Ultra160 Family Manager Set

for Windows NT®, Windows® 95/98, Windows 2000, Novell NetWare, SCO UNIX, and UnixWare

User's Guide

Ultra 160 SCSI

adaptec®

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Introduction

The Adaptec® Ultra160 Family Manager Set is a set of software drivers and other files that enable your Adaptec Ultra160 Family host adapter to communicate with your computer. The Adaptec Ultra160 Family Manager Set contains drivers for the following operating systems:

- Microsoft Windows NT®
- Microsoft Windows® 95/98
- Microsoft Windows® 2000
- Novell NetWare
- SCO UnixWare

The remainder of this chapter includes a table that lists all Adaptec host adapters and device drivers that make up the Adaptec Ultra160 Family, as well as the minimum requirements needed to install the software.

The remaining chapters are organized by operating system. Each chapter provides instructions on how to install the driver at the same time you install your operating system. If your operating system is already installed, instructions on updating or installing the driver are also included. If you have problems installing and using the driver, refer to the *Troubleshooting* sections, included at the end of each chapter.

Device Drivers

The Ultra160 Family Manager Set has one or more drivers file for each operating system. Use the table below to determine the correct driver for your operating system.

Operating System	Ultra160 Driver
Windows NT	*adpu160m.sys*
Windows 95/98	*adpu160m.mpd*
Windows 2000	*adf6u160m.sys* (Ultra160 19160) *adpu160m.sys* (all other Ultra160 cards)
NetWare	*adpt160m.ham*
SCO UnixWare	*adst21* (UnixWare 2.1x) *adst70* (UnixWare 7.01/7.1)

For information on how to install the driver for your SCSI adapter, refer to the section of this user's guide that describes your specific operating system.

Adaptec Ultra160 Family Host Adapters

The following Adaptec PCI-to-SCSI host adapters are collectively referred to as the Adaptec Ultra160 Family host adapters:

Host Adapter	Description
AHA-3960D	Dual-channel PCI-to-Ultra160
SCSI Card 39160	Dual-channel PCI-to-Ultra160
SCSI Card 29160	Single-channel PCI-to-Ultra160
SCSI Card 29160N	Single-channel PCI-to-Ultra160
SCSI Card 19160	Single-channel PCI-to-Ultra160
SCSI Card 29160LP	Single-channel PCI-to-Ultra160
AIC-7892	Single-channel PCI-to-Ultra160 ASIC
AIC-7899	Single-channel PCI-to-Ultra160 ASIC

Requirements

The following are the minimum and recommended requirements needed to install the Adaptec Ultra160 Family Manager Set:

- A PCI computer, with an installed and configured Adaptec Ultra160 Family host adapter(s).
- An installed primary (boot) floppy disk drive. The drive must be able to read your operating system disks. A 3.5-inch (1.44 MB) floppy disk drive is required.
- The driver disks included with your Adaptec Ultra160 Family Manager Set.
- An installed and configured CD-ROM drive.
- The distribution software and documentation included with your operating system.
- The *User's Guide* for your host adapter.

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Microsoft Windows NT Installation

This chapter explains how to install the Adaptec Ultra160 Family Manager Set driver ***adpu160m.sys*** for Windows NT. The ***adpu160m.sys*** driver supports all Adaptec Ultra160 Family host adapters. Refer to the list on page 1-2.

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

Installing the Driver When Installing Windows NT

The *adpu160m.sys* driver is not embedded on the Windows NT 4.0 installation disks (or CD-ROM) and must be added during Windows NT installation.

Completing a Fresh Windows NT 4.0 Installation From Floppy Disk

1. Create the Windows NT driver disk. For more information, refer to the *Creating Family Set Driver Disks* section of the *Family Manager Set QuickStart Guide*.
2. Start your system with the Windows NT Boot Disk in the floppy disk drive.
3. When prompted, insert disk #2 in your floppy disk drive. After a few moments you will see a blue screen. To setup Windows NT now, press **Enter**.
4. Press **S** to skip auto-detection of your SCSI host adapter.
5. Press **S** again to specify an additional device.
6. Press **Enter** to select **Others**; insert the Ultra160 Family Manager Set disk for Windows in your floppy disk drive.
7. Using the arrow keys, select the following driver and press **Enter**:

   Adaptec Ultra160 Family PCI SCSI Controller (NT4.0)

8. To add other host adapters that are not part of the Ultra160 Family, press **S** and repeat from Step 5 for each additional adapter and insert the appropriate driver disk. The Adaptec Ultra160 Family host adapters use the same driver; it is not necessary to install the driver again.
9. Press **Enter** to continue with the Windows NT operating system setup. Follow the instructions on-screen and in the Windows NT documentation to complete the installation.

