Adaptec 7800 Family Manager Set

for NetWare, OS/2, Windows 95, Windows NT, SCO UNIX, and UnixWare

User's Guide Ver 1.0

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1

Getting Started
Using This Guide

This user's guide provides all the information needed to install and use the Adaptec 7800 Family Manager Set.

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

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

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

Overview—Adaptec 7800 Family Manager Set

The Adaptec 7800 Family Manager Set is software (drivers), that allows your Adaptec 7800 Family host adapter to communicate with your computer. Different operating systems usually require separate drivers. The Adaptec 7800 Family Manager Set contains drivers for the following operating systems:

✶ Novell NetWare

✶ IBM OS/2

✶ Microsoft Windows 95

✶ Microsoft Windows NT

✶ SCO UNIX

✶ Novell UnixWare

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

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

Adaptec 7800 Family Host Adapters

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

✶ AHA-2910 PCI-to-Fast SCSI (non-bootable)

✶ AHA-2940 PCI-to-Fast SCSI

✶ AHA-2940W PCI-to-Fast and Wide Single-ended SCSI

✶ AHA-2944W PCI-to-Fast and Wide Differential SCSI

✶ AHA-2940*Ultra* PCI-to-Wide *Ultra*SCSI

✶ AHA-3940 MultiChannel SCSI-to-PCI

* AHA-3940W MultiChannel Wide SCSI-to-PCI
* AIC-7850 Single-chip PCI-to-Fast SCSI
* AIC-7870 Single-chip PCI-to-Fast and Wide SCSI
* AIC-7880 Single-chip PCI-to-*Ultra*SCSI

Requirements

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

* A PCI computer, with an installed and configured Adaptec 7800 Family host adapter(s).

* An installed primary (boot) floppy diskette drive. The drive must be able to read your operating system diskettes. A 3.5-inch (1.44 MByte) or 5.25-inch (1.2 MByte) high-density floppy diskette drive is required.

* The diskettes included with your Adaptec 7800 Family Manager Set.

* *Optional*—an installed and configured CD-ROM drive for installing your operating system from a compact disc.

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

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

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Novell NetWare Installation

This chapter provides the information needed to install and use the
Adaptec 7800 Family Manager (driver) for NetWare—Novell NetWare
v3.1x and v4.x. The 7800 Family driver for NetWare supports all Adaptec
7800 Family host adapters listed on page 8.

Adaptec's 7800 Family drivers for Novell NetWare are fully Novell
NetWare Tested and Approved. The two NetWare subdirectories
(\netware\v3_1x and \netware\v4_xx) on the 7800 Family Manager Set
diskette for NetWare contain the following files; however, the files in
\netware\v3_1x can only be used with NetWare v3.1x, and the files in
\netware\v4_xx with NetWare v4.x.

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

To begin driver installation, first calculate the slot number as described in
Calculating the Slot Number on page 11. Then, if you are performing a
first-time NetWare installation, see *Installing NetWare and the Driver* on
page 12. If NetWare is already installed in your system, see *Updating
NetWare with the Driver* on page 16.

Calculating the Slot Number

The slot number is used to uniquely identify each 7800 Family host adapter installed in your system. To properly load the driver for each 7800 Family host adapter, you will need to calculate the slot number in order to include it as part of the load command line. If the slot number is not included, NetWare prompts you for one.

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

To calculate the slot number, obtain the Bus:Device xx:xxh values identified when running the SCSI*Select* utility for your host adapter. The calculation is done manually, as described in the following steps:

1 Make sure your PCI computer system is properly set up and configured.

2 Run the SCSI*Select* utility for your host adapter. Refer to your host adapter's *User's Guide* for instructions.

> **NOTE**: The host adapter light is lit during activity. If you have multiple adapters, use this light to determine which adapter SCSI*Select* is displaying information for.

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

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

NOTE: The Device slot number identified through SCSI*Select* is not the same as the slot number needed to load the driver through the load command line.

4 Use the following formula to calculate the slot number:

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

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

Installing NetWare and the Driver

This section describes how to install the *aic7870.dsk* driver at the same time you install NetWare v3.1x or v4.x. If NetWare v3.1x or v4.x is already installed and you wish to install or update the *aic7870.dsk* driver, see *Updating NetWare with the Driver* on page 16.

Installing NetWare v4.x and the Driver

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

1 Make backup copies of all Novell and Adaptec 7800 Family Manager Set diskettes using diskcopy, and use those backup copies as your working diskettes.

2 Boot DOS on your computer.

3 Change to the directory where the installation files are found. For a CD-ROM, the subdirectory is similar to

d:\netware.40\english\

4 Type install and press **Enter**.

5 Select **Install New NetWare v4.x** if you are installing NetWare v4.x for the first time, or **Upgrade NetWare v3.1x or v4.x** if you are upgrading to NetWare v4.x.

6 Follow the instructions in the *NetWare User's Manual* for partitioning, creating a server name, and checking the IPX Network number.

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

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

9 Press **F3** and specify the path to the *aic7870.dsk* driver for -NetWare (e.g., a:\netware\v4_xx).

10 Select **AIC7870.DSK** and press **Enter**.

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

11 Specify the server directory (usually *c:\server.40* for NetWare v4.02 or *c:\nwserver* for NetWare v4.10) and press **Enter**. The *install* program copies the necessary files to this directory.

12 When the screen displays Loading driver aic7870.dsk, Please Wait, switch to the System Console screen (Press **Alt-Esc** to switch screens).

13 You will see that the driver has prompted you for the slot number. Enter the slot number calculated for your host adapter and press **Enter** (See *Calculating the Slot Number* on page 11). You are automatically switched back to continue with installation.

14 If you are using multiple host adapters in your server, load the driver again for each host adapter.

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

Refer to the *NetWare User's Manual* for information on installing other NetWare Loadable Modules (NLMs). If an error message appears when you attempt to load the driver, see *Troubleshooting* on page 27.

15 Select **Continue the Installation** to create disk partitions and system volumes, and to specify volume names; follow the procedures listed in the *NetWare User's Manual.*

> **NOTE**: To load the driver automatically at server bootup, make sure the startup.ncf file includes the load command line and correct slot number for your host adapter. See *Updating NetWare with the Driver* on page 16 and *Using startup.ncf and autoexec.ncf* on page 21.

Installing NetWare v3.1x and the Driver

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

1 Make backup copies of all Novell and Adaptec 7800 Family Manager Set diskettes using diskcopy, and use those backup copies as your working diskettes.

2 Boot DOS on your computer.

3 Change to the directory where the installation files are found. For a CD-ROM, the subdirectory is similar to

d:\netware.312\english\

4 Type install and press **Enter**.

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

5 When you see the NetWare colon prompt (:), use the load command to install the driver from the 7800 Family Manager Set diskette for NetWare. You will also need the slot number described in *Calculating the Slot Number* on page 11.

The correct syntax to load the 7800 Family driver is

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

Command line options are *not* case sensitive. Placing commas between command line options is optional. See *Using the Load Command Line Options* on page 17 for possible values.

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

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

NOTE: To load the driver automatically at server bootup, copy the driver to the server's startup directory and modify the *startup.ncf*. See *Updating NetWare with the Driver* on page 16 and *Using startup.ncf and autoexec.ncf* on page 21.

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

Updating NetWare with the Driver

This section describes how to update/install the *aic7870.dsk* driver if NetWare v3.1x or v4.x is already installed. If you are installing NetWare v3.1x or v4.x for the first time, see *Installing NetWare and the Driver* on page 12.

