that your adapter is supported by this version of the driver.

[xxxxx089]

Unable to allocate memory. This indicates that there may be a problem with the amount of memory installed in your system. Verify that your system has at least the minimum amount of memory required by your operating system.

[xxxxx096]

Adapter hardware initialization failure—possible resource conflict. The driver has attempted to initialize the adapter hardware but failed. This might suggest that the adapter resources (e.g., IRQ) conflict with another board installed in your system.

[xxxxx097]

Unable to allocate memory. This indicates that there may be a problem with the amount of memory installed in your system. Verify that your system has at least the minimum amount of memory required by your operating system.

[xxxxx0af]

Unable to de-allocate memory that was allocated for a target device. Normally, this is not a serious problem, unless you get this message frequently over a short period of time. The memory can be reclaimed by rebooting the system.

[xxxxx0ce]

Scatter Gather Limit exceeded. An I/O request packet from the system contained a Scatter Gather element list that contained more elements than are supported by the miniport. Scatter Gather is a list of data segments that define the entire data transfer. Scatter Gather is a means to improve total data throughput. This error might be caused by a component external to the miniport driver, such as the operating system or an ASPI application.

[xxxxxd4]

Adapter hardware failure - adapter reset. The host adapter hardware failed and the miniport has to reset the hardware.

[xxxxx0d6]

Internal driver error. An error has occurred while the driver was setting up its internal data structures. Try installing the most up-to-date version of the driver available from the Adaptec Web site or BBS.

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Microsoft Windows 95 Installation

This chapter explains how to install the Adaptec 7800 Family Manager Set *aic78xx.mpd* and *aic78u2.mpd* drivers for Windows® 95. The *aic78xx.mpd* driver supports all Adaptec 7800 Family UltraSCSI (and earlier) host adapters, and the *aic78u2.mpd* driver supports all Ultra2 SCSI adapters. Refer to the list on page 1-3.

If you are performing a first time Windows 95 installation, see *Installing the Driver When Installing Windows 95* on page 3-2. If Windows 95 is already installed in your system, see *Installing the Driver When Windows 95 is Already Installed* on page 3-2.

Note: When Windows 95 starts, if a *New Hardware Found* dialog is displayed after your 7800 Family Manager Set host adapter has been installed, you must select the Driver from *Disk Provided by Hardware Manufacturer* option. Insert your Adaptec 7800 Family Manager Set v. 3.00 diskette into the floppy drive and type a:\win95 as the path. Then, follow the on screen instructions.

Installing the Driver When Installing Windows 95

A version of the *aic78xx.mpd* (Ultra SCSI) driver is embedded (included) in the Windows 95 installation CD-ROM. During a normal Windows 95 installation, the 7800 Family host adapter (Ultra SCSI or earlier) is detected in your system and the embedded *aic78xx.mpd* driver is automatically installed.

> **Note:** If the Windows 95 installation cannot detect the 7800 Family host adapter(Ultra SCSI or earlier) installed in your computer, or you are installing the *aic78u2.mpd* driver for an Ultra2 SCSI host adapter, you must install the driver manually after Windows 95 is complete. Follow the procedures in the section, *Installing the Driver When Windows 95 is Already Installed*, below

Installing the Driver When Windows 95 is Already Installed

To update or install the *aic78xx.mpd* or *aic78u2.mpd* if Windows 95 is already installed, follow these instructions:

> **Note:** All Adaptec 7800 Family Ultra SCSI (and earlier) host adapters use the *aic78xx.mpd* driver. Ultra2 SCSI adapters use the *aic78u2.mpd* driver. Once the correct driver is updated, it is not necessary to update it again for each 7800 Family host adapter installed in your system.

1 Start Windows 95.

2 Click the **Start** button on the Windows 95 task bar, and then point to Settings.

3 Click **Control Panel**.

4 Double-click the System icon.

5 On the Device Manager tab, click the plus sign (+) next to the SCSI controller icon.

Note: If Windows 95 cannot determine the type of host adapter installed in your computer, a yellow question mark labelled *Other devices* appears instead of the SCSI controller icon. To continue, click the plus sign (+) next to the question mark; a yellow question mark labelled *PCI SCSI Bus Controller* then appears.

6 Double-click the 7800 Family host adapter you wish to update, or if a yellow question mark labelled *PCI SCSI Bus Controller* is displayed, double-click the question mark.

7 Insert the Adaptec 7800 Family Manager Set v.3.00 diskette into drive A.

8 Select the Drives tab

Note: If the version of Windows 95 you are using displays an **Update Drivers** button instead of a **Change Driver** button, follow the procedures in the section *Updating the Driver for Windows 95 (Version OSR 2)* on page 3-4.

9 Click **Change Driver**. If you are prompted to select the hardware type, select **SCSI Controller**.

10 Click the **Have Disk** button and enter a:\win95 as the path.

11 Click **OK**.

12 Select the 7800 Family host adapter, and click **OK**.

13 Click **OK**. The driver is copied and scanned.

14 You must restart your computer for the changes to take effect. Click **Yes** to restart your computer. Click **No** to return to the system properties window.

Updating the Driver for Windows 95 (Version OSR 2)

This section covers the remaining steps for updating the drives on Windows 95, OSR 2.

1 Follow steps 1 through 7 in the previous section, *Installing the Driver When Windows 95 is Already Installed.*

2 Click **Update Drivers**.

3 In the Update Device Driver Wizard, select **Yes**, then click **Next**.

4 Under Location type a:\win95, then click **OK**.

5 Click **Finish**.

6 The message *Please insert the disk labeled '7800 Family Manager Set v.3.00 Installation Disk'* appears dialog box. Click **OK**.

7 In the Copying Files dialog box, a message stating that *'The file AIC78XX.MPD or AIC78U2.MPD on 7800 Family Manager Set v3.00 installation disk could not be found...'* appears. Type a:\win95 and click **OK** to install the driver.

8 Click **Yes** to restart you computer to update the changes. To return to the System Properties window, click **No**.

> **Note:** If you wish to re-update the driver again, you must select No at step 3 above, then click Next and follow the onscreen instructions to re-update.

Troubleshooting

Problems and Solutions

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 32-bit protected mode device drivers used by Windows 95 to control host adapters and devices. Windows 95 includes a set of miniport drivers for various SCSI host adapters.

If your 7800 Family host adapter is already installed, the adapter's miniport driver is automatically installed and configured during Windows 95 installation. Follow the instructions listed in *Installing the Driver When Windows 95 is Already Installed* on page 3-2 to ensure that the miniport driver is updated.

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 in the Device Manager, follow these steps:

1   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.

2   If Windows does not detect the 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.

3   Insert the 7800 Family Manager Set diskette for Windows 95 into your floppy drive.

4   Select the model of your 7800 Family host adapter, and then click the **Have Disk** button.

5   Enter a:\win95 or b:\win95 as the location to copy the file from.

6   Click **OK**. The driver is copied and your system is updated.

7   You must restart your computer for the changes to take effect.

What if a yellow exclamation mark 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.)

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 and need to access your CD-ROM drive.

- You are using a scanner or another SCSI device with *config.sys*- or *autoexec.bat*-based drivers, such as Hewlett Packard *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).

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 Make sure your ASPI Real mode drivers (including *aspicd.sys, aspi8dos.sys,* and *mscdex.exe*) are loaded and running from your *config.sys* and *autoexec.bat* files. Refer to the EZ-SCSI User's Guide for more information.

2 If step 1 did not work, 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.

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Novell NetWare Installation

This chapter explains how to install the Adaptec 7800 Family Manager Driver *aic7870.dsk* (Ultra SCSI) or *aic78u2.ham* (Ultra2 SCSI) for Novell NetWare— NetWare v3.1x, v4.0, and v4.1x. The *aic7870.dsk* driver supports all Adaptec 7800 Family UltraSCSI (and earlier) host adapters, and the *aic78u2.ham* driver supports all Ultra2 SCSI adapters. Refer to the list on page 1-3.

If you are performing a first time NetWare installation, see *Installing the Driver When Installing NetWare* on page 4-2. If NetWare is already installed in your system, see *Installing the Driver When NetWare is Already Installed* on page 4-4.

Installing the Driver When Installing NetWare

To install the *aic7870.dsk* or *aic78u2.ham* driver when you install NetWare, follow the instructions below for the version of NetWare you are installing.