Completing a Fresh Windows NT 4.0 Installation From CD-ROM

1. Insert the Windows NT 4.0 CD into the CD-ROM drive.
2. Start your system. Press the **F6** key when you see the following message:

   Setup is inspecting your computer's hardware configuration...

   If you do not see this message, your system may not be setup to boot from a CD-ROM. You will need to install from floppy disks. See *Completing a Fresh Windows NT 4.0 Installation From Floppy Disk* on page 2-2.
3. When prompted, press **S** to specify an additional device.
4. Press **Enter** to select **Others;** insert the Ultra160 Family Manager Set disk for Windows in your floppy disk drive.
5. Using the arrow keys, select the following driver and press **Enter**:

   Adaptec Ultra160 Family PCI SCSI Controller (NT4.0)
6. To add other host adapters that are not part of the Ultra160 Family, press **S** and repeat from Step 4 for each additional adapter and insert the appropriate driver disk. The Adaptec Ultra160 Family host adapters use the same driver; it is not necessary to install the driver again.
7. Press **Enter** to continue with the Windows NT operating system setup. Follow the instructions on-screen and in the Windows NT documentation to complete the installation.

Installing the Driver When Windows NT is Already Installed

To update or install the *adpu160m.sys* driver if Windows NT is already installed, follow the instructions below for the version of Windows NT you are installing.

Updating Windows NT 4.0

1. Start Windows NT.
2. Click the **Start** button on the Windows NT task bar, and then point to **Settings**.
3. Click the **Control Panel**.
4. Double-click the **SCSI Adapters** icon.
5. Click the **Drivers** tab, and then click the **Add** button.
6. In the Install Driver window, click the **Have Disk** button.
7. Insert the Family Manager Set CD-ROM for Windows into drive *D*.
8. From the Copy Manufacturer's File From text box, type d:\fmsimage\fms111\windows\nt4_0\nt4, and click **OK**.
9. In the Install Driver window, Click **OK**.
10. Click the **New** button when asked if you want to use the currently installed driver(s) or install a new one(s).
11. Type d:\fmsimage\fms111\windows\nt4_0\nt4 again, and click **Continue**. The driver is now installed.
12. You must restart your computer for the changes to take effect. Click **Yes** to restart your computer. Click **No** to return to the SCSI Adapters window.

Using Advanced Configuration Parameters

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

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

Using Windows NT SCSI Parameters

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

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

- **DisableTaggedQueuing** — A nonzero value indicates that the SCSI host adapter disables tagged queueing for SCSI devices. The data type for this value is REG_SZ.
- **DisableSynchronousTransfers** — A nonzero value indicates that the SCSI host adapter is not to initiate synchronous negotiations (but it may still accept negotiations initiated by a SCSI target). The data type for this value is REG_SZ.
- **DisableDisconnects** — A nonzero value indicates that targets are not permitted to disconnect during the execution of a SCSI command. The data type for this value is REG_DWORD.
- **MaximumLogicalUnit** — This can limit the scan for connected devices on the SCSI bus. Valid values are 1 to 8. If 1 is specified, the Windows NT SCSI manager assumes that no SCSI targets support LUNs other than 0. Otherwise, LUNs from 0 to 8 are scanned during system initialization. The data type for this value is REG_DWORD.

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

To enter Windows NT parameters, follow these steps:

1. Select **Run** from the Start button.
2. Type regedt32 and press **Enter**.
3. Open the registry list to the following location:

   \HKEY_LOCAL_MACHINE\System\CurrentControlSet\Services\adpu160m\Parameters\Device

   If the Parameters/Device keys already exist, skip to Step 8 below to begin entering values. If the keys do not yet exist, you will need to create them by continuing with Step 4.
4. Click on the **adpu160m** key.
5. Select **Add Key** from the Edit menu; type Parameters in the Key Name edit box. Leave the Class edit box blank.
6. Click on the **Parameters** key.
7. Select **Add Key** from the Edit menu; type Device in the Key Name edit box. Leave the Class edit box blank.

   To specify a certain host adapter, append Device with the number of the host adapter. For example, type Device0 for the first host adapter, Device1 for the second, and so forth. If you omit the host adapter number, the configuration information applies to all Ultra160 Family host adapters.
8. Click on the **Device** key.
9. Select **Add Value** from the Edit menu. In the Value Name edit box, enter one of the valid parameter values. Make sure to enter the appropriate data type for the value. To enter additional values, repeat Steps 8 and 9.