The instructions for updating/installing the driver are similar for both NetWare v3.1x and v4.x. Procedures that are specific to a NetWare version are noted below.

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

2   Copy the *aic7870.dsk* driver and *aspitran.dsk* module from the 7800 Family Manager Set diskette for NetWare 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 drivers in the directory.

> **NOTE**: For NetWare v3.1x, the *aic7870.dsk* and *aspitran.dsk* files are located in the *\netware\v3_1x* subdirectory on the diskette; for NetWare v4.x, the files are in *\netware\v4_xx.*

3   If necessary, modify the load command line in the *startup.ncf* so that the proper path to the driver and the correct slot number is specified. See *Using startup.ncf and autoexec.ncf* on page 21.

The correct syntax to load the 7800 Family driver is

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

Command line options are *not* case sensitive. Placing commas between command line options is optional. See *Using the Load Command Line Options* on page 17 for possible values. To calculate the slot number for each host adapter, see *Calculating the Slot Number* on page 11.

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

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 following table:

Option	Values	Default	Description
Slot=	16-41, 116-141, etc.	None	Defines host adapter device location. If none is given, you are prompted for one. See Calculating the Slot Number on page 11.
verbose=	y	n	Causes driver to display host adapter configuration information at load time.
removable=[1]	on,off	on	Enables support for removable media other than CD-ROMs, which are controlled by aspicd. dsk. By default, removable media is supported. You may want to disable removable disk support in order to load an ASPI Removable Disk Module.
fixed_disk=	on,off	on	Enables support for hard disks. By default, hard disks are supported. You may want to disable fixed disk support in order to load an ASPI Fixed Disk Module.
dev_enable=	00-FF[2]	FF	Allows you to enable the dirver's registration of SCSI devices on a per target basis. A bit value of 0 causes the target not to register under the operating system. These devices are still accessible via ASPI. This enable bit mask is entered in hex (see Bit Mask Options on page 20).
start_unit	0-FF[2]	0	A bit mask to enable sending Start_Unit. Command is sent only if device responds with a Not Ready Status. This feature is not needed by most devices. This bit mask is entered in hex (see Bit Mask Options on page 20)

Option	Values	Default	Description
tag_disable	0-FF²	00	Disables tagged queuing for specific targets. Tagged queuing is enabled by default. If bit mask is set, then tagged queuing for that particular device is disabled. This disable bit mask is entered in hex (see Bit Mask Options on page 20).
lun_enable=1	00-FF²	01	A bit mask to enable scanning for specific LUNs on all targets. For example, a value of 7 would cause the driver to scan for LUNs 0,1,and 2 on all targets. The default value of 01 causes the driver to scan LUN0 only. For multiple LUN CDs, use the lun_enable switch on aspicd. dsk, not aic 7870. dsk. This enable bit mask is entered in hex (see Bit Mask Options on the next page.)
io_combine	1–32	32	Specifies maximum number of segments in a scatter/gather list.
max_sectors	1–256	256	Specifes maximum number of total sectors in a single scatter/gather list
max_tags	1–32	16	Specifies maximum number of tagged commands per device.
max_nontags	1–2	2	Specifies maximum number of nontagged commands pending per device. Only 1 command is actually sent on the SCSI bus. A value of 2 allocates a control block where the next command waits for the previous commmand to complete.
read_after_write	0–1	1	Specifies default verify mode; 0=No verify on writes, 1=Hardware verify.
instrumenta-tion	0–1	0	If 1, enables instrumentation - vari-able updates at load time. The driver maintains internal instrumentation data for use by I/O Management applications. Instrumentation can also be enabled by the I/O management application, so inclusion of this option is not always necessary.

[1]Many multiple-lun and removable media devices are changers or
[1]magazines. Some of these are only supported by the *aic7870. dsk*
driver through an ASPI driver provided by the hardware vendor.
[2]On the AHA-2940W and AHA-3940W, these values become FFFF.

Bit Mask Options

Use this example to aid in calculating bit mask option hex values. Each SCSI device (ID 0-7 or 0-15 for the AHA-2940W and AHA-3940W) is enabled by a 1 in its corresponding bit position. In this example, lun_enable=05 enables scanning for LUNs 0 and 2 on all targets.

	Bit Position			
SCSI ID	1514312	111098	7564	3210
0, 2	0 0 0 0	0 0 0 0	0000	0101

Converted binary-to-hex:

= 05h	0	0	0	5
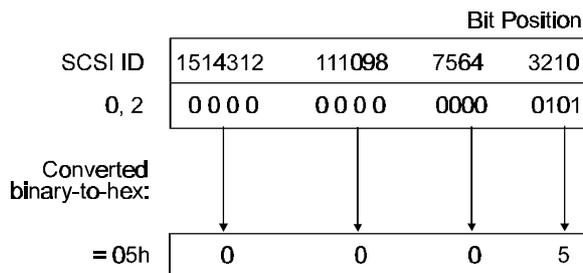
Sample Load Command

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

        load a:\netware\v3_1x\aic7870

The resultant screen looks similar to

```
:load a:\netware/v3_1x/aic7870          <ENTER>
Loading module aic7870.dsk
    Adaptec AIC-7870 Manager & SCSI Disk Module
    Version 1.08     January 27, 1995
    Copyright `1995 Adaptec, Inc.    All rights reserved
    Auto-loading module ASPITRAN.DSK
    Adaptec Netware 386 ASPI Transport Layer v1.20
    Version 1.20     October 13, 1994
Supported Slot values are 27, 29, 31
Slot:   27   <ENTER>
```

Slot values that already have another registered device do not appear. Only the slots available for use by the host adapter appear on the screen. If an error message appears when attempting to load the driver, refer to *Troubleshooting* on page 27.

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

The resultant screen looks similar to

```
:load a:\netware/v3_1x/aic7870   verbose=y   slot=22      <ENTER>
Loading module aic7870.dsk
    Adaptec AIC-7870 Manager & SCSI Disk Module
    Version 1.08     January 27, 1995
    Copyright `1995 Adaptec, Inc.    All rights reserved
    Auto-loading module ASPITRAN.DSK
    Adaptec Netware 386 ASPI Transport Layer v1.20
    Version 1.20     October 13, 1994

    PCI Bus Number:          0
    PCI Device Number:       6

    Host Adaptec SCSI ID:    7
    Interrupt Level:         11

    Shared Interrupt:        Enabled
    Firmware Type:           7871
    Firmware Revision:       0.0
```

Using startup.ncf and autoexec.ncf

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

To automatically load the *aic7870.dsk* at server bootup, the *startup.ncf* must contain a load command line that specifies the location of the driver on the hard disk, any available options (see *Using the Load Command Line Options* on page 17), and the slot number (see *Calculating the Slot Number* on page 11).

NOTE: To load the driver from your hard disk, the *aic7870.dsk* 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., *:\nwserver*)].

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

    load [pathname]aic7870 [options] slot=x

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

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

> **NOTE**: For each 7800 Family host adapter installed, a separate load command line must be included in the *startup.ncf* file. The slot number (slot=) identifies the specific adapter.

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

> **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 SCSI Devices

This section provides procedures and tips on the following topics:

✶   Booting from a SCSI Device

✶   Formatting Media

✶   Using Removable Media

✶   Using the NetWare Tape Backup

✶   Using a CD-ROM with NetWare

✶   Optimizing Performance

Booting from a SCSI Device

1 For the 7800 Family host adapter, use the SCSI*Select* utility to configure your preferred boot device.

When the host adapter BIOS is enabled, the host adapter can be set to scan the SCSI bus; the system boots from the first drive encountered.