NetWare v3.1x

Follow these instructions only if you are installing NetWare v3.1x for the first time:

1 Follow the procedures in your NetWare documentation for installing a new server.

2 After completing the NetWare installation, exit to DOS.

If you are installing the *aic89u2.ham* driver, continue on to step 3. If you are installing the *aic7870.dsk* driver, jump to step 5.

3 Copy all the files from the *NetWare 3.12 Patch Disk* to the *c:\server.312* directory. Do this with the following command:

copy a:*.* c:\server.312\server.exe

4 Update the *server.exe* file with the following command:

lswap c:\server.312\loader.exe c:\server.312

5 Create the *startup.ncf* with the following lines:

load pm312

pmload c:\server.312

load aic78u2

6 Start *server.exe* and continue with the installation.

NetWare v4.0 or v4.1x

Follow these instructions only if you are installing NetWare v4.0 or v4.1x for the first time:

1 Begin installation of NetWare v4.0 or v4.1x on your server as instructed in your NetWare documentation.

2 When a screen appears that asks you to select a disk driver, press **Insert**.

3 Insert the Adaptec 7800 Family Manager Set diskette for NetWare into your disk drive.

4 Press **F3** and specify the path to the *aic7870.dsk* or *aic78u2.ham* driver for NetWare (e.g., *a:\netware\v4_xx* on the diskette).

5 Select *AIC7870.DSK* or *AIC78U2.HAM* and press **Enter**.

6 Press **Alt-ESC**. From the console prompt type the following:

load a:\netware\aic7870.dsk

or

load a:\netware\aic78u2.ham

7 Press **Enter**. A list of slot numbers separated by commas is displayed. Write down all slot numbers listed. Do not press **Enter**.

8 Press **ESC** twice.

9 At the prompt, press **Alt-ESC**.

10 Choose Select/Modify Driver Parameters then press **Enter**.

11 Type the slot number and press **Enter**.

12 Press **F10**, or **ESC**.

13 Choose Save Parameters and Continue, and press **Enter**.

14 To install additional adapters, follow the procedures from step 10.

15 When complete, select Continue the Installation to complete the installation.

Note: To load the driver automatically at server bootup, make sure the *startup.ncf* file includes the load command line for your host adapter. See *Installing the Driver When NetWare is Already Installed* on page 4-4 and *Loading the Driver at Server Bootup* on page 4-5.

Installing the Driver When NetWare is Already Installed

To update or install the *aic7870.dsk* or *aic78u2.ham* driver when NetWare is already installed, follow the instructions in this section. The procedures are similar for all versions of NetWare. Procedures that are specific to a NetWare version are noted when necessary.

1 Make a backup copy of the old driver (if it exists) before installing the new driver.

2 Copy the *aic7870.dsk* or *aic78u2.ham* driver from the 7800 Family Manager Set diskette for NetWare into the server's startup directory (e.g., *c:\nwserver, c:\server.40, c:\server.312*) on your hard disk. This overwrites any existing version of the driver in the directory.

Note: For NetWare v3.1x, the driver file is located in the *\netware\v3_1x* directory on the diskette; for NetWare v4.0 and v4.1x, the file is 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 all appropriate command line options are specified. See *Loading the Driver at Server Bootup* on page 4-5.

The correct syntax to load the 7800 Family driver is

    load [*pathname*]aic7870 [*options*]

    or

    load [*pathname*]aic78u2 [*options*]

Command line options are *not* case sensitive. Placing commas between command line options is optional. See *Loading the Driver at Server Bootup* on page 4-5 for possible values.

Loading the Driver at Server Bootup

To automatically load the *aic7870.dsk* or *aic78u2.ham* at server bootup, the *startup.ncf* file (usually located in your server's startup directory) must contain a load command line that specifies the location of the driver and any appropriate command line options (see *Using the Load Command Line Options* on page 4-7). For additional information on the *startup.ncf* file, refer to your NetWare documentation.

> **Note:** To load the driver from your hard disk, the driver and *aspitran.dsk* module must be copied from the 7800 Family Manager Set diskette for NetWare to a directory on your hard disk [usually the server's startup directory (e.g., *c:\nwserver*)].

The correct syntax to load the driver is

load [*pathname*]aic7870 [*options*]

or

load [*pathname*]aic78u2 [*options*]

For example, the command line to load the driver from the *c:\nwserver* directory, with the verbose= option *on* is

load c:\nwserver\aic7870 verbose=y

or

load c:\nwserver\aic78u2 verbose=y

Command line options are *not* case sensitive. Placing commas between command line options is optional. See *Using the Load Command Line Options* on page 4-7 for possible values.

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

> **Note:** You can also use your DOS text editor to modify the *startup.ncf* file.

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 the Load Command Line Options

You can specify several command line options when the driver is loaded. The available options are described in the tables below. The first table describes the command line options for the *aic7870.dsk* driver for Ultra SCSI and earlier products. The second table describes command line options for the *aic78u2.ham* driver for Ultra2 SCSI products.

Table of aic7870.dsk Command Line Options:

Option	Values	Default	Description
auto_bus_fairness=	on, off	on	Enables/disables auto SCSI bus fairness algorithm.
auto_disable_tagq=	on, off	on	Enables/disables auto disable tag queuing algorithm.
auto_flush_diskreq=	on, off	on	Enables/disables auto disk flush algorithm.
cdrom=	on, off	on	Enables/disable driver support for CD-ROM devices; on = Driver, off = ASPI.
dev_enable=	00-FFFF	FFFF	Allows you to enable the driver's registration of SCSI devices on a per target basis. By default, all targets are scanned. 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* on page 4-12).

Option	Values	Default	Description
ext_tran=	yes, no	no	Determines translation method for a new drive in the system; yes = extended, no = standard. By default, standard translation is used unless set to extended by SCSI*Select*
fixed_disk=	on, off	on	Enables/disables support for hard disks. By default, hard disks are supported. You may want to disable hard disk support in order to load an ASPI Fixed Disk Module.
flush_diskreq=	00-FFFF	0	A bit mask to send occasionally ordered tags to specific targets. By default, no targets receive occasionally ordered tags. This bit mask is entered in hex (see *Bit Mask Options* on page 4-12).
instr=	on, off	off	Enables/disables recording of I/O statistics.
io_combine=	1-32	16	Specifies maximum number of segments in a scatter/gather list.
lun_enable=[1]	00-FFFF	01	A bit mask to enable scanning for specific LUNs on all targets. The default value of 01 causes the driver to scan LUN 0 only. This enable bit mask is entered in hex (see *Bit Mask Options* on page 4-12.)
max_tags=	1-128	16	Specifies maximum number of tagged commands per device.

Option	Values	Default	Description
multlun_targets	00-FFFF	FFFF	A bit mask to enable LUNs on selected targets. By default, LUNs on all targets are enabled. This bit mask is entered in hex (see *Bit Mask Options* on page 4-12).
read_after_write	0-1	1	Specifies default verify mode; 0 = Off (No verify on writes), 1 = On (Hardware verify).
removable=[1]	on, off	on	Enables/disables support for removable media other than CD-ROMs. By default, removable media is supported. You may want to disable removable disk support in order to load an ASPI Removable Disk Module.
start_unit	0-FFFF	0	A bit mask to enable sending the Start_Unit command to specific targets. By default, the command is not sent to any target. This feature is not needed by most devices. This bit mask is entered in hex (see *Bit Mask Options* on page 4-12).
tag_disable	0-FFFF	0	A bit mask to disable tagged queuing for specific targets. By default, tagged queuing is enabled for all targets. If bit mask is set, then tagged queuing for that particular device is disabled. This bit mask is entered in hex (see *Bit Mask Options* on page 4-12).

Option	Values	Default	Description
slot=	0-xxxx[2]	0	Defines a physical slot number for the host adapter. If 0 is specified, or if this option is not specified, then the driver loads for all 7800 Family host adapters.
verbose=	yes, no	no	Displays host adapter configuration information at load time.