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

Using Driver-specific Parameters

To use the Registry Editor to enter *adpu160m.sys* driver-specific parameters that affect the configuration information for Adaptec SCSI PCI device drivers, follow the instructions below. A list of valid parameters follows:

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

- **/INSTRUMENTATION—**enables recording of I/O statistics and errors. If this option is not specified, instrumentation defaults to disabled. The data type for this value is REG_SZ.
- **/INSTR_ERRLOG_Z=*nnn***—sets the maximum number of error log entries, if /INSTRUMENTATION is enabled. If a number is not specified, the maximum number or error log entries defaults to 32. Valid values are 0-128. The data type for this value is REG_SZ.
- **/MAXTAGS=*nnn***—specifies the tagged command queue depth. If a number is not specified, the tagged queue depth defaults to 128. Valid values are 1-255. The data type for this value is REG_SZ.
- **/HOTPLUG —**enables Hot-Plug PCI feature. If this option is not specified, Hot-Plug PCI feature defaults to disabled.

To enter driver-specific parameters, follow these steps:

1. Select **Run** from the Start button.
2. Type regedt32 and press **Enter**.
3. Open the registry list to the following location:

   \HKEY_LOCAL_MACHINE\System\CurrentControlSet\Services\adpu160m\Parameters\Device\DriverParameters

   If the Parameters/Device, and Driver Parameters keys already exist, skip to Step 10 below to begin entering parameters. If the keys do not yet exist, you will need to create them by continuing with Step 4.

4. Click on the **adpu160m** key.
5. Select **Add Key** from the Edit menu; type Parameters in the Key Name edit box. Leave the Class edit box blank.
6. Click on the **Parameters** key.
7. Select **Add Key** from the Edit menu; type Device in the Key Name edit box. Leave the Class edit box blank.

   To specify a certain host adapter, append Device with the number of the host adapter. For example, type Device0 for the first host adapter, Device1 for the second, etc. If you omit the host adapter number, the configuration information applies to all Ultra160 Family host adapters.
8. Click on the **Device** key.
9. Select **Add Value** from the Edit menu; type Driver Parameters in the Key Name edit box. Enter REG_SZ as the data type and press **Enter**.
10. A String Editor text box appears. Enter valid parameters in the text box. When entering multiple parameters, each parameter must be separated by a space.

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

Hot-Plug PCI is supported by the Windows NT 4.0 driver *adpu160m.sys*. You will need a system that supports Hot-Plug PCI as well as associated Hot-Plug PCI application software in order for Hot-Plug PCI to work. *Do not* enable the Hot-Plug PCI feature unless your system is Hot-Plug PCI capable and you wish to use the Hot-Plug PCI feature.

Follow the instructions below to enable Hot-Plug PCI support in the driver:

1. Insert the Family Manager Set CD-ROM for Windows into drive *D*.
2. Select **Run** from the Start menu.
3. Type d:\fmsimage\fms111\windows\nt4_0\nt4\hotp160m.reg and press **Enter**.
4. Click **OK**.
5. Reboot the system.

Note: The file *hotp160m.reg* adds Hot-Plug related entries into the NT Registry, including the driver-specific registry value /HOTPLUG. Running *hotp160m.reg* will overwrite your current driver-specific registry values located at:

\HKEY_LOCAL_MACHINE\System\CurrentControlSet\
Services\adpu160m\Parameters\Device\DriverParameters

If you have previously added other driver specific registry values, you should note them before running the *hotp160m.reg* file. After running *hotp160m.reg*, you may verify and restore those previously added driver-specific registry values, if needed.

Using Windows NT and the Host Adapter

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

Removing a Host Adapter

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

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

To eliminate the Warning message, you must update the Windows NT software configuration, as described below:

Removing a Host Adapter in Windows NT 4.0

1. From the Control Panel, double-click the **SCSI Adapters** icon.
2. Click the **Drivers** tab.
3. Using the arrow keys select the following driver:

   Adaptec 19160, 29160(N), 39160, AHA-3960D, AIC-7892/7899 Ultra160 PCI SCSI Controller (NT 4.0)
4. Click the **Remove** button.
5. If you are sure you are removing the correct host adapter type, click **Yes**.
6. Click **Yes** to restart the computer and initialize changes. Click **No** to return to the SCSI Adapters window.

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

Swapping a Host Adapter

Swapping an Ultra160 Family host adapter for a non-Ultra160 Family host adapter is similar to the procedure for adding a host adapter. The important distinction is that you make all software configuration changes while Windows NT is running and before you make the hardware changes.

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

To swap adapters, follow these steps:

1. Install the driver for the Ultra160 Family host adapter by following the steps in *Installing the Driver When Windows NT is Already Installed* on page 2-4.

   It is not essential to remove the device driver for the host adapter you are replacing. Windows NT dynamically detects the absence or presence of host adapter hardware, and no problems should arise if you leave the existing device driver installed. You may remove the device driver later, after you have successfully rebooted Windows NT. However, if you leave the driver installed, the system alerts you with an error message of the extra device driver every time you boot. See *Removing a Host Adapter* on page 2-10.