2 Modify your DOS *autoexec.bat* file to run *server* from your server's startup directory.

3 Reboot your server. NetWare should bootup at this point.

4 Enter your file server name and internal IPX number.

Formatting Media (NetWare v3.1x Only)

The NetWare v3.1x *install.nlm* program lets you optionally format a disk drive for use with NetWare. When using SCSI, it allows you to low-level format several SCSI drives simultaneously.

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

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

✶ What *install* does not say is that you can also enter an interleave value of zero. This zero interleave value instructs the drive to use its optimal interleave value.

✶ When formatting SCSI disks or removable drives on the 7800 Family host adapter SCSI bus, we recommend that you use an interleave value of zero.

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 option. 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 Verigy[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 medio 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 Moun**t option.

Lock Status

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

Verify

Read After Write Verify (menu choice 2) is set to *Hardware Level* by default. This option cannot be specified in the *startup.ncf* or *autoexec.ncf* files. However, the default can be set on the command line, see *Using the Load Command Line Options* on page 17.

The available options are defined as follows:

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

Using the NetWare Tape Backup

Included with Novell NetWare is a server-based tape backup utility called *sbackup.nlm*. This utility allows 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*, load *tapedai.dsk*, *tsaxxx.nlm (tsa312.nlm*, *tsa400.nlm, tsa410.nlm)*, and sbackup with these options:

    :load tapedai

    :load tsaxxx

    :load sbackup

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

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

2 When *sbackup* is loaded, it asks for a login name. Enter the appropriate name.

3 If *sbackup* asks you to select the device driver, select the **HP DIBI-2 Tape Driver**, regardless of the type of SCSI tape drive being attached (e.g., even if the tape drive is manufactured by Wangtek, *do not* select the Wangtek driver).

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

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

Using a CD-ROM with NetWare

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

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

:load [pathname] aic7870.dsk slot=x

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

:load [pathname] aspicd.dsk

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

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

:load [pathname] cdrom.nlm

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

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

:cd device list

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

       :cd mount *[x] [name]*

Optimizing Performance

The Adaptec 7800 Family SCSI Bus Master firmware increases the SCSI performance of the Adaptec 7800 Family host adapters under multitasking environments. The firmware uses a paging mechanism to handle up to 255 simultaneous SCSI commands. The sequencer can simultaneously manage up to 32 tagged, or 2 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 with some drives.

Troubleshooting

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

       ERR xxx:*message*

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

       000-099 Non-host Adapter specific

       100-299 Host adapter specific

       300-999 Reserved

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

Non-Host Adapter Specific

000　　Failed ParseDriverParameters call

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

001　Unable to reserve hardware, possible conflict

The driver failed in its attempt to reserve the host adapter's hardware settings (i.e. DMA and IRQ settings). Another card in your

system may be causing a conflict with the host adapter.

002　NetWare rejected card - Failed AddDiskSystem call

The driver failed in its attempt to register the host adapter with

NetWare. The file server may not have enough memory.

003　Invalid command line option entered -> option

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

004　Invalid command line, please enter correctly

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

005　Unable to allocate resource tags from NetWare

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

006　Unable to register events with NetWare

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

Host Adapter Specific

200　No host adapter found for this driver to register

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

203　Invalid 'slot' setting

The slot= number is invalid. Remove the slot= option and allow the driver to prompt you for slot choices.

204   Invalid 'verbose' setting, use 'y'

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

205   Invalid 'removable' setting, use 'off'

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

206   Invalid 'fixed_disk' setting, use 'off'

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

208   SCSI present but not enabled/configured for PCI

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

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

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

211   Unable to initialize host adapter

The host adapter failed the initialization routine.

3

IBM OS/2 Installation

This chapter provides the information needed to install and use the Adaptec 7800 Family Manager (driver) for OS/2 — OS/2 v2.1x and OS/2 Warp. The 7800 Family driver for OS/2 supports all Adaptec 7800 Family host adapters listed on page 8.

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

The following files are available on the 7800 Family Manager Set diskette for OS/2. Normally they are in the *os2_3x* directory.

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

If you are performing a first time OS/2 installation, see *Installing OS/2 and the Driver* on page 31 to begin driver installation. If OS/2 is already installed in your system, see *Updating OS/2 with the Driver* on page 32.

Installing OS/2 and the Driver

This section describes how to install the *aic7870.add* driver at the same time you install OS/2 v2.1x or OS/2 Warp. If OS/2 v2.1x or OS/2 Warp is already installed and you wish to update/install the *aic7870.add* driver, see *Updating OS/2 with the Driver* on page 32.

Installing OS/2 v2.1x and the Driver

Follow these instructions *only* if you are installing OS/2 v2.1x for the first time.

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

2   Copy the *os2ldr* file from the 7800 Family Manager Set diskette for OS/2 (i.e., \os2_3x\) onto the OS/2 installation diskette.

3   Copy the *ibmint13.i13* and the *aic7870.add* files from the 7800 Family Manager Set diskette for OS/2 (i.e., \os2_3x\) onto the OS/2 diskette # 1. This overwrites any existing version of the files included on diskette #1.

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

   basedev=aic7870.add\x13/pcihw

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

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

7   After the computer has restarted, OS/2 displays a welcome screen. You have the option to view online information while the OS/2 desktop is building. Allow OS/2 to finish building.

> **NOTE** : Refer to the *readme,txt* file for any additional information on installing OS/2 v2.1x and the driver.

Installing OS/2 Warp and the Driver

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

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

2   Copy the *aic7870.add* driver from the 7800 Family Manager Set diskette for OS/2 (i.e., *\os2_3x\aic7870.add*) onto the OS/2 Warp installation diskette #1. This overwrites any existing version of the driver included on diskette #1.

3   Run the OS/2 Warp installation program; follow the instructions in your OS/2 documentation.

4   At the end of the installation process, follow the onscreen instructions to re-move the last OS/2 distribution diskette and reboot the computer.

5   Once the computer has rebooted, any older versions of the *aic7870.add* driver existing on the hard drive must be overwritten with the newer version of the driver now available on the OS/2 Warp installation diskette #1.

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

6   Reboot the computer.

Updating OS/2 with the Driver

This section describes how to update or install the *aic7870.add* driver if OS/2 v2.1x or OS/2 Warp is already installed. If you are installing OS/2 v2.1x or OS/2 Warp for the first time, see *Installing OS/2 and the Driver* on page 31.

Follow these instructions only if OS/2 v2.1x or OS/2 Warp is already installed. The instructions for updating or installing the driver are the same for both OS/2 v2.1x or OS/2 Warp.

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

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

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

3   Run the *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**.

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

5   The computer scans for the host adapter(s). If a host adapter is found, the *Installing Device Drivers* message appears. Another message appears when the driver is successfully installed. If no host adapters are found, an error message appears.

Using Command Line Options

The *aic7870.add* driver is normally installed automatically and does not require any modifications to its configuration. In certain situations, however, you may wish to modify the driver to meet your specific needs.

The command line options described in this section apply to both OS/2 v2.1x and OS/2 Warp.

✱   Turn to *Example 1* and *Example 2* on page 36 to see how the command line options can be used in specific installations.

✱   Refer to your OS/2 documentation for more information on using the command line options.