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

[2] The values can vary and are dependent on the system configuration.
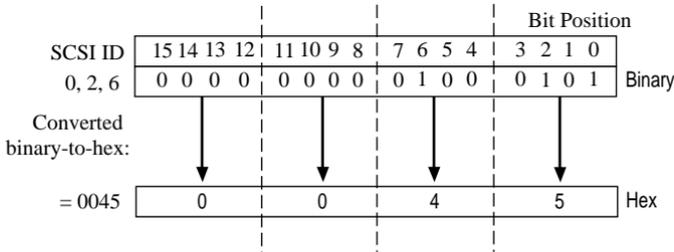
Table of aic78u2.dsk Command Line Options

Option	Values	Default	Description
auto_bus_fairness=	on, off	on	Enables/disables auto SCSI bus fairness algorithm.
auto_disable_tagq=	on, off	on	Enables/disables auto disable tag queuing algorithm.
auto_flush_diskreq=	on, off	on	Enables/disables auto disk flush algorithm.
dev_enable=	0-FFFF	FFFF	Allows you to enable the driver's registration of SCSI devices on a per target basis. By default, all targets are scanned. 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* on page 4-12).

Option	Values	Default	Description
flush_diskreq=	0-FFFF	0	A bit mask to send occasionally ordered tags to specific targets. By default, no targets receive occasionally ordered tags. This bit mask is entered in hex (see *Bit Mask Options* on page 4-12).
lun_enable=[1]	0-FF	01	A bit mask to enable scanning for specific LUNs on all targets. The default value of 01 causes the driver to scan LUN 0 only. This enable bit mask is entered in hex (see *Bit Mask Options* on page 4-12.)
max_tags=	1-128	16	Specifies maximum number of tagged commands per device.
multlun_targets=	0-FFFF	FFFF	A bit mask to enable LUNs on selected targets. By default, LUNs on all targets are enabled. This bit mask is entered in hex (see *Bit Mask Options* on page 4-12).
slot=	0-xxxx[1]	0	Defines a physical slot number for the host adapter. If 0 is specified, or if this option is not specified, then the driver loads for all 7800 Family host adapters.
verbose=	yes, no	no	Displays host adapter configuration information at load time.

[1] The values can vary and are dependent on the system configuration.

Bit Mask Options

Use the example below as an aid for calculating bit mask option hex values. Each SCSI device is enabled by a 1 in its corresponding bit position. The table that follows the figure, lists the binary-to-hex conversions. Using this example, if you want to enable scanning for LUNs 0, 2, and 6 on all targets, then use the command line option of lun_enable=0045.

																Bit Position
SCSI ID	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	
0, 2, 6	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	1	Binary

Converted binary-to-hex:

= 0045	0	0	4	5	Hex

Binary	Hex.	Binary	Hex.
0000	0	1000	8
0001	1	1001	9
0010	2	1010	A
0011	3	1011	B
0100	4	1100	C
0101	5	1101	D
0110	6	1110	E
0111	7	1111	F

Sample Load Commands

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

    load a:\netware\v3_1x\aic7870

If an error message appears when attempting to load the driver, refer to *Troubleshooting* on page 4-18.

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 NetWare and the Host Adapter

This section contains useful information on using NetWare and your host adapter.

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 these 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 disk 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 (*aic7870.dsk* driver only)

Read After Write Verify (menu choice 2) is set to *Hardware Level* by default. The option can also be set on the command line, see *Using the Load Command Line Options* on page 4-7.

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. We recommend this setting for best data security.
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 you to backup server disk drives to a server tape drive. The utility 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*, *tsa*, and *sbackup* modules.

1 Once you have loaded *aic7870.dsk* or *aic78u2.ham*, load *tapedai.dsk, tsaxxx.nlm (tsa312.nlm, tsa400.nlm, tsa410.nlm)*, and *sbackup* with these options:

> :load tapedai
> :load tsa*xxx*
> :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 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

To use a CD-ROM with NetWare v3.1x, v4.0, or v4.1x, follow these instructions:

1   Load *aic7870.dsk* or *aic78u2.ham* by entering the following line:

    :load [*pathname*]aic7870

    or

    :load [*pathname*]aic78u2

2   If using an Ultra SCSI host adapter, load *aspicd.dsk* by entering the following line:

    :load [*pathname*]aspicd

    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 or aic78u2.ham*.

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 128 tagged, or 1 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 number a better random performance.

> **Note:** A large number of max_tags can also cause starvation problems leading to deactivations with some drives.

Troubleshooting

Error Messages

The error messages listed below are the messages associated with the *aic7870.dsk* or *aic78u2.ham* driver. Messages are listed sequentially according to the last three digits of the error code. For example, [xxxxx080], [xxxxx081], [xxxxx082], etc.

> **Note:** When reporting problems to Customer Support, be sure to include the complete error code in your problem description.

[xxxxx080] Unable to allocate memory
This indicates that there may be a problem with the amount of memory installed in your system. Verify that your system has at least the minimum amount of memory required by your operating system.

[xxxxx081] Adapter software initialization failure
An error has occurred while the driver was setting up its internal data structures. Verify that your adapter is supported by this version of the driver.

[xxxxx082] Internal driver error
An error has occurred while the driver was setting up its internal data structures. Try installing the most up-to-date version of the driver available from the Adaptec Web site or BBS.

[xxxxx083] Adapter not supported by this version of the driver
Your adapter is not supported by the driver on your system. You may have installed a new adapter and have not updated the driver on your system.

[xxxxx084] Adapter software initialization failure
An error has occurred while the driver was setting up its internal data structures. Try installing the most up-to-date version of the driver available from the Adaptec Web site or BBS.

[xxxxx085] Unable to allocate memory
This indicates that there may be a problem with the amount of memory installed in your system. Verify that your system has at least the minimum amount of memory required by your operating system.

[xxxxx087] Internal driver error
An error has occurred while the driver was setting up its internal data structures. Try installing the most up-to-date version of the driver available from the Adaptec Web site or BBS.

[xxxxx088] Adapter software initialization failure
An error has occurred while the driver was setting up its internal data structures. Try installing the most up-to-date version of the driver available from the Adaptec Web site or BBS.

[xxxxx089] Unable to allocate memory
This indicates that there may be a problem with the amount of memory installed in your system. Verify that your system has at least the minimum amount of memory required by your operating system.

[xxxxx096] Adapter hardware initialization failure - possible resource conflict
The driver has attempted to initialize the adapter hardware but failed. This might suggest that the adapter resources (e.g., IRQ) conflict with the resources of another board installed in your system.

[xxxxx099] Adapter software initialization failure
[xxxxx09a] Adapter software initialization failure
[xxxxx09b] Adapter software initialization failure
An error has occurred initializing one of the driver's internal data structures for a device connected to the adapter. This may result in problems accessing the device. Try installing the most up-to-date version of the driver available from the Adaptec Web site or BBS.

[xxxxx0ab] Driver already loaded for this host bus adapter
The driver is already loaded for this adapter. Verify that the correct adapter is specified in your command line or startup file.

[xxxxx0ac] Driver already loaded for all host bus adapters
The driver is already loaded for all the supported adapters in this system.

[xxxxx0a4] SCSI bus reset by third party hardware
Hardware such as an array enclosure may have reset the SCSI bus. This is a normal condition unless you receive additional errors.

[xxxxx0a7] Unable to allocate memory
[xxxxx0a8] Unable to allocate memory
This indicates that there may be a problem with the amount of memory installed in your system. Verify that your system has at least the minimum amount of memory required by your operating system.

[xxxxx0a9] Possible interrupt conflict
This indicates that the adapter IRQ conflicts with the IRQ of another board installed in your system. Check your hardware documentation for instructions on setting and changing IRQs.

[xxxxx0c9] Invalid command line parameter
A command line option for the driver is invalid. See *Using the Load Command Line Options* on page 4-7 for valid command line options.

[xxxxx0ca] Invalid command line syntax
[xxxxx0cb] Invalid command line syntax
[xxxxx0cc] Invalid command line syntax
The command line syntax for the driver is incorrect. See *Using the Load Command Line Options* on page 4-7 for entering the correct syntax.

[xxxxx07c] Unable to allocate memory
[xxxxx07d] Unable to allocate memory
[xxxxx07e] Unable to allocate memory
[xxxxx07f] Unable to allocate memory
This indicates that there may be a problem with the amount of memory installed in your system. Verify that your system has at least the minimum amount of memory required by your operating system.

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IBM OS/2 Installation

This chapter explains how to install the Adaptec 7800 Family Manager Set Driver for OS/2. The *aic7870.add* driver supports Ultra SCSI devices for OS/2 v.2.1x, and OS/2 Warp3.x, 4.x, and 4.x SMP. The *aic78u2.add* driver supports Ultra2 SCSI devices for OS/2 Warp 3.x, 4.x, and 4.x SMP. Refer to the list of devices on page 1-3.