2. Once the new device driver is installed, shut down Windows NT and replace the existing host adapter with the Ultra160 Family host adapter.

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

Troubleshooting

Problems and Solutions

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

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

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

   Press spacebar NOW to invoke the Last Known Good menu

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

Error Messages

Error messages generated by the *adpu160m.sys* driver can be viewed by opening the Windows NT Event Viewer error logs.

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

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

   Error messages generated by the driver show up as Event ID 11. Error messages generated by the SCSI port show up as Event ID 9.

2. To view event details, select **System** from the Log menu. Double-click the **adpu160m.sys** driver event that has an Event ID of 11. (There may be none or multiple driver events.)

   The top portion of the Event Detail dialog box displays information such as the time that the event was generated, the computer on which the event occurred (in case of remote monitoring) and the description of the event. The Data section of the Event Details dialog box displays the error messages generated.

3. Click the **Words** radio button.

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

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

adpu160m.sys Error Messages

The following error messages are listed sequentially according to the last three digits of the error message. For example, [xxxxx010], [xxxxx011], [xxxxx012], etc.

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

[xxxxx004] Command completed with error
[xxxxx005] Command completed with error
[xxxxx006] Command completed with error

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

[xxxxx010] Error issuing command

An error has occurred while the driver was setting up its internal data structures.

[xxxxx011] Error issuing command

The requested command is not supported by this driver.

[xxxxx012] Error issuing command
[xxxxxx99] Error issuing command

The driver does not recognize the target device.

[xxxxx021] Target device protocol error

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

[xxxxx022] Adapter or target device protocol error

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

[xxxxx023] Target device parity error

The driver has detected a parity error by the target device.

[xxxxx024] Data overrun or underrun

The adapter was given more or less data than the expected amount of data.

[xxxxx031] Target device queue full

The target device internal buffer is full.

[xxxxx032] Target device busy

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

[xxxxx050] Host adapter failure
[xxxxxx9A] Host adapter failure

Your host adapter may not be properly installed or is defective. Try resetting the adapter in the PCI slot, or try installing it a different PCI slot.

[xxxxx081] Adapter initialization failure
[xxxxxx8A] Adapter initialization failure
[xxxxxx83] Adapter initialization failure

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

[xxxxx089] Unable to allocate memory

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

[xxxxx096] Adapter hardware initialization failure—possible resource conflict

The driver has attempted to initialize the adapter hardware but failed. This might suggest that the adapter resources (for example, IRQ) conflict with another board installed in your system.

[xxxxx097] Unable to allocate memory

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

[xxxxx0af] Unable to de-allocate memory that was allocated for a target device

Normally, this is not a serious problem, unless you get this message frequently over a short period of time. The memory can be reclaimed by rebooting the system.

[xxxxx0ce] Scatter/Gather limit exceeded

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

[xxxxxd4] Adapter hardware failure - adapter reset

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

[xxxxx0d6] Internal driver error

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

3

Microsoft Windows 95/98 Installation

This chapter explains how to install the Adaptec Ultra160 Family Manager Set driver *adpu160m.mpd* for Windows 95/98. The *adpu160m.mpd* driver supports all Adaptec Ultra160 Family host adapters. Refer to the list on page 1-2.

If you are performing a first time Windows 95/98 installation, see *Installing the Driver When Installing Windows 95/98* on page 3-4. If Windows 95 is already installed in your system, see *Installing the Driver When Windows 95/98 is Already Installed* on page 3-6.

Note: When Windows 95/98 starts, if a New Hardware Found dialog box is displayed after your Ultra160 Family Manager Set host adapter has been installed, you must select the driver from **Disk Provided by Hardware Manufacturer** option. Insert your Family Manager Set CD-ROM for Windows into the disk drive, and type d:\fmsimage\fms111\windows\win9x as the path. Then, follow the on-screen instructions.

DOS Drivers for CD-ROM Access

The CD-ROM drivers need to be installed only if DOS access to a CD-ROM drive attached to a SCSI host adapter is required. If Windows 95, Windows 98, or NetWare is already installed, or if the CD-ROM drive is not connected to a SCSI adapter, these drivers do not need to be copied or installed. However, you may choose to install these drivers if you are having trouble accessing your CD-ROM from NetWare or Windows 95/98.

Note: You do not need these drivers for Windows NT or UNIX.