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

ADD Command Syntax

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

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

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

ADD Command Switches

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

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

Universal Parameters

/et

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

/!et

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

/v

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

/pcihw

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

Adapter ID

/a:n

Adapter numbers are assigned based on BIOS address (starting from the lowest first) and then Device number (PCI Device number in hex as seen at the upper right hand corner of the first 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

/dm:x,y,z

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

/!dm:x,y,z

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

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

/sm:x,y,z

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

/!sm:x,y,z

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

/tag:x

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

/i

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

/ur

Enables reporting of under runs.

/!ur

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

Example 1

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

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

Example 2

Suppose that you have a multidisk CD-ROM as target 4 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

NOTE: There are no switches for directly controlling *os2aspi.dmd*, the ASPI device manager.

Important Tips

✦ *os2scsi.dmd* only allocates devices when a device driver requests it, but this prevents *os2aspi* from accessing it. There is nothing in the ASPI specification regarding device allocation, so *os2aspi* must rely on other managers to fairly share targets. This should only be a problem if you have two drivers that use different managers and you want them both to access the same target at the same time: for example, if you have two tape applications, one is using *os2scsi*, the other is using *os2aspi*, and they are both trying to access the tape at the same time.

✦ *Do not* disable DASD manager access to the boot drive if you are booting from your SCSI host adapter. If you do, your computer will not be able to boot.

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

Using Drives Over 1 GByte

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

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

4

Microsoft Windows 95 Installation

This chapter provides the information needed to install and use the Adaptec 7800 Family Manager (driver) for Windows 95. The 7800 Family driver for Windows 95 supports all Adaptec 7800 Family host adapters listed on page 8.

The 7800 Family Manager Set diskette for Windows 95 contains the files needed for driver installation. The Windows 95 subdirectory (*\win95*) on the diskette contains the following files:

* *aic78xx.mpd*—Adaptec's 7800 Family driver for Windows 95

* *aic78xx.inf*—file used by Windows 95 Setup for driver installation

* *readme.txt*—An ASCII text file describing the Adaptec 7800 Family driver for Windows 95

If you are performing a first time Windows 95 installation, see *Installing Windows 95 and the Driver* on page 39. If Windows 95 is already installed in your system, see *Updating Windows 95 with the Driver* on page 39.

Installing Windows 95 and the Driver

A version of the *aic78xx.mpd* driver is embedded (included) in the Windows 95 installation CD. During a normal Windows 95 installation, the 7800 Family host adapter is detected in your system and the embedded *aic78xx.mpd* driver is automatically installed. Once the Windows 95 installation is complete, you can update the *aic78xx.mpd* driver with the most recent version of the driver by following the instructions in *Updating Windows 95 with the Driver*, below.

> **NOTE**: If Windows 95 installation cannot detect the 7800 Family host adapter installed in your computer, you must install the *aic78xx.mpd* driver manually once Windows 95 installation is complete. To determine if the *aic78xx.mpd* driver was installed, and to install the driver manually, see *Updating Windows 95 with the Driver*, below.

Updating Windows 95 with the Driver

This section describes how to update/install the *aic78xx.mpd* driver if Windows 95 is already installed. If you are installing Windows 95 for the first time, *see Installing Windows 95 and the Driver*, above.

> **NOTE**: All Adaptec 7800 Family host adapters use the same *aic78xx.mpd* driver. Once the 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 On the Driver tab, click **Change Driver**. You may be asked to select the hardware type; if asked to do so, select SCSI Controller.

8 Click the **Have Disk** button and enter a:\win95 as the location to copy the manufacturer's file from.

9 Click **OK**.

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

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

12 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.

5

Microsoft Windows NT Installation

This chapter provides the information needed to install and use the Adaptec 7800 Family Manager (driver) for Windows NT—Windows NT v3.1 and v3.5x. The 7800 Family driver for Windows NT supports all Adaptec 7800 Family host adapters listed on page 8.

The 7800 Family Manager Set diskette for Windows NT contains the files needed for driver installation. The two Windows NT subdirectories (*\winnt\3_1 and \winnt\3_5*) on the diskette both contain the following files; however, the files in *\winnt\3_1* can only be used with Windows NT v3.1, and the files in *\winnt\3_5* with Windows NT v3.5x:

✱ *aic78xx.sys*—Adaptec's 7800 Family driver for Windows NT

✱ *oemsetup.inf*—A file used by Windows NT Setup for driver installation

✱ *readme.txt*—An ASCII text file describing the Adaptec 7800 Family driver for Windows NT

If you are performing a first time Windows NT installation, see *Installing Windows NT and the Driver* on page 42 to begin driver installation. If Windows NT is already installed in your system, see *Updating Windows NT with the Driver* on page 45.

Installing Windows NT and the Driver

This section describes how to install the *aic78xx.sy*s driver at the same time you install either Windows NT v3.1 or v3.5x. If Windows NT v3.1 or v3.5x is already installed and you wish to install or update the *aic78xx.sys* driver, see *Updating Windows NT with the Driver* on page 45.

Installing Windows NT v3.1 and the Driver

Follow these instructions only if you are installing Windows NT v3.1 for the first time. You may install Windows NT from a floppy drive or from a CD-ROM drive; whichever you choose, make sure the hardware installation is completed prior to following these steps.

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

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

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

3   When prompted, select **Custom** setup.

> **CAUTION**: If you choose Express setup, the installation process is unable to detect your Adaptec host adapter and the installation fails.

4   Windows NT Setup displays all recognized host adapters. If no host adapters are installed, Windows NT Setup displays none. Press S to configure additional SCSI adapters.

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

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

7   The screen displays the adapter drivers supported on the diskette. Use the down arrow to select Adaptec AHA-2940/AIC-78xx (PCI) NT v3.1 and press **Enter**.

8 If you want to add other host adapters (that are not a part of the 7800 Family), do so at this time by repeating Step 5 for each additional adapter and inserting the appropriate disk provided by the hardware manufacturer. All Adaptec 7800 Family host adapters use the same driver; it is not necessary to install the *aic78xx.sys* driver again.

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

Installing Windows NT v3.5x and the Driver

An older version of the *aic78xx.sys* driver is embedded (included) in the Windows NT v3.5x installation disks (or CD). We recommend first installing the embedded driver by following the instructions in your Windows NT v3.5x documentation for a normal Windows NT installation. Once the Windows NT installation is complete, you can update the *aic78xx.sys* driver by following the instructions in *Updating Windows NT with the Driver* on page 45.

> **NOTE**: During a normal Windows NT installation, the 7800 Family host adapter is detected in your system and the embedded *aic78xx.sys* driver is automatically installed.

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

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

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

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

2 Put the diskette into drive A (not drive B) and turn on your computer. When prompted, insert Windows NT Disk 2.

3 From the Welcome to Setup Screen, press **Enter** to set up Windows NT.

4 When prompted, select **Custom** setup.

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

5 Press B 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 B 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**.

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

10 If you want to add other host adapters (that are not a part of the 7800 Family), do so at this time by repeating Step 7 for each additional adapter and inserting the appropriate disk provided by the hardware manufacturer. The Adaptec 7800 Family host adapters use the same driver; it is not necessary to install the *aic78xx.sys* 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.

Updating Windows NT with the Driver

This section describes how to update/install the *aic78xx.sys* driver if Windows NT v3.1 or v3.5x is already installed. If you are installing either Windows NT v3.1 or v3.5x for the first time, see *Installing Windows NT and the Driver* on page 42.