If you are installing OS/2 for the first time, see *Installing the Driver When Installing OS/2* on page 5-1. If OS/2 is already installed in your system, see *Installing the Driver When OS/2 is Already Installed* on page 5-6.

Installing the Driver When Installing OS/2

To install the *aic7870.add* or *aic78u2.add* driver at the same time you install OS/2, follow the instructions below for the version of OS/2 you are installing.

Note: When installing OS/2 from a CD-ROM, be sure the CD-ROM SCSI ID is not set to 0 or 7.

Installing OS/2 v2.1x (Ultra SCSI Driver Only)

Follow these instructions *only* if you are installing OS/2 v2.1x for the first time. We assume here that OS/2 is not already installed on the system. You will need to have access to a computer where you can copy DOS files from one diskette to another.

> **Note:** To install the *aic7870.add* driver, it is necessary to copy the driver from the 7800 Family Manager Set diskette for OS/2 on to the OS/2 installation diskette #1. However, before you can copy the driver, you must first remove various files from the OS/2 installation diskette #1, as explained in step 2 below.

1   Go to a computer on which DOS, Windows®, or OS/2 is already installed. Use diskcopy to make backup copies of all IBM OS/2 and Adaptec-supplied diskettes. Use the backup copies as your working diskettes.

2   Delete some of the existing files on the backup copy of the OS/2 diskette #1 so that approximately 120 KBytes of disk space is available on the diskette. Use the following information to help you decide which files to delete:

   –   If the Adaptec 7800 Family host adapter is the only Adaptec host adapter installed in your system, delete all Adaptec drivers (*aha152x.add*, *aha154x.add*, *aha164x.add*, *aha174x.add*, *aic7770.add*, and *fd16_700.add*).

   –   If you have an Adaptec host adapter that is not part of the 7800 Family, delete all of the Adaptec drivers not used by that particular host adapter. For example, if you have an Adaptec AHA-1540CP host adapter installed in your computer, delete all Adaptec drivers except for the *aha154x.add* driver.

   –   If you have deleted the suggested Adaptec drivers above, and you still do not have approximately 120 KBytes of disk space available on the diskette, delete these files: *ibm2flpy.add*, *ibm2adsk.add*, and *ibm2scsi.add*.

3   Copy the *os2ldr* file from the 7800 Family Manager Set diskette for OS/2 (i.e., *\os2\aic7870*) onto the OS/2 installation diskette.

4 Copy the *ibmint13.i13* and the *aic7870.add* files from the 7800 Family Manager Set diskette for OS/2 (i.e., *\os2\aic7870*) onto the
OS/2 diskette # 1.

5 Add the following line to the *config.sys* file on diskette #1:

basedev=aic7870.add

6 Run the OS/2 v2.1x installation program; follow the instructions in your OS/2 documentation.

7 At the end of the installation process, follow the onscreen instructions to remove the last OS/2 distribution diskette and reboot the computer.

8 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 v2.1x and the driver.

Installing OS/2 Warp 3.x, 4.x, and 4.x SMP

Follow these instructions *only* if you are installing OS/2 Warp 3.x, 4.x, and 4.x SMP for the first time. The instructions are the same for these versions of OS/2, unless otherwise stated. We assume here that OS/2 is not already installed on the system. You will need to have access to a computer where you can copy DOS files from one diskette to another.

> **Note:** To install the *aic7870.add* or *aic78u2.add* driver, it is necessary to copy the driver from the Adaptec 7800 Family Manager Set diskette for OS/2 on to the OS/2 installation diskette #1. However, before you can copy the driver, you must first remove various files from the OS/2 installation diskette #1, as explained in step 2 below.

1 Go to a computer on which DOS, Windows, or OS/2 is already installed. Use diskcopy to make backup copies of all IBM OS/2 and Adaptec-supplied diskettes. Use the backup copies as your working diskettes.

2 Delete some of the existing files on the backup copy of the OS/2 installation diskette #1 so that approximately 140 KBytes of disk space is available on the diskette. Use the following information to help you decide which files to delete:

– If the Adaptec 7800 Family host adapter is the only Adaptec host adapter installed in your system, delete all Adaptec drivers (*aha152x.add*, *aha154x.add*, *aha164x.add*, *aha174x.add*, *aic7770.add*, and *fd16_700.add*).

– If you have an Adaptec host adapter that is not part of the 7800 Family, delete all of the Adaptec drivers not used by that particular host adapter. For example, if you have an Adaptec AHA-1540CP host adapter installed in your computer, delete all Adaptec drivers except for the *aha154x.add* driver.

– If you have deleted the suggested Adaptec drivers above, and if you do not have a Microchannel architecture system, and you still do not have approximately 120 KBytes of disk space available on the diskette, delete these files: *ibm2flpy.add*, *ibm2adsk.add*, and *ibm2scsi.add*.

> **Note:** If you have a combination PCI/Microchannel architecture system, you need to delete third-party driver files not required.

3 Copy the *aic7870.add* or *aic78u2.add* driver from the 7800 Family Manager Set diskette for OS/2 onto the OS/2 installation diskette #1. This overwrites any existing version of the driver included on diskette #1.

> **Note:** The *aic7870.add* driver resides in the *\os2\aic7870* directory and the *aic78u2.add* driver resides in the *\os2\aic78u2* directory.

4 For each driver removed from the OS/2 diskette #1, remove its corresponding line in the *config.sys* file (also on OS/2 diskette #1).

For example, if you deleted all Adaptec drivers, as explained in Step 2a, above, remove the following lines from the *config.sys* file:

```
basedev=aha152x.add
basedev=aha154x.add
basedev=aha164x.add
basedev=aha174x.add
basedev=aic7770.add
basedev=fd16_700.add
```

5 In the *config.sys* file on OS/2 diskette #1, add the following line:

```
set  copyfromfloppy=1
```

This line must be added so that the install process copies the *aic7870.add* or *aic78u2.add* driver from the OS/2 diskette #1, instead of the *aic7870.add* driver included on your OS/2 CD-ROM.

> **Note:** For OS/2 Warp 4.0 or 4.0 SMP users only, add the basedev=aic7870.add or basedev=aic78u2.add line to the top line of the *config.sys* file on OS/2 diskette #1. This will result in two basedev=aic7870.add or basedev=aic78u2.add statements existing in the *config.sys* file.

6 Run the OS/2 installation program; follow the instructions in your OS/2 documentation until you reach the System Configuration window.

7 In the System Configuration windows, click the SCSI Adapter Support icon.

8 Deselect any highlighted adapters (including the Adaptec 294x, 394x, AIC7870 PCI SCSI), and click **OK**. The text box for SCSI Adapter Support should say None.

> **Note:** If these adapters are not deselected, the driver included on the CD-ROM will be copied over the driver being installed.

9 Follow the instructions in your OS/2 documentation to complete the installation.

> **Note:** The update files *os2ldr* and *ibmint13.i13* included with the Adaptec 7800 Family Manager Set are not needed when installing OS/2 Warp.
>
> After installation is complete, verify that only one basedev=aic7870.add statement exists in the *config.sys* file on your hard drive. Remove other instances if more than one is found.

Installing the Driver When OS/2 is Already Installed

To update or install the *aic7870.add* or *aic78u2.add* driver if OS/2 is already installed, follow the instructions below. The procedures are similar for all versions of OS/2. Procedures that are specific to an OS/2 version are noted when necessary.

1 If you are updating the driver, simply copy the *aic7870.add* or *aic78u2.add* driver from the 7800 Family Manager Set diskette for OS/2 (e.g., *\os2\aic7870.add* or *\os2\aic78u2.add*) into the *\os2* directory (for OS/2 v2.1x) or *\os2\boot* directory (for OS/2 Warp 3.x, 4.x, or 4.x SMP) 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.

> **Note:** The *aic78u2.add* driver does not support OS/2 v2.1x

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 2:

2 Run the *ddinstal* program by selecting the **Device Driver Install** icon from the System Setup folder or by typing ddinstal at the OS/2 prompt.

> **Note:** If you are running OS/2 v2.1x, 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 v2.1x 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 OS/2. Then type ddinstal and press **Enter**.

3 Insert the Adaptec 7800 Family Manager Set diskette for OS/2 in the appropriate disk drive and follow the prompts from *ddinstal*.

4 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.