Install CD-ROM Drivers on a DOS Bootable Hard Disk

The following system files should be modified:

- *config.sys*
- *autoexec.bat*

1. Copy the files *aspi8u2.sys* and *aspicd.sys* from the DOS directory of the Ultra160 Family Manager Set disk for Windows to your *C* drive. At the DOS prompt, type the following lines and press **Enter** after each line:

   ```
   mkdir  c:\scsi
   copy  a:\dos\*.*  c:\scsi
   ```

2. Modify *config.sys* for loading *aspi8u2.sys* and *aspicd.sys,* which is necessary for connecting a CD-ROM. Either create this file in *C*:\ if you do not currently have a *config.sys,* or add these lines to the existing *config.sys* file. Note that you may need to change the path for the drivers.

   ```
   device=c:\scsi\aspi8u2.sys /d
   device=c:\scsi\aspicd.sys /d:aspicd0
   ```

3. Modify *autoexec.bat* for loading *mscdex.exe*. Either create this file in *C*:\ if you do not currently have *autoexec.bat,* or add these lines to the existing *autoexec.bat* file.

   ```
   c:\dos\mscdex.exe /d:aspicd0 /m:12
   ```

Note: This will assign the CD-ROM to the next available drive letter, typically *D* if there is only one DOS drive. If you are using MS-DOS 5.0 and do not already have *mscdex.exe*, you will need to either upgrade to MS-DOS 6.0 or above.

4 Reboot your system. You are now able to access your CD-ROM drive from the command line and from Windows.

Update Windows 95 or 98 Installation Disks

To update the Windows 95 or 98 boot disk that came with your Windows 95 or 98 CD-ROM, make a backup of the boot disk. Then copy *aspi8u2.sys* and *aspicd.sys* from the DOS directory of the Ultra160 Family Manager Set disk for Windows to the root directory of the Windows 95 or Windows 98 boot disks. The steps to do this will depend on your system setup. This is easier to do on a system that has DOS, Windows 95, or Windows 98 already installed. Here is one example:

1 Insert the Ultra160 Family Manager Set disk for Windows in drive *A* and at the DOS prompt type:

```
copy  a:\dos\aspi8u2.sys  c:\
copy  a:\dos\aspicd.sys  c:\
```

2 Then insert the backup Windows boot disk in drive *A* and type:

```
copy  c:\aspi8u2.sys  a:\
copy  c:\aspicd.sys  a:\
```

To begin installation, see *Installing the Driver When Installing Windows 95/98* on page 3-4.

Installing the Driver When Installing Windows 95/98

Installing the Driver When Installing Windows 95

Note: Follow the Windows 95 Installation Guide to install Windows 95. If your Windows 95 CD came with a Windows 95 Boot disk, you will need to update the Windows 95 Boot disk. Copy the file *aspi8u2.sys* and *aspicd.sys* from the DOS directory of the Ultra160 Family Manager Set disk for Windows to the Windows 95 Boot disk. Refer to the section *DOS Drivers for CD-ROM Access* on page 3-2 for instructions.

1. If **New Hardware Found** is displayed, select **Driver from disk provided by hardware manufacturer**.
2. Insert your Family Manager Set CD-ROM, and type d:\fmsimage\fms111\windows\win9x as the path; follow the instructions that appear on-screen.
3. If you are prompted to reboot the system, select **No** if you have a dual-channel adapter or if you have multiple Ultra160 adapters. Then repeat Steps 1 through 3 for each SCSI channel until all Ultra160 adapters are found. Otherwise, select **yes** to reboot the system.
4. Once Windows 95 has rebooted, follow the steps in the section *Installing the Driver When Windows 95/98 is Already Installed* on page 3-6 to verify that the drivers have been added and are working properly. If a yellow question mark labeled *PCI SCSI Bus Controller* is displayed, update the driver as instructed.

Installing the Driver When Installing Windows 98

You will need to update the Windows 98 Boot disk that came with your Windows 98 CD. You need to do this on a system that has DOS, Windows 95, or Windows 98 already installed. Follow the instructions in *DOS Drivers for CD-ROM Access* on page 3-2.

1. Insert the Windows 98 boot disk into the floppy disk drive. Power on the system, insert the Windows 98 CD into the CD-ROM drive, and wait for the system to boot up.

2. At the Microsoft Windows 98 Start Menu screen select

   1. Start Windows 98 Setup from CD-ROM

   Follow the on-screen instructions to continue Windows 98 Setup. Setup will run and restart your computer. If you are given an option, always select **1. Start Windows 98 Setup from CD-ROM**. Windows installation will continue for some time.

3. When you see the Add New Hardware Wizard screen and PCI SCSI Bus Controller is displayed, click **Next**.

4. Select **Search for best driver**, then click **Next**.

5. Select **Specify a location** and type:

   d:\fmsimage\fms111\windows\win9x

   in the space provided. Insert the Family Manager Set CD-ROM. Click **Next**.