Updating Windows NT v3.1

Follow these instruction only if Windows NT v3.1 is already installed.

1 Select and start the Windows NT Setup program. (Its icon is usually found in the Main program group.) There is a brief pause while Windows NT Setup scans your hardware configuration.

2 Select the **Options** pull-down menu and then select **Add/Remove SCSI Adapters**. The SCSI Adapter *setup* program displays a list of all host adapters currently installed.

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 and press **Enter**.

6 Enter the path to the installation files by typing

   a:\winnt\3_1

7 The screen displays the adapter drivers supported on the diskette. Use the down arrow to select Adapter AHA-2940/AIC-78xx (PCI) NT v3.1 and click **OK**. The driver is added to the list of SCSI adapters.

8 Select Adaptec AHA-2940/AIC-78xx (PCI) NT v3.1 from the list of SCSI adapters and click **Install**.

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

9 If the following message appears, click **New** to replace the existing driver and skip to Step 11.

> The SCSI Adapter selected is already installed

If the following message appears, continue with Step 10:

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

10 Change the path to the directory (i.e., a:\winnt\3_1) with the desired device driver, then click **Continue**.

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

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

> Adaptec AHA-2940/AIC 78xx (PCI) NT v3.1

12 Add other types of host adapters if necessary (see Step 4 on page 45), or click **Close** to exit the SCSI adapters portion of Windows NT Setup, and then close the program.

13 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.

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

> **CAUTION**: If you are updating the driver that controls the boot host adapter from which Windows NT loads, you must complete the additional steps listed below in *Updating the Boot Host Adapter.*

Updating the Boot Host Adapter

If the driver you are updating controls the boot host adapter from which Windows NT v3.1 loads, you must update the device driver in two locations (because Windows NT boots in a two-stage process): the Windows NT device driver directory (i.e., \winnt\system32\drivers\aic78xx.sys) and c:\ntbootdd.sys.

In the first stage of booting, no software configuration is available and Windows NT loads the device driver to control the computer boot disk from the file c:\ntbootdd.sys. Therefore, when you perform the steps described above to update a driver you must also explicitly copy the aic78xx.sys device driver to c:\ntbootdd.sys (meaning that aic78xx.sys is copied over and renamed as c:\ntbootdd.sys).

1   Click the **Command Prompt** icon in the Main program group.

2   Switch to the root directory of the C drive by typing

    cd \

3   Since the *c:\ntbootdd.sys* file is *system, hidden, and read only*, you must use an attribute change program to disable the hidden and read only attributes so that the file can be modified. To disable the attributes, type

    attrib ntbootdd.sys -r -h -s

4   To copy the *aic78xx.sys* device driver to *ntbootdd.sys*, type

    copy %systemroot%system32\drivers\aic78xx.sys ntbootdd.sys

5   To change the attributes of the *ntbootdd.sys* file back to the original, type

    attrib ntbootdd.sys +r +h +s

Updating Windows NT v3.5x

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

1   Select and start the Windows NT Setup program. (Its icon is usually found in the Main program group.) There is a brief pause while Windows NT Setup scans your hardware configuration.

2   Select the **Options** pull-down menu and then select **Add/Remove SCSI Adapters**. The SCSI Adapter *setup* program displays a list of all host adapters currently installed.

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 the following path to the installation files and then click **OK**.

a:\winnt\3_5

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

7 Select Adaptec AHA-2940/AIC-78xx (PCI) NT v3.5x from the list of SCSI adapters and click **Install.**

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

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

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

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 string should look similar to

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

11 Add other types of host adapters if necessary (see Step 4 on page 48), 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.

Removing a Host Adapter

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

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

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

1 Select and start the Windows NT Setup program. There is a brief pause while Windows NT Setup scans your hardware configuration.

2 Select the **Options** pull-down menu and then select **Add/Remove SCSI Adapters**. The SCSI Adapter *setup* program displays a list of all host adapters currently installed.

3 Select the host adapter you want to remove and click the **Remove** button. When the Windows NT Setup program asks you for confirmation, click **OK**.

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

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

5 Return to Step 3 if you want to remove driver support for other types of host adapters, or click **Close** to exit the SCSI adapters portion of Windows NT Setup.

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

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

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

7 Restart 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.

Swapping a Host Adapter

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

1 Install the driver for the new host adapter by following the steps in *Updating Windows NT with the Driver* on page 45.

It is not essential to remove the device driver for the host adapter you are replacing. Windows NT dynamically detects the absence or presence of host adapter hardware, and no problems should arise if you leave the existing device driver installed. You may remove the device driver later, after you have successfully rebooted Windows NT. However, if you leave the driver in, the system alerts you with an error message of the extra device driver every time you boot. See *Removing a Host Adapter* on page 49.

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

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

NOTE: *For Windows NT v3.1 only.* If the host adapter you are swapping controls the computer boot device, you must follow the *additional* steps in *Updating the Boot Host Adapter* on page 47.

Troubleshooting

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

1 Undo any hardware changes you have made to the computer since it was last operational.

2 Reboot the computer. Watch the display carefully during bootup. If the following message appears, press the **Spacebar** and follow the instructions on the screen to continue booting with the last known good configuration:

> Press spacebar NOW to invoke the Last Known Good menu

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

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

6

SCO UNIX Installation

This chapter provides the information needed to install and use the
Adaptec 7800 Family Manager (driver) for SCO UNIX—SCO UNIX 3.2
v4.2, SCO OpenDesktop 3.0 (ODT 3.0), SCO OpenServer 3.0, and SCO
OpenServer 5. The 7800 Family driver for SCO UNIX supports all
Adaptec 7800 Family host adapters listed on page 8.

> **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.

The following driver package is available on the 7800 Family Manager Set
diskette for SCO UNIX:

★ *alad*—Adaptec's 7800 Family driver for SCO 3.2v4.2 based products (SCO
   UNIX 3.2v4.2, SCO ODT 3.0, SCO OpenServer 3.0)

★ *alad325*—Adaptec's 7800 Family driver for SCO OpenServer 5

If you are performing a first time SCO UNIX installation, see *Installing
SCO UNIX and the Driver* on page 53 to begin driver installation. If SCO
UNIX is already installed in your system, see *Updating SCO UNIX with
the Driver* on page 56.

The BTLD Process

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

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

Installing SCO UNIX and the Driver

This section describes how to install the *alad* driver at the same time you install either SCO UNIX 3.2 v4.2, SCO ODT 3.0, or SCO OpenServer 3.0. If you are installing SCO OpenServer 5, follow the instructions provided with the SCO product to perform the initial installation (regular non-BTLD installation) of the embedded driver. If you then wish to update the embedded driver, follow the instructions in *Updating SCO UNIX with the Driver* on page 56.

If SCO UNIX 3.2 v4.2, SCO ODT 3.0, SCO OpenServer 3.0, or SCO OpenServer 5 is already installed and you wish to install or update the driver, see *Updating SCO UNIX with the Driver* on page 56.

NOTE: If you are changing the boot device from a non-SCSI hard disk to a SCSI hard disk attached to an Adaptec 7800 Family host adapter, you must reinstall SCO UNIX. If you are already booting from a SCSI hard disk and wish to boot from SCSI hard disk attached to an Adaptec 7800 Family host adapter, you may elect to either reinstall SCO UNIX with the new driver (as described in this section), or update SCO UNIX with the new driver (see *Updating SCO UNIX with the Driver* on page 56). If you have difficulty performing the driver installation or update, see *Booting the Computer from a SCSI Drive* on page 64.