5 Reboot the computer for the changes to take effect.

Using Command Line Options

Once installed, the *aic7870.add* or *aic78u2.add* driver does not usually require any modifications to its configuration. In certain situations, however, you may wish to add command line options to the driver to meet your specific needs. The command line options described in this section can be used in OS/2 v2.1x and OS/2 Warp 3.x and 4.x.

The *aic7870.add* or *aic78u2.add* driver command line resides in the *config.sys* file. Command line options are not case sensitive, and take effect after the computer is rebooted. The command line syntax is

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

or

basedev=aic78u2.add [*Universal Parameters*] [*Adapter ID*] [*Unit Parameters*: [*SCSI Target ID*]]

> **Caution:** Your computer may not boot if you enter the command line options incorrectly.

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. (This is the default setting.)

/!pcihw
Disables the /pcihw switch. This parameter will cause the driver to access the PCI configuration space though PCI BIOS function calls.

Adapter ID

/a:*n*
Adapter numbers are assigned based on BIOS address (starting from the lowest first) and the Device number (PCI Device number in hex as seen at the upper right hand corner of the first SCSI*Select* 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

Replace the italicized letters (*x,y,z*) in the switch descriptions below with the SCSI target ID(s) of the device(s) that you want affected. The IDs may be a single ID (x) or a list of IDs (x,y,z). The IDs must be separated by commas.

/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* disable DASD manager support to 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 underruns.

/!ur

Disables reporting of underruns. (This is the default setting.)

Command Line Examples

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
>
> or
>
> basedev=aic78u2.add /a:0 /!dm:3

Example 2

Suppose that you have a multidisk CD-ROM as target 4 on host adapter 0 and two DASD devices as targets 1 and 5 on host adapter 1. 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
>
> or
>
> basedev=aic78u2.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.

Troubleshooting

Problems and Solutions

How do I assign an interrupt for the host adapter?
The interrupt assignment is handled via the motherboard BIOS. You may or may not be able to assign an interrupt manually. Refer to your motherboard or system documentation.

During installation, OS/2 fails to find the hard drive.
Make sure the latest driver from Adaptec has been installed. Add the /pcihw or /!pcihw command option to the basedev=aic7870.add (or *aic78u2.add*) driver statement in the *config.sys* file.

Does extended translation need to be enabled on the host adapter to support drives greater than 1GByte?
Under OS/2, if you are using a FAT file system and/or switching back and forth from DOS, extended translation should be enabled. If you are using HPFS (High Performance File System), extended translation may or may not be enabled. Once the driver for the host adapter loads, the remaining hard drive space will be seen beyond 1024KBytes.

Error Messages

The error messages listed below are the messages associated with the *aic7870.add* or *aic78u2.add* driver. Messages are listed sequentially according to the last three digits of the error code. For example, [xxxxx080], [xxxxx081], [xxxxx082], etc.

> ✔ **Note:** When reporting problems to Customer Support, be sure to include the complete error code in your problem description.

[xxxxx080] Unable to allocate memory
This indicates that there may be a problem with the amount of memory installed in your system. Verify that your system has at least the minimum amount of memory required by your operating system.

[xxxxx081] Adapter software initialization failure

An error has occurred while the driver was setting up its internal data structures. Verify that your adapter is supported by this version of the driver.

[xxxxx082] Internal driver error

An error has occurred while the driver was setting up its internal data structures. Try installing the most up-to-date version of the driver available from the Adaptec Web site or BBS.

[xxxxx083] Adapter not supported by this version of the driver

Your adapter is not supported by the driver on your system. You may have installed a new adapter and have not updated the driver on your system.

[xxxxx084] Adapter software initialization failure

An error has occurred while the driver was setting up its internal data structures. Try installing the most up-to-date version of the driver available from the Adaptec Web site or BBS.

[xxxxx085] Unable to allocate memory

This indicates that there may be a problem with the amount of memory installed in your system. Verify that your system has at least the minimum amount of memory required by your operating system.

[xxxxx087] Internal driver error

An error has occurred while the driver was setting up its internal data structures. Try installing the most up-to-date version of the driver available from the Adaptec Web site or BBS.

[xxxxx088] Adapter software initialization failure

An error has occurred while the driver was setting up its internal data structures. Try installing the most up-to-date version of the driver available from the Adaptec Web site or BBS.

[xxxxx089] Unable to allocate memory

This indicates that there may be a problem with the amount of memory installed in your system. Verify that your system has at least the minimum amount of memory required by your operating system.

[xxxxx096] Adapter hardware initialization failure - possible resource conflict
The driver has attempted to initialize the adapter hardware but failed. This might suggest that the adapter resources (e.g., IRQ) conflict with the resources of another board installed in your system.

[xxxxx099] Adapter software initialization failure
[xxxxx09a] Adapter software initialization failure
[xxxxx09b] Adapter software initialization failure
An error has occurred initializing one of the driver's internal data structures for a device connected to the adapter. This may result in problems accessing the device. Try installing the most up-to-date version of the driver available from the Adaptec Web site or BBS.

[xxxxx0a7] Unable to allocate memory
This indicates that there may be a problem with the amount of memory installed in your system. Verify that your system has at least the minimum amount of memory required by your operating system.

[xxxxx0a9] Possible interrupt conflict
This indicates that the adapter IRQ conflicts with the IRQ of another board installed in your system. Check your hardware documentation for instructions on setting and changing IRQs.

[xxxxx0c9] Invalid command line parameter
A command line option for the driver is invalid. See *Using Command Line Options* on page 5-8 for valid command line options.

[xxxxx0ca] Invalid command line syntax
[xxxxx0cb] Invalid command line syntax
[xxxxx0cc] Invalid command line syntax
The command line syntax for the driver is incorrect. See *Using Command Line Options* on page 5-8 for entering the correct syntax.

[xxxxx07c] Unable to allocate memory
[xxxxx07d] Unable to allocate memory
[xxxxx07e] Unable to allocate memory
[xxxxx07f] Unable to allocate memory
This indicates that there may be a problem with the amount of memory installed in your system. Verify that your system has at least the minimum amount of memory required by your operating system.

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SCO UNIX Installation

This chapter explains how to install the Adaptec 7800 Family Manager Set Driver *alad* or *alad325* (for Ultra SCSI), and *blad* or *blad325* (Ultra2 SCSI) for SCO UNIX—SCO UNIX 3.2v4.2, SCO OpenDesktop 3.0 (ODT 3.0), SCO OpenServer 3.0, and SCO OpenServer 5.

The *alad* and *blad* drivers (or packages) are used with SCO UNIX 3.2v4.2 based products (SCO UNIX 3.2v4.2, SCO ODT 3.0, or SCO OpenServer 3.0). The *alad325* and *blad325* drivers (or packages) are used with SCO OpenServer 5. The *alad* and *alad325* drivers support Ultra SCSI and earlier Adaptec 7800 host adapters, the *blad* and *blad325* drivers support Ultra2 Adaptec 7800 host adapters. Refer to the Adaptec 7800 Family host adapters on page 1-3.

If you are performing a first time SCO UNIX installation, see *Installing the Driver When Installing SCO UNIX* on page 6-2 to begin driver installation. If SCO UNIX is already installed in your system, see *Installing the Driver When SCO UNIX is Already Installed* on page 6-5.

> **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 recommended by SCO.

Installing the Driver When Installing SCO UNIX

To install the *alad/ alad325* or *blad/ blad325* drivers at the same time you install SCO UNIX, follow the instructions below for the version of SCO UNIX you are installing.

Installing SCO UNIX 3.2 v4.2, SCO ODT 3.0, or SCO OpenServer 3.0

Follow these instructions only if you are installing SCO UNIX 3.2v4.2, 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.

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

1   Insert the SCO UNIX N1 (Boot) floppy diskette into the primary floppy drive and turn ON the computer.

2   When you see these prompts

    SCO UNIX System V/386
    Boot
    :

type link and press **Enter**.

> **Note:** Do not use the link command to install the driver for SCO OpenServer 5. See *Installing SCO OpenServer 5* on page 6-4.

3   Type alad or blad as the package you want linked to the system and press **Enter.**

4 Insert the requested volume (7800 Family Manager Set diskette for SCO UNIX) in the floppy drive and press **Enter**. Prompts 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.

5 When prompted to insert the SCO UNIX N2 (Filesystem) diskette, remove the 7800 Family Manager Set diskette for SCO UNIX from the floppy drive, and then insert the SCO UNIX N2 (Filesystem) diskette and press **Enter.**

6 Follow the procedures in your SCO UNIX documentation for completing the installation until you have reached and completed the Password procedure.