6. When you see the Adaptec Ultra160 PCI SCSI Controller click **Next**.

7. When you see the following message:

   Windows has finished installing the software that your new hardware device requires.

   Click **Finish**.

8. If you are prompted to reboot the system, select **No** if you have a dual-channel adapter of if you have multiple Ultra160 adapters. Then repeat Steps 4 through 8 for each SCSI channel until all Ultra160 adapters are found. Otherwise, select **Yes** to reboot the system.

9. Follow the on-screen instruction to complete the Windows 98 installation.

Installing the Driver When Windows 95/98 is Already Installed

To update or install the *adpu160m.mpd* driver if Windows 95/98 is already installed, follow these instructions:

Note: All Adaptec Ultra160 Family host adapters use the *adpu160m.mpd* driver. Once the correct driver is updated, it is not necessary to update it again for each Ultra160 Family host adapter installed in your system.

1. Start Windows 95/98.
2. Using the right mouse button (right-click), click the **My Computer** icon.
3. Click **Properties**.
4. On the Device Manager tab, click the plus sign (**+**) next to the SCSI Controller icon.

Caution: If Windows 95/98 cannot determine the type of host adapter installed in your computer, a yellow question mark labeled *Other Devices* appears instead of the SCSI Controller icon. To continue, click the plus sign (**+**) next to the question mark; a yellow question mark labeled *PCI SCSI Bus Controller* then appears.

5. Double-click the Ultra160 Family host adapter you wish to update, or if a yellow question mark labeled *PCI SCSI Bus Controller* is displayed, double-click the question mark.
6. Insert the Family Manager Set CD-ROM into drive *D*.
7. Select the **Drivers** tab.

Caution: If the version of Windows 95/98 you are using displays an Update Driver button instead of a Change Driver button, follow the procedures in the section *Updating the Driver for Windows 95* on page 3-8.

8. Click **Change Driver**. If you are prompted to select the hardware type, select **SCSI Controller**.
9. Click the **Have Disk** button and type:

   d:\fmsimage\fms111\windows\win9x

   as the path.
10. Click **OK**.
11. Select the Ultra160 Family host adapter, and click **OK**.
12. Click **OK**. The driver is copied and scanned.
13. You must restart your computer for the changes to take effect. Click **Yes** to restart your computer. Click **No** to return to the System Properties window.

Updating the Driver for Windows 95

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

1. Follow Steps 1 through 7 in the previous section, *Installing the Driver When Windows 95/98 is Already Installed*.
2. Click **Update Driver**.
3. In the Update Device Driver Wizard, select **Yes**, then click **Next**.
4. Under Location type d:\fmsimage\fms111\windows\win9x, then click **OK**.
5. Click **Finish**.
6. In the Copying Files dialog box, the following message may appear:

   The file adpu160m.mpd on Ultra160 Family Manager Set installation disk could not be found.

   Type d:\fmsimage\fms111\windows\winnt, and click **OK** to install the driver.
7. Click **Yes** to restart you computer and update the changes. To return to the System Properties window, click **No**.

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

Troubleshooting

Problems and Solutions

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

Miniport drivers are 32-bit Protected Mode device drivers used by Windows 95/98 to control host adapters and devices. Windows 95/98 includes a set of miniport drivers for various SCSI host adapters.

If your Ultra160 Family host adapter is already installed, the adapter's miniport driver is automatically installed and configured during Windows 95/98 installation. Follow the instructions listed in *Installing the Driver When Windows 95/98 is Already Installed* on page 3-6 to ensure that the miniport driver is updated.

To make sure the driver is installed correctly in systems running Windows 95/98, open the **Control Panel**, double-click **System**, and click the **Device Manager** tab. Then double-click the **SCSI Controllers** icon; you should see the model name of the SCSI host adapter(s) installed in your system.

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

If the SCSI Controllers icon or your host adapter's model name do not appear in the Device Manager, follow these steps:

1. Open **Control Panel** and double-click the **Add New Hardware** icon. Let Windows search for the host adapter by selecting **Yes** on the second screen of the Add New Hardware Wizard.
2. If Windows does not detect the adapter, run the Add New Hardware Wizard again. This time, select **No** on the second screen of the wizard, then select **SCSI Controllers** on the next screen.
3. Insert the Ultra160 Family Manager Set disk for Windows into your floppy disk drive.
4. Select the model of your Ultra160 Family host adapter, and then click the **Have Disk** button.
5. Enter a:\win95 or a:\win98 as the location to copy the file from.
6. Click **OK**. The driver is copied and your system is updated.

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

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

This means there is some kind of resource problem. First, see if the names of any host adapters appear that are not actually installed in your computer. If so, select the name and click **Remove**.