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

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

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

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

2   When you see this message, type link and press **Enter**:

SCO UNIX System V/386

Boot

:

The screen then displays the following message:

What packages do you need linked in the system,

or 'q' to quit?:

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

3   Type alad and press **Enter**. *alad* is the *package* name (or *prefix*) for the *alad* driver used with 7800 Family host adapters.

4   Next, this boot line and a series of prompts similar to the following appear:

fd(64)unix rootfd(96) swapram(0) swaplo32 ronly mem/p

```
link"alad"  btldfd(x)
 :
Loading kernel fd(x)unix .text...............................................
 :
 :
```

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

5   When you see this message

Please insert the fd(x)alad volume and press <Return>,

 or 'q' to quit:

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

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

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

Insert N2 (Filesystem) floppy and press <Return>

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

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

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

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

> The BTLD packages will now be added to the Link Kit.
> The following packages are on this disk.
> Name   Description
> alad   Adaptec AIC-7870 Driver v1.7 for SCO UNIX 3.2v4.2
> alad325   Adaptec AIC-7870 Driver v1.7 for SCO OpenServer5
>
> Please enter the names of the packages you
> wish to install or q to quit:__
> [default: alad]

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

Installation is complete.

Updating SCO UNIX with the Driver

This section describes how to update/install the 7800 Family driver for SCO UNIX if SCO UNIX 3.2 v4.2, SCO ODT 3.0, SCO OpenServer 3.0, or SCO OpenServer 5 is already installed. If you are installing these SCO products for the first time, see *Installing SCO UNIX and the Driver* on page 53. The instructions for installing/updating the driver are similar for all SCO products. Procedures that are specific to SCO versions are noted below.

CAUTION: Improper or corrupt driver updates might *destroy* your existing UNIX filesystem. Back up all important files before proceeding.

NOTE: If you are adding an additional 7800 Family host adapter to a system with a 7800 Family host adapter already present, skip to *Adding Devices with mkdev* on page 61. You may update the driver first by following steps 1 through 6.

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

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

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

* *Using the Install Package*—Uses installpkg to load the driver.

* *Examining the mscsi File*—If you want to change your primary host adapter to a 7800 Family host adapter, replace the string spad, ad, arad, eiad, or other string with alad for host adapter Number 0 (zero) in the *mscsi* (SCSI configuration master table) file. This replacement causes the driver to become a permanent part of the new boot kernel on rebuild.

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

* *Updating the Hardware Configuration*—Configures the hardware using SCSI*Select* as explained in your host adapter's *User's Guide.*

* *Booting the New Kernel*—Reboots the computer with the new kernel.

Performing a System Backup

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

> **NOTE**: To back up the whole system, refer to your SCO manuals.

1 Login 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 /etc/boot /stand

cp /stand/unix /stand/unix.orig

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

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

If you want to perform this extra backup, type the following and press **Eter**:

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

If you ever want to restore the previous kernel configuration, the extra backup step above ensures that the entire system configuration can be restored. If you need to restore the previous configuration, boot up from the original kernel (see *Booting from the Old Kernel* on page 64), type the following and press **Enter** after each line:

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

Using the Install Package

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

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

2   Insert the 7800 Family Manager 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 AIC-7870 Driver v1.7 for SCO UNIX
                  3.2v4.2

> alad325   Adaptec AIC-7870 Driver v1.7 for SCO
>   OpenServer 5
> Please enter the names of the packages you wish to install, or
> q to
> quit:

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

> Installing alad

When the driver is done loading, the following appears:

> Installed alad
> #

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

Examining the mscsi File

1   Enter this command:

> cd /etc/conf/cf.d

2   Enter this command to copy the file:

> cp mscsi mscsi.org

3   Use a text editor to edit this file. Enter the following command if using the *vi* editor:

> vi mscsi

4   Search for all entries with the host adapter number 0 (zero). The host adapter number is the third column in each entry. For example:

This field applies to SCO OpenServe 5 only.

5   Modify your *mscsi* file depending on your hardware configuration:

❖   If you are booting from a 7800 Family host adapter, make sure the host

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

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
auto	embedded	AHA-1540/1640 family
auto	embedded	AHA-1740 family
auto	embedded	AIC-6260 family
arad	BTLD	AIC-7770 family
smad	BTLD	A/C-6260/630 family

6 Save the file and exit the text editor.

Rebuilding the UNIX Kernel

1 Type the following at the # prompt and press **Enter** after each line:

cd /etc/conf/cf.d

./link_unix

Status messages appear.

2 When the kernel has been built, shut down the system by typing haltsys and pressing **Enter**.

3 Turn OFF the system power when you are prompted to do so.

4 Continue with the section *Updating the Hardware Configuration* below.

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

Updating the Hardware Configuration

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

Booting the New Kernel

1 Follow the onscreen instructions to reboot your system, usually by pressing **Enter**.

2 Check the host adapter BIOS messages to verify that all your installed SCSI devices are listed.

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 63 if the system crashes or if panic (UNIX error) messages are displayed during bootup.

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

Adding Devices with mkdev

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

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

✶ When the system asks for the host adapter *prefix*, type alad and press **Enter**.

✶ Refer to the *SCO UNIX Operating System Administration Guide* for additional information on mkdev and adding devices to your system.

Using Wide SCSI Host Adapters and Devices

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

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

Using Tunable Parameters for the alad Driver

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

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

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

Setting Parameters

If the *space.c* file has not been modified, all the parameters are set according to the 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};

Other Information

The alad 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

Using Drives Over 1 GByte

SCO UNIX supports drives over 1 GByte. SCO UNIX has no limitation with drives over 1 GByte, and recognizes the drive whether the Extended

BIOS Translation feature is enabled or disabled in the SCSI*Select* utility. See the host adapter's *User's Guide* for additional information on using driver over 1 GByte.

Troubleshooting

Checking Host Adapter BIOS Messages

✴ Make sure that BIOS messages appear for your primary 7800 Family host adapter. If not, the host adapter may not be properly configured, check the following:

❖ The 7800 Family host adapter supports level-triggered interrupts and can share the same interrupt with another 7800 Family host adapter or PCI hard ware that also supports level-triggered interrupts. Check your host adapter's *User's Guide* and your computer documentation for de tails in configuring IRQs and other parameters in the CMOS setup.

❖ The Boot host adapters should be installed into the lowest PCI Device num ber. 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 cor ner 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 de termine 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.

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

❖ If booting from ISA/EISA-based host adapters and using a 7800 Family host adapter as a secondary device, see your ISA/EISA-based host adapter docu mentation to ensure the host adapter is at the lowest BIOS base address. ISA/

EISA-based host adapters boot before the 7800 Family host adapters.

✶   Check the BIOS messages to verify that all installed SCSI devices are listed. If some or all devices do not appear, possible reasons are as follows:

   ❖   SCSI cables may be loose.

   ❖   Installed devices on the host adapter may have SCSI ID conflicts.

   ❖   SCSI termination may be set incorrectly.

   ❖   Some older SCSI peripherals, especially CD-ROM drives, do not prop erly respond to synchronous negotiation. As a result, these peripherals may lock or reset the SCSI bus. To solve this problem, turn off synchro nous negotiation for this device ID through the SCSISelect utility for the host adapter. See the host adapter's *User's Guide.*

Booting from the Old Kernel

✶   Reboot the system.