> **Note:** *For SCO UNIX 3.2v4.2 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.

7 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 7800 Family Driver for SCO UNIX 3.2v4.2/dxx
        alad325 Adaptec 7800 Family Driver for SCO OpenServer 5/dxx

        blad   Adaptec 7800 U2 Family Driver for SCO UNIX 3.2v4.2
        blad325 Adaptec 7800 U2 Family Driver for SCO OpenServer 5

    Please enter the names of the packages you
    wish to install or q to quit:__
    [default: alad]

8   Type alad or blad and press **Enter**. The *alad* driver for your
7800 Family host adapter has been relinked to the SCO UNIX
kernel.

Installation is complete!

Installing SCO OpenServer 5

1   Insert the SCO OpenServer 5 Boot floppy diskette into the
primary floppy drive and turn ON the computer.

2   When you see these prompts

        SCO OpenServer (TM) Release 5
        Boot
        :

type link and press **Enter**.

3   Type alad325 or blad325, or type ahslink for OpenServer 5.00,
as the package you want linked to the system and press **Enter.**

4   Insert the requested volume (i.e., the 7800 Family Manager Set
diskette for SCO UNIX) in the floppy drive and press **Enter**. If
your driver is already embedded, several messages appear
including a message similar to

        Table "io_init" contains (at 21) another routine named
        "aladinit."

        Please enter

        Which (0-40) to replace ('?' to list),
        'a' to add "aladinit" at the end [default]/
        'n' to do nothing
        or 'q' to quit:

5   If the above message does not appear, skip to step 6.
Otherwise, enter the corresponding number for "aladinit or
bladinit." In the above example, the number 21 appears in the
Table "io_init" contains (at 21) another routine named "aladinit"
message, and is the number that should be entered. If you are
unsure of which number to use, enter a "?" to list possible
values; use the number that is listed next to "aladinit.' In
general, enter 21 for OpenServer 5.0.0 and 5.0.2, and enter 25
for 5.0.4.

6 If the driver is properly loaded, the following message appears:

```
alad.alad:Loading module fd(52)/alad/driver/alad/Driver.o
.text ..........
:
:
alad325: Driver "alad" successfully loaded.
```

7 Insert the Boot floppy diskette and press **Enter**.

Follow the procedures in your SCO UNIX documentation for completing the installation.

Installing the Driver When SCO UNIX is Already Installed

To update or install the *alad/ alad325* driver if SCO UNIX is already installed, follow the instructions in this section. The procedures are similar for all versions of SCO UNIX. Procedures that are specific to a SCO version are noted when necessary.

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

Installing or updating the driver involves the following tasks, which must be completed in the order presented:

■ *Perform a System Backup*—Backs up the old UNIX kernel and any other important files.

■ *Use the Install Package*—Uses installpkg to load the driver.

■ *Modify the mscsi File*—Changes the primary host adapter to a 7800 Family host adapter, if necessary.

■ *Rebuild the UNIX Kernel*—Rebuilds the kernel to reflect the new changes.

■ *Boot the New Kernel*—Reboots the computer with the new kernel.

> **Note:** To update/install the driver, you must first enter the Single User Mode (System Maintenance Mode). Refer to the SCO UNIX documentation for instructions on how to use the init(m) or shutdown(m) command to bring the system to System Maintenance Mode.

Perform a System Backup

If you have not already done so, back up all important files on the computer by following these steps:

> **Note:** To back up the whole system, refer to your SCO UNIX documentation.

1   Log in as root.

2   *For SCO 3.2v4.2 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 /dev/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. To perform this backup, type the following and press **Enter**:

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

Use the Install Package

To load the driver using installpkg, follow these steps:

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 Set diskette for SCO UNIX 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 7800 Family Driver for SCO UNIX 3.2v4.2/dxx |
> | alad325 | Adaptec 7800 Family Driver for SCO OpenServer 5/dxx |
> | blad | Adaptec 7800 U2 Family Driver for SCO UNIX 3.2v4.2/dxx |
> | blad325 | Adaptec 7800 U2 Family Driver for SCO OpenServer 5/dxx |

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

3   At this point, type alad or blad (or alad325 or blad325 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/ alad325* driver has now been loaded into the *Link Kit*
for kernel addition.

Modify the mscsi File

If necessary, to change your primary host adapter to a 7800 Family host adapter, follow these steps:

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 Type	Host Adapter Number	Target ID	Logical Unit Number	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 the *mscsi* file according to your hardware setup:

– 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 each device on your primary Adaptec host adapter. See the table below:

Host Adapter Prefix	Type of Driver	Primary Adaptec Host Adapter
ad	embedded	AHA-1540/1640 family
eiad	embedded	AHA-1740 family
spad	embedded	AIC-6260 family
arad	BTLD	AIC-7770 family
smad	BTLD	AIC-6260/6360 family
alad	BTLD	AIC-78xx, AIC-7895
blad	BTLD	AIC-789x

6 Save the file and exit the text editor.

Rebuild the UNIX Kernel

To rebuild the UNIX kernel with the new changes, follow these steps:

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.

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

Boot the New Kernel

To reboot the computer with the new kernel, follow these steps:

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.

   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.

3 Wait for UNIX to complete bootup with the new kernel.

   Refer to *Troubleshooting* on page 6-13 if the system crashes or if panic (UNIX error) messages are displayed during bootup.

The *alad/ alad325* driver for your 7800 Family host adapter should now be ready for use.

Using SCO UNIX and the Host Adapter

This section contains useful information on using SCO UNIX and your host adapter.

Using Multiple Host Adapters

If you are adding an additional 7800 Family host adapter to a system with a 7800 Family host adapter already installed, follow the instructions in the SCO UNIX documentation for adding devices using the mkdev command. When the system asks for the host adapter prefix, type alad or blad and press **Enter**.

Changing the Boot Disk

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 a SCSI hard disk attached to an Adaptec 7800 Family host adapter, you may elect to either reinstall SCO UNIX with the new driver (see *Installing the Driver When Installing SCO UNIX* on

page 6-2), or update SCO UNIX with the new driver (see *Installing the Driver When SCO UNIX is Already Installed* on page 6-5).

Using Wide SCSI Host Adapters and Devices

SCO UNIX 3.2v4.2, 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/ alad325* 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 SCSI*Select* 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};

Enabling Scatter/Gather and Tagged Queuing

The *alad/ alad325* driver supports scatter/gather and tagged queuing; however, the *Sdsk* (SCSI disk module) driver controls whether these features are enabled or disabled. Look for the *Sdsk* driver controls in the *space.c* file. It is located at

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

Troubleshooting

Problems and Solutions

In SCO OpenServer 5, my system hangs after I have installed the driver and rebooted the system.

If you are installing OpenServer 5, version 5.0.0, you may have to install the SCO OpenServer 5 keyboard patch (available from the SCO Web site or BBS) at the same time you install the *alad325* driver. To install the keyboard patch at the same time you install SCO OpenServer 5 and the *alad325* driver, type the following instead of the ahslink command described above:

> defbootstr ahslink = "kbp alad325"

Follow the onscreen instructions to insert the SCO keyboard patch diskette (kbp) and the 7800 Family Manager Set diskette for SCO UNIX when instructed.

I have problems using my SCSI devices.

During bootup, check to see if the BIOS messages for your primary 7800 Family host adapter lists all installed SCSI devices. If some or all devices do not appear, check the following (also check your host adapter's *User's Guide* for additional troubleshooting information):

- Are all SCSI devices powered?

- Are all SCSI bus cables and power cables properly connected?

- Do the host adapter and all devices on the SCSI bus have unique SCSI IDs?

- Are all devices on the SCSI bus terminated properly?

- Do you have an older SCSI peripheral installed? 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 SCSI*Select* utility for the host adapter. See the host adapter's *User's Guide*.

My computer does not recognize my host adapter.

During bootup, check to see if the BIOS message for your primary 7800 Family host adapter appears. If the messages do not appear, 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 system 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 SCSI*Select* utility (by pressing a key combination displayed onscreen at bootup). Look on the first screen of SCSI*Select* in the upper right hand corner for Bus:Device xx:xxh (given in hex).

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

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

I am having problems 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 SCSI*Select* utility is enabled.

– Be sure the Extended BIOS Translation feature in the SCSI*Select* utility is enabled. The host adapter BIOS automatically selects the correct translation method as needed.