If a red X appears in front of your host adapter name, remove all the host adapter references under SCSI Controllers and run the Add New Hardware Wizard, following the steps on page 3-9.

If a yellow exclamation point appears in front of your host adapter name, the resources that the driver uses probably do not match the resources used by the hardware. Double-click the host adapter name, then click on the **Resource** tab. Deselect the **Use Automatic Settings** box and edit the resources (Interrupt Request, Direct Memory Access, etc.) so they match those used by the host adapter. If the problem still remains, there is probably a hardware resource conflict between the host adapter and other hardware in your computer. You can fix this by changing the hardware resource settings. (See the hardware documentation for your computer and peripheral devices.)

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

1 Open the **Control Panel**, double-click on **System**, and click the **Device Manager** tab.

2 Double-click the **SCSI Controllers** icon, select the name of the old host adapter, and click **Remove**.

3 Turn OFF the computer and physically remove the currently installed host adapter.

4 Install the new host adapter according to the instructions in the hardware documentation.

5 Turn the computer ON. If the new host adapter supports Plug and Play, Windows will install and configure it automatically. Otherwise, run the Add New Hardware Wizard to make sure the new driver is loaded.

If I am running under Windows 95/98, do I need lines for the Adaptec Real Mode ASPI drivers and mscdex.exe in my config.sys and autoexec.bat files?

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

- You are running in MS-DOS Mode and need to access your CD-ROM drive.
- You are using a scanner or another SCSI device with *config.sys*- or *autoexec.bat*-based drivers, such as Hewlett Packard *sjiix.sys*.
- You have an older model SCSI-1 CD-ROM drive that Windows 95/98 does not support.
- You are using a CD-Recorder drive (however, some newer models of CD-Recorder drives can use the embedded Windows miniport drivers).

My CD-ROM drive doesn't work properly under Windows 95/98.

Some older models of SCSI CD-ROM drives are not compatible with the embedded Windows 95/98 CD-ROM driver. You can add support for the CD-ROM drive by doing the following:

1. Make sure your ASPI Real Mode drivers (including *aspicd.sys*, *aspi8u2.sys*, and *mscdex.exe*) are loaded and running from your *config.sys* and *autoexec.bat* files. See *Install CD-ROM Drivers on a DOS Bootable Hard Disk* on page 3-2
2. If Step 1 did not work, find the file named *cdtsd.vxd* in the *\windows\system\iosubsys* directory and rename it *cdtsd.sav*.

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

The mapping between *mscdex.exe*, which runs in Real Mode, and the Windows 95/98 CD-ROM driver does not match. You can correct this in one of two ways:

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

4

Microsoft Windows 2000 Installation

This chapter explains how to install the Adaptec Ultra160 Family Manager Set driver for Windows 2000. The driver supports all Adaptec Ultra160 Family host adapters and ASICs. Refer to the list on page 1-2.

If you are performing a first-time Windows 2000 installation, see *Installing the Driver When Installing Windows 2000*. If Windows 2000 is already installed in your system, see *To Update the Driver When Windows 2000 is Already Installed* on page 4-3.

Installing the Driver When Installing Windows 2000

1. Create the Windows 2000 driver disk. Refer to the *Family Manager Set QuickStart Guide* section, *Creating Family Manager Set Driver Disks*.

Note: Windows 2000 will not install driver from CD.

2. Start your system with the Windows 2000 CD-ROM in the CD-ROM drive.

Note: When using a CD-ROM drive to install Windows 2000 from the bootable CD-ROM, make sure Bootable CD-ROM support is enabled in either the system or SCSI BIOS setup utility. If these options are not available, boot from the Windows 2000 floppy disks.

3. You may see a message:

   Press any key to boot from CD.

   You have five seconds to press a key to boot off the CD.

4. Press **F6** when this message is displayed:

   Press F6 if you need to install a third-party SCSI or RAID driver...

5. After a brief delay, a message prompts you to install your driver. Press **S** to specify a driver.
6. Insert the Ultra160 Family Manager Set disk created in Step 1 into drive *A*, and press **Enter**.
7. You are presented with a selection of driver choices. Highlight the Adaptec SCSI Controller for your adapter (there should be a specific mark for the icon) and press **Enter**.
8. If you have no other controllers to add, press **Enter** to continue with the Windows 2000 installation.
9. After Windows 2000 has completed installation, please reinstall your SCSI driver from the Device Manager if you have

a SCSI adapter other than an Adaptec SCSI Card 19160. Follow the steps in *To Update the Driver When Windows 2000 is Already Installed* to ensure all desired drivers are installed.