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

Booting the Computer from a SCSI Drive

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

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

   ❖   Be sure the Drives setting (in your computer's CMOS setup program) that corresponds to the SCSI boot drive is set to **None** or **No Drives Installed**, as is required for SCSI hard disk drives. (See your computer's documentation.)

   ❖   Be sure the Host Adapter BIOS setting in the SCSI*Select* utility is en abled.

❖ Be sure the Extended BIOS Translation feature in the SCSI*Select* utility is disabled. This feature is used only with MS-DOS 5.0 or above. You do not need to enable this option for SCO UNIX.

✭ Examine the SCO UNIX *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 *Examining the mscsi File* on page 59 for additional information)

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

alad   Sdsk   0   0   0

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

alad   Sdsk   0   0   0   0

NOTE: Each field is separated by a tab (do not use the spacebar to separate fields).3

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

[1] This field applies to SCO OpenServer 5 only.

❖ **Host Adapter Prefi—**Identifies the name of the host adapter driver. If you are booting from a 7800 Family host adapter, the Host Adapter Prefix must be *alad*.

❖ **SCSI Device Type**—Identifies the type of SCSI device. For example, Sdsk indicates that the device is a hard disk; Srom indicates a CD-ROM drive; and Stp indicates a tape drive.

❖ **Host Adapter Number**—Identifies the SCSI host adapter that the SCSI device is attached to. For example, the first 7800 Family host adapter is 0, the second 7800 Family host adapter is 1.

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

❖ **Logical Unit Number**—Identifies the Logical Unit Number of the SCSI device. This field is usually 0.

❖ **Bus**—Identifies the SCSI bus that the SCSI device is attached to. For most single channel devices such as the AHA-2940/2940W, the Bus number is 0.

If you need to edit the *mscsi* file, use the vi editor. You must build a new kernel in order for any changes to take effect (see *Rebuilding the UNIX Kernel* on page 60).

7

Novell UnixWare Installation

This chapter provides the information needed to install and use the Adaptec 7800 Family Managers (drivers) for UnixWare—UnixWare 1.x and UnixWare 2.x. The 7800 Family drivers for UnixWare support all Adaptec 7800 Family host adapters listed on page 8.

The following driver packages are available on the 7800 Family Manager Set diskette for UnixWare 1.x and 2.x.

✸ *adsl*—Adaptec's 7800 Family driver for UnixWare 2.x.

✸ *adslo*—Adaptec's 7800 Family driver for UnixWare 1.x

If you are performing a first time UnixWare installation, see *Installing UnixWare and the Driver* on page 68 to begin driver installation. If UnixWare is already installed in your system, see *Updating UnixWare with the Driver* on page 72.

Driver Installation Process

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

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

✸ When performing a *new* UnixWare installation, the operating system determines whether your computer boots from the host adapter SCSI bus. The driver is automatically installed as loadable, or link-edited with the kernel to suit your computer.

★ When performing a driver *update* installation, UnixWare assumes that your computer does not boot from a device connected to the host adapter SCSI bus. If your computer *should* boot from the host adapter SCSI bus, you must perform the simple edit described in *Modifying the New System File* on page 74.

Using Drives Over 1 GByte

UnixWare 1.x does not support Extended BIOS Translation. If you have a hard drive larger than 1 GByte, you *must* disable this feature on your host adapter before installing or updating the driver. See the host adapter's *User's Guide* for details on using drives over 1 GByte.

> **NOTE**: After changing the setting of the Extended BIOS Translation feature, be sure to partition and high-level format the drive.

Installing UnixWare and the Driver

This section describes how to install the 7800 Family driver for UnixWare at the same time you install UnixWare 1.x or 2.x. If UnixWare 1.x or 2.x is already installed and you wish to install or update the driver, see *Updating UnixWare with the Driver* on page 72.

Installing UnixWare 1.x and the Driver

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

★ *Modifying the Advanced CMOS Setup*

★ *Installing UnixWare*

★ *Loading the Drivers onto the Hard Disk*

> **NOTE**: The UnixWare 1.x operating system supports only *eight* SCSI buses in the computer system. This means you can install no more than *eight* host adapters.

Modifying the Advanced CMOS Setup

Follow these instructions for modifying the Advanced CMOS Setup:

1   Reboot the computer and press **F1, F2,** or **DEL** (depending on the BIOS) to enter the CMOS setup program.

2   Set all PCI channels to IRQ 10.

> **NOTE**: When installing UnixWare 1.x, all installed 7800 Family host adapters must use IRQ 10 and will not work with other IRQs. When installing UnixWare 2.x, any IRQ can be used.
>
> When initial installation of UnixWare 1.x is complete, the IRQ can be changed to another supported IRQ as long as there are no conflicts with the IRQ of another host adapter. The IRQ in the CMOS setup must correspond to the IRQ in the configuration table.

3   If you need to change the host adapter configuration, see the host adapter's *User's Guide* for instructions on using the SCSI*Select* utility.

Installing UnixWare

Follow these instructions to load the UnixWare operating system and *adslo* driver into memory from the UnixWare distribution media and the IHV HBA diskette (or the 7800 Family Manager Set diskette for UnixWare 1.x and 2.x). Refer to the *UnixWare Installation Guide* for more information.

1   Insert Diskette 1 of the UnixWare 1.x Boot Package into the floppy boot drive. Boot your computer.

2   Follow the onscreen instructions to boot (usually by pressing **F1**). The UnixWare operating system starts to load.

3   When prompted to insert the Host Bus Adapter Drivers Diskette , insert the IHV HBA driver diskette (or 7800 Family Manager Set diskette for UnixWare 1.x and 2.x) into the primary floppy drive and press **Enter** (you cannot load the *adslo* driver from a secondary floppy drive). As the driver loads, a message

identifying the located host adapter briefly appears on screen.

4 Follow the onscreen instructions to load the UnixWare operating system. Refer to the operating system documentation and onscreen help files for help in choosing options.

> ❖ The installation program instructs you to load the second and third UnixWare boot and Foundation Set diskettes.

> ❖ Then the installation program instructs you to choose a media format for the Foundation Set software. If the media type for the device you connected for the Foundation Set software media does not appear as a choice, the device may not have been recognized when the driver was loaded into memory.

> ❖ The UnixWare 1.x optional online explanation of the installation pro cess can be accessed at this time. If this is your first time, the informa tion may be valuable to you.

5 At the end of this part of the installation process you are prompted to insert the HBA Diskette(s) that you used before . Continue with the next section.

Loading the Drivers onto the Hard Disk

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

1 Insert the IHV HBA driver diskette (or Adaptec 7800 Family Manager Set diskette for UnixWare 1.x and 2.x), and press **Enter**.

2 Follow the instructions onscreen to finish the installation. Refer to the operating system documentation for help in choosing options.

3 Remove the IHV HBA diskette (or Adaptec 7800 Family Manager Set diskette for UnixWare 1.x and 2.x) when prompted to do so.

4 After the installation, restart the computer, login, set user-level, etc. The UnixWare operating system *E-mail* utility notifies you that there are messages in your mailbox.

5 Check your UnixWare mailbox for an E-mail message on the status of the installed *adslo* driver package.

Your UnixWare installation should now be complete.

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

Installing UnixWare 2.x and the Driver

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

1   Insert the Install Diskette of the UnixWare 2.x package into the floppy boot drive. Reboot your computer.

    Wait for the first UnixWare 2.x installation screen and prompt and then follow the onscreen instructions.