■ Examine the SCO UNIX *mscsi* 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 *mscsi* file (see *Modify the mscsi File* on page 6-8 for additional information)

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

    alad   Sdsk   0   0   0
    or
    blad   Sdsk   0   0   0

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

    alad   Sdsk   0   0   0   0
    or
    blad   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 Number	Target ID	Logical Unit Number	Bus[1]
alad	Sdsk	0	0	0	0
blad	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* or *blad*.

– **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.

– **Target ID**—Identifies the SCSI ID of the SCSI device.

– **Logical Unit Number**—Identifies the Logical Unit Number (LUN) 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 *mscsi* file, use the vi editor. You must build a new kernel in order for any changes to take effect (see *Rebuild the UNIX Kernel* on page 6-9).

■ If you are booting from a 7800 Family host adapter and are using ISA/EISA-based host adapters as secondary devices, you must disable the BIOS on all ISA/EISA-based host adapters.

If you are booting from ISA/EISA-based host adapters and are 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.

My computer crashes or displays panic messages during the bootup procedure.
You may have to boot from the backup kernel created earlier. To boot from the backup kernel, follow these steps:

1 Reboot the system.

2 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.

Error Messages

The error messages listed below are the messages associated with the *alad/ alad325* or *blad/ blad325* drivers. Messages are listed sequentially according to the last three digits of the error code. For example, [xxxxx020], [xxxxx021], [xxxxx022], etc.

Note: When reporting problems to Customer Support, be sure to include the complete error code in your problem description.

[xxxxx020] Adapter or target device not responding or not connected
The target device did not respond to the adapter. If the device is present, refer to your host adapter's user's guide for troubleshooting information. If the device is no longer connected to the system, ignore this error.

[xxxxx022] Adapter or target device protocol error
The adapter or target device has broken the communication protocol. A badly behaving device could be causing this message to appear. Normally this is not a serious problem. If you get this message frequently over a short period of time, it could indicate that the device or system is malfunctioning. Unplug or power down unused devices to see if the problem persists.

[xxxxx030] Target device busy
[xxxxx032] Target device busy
The target device reports a busy status. Another program might already be using this device.

[xxxxx09D] Unexpected interrupt
The Adaptec driver received an interrupt from the system that does not correspond to any adapter supported by the driver. This could be caused by another host adapter from a different vendor, such as a video card or a network card. The problem can also be caused by malfunctioning hardware.

[xxxxx0a3] Adapter diagnostic failure - possible resource conflict
The driver failed the internal software or hardware diagnostic. Refer to your host adapter's user's guide for troubleshooting information.

[xxxxx0ca] Cannot initialize device
The system, host adapter, or target device is busy or is not responding. The target device could not be initialized.

[xxxxx0cb] Unable to allocate memory. Decrease alad_instr_buffersz in space.c
The driver has requested a larger buffer size than the available RAM. Either increase the amount of RAM in the system, or decrease the user option alad_instr_buffersz in the */etc/conf/pack.d/alad/space.c* file.

[xxxxx0cc] CONFLICT: Disconnection must be enabled in order for tag-queueing to work
Use the SCSI*Select* utility of your host adapter to enable Disconnection for each device reporting this message. Alternatively, disable tagged queuing in */etc/conf/pack.d/alad/space.c* file by setting alad_do_tagged = 0. If tagged queuing is disabled, performance may be negatively affected.

▼▼▼▼7

SCO UnixWare Installation

This chapter explains how to install the Adaptec 7800 Family Managers Set Driver *adsl20* or *adsl* (UltraSCSI) and *adsb20* or *adsb* (Ultra2 SCSI) for SCO UnixWare—SCO UnixWare 2.0x and SCO UnixWare 2.1.

adsl20 and *adsb20* drivers (or packages) are used with SCO UnixWare 2.0x. The *adsl* and *adsb* drivers (or packages) are used with SCO UnixWare 2.1. The *adsl* and *adsl20* support Ultra SCSI and earlier Adaptec 7800 host adapters. The *adsb* and *adsb20* drivers support Ultra2 Adaptec 7800 host adapters. Refer to the Adaptec 7800 Family host adapters on page 1-3.

If you are performing a first time SCO UnixWare installation, see *Installing the Driver When Installing SCO UnixWare* on page 7-2 to begin driver installation. If SCO UnixWare is already installed in your system, see *Installing the Driver When SCO UnixWare is Already Installed* on page 7-3.

Installing the Driver When Installing SCO UnixWare

To install the *adsl20/ adsl* or *adsb20/ adsb* drivers at the same time you install SCO UnixWare, follow the instructions below. The procedures are the same for SCO UnixWare 2.0x and 2.1.

1   Insert the Install diskette of the SCO UnixWare package into the floppy boot drive. Reboot your computer.

Wait for the first SCO UnixWare installation screen and prompt to appear, 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 7800 Family Manager Set diskette for UnixWare 2.x into the primary floppy drive and press **Enter** (you cannot load drivers from a secondary floppy drive).

As the driver loads, a message identifying the installed host adapter briefly appears on screen. The installation process determines which device drivers on the diskettes are needed.

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 view/change the SCO UnixWare device driver configuration data.

6   Follow the onscreen instructions to continue with installation. Refer to the SCO UnixWare documentation and onscreen help files for help in choosing options.

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

Installing the Driver When SCO UnixWare is Already Installed

To update or install the *adsl20/ adsl* or *adsb20/ adsb* drivers on a system where SCO UnixWare is already installed, follow the instructions in this section. The procedures are similar for SCO UnixWare 2.0x and 2.1. Procedures that are specific to a SCO UnixWare version are noted when necessary.

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

Installing or updating the driver involves the following tasks, which must be completed in the order presented:

- *Back Up the Computer*—Backs up the old SCO UnixWare kernel and any other important files.

- *Load the Package*—Uses pkgadd to load the 7800 Family driver package.

- *Modify 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.

- *Rebuild the SCO UnixWare Kernel*—Rebuilds the kernel with the new driver.

- *Boot the New Kernel*—Reboots the computer with the new kernel.

> **Note:** Remember that SCO UnixWare commands are *case sensitive*. Enter the commands exactly as shown.

Back Up the Computer

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

1 Log in as root at the UnixWare # system prompt.

2 To back up the old SCO UnixWare kernel, type the following and press **Enter**:

    cp /stand/unix /stand/unix.work

3 To back up the old configuration file, type the following and press **Enter**:

For SCO UnixWare 2.0x:

    cp /etc/conf/sdevice.d/adsl20 /save/adsl20

or

    cp /etc/conf/sdevice.d/adsb20 /save/adsb20

For SCO UnixWare 2.1:

    cp /etc/conf/sdevice.d/adsl /save/adsl

or

    cp /etc/conf/sdevice.d/adsb /save/adsb

Load the Package

To load the driver, follow these steps:

1 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 Set diskette for UnixWare 2.x) into the floppy boot drive.

2 Select the *adsl20/ adsl* or *adsb20/ adsb* package from the onscreen menu and press **Enter**. The package is loaded into your SCO UnixWare operating system.

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

Do not reinsert the IHV HBA diskette (or Adaptec 7800 Family Manager Set diskette for UnixWare 2.x). Instead, type q (quit) and press **Enter**.

4 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 7-11.

5 Type pkginfo and press **Enter**.

6 Verify that the *adsl20/adsl* or *adsb20/adsb* driver is now listed. The *adsl20/adsl* or *adsb20/adsb* driver appears among the other installed packages.

If the *adsl20/adsl* or *adsb20/adsb* driver does not appear in the pkginfo listing, turn to *Troubleshooting* on page 7-11.

The listing should be similar to

   system   adsl   Adaptec AIC-7870 PCI SCSI IHV HBA

   or

   system   adsb   Adaptec AIC-7870 PCI SCSI IHV HBA

Modify the New System File

1 Display the contents of the *adsl20/ adsl* file or *adsb20/ adsb* by typing the following and pressing **Enter**:

For SCO UnixWare 2.0x:

    cat adsl20

    or

    cat adsb20

For SCO UnixWare 2.1:

    cat adsl

    or

    cat adsl

2 If your computer *is to boot* from a device connected to a 7800 Family host adapter, verify that the line $static is present immediately below the line $version 2.

3 If your computer *is not to boot* from the host adapter SCSI bus, and you wish to leave the driver as a loadable module, edit and verify that the line $static is not present directly below the line $version 2.