To Update the Driver When Windows 2000 is Already Installed

To update or install the driver if Windows 2000 is already installed, follow these instructions:

1. Start Windows 2000.
2. Click the **Start** button on the Windows 2000 task bar, and then point to **Settings**.
3. Click the **Control Panel**.
4. Double-click the **System** icon.
5. Select the **Hardware** tab and click the **Device Manager** button.
6. Under SCSI and RAID Controllers, click on the **+** sign to the left. This displays the SCSI adapters currently installed. Right-click on the device you wish to update and select **Properties**.
7. Click the **Driver** tab and click the **Update Driver** button. The Update Device Driver Wizard starts. Click **Next**.
8. Select the **Search for a Suitable Driver** option, and click **Next**.
9. Be sure the only selection that is checked is **CD-ROM Drives**. Insert the Family Manager Set CD-ROM, and click **Next**.
10. At this step, Windows 2000 recommends one of two choices. If it recommends using the driver found on the driver disk, then click **Next** and skip to Step 12. It might recommend that you keep the existing driver and mention that it found other suitable drivers. If this is the case, select **Install one of the other drivers** and click **Next**.
11. Select the driver from the Adaptec provider that best fits your adapter and click **Next**.
12. You may get a warning that a Digital Signature was not found. Check Adaptec's Web site periodically for updated drivers with the Digital Signature. Click **Yes**.

13 You may be asked to enter the path for the driver. See *Driver Pathnames* on page 4-4 for a list of pathname choices.

14 Click **Finish**. You may be required to reboot your system.

Note: If your SCSI card is a dual-channel adapter (such as the Adaptec SCSI Card 39160), be sure to update both references in the Device Manager before rebooting.

Upgrading an Existing Windows 95/98 or Windows NT Version 4 Installation to Windows 2000

1 With your operating system started, insert your Windows 2000 CD-ROM and choose to upgrade your system. Your system reboots.

2 The Windows 2000 Setup program starts. Press **F6** when this message is displayed:

```
Press F6 if you need to install a third-party SCSI or RAID driver...
```

3 Follow the directions from *Installing the Driver When Installing Windows 2000* on page 4-2.

Driver Pathnames

The following table contains driver pathnames.

Driver Pathnames	Description
\win2000\adf6u160\adf6u160.sys	Windows 2000 Ultra160 driver for the 19160
\win2000\ultra160\adpu160m.sys	Windows 2000 Ultra160 driver for all other Adaptec Ultra 160 cards

Using Advanced Configuration Parameters

Advanced users may use software parameters to alter the configuration of the Windows 2000 device drivers supplied by Adaptec. All Windows 2000 configuration information is stored in a

data structure supplied by Windows 2000, called the Registry. You can edit this information through a tool called the Registry Editor.

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

Using Windows 2000 SCSI Parameters

Follow the instructions below to enter the registry values that affect how the Windows 2000 SCSI manager interprets the generic configuration information of SCSI device drivers. Each driver has its own key reference in the registry. In this example, the Ultra160 key is used (*adpu160m)*. The other keys are *aic78xx, aic78u2, adf6u160,* and *2930u2*. All SCSI host adapters supported by the modified key are affected by the values you enter here. A list of valid values follows:

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

- **DisableTaggedQueuing**—A nonzero value indicates that the SCSI host adapter disables Tagged Queueing for SCSI devices. The data type for this value is REG_SZ.
- **DisableDisconnects**—A nonzero value indicates that targets are not allowed to disconnect during the execution of a SCSI command. The data type for this value is REG_DWORD.
- **DisableMultipleRequests**—This limits the number of commands to each logical device to one. The data type for this value is REG_DWORD.
- **MaximumLogicalUnit**—This can limit the scan for connected devices on the SCSI bus. Valid values are 0 to 7. If 1 is specified, the Windows 2000 SCSI manager assumes that no SCSI targets support LUNs other than 0. Otherwise, LUNs from 0 to 7 are scanned during system initialization. The data type for this value is REG_DWORD.
- **MaximumSGList**—Specifies the maximum number of Scatter/Gather elements. Valid values are 17-255. The data type for this value is REG_DWORD.

To enter Windows 2000 parameters, follow these steps:

1. Select **Run** from the Start button.
2. Type regedt32 and press **Enter**.
3. Open the registry list to the following location:

   \HKEY_LOCAL_MACHINE\System\CurrentControlSet\Services\adpu160m\Parameters\Device

   If the Parameters\Device keys already exist, skip to Step 8 below to begin entering values. If the keys do not yet exist, you need to create them by continuing with Step 4.
4. Click on the **adpu160m** key.
5. Select **Add Key** from the Edit menu; type Parameters in the Key Name edit box. Leave the Class edit box blank.
6. Click on the **Parameters** key.
7. Select **Add Key** from the Edit menu; type Device in the Key Name edit box. Leave the