2   When prompted to either Install Host Bus Adapter Drivers or Continue Installation, first remove the Install diskette, then select **Install Host Bus Adapter Driver** and press **Enter**.

3   Insert the HBA driver diskette (or 7800 Family Manager Set diskette for UnixWare 1.x and 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 located 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 UnixWare device driver configuration data.

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

7   When prompted, you are asked to reinsert the specific HBA Diskette(s) that you used before.

8   Follow the onscreen instructions to complete the UnixWare installation.

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

Updating UnixWare with the Driver

This section describes how to update/install the 7800 Family driver for UnixWare if UnixWare 1.x or 2.x is already installed. If you are installing -UnixWare 1.x or 2.x for the first time, see *Installing UnixWare and the Driver* on page 68. The instructions for updating/installing the driver are similar for both UnixWare 1.x and 2.x. Procedures that are specific to a UnixWare version, are noted below.

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

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

✱   *Backing Up the Computer*—Backs up the old UnixWare kernel and any other important files.

✱   *Loading the Package*—Uses pkgadd to load the 7800 Family driver package.

✱   *Modifying the New System File*—For computers booting from a device connected to a 7800 Family host adapter, modifies the new driver that was loaded in the previous procedure. Loading the driver causes the driver to become a permanent part of the new boot kernel on rebuild.

✱   *Building the Loadable Modules (UnixWare 1.x Only)*—Builds the loadable modules for the driver(s).

✱   *Rebuilding the UnixWare Kernel*—Rebuilds the kernel with the new driver.

✱   *Booting the New Kernel*—Reboots with the new kernel.

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

Backing Up the Computer

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

1   Login as root at the UnixWare # system prompt.

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

    cp /stand/unix /stand/unix.work

Loading the Package

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

    /etc/conf/bin/idinstall -d adslo

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

    /etc/conf/bin/idinstall -d adsl

2   At the system prompt, type the following and press **Ente**r:

    pkgadd -d diskette1

Follow the instructions onscreen to insert the IHV HBA diskette (or 7800 Family Manager Set diskette for UnixWare 1.x and 2.x) into the floppy boot drive.

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

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

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

Do not reinsert the IHV HBA diskette (or Adaptec 7800 Family Manager Set diskette for UnixWare 1.x and 2.x). Instead, type q (quit) and press **Enter**.

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

If a mail message informs you that the installation has failed, turn to *Troubleshooting* on page 79.

6 Type pkginfo and press **Enter**.

7 Verify that the driver is now listed. The host adapter driver appears among the other installed packages.

If the host adapter driver does not appear in the pkginfo listing, turn to *Troubleshooting* on page 79.

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

    system ihvhba Adaptec AIC-7870 PCI SCSI IHV HBA

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

    system adsl Adaptec AIC-7870 PCI SCSI IHV HBA

Modifying the New System File

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

If your computer *is not to boot* from the host adapter SCSI bus, and you wish to leave the driver as a loadable module, skip to *Building the Loadable Modules (UnixWare 1.x Only)* on page 75 for UnixWare 1.x and *Rebuilding the UnixWare Kernel* on page 75 for UnixWare 2.x.

1 Back up the *adsl* UnixWare configuration file. To do this, type the following and press **Enter** after each line:

    cd /etc/conf/sdevice.d

    cp adsl /save/adsl.org

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

    $loadable adslo

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

    $static

3   Display the contents of the edited *adsl* or *adslo* file by typing the following and pressing **Enter**:

cat adsl (for UnixWare 2.x)

cat adslo (for UnixWare 1.x)

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

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

Building the Loadable Modules (UnixWare 1.xOnly)

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

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

cd /etc/conf/bin

./idbuild -M adsl

Rebuilding the UnixWare Kernel

1   Type the following at the # prompt and press **Enter** after each line:

cd /etc/conf/bin

./idbuild -B

Status messages appear.

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

cd /etc/conf/cf.d

cp unix /stand/unix

cd /

shutdown -g0

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

The UnixWare kernel is now ready for host adapter operation.

Booting the New Kernel

1   Follow the onscreen instructions (usually by pressing **Enter**) to reboot your computer.

2   Check the bootup messages to verify that all your installed SCSI devices are listed. If some or all of your installed SCSI devices do not appear at this time your SCSI cables may be loose, or the SCSI device setup may not be complete. Refer to your computer's troubleshooting and SCSI configuration documentation.

3   Wait for UnixWare to complete bootup with the new kernel. Refer to *Troubleshooting* on page 79 if the computer crashes or if panic (UnixWare error) messages appear during bootup.

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

Using Tunable Parameters

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

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

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

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

NOTE: The *adsl* and *adslo* drivers support tagged queuing and reinitialization.

Using Multiple Host Adapters

When using multiple host adapters, consider the following:

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

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

✱ 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, set the host adapter to the lowest PCI Device number. See your host adapter's *User's Guide.*

✱ *For UnixWare 1.x:* If you skip a host adapter in a PCI slot, disable the host adapter BIOS (see the host adapter's *User's Guide*). Enable the channel in the *sdevice.d* file by selecting Y at the line /etc/conf/sdevice.d/adsl .

✱ UnixWare 2.x supports auto-configuration. When adding multiple host adapters to an existing UnixWare 2.x system, simply install the board and reboot; the system automatically reconfigures and rebuilds the kernel. If you want to choose a host adapter to boot from, simply disable the BIOS on all other host adapters.

Removing the Driver

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

1 Back up all important computer files.

2 *For UnixWare 2.x:* At the UnixWare root prompt, type the following:

/etc/conf/bin/idinstall -d adsl

These files will be deleted:

/etc/conf/mdevice.d/adsl

/etc/conf/pack.d/adsl/Driver.o

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

/etc/conf/pack.d/adsl/disk.cfg

/etc/conf/sdevice.d/adsl

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

/etc/conf/bin/idinstall -d adslo

These files will be deleted:

/etc/conf/mdevice.d/adslo

/etc/conf/pack.d/adslo/Driver.o

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

/etc/conf/pack.d/adslo/disk.cfg

/etc/conf/sdevice.d/adslo

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

/etc/conf/bin/idbuild -B -K

cp /etc/conf/cf.d/unix /unix

cd /

shutdown -g0

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

Troubleshooting

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

Check the Advanced CMOS Setup (UnixWare 1.x Only)

1 Reboot the computer and press **F1** or **DEL** (depending on the BIOS) to enter the CMOS setup program.

2 Set all PCI channels to IRQ 10. For UnixWare 1.x, all 7800 Family host adapters use IRQ 10 and will not work with other IRQs. For UnixWare 2.x, any IRQ can be used.

Boot from the Old Kernel

1 Reboot the computer.

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

3 *For UnixWare 1.x:* The computer asks which kernel you want to boot. Type the name of the old kernel (e.g., unix.work) and press **Enter**. Your computer should now boot from the backup kernel created earlier in *Updating UnixWare with the Driver* on page 72.

For UnixWare 2.x: From the [boot]# prompt, first type KERNEL=old kernel (e.g., KERNEL=unix.work) and press **Enter**. Then, type go and press **Enter**. Your computer should now boot from the backup kernel created earlier in *Updating UnixWare with the Driver* on page 72.

Repeat the Update Installation

1 Follow the instructions in *Removing the Driver on* page 77 to delete the driver from your computer.

2 Perform the driver update procedure again. See *Updating UnixWare with the Driver* on page 72.