Rebuild the SCO UnixWare Kernel

To rebuild the UnixWare kernel with the new changes, follow these steps:

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 SCO UnixWare kernel is now ready for host adapter operation.

Boot the New Kernel

To reboot the computer with the new kernel, follow these steps:

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. If so, go back and correct any problems before proceeding.

3 Wait for SCO UnixWare to complete bootup with the new kernel.

Refer to *Troubleshooting* on page 7-11 if the computer crashes or if panic (SCO UnixWare error) messages appear during bootup.

The updated driver for SCO UnixWare should now be ready to use.

Using SCO UnixWare and the Host Adapter

This section contains useful information on using SCO UnixWare and your host adapter.

Using Tunable Parameters

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

/etc/conf/pack.d/adsl/space.c

These parameters can be tuned for the *adsl20/ adsl* or *adsb20/ adsb* 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 then reboot the system for the new parameters to take effect. To rebuild the kernel, type the following, and press **Enter** after each line:

/etc/conf/bin/idbuild -B
cp /etc/conf/cf.d/unix /stand/unix

Note: The drivers support tagged queuing and reinitialization.

Using Multiple Host Adapters

When using multiple host adapters, consider the following:

■ The host adapter and computer must be configured for multiple host adapters as explained in the host adapter's *User's Guide.*

■ To boot from the 7800 Family host adapter, make sure the host adapter is installed in the lowest PCI slot number. See your host adapter's *User's Guide.*

■ SCO UnixWare 2.x supports auto-configuration. When adding multiple host adapters to an existing SCO 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 *adsl20/ adsl* or *adsb20/ adsb* driver, you can use the following procedure to remove it completely:

1 Back up all important computer files.

2 At the UnixWare root prompt, type the following:

For SCO UnixWare 2.0x:

/etc/conf/bin/idinstall -d adsl20

or

/etc/conf/bin/idinstall -d adsb20

The following files will be deleted:

/etc/conf/mdevice.d/adsl20
/etc/conf/pack.d/adsl20/Driver.o
/etc/conf/pack.d/adsl20/space.c
/etc/conf/pack.d/adsl20/disk.cfg
/etc/conf/sdevice.d/adsl20

or

/etc/conf/mdevice.d/adsb20
/etc/conf/pack.d/adsb20/Driver.o
/etc/conf/pack.d/adsb20/space.c
/etc/conf/pack.d/adsb20/disk.cfg
/etc/conf/sdevice.d/adsb20

For SCO UnixWare 2.1:

/etc/conf/bin/idinstall -d adsl

or

/etc/conf/bin/idinstall -d adsb

The following 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
```

or

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

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

Problems and Solutions

My computer crashes or displays panic messages during the bootup procedure!
You may have to boot from the backup kernel created earlier, and then perform the driver update procedure again.

To boot from the old kernel, follow these steps:

1 Reboot the computer.

2 At the Booting UNIX System… prompt or loading UnixWare graphics, press the **Spacebar**.

3 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 *Installing the Driver When SCO UnixWare is Already Installed* on page 7-3.

To repeat the driver update procedure, follow these steps:

1 Follow the instructions in *Removing the Driver* on page 7-9 to delete the driver from your computer.

2 Perform the driver update procedure again. See *Installing the Driver When SCO UnixWare is Already Installed* on page 7-3.

Error Messages

The error messages listed below are the messages associated with the drivers. Messages are listed sequentially according to the last three digits of the error code. For example, [xxxxx020], [xxxxx021], [xxxxx022], etc.

> **Note:** When reporting problems to Customer Support, be sure to include the complete error code in your problem description.

[xxxxx003] Command completed with error
[xxxxx004] Command completed with error
[xxxxx005] Command completed with error
[xxxxx006] Command completed with error
[xxxxx007] Command completed with error
[xxxxx008] Command completed with error
[xxxxx009] Command completed with error
A request issued to a target device completed with an indication that there is an error. In most cases, the error is recovered and normal operation continues.

[xxxxx010] Error issuing command
An error has occurred while the driver was setting up its internal data structures. Try installing the most up-to-date version of the driver available from the Adaptec Web site or BBS.

[xxxxx011] Error issuing command
The requested command is not supported by this driver.

[xxxxx012] Error issuing command
The driver does not recognize the target device.

[xxxxx013] Error issuing command
[xxxxx014] Error issuing command
An error has occurred while the driver was setting up its internal data structures. Try installing the most up-to-date version of the driver available from the Adaptec Web site or BBS.

[xxxxx015] Error issuing command
An error has occurred with the driver. Try installing the most up-to-date version of the driver available from the Adaptec Web site or BBS.

[xxxxx020] Adapter or target device not responding or not connected
The target device did not respond to the adapter. If the device is present, refer to your host adapter's user's guide for troubleshooting information. If the device is no longer connected to the system, ignore this error.

[xxxxx021] Target device protocol error

An unexpected event occurred during data transfer between the adapter and target device. Normally, this indicates a faulty or non-compliant target device.

[xxxxx022] Adapter or target device protocol error

The adapter or target device has broken the communication protocol. A badly behaving device could be cause this message to appear. Normally this is not a serious problem. If you get this message frequently over a short period of time, it could indicate that the device or system is malfunctioning. Unplug or power down unused devices to see if the problem persists.

[xxxxx023] Target device parity error

The driver has detected a parity error by the target device. Try decreasing the transfer rate or disable the Ultra SCSI speed in SCSI*Select*. Also, make sure you are using good-quality SCSI cables.

[xxxxx024] Data overrun or underrun

The adapter was given more or less data than was expected.

[xxxxx030] Target Device busy

The target device reports a busy status. Another program might already be using this device.

[xxxxx031] Target device queue full

The target device internal buffer is full.

[xxxxx032] Target device busy

The target device reports a busy status. Another program may already be using this device.

[xxxxx041] Command aborted
[xxxxx042] Command aborted
[xxxxx043] Command aborted
[xxxxx044] Command aborted
[xxxxx045] Command aborted

An internal condition caused the driver to abort the command. In most cases, the command is retried and is recovered, and normal operation continues.

[xxxxx046] Target device did not respond to abort sequence
The target device did not abort the command requested by the driver. Some devices do not support the abort command properly. Normally, this indicates a faulty or noncompliant target device.

[xxxxx047] Command aborted
An internal condition caused the driver to abort the command. In most cases, the command is retried and is recovered, and normal operation continues.

[xxxxx048] Unable to abort command
An error occurred while aborting a command. Possibly, the command has already completed and there is nothing to abort.

[xxxxx049] Command abort in progress
This indicates an abort command has been issued. This is a normal operating condition.

[xxxxx051] Target device did not respond to reset sequence
The target device did not reset correctly as requested by the driver. Normally, this indicates a faulty or non-compliant target device.

[xxxxx081] Adapter Initialization Failure
An error has occurred while the driver was setting up its internal data structures. Verify that your adapter is supported by this version of the driver.

[xxxxx083] Adapter not supported by this version of the driver
Your adapter is not supported by the driver on your system. You may have installed a new adapter and have not updated the driver on your system.

[xxxxx096] Adapter hardware initialization failure - possible resource conflict
The driver has attempted to initialize the adapter hardware but failed. This might suggest that the adapter resources (e.g., IRQ) conflict with another board installed in your system.

[xxxxx097] Unable to allocate memory
This indicates that there may be a problem with the amount of memory installed in your system. Verify that your system has at least the minimum amount of memory required by your operating system.

[xxxxx098] Exceeded maximum number of host bus adapters
The driver has detected more host bus adapters than is supported by this version of the driver or operating system.

[xxxxx0a4] SCSI bus reset by third party
Hardware such as an array enclosure may have reset the SCSI bus. This is a normal condition unless you receive additional errors.

[xxxxx0a5] SCSI bus reset by host adapter
The host adapter may have reset the SCSI bus. This is a normal condition unless you receive additional errors.

[xxxxx0cf] System configuration error
The driver encountered an error with your hardware. Refer to your host adapter's user's guide for troubleshooting information.

[xxxxx0d0] Command timeout
The target device is either busy, not ready, malfunctioning, or is not present. Refer to your host adapter's user's guide for troubleshooting information.

[xxxxx0d7] Target device scan failed
The driver encountered an error scanning the target device. Refer to your host adapter's user's guide for troubleshooting information.

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Adaptec 7800 Family Manager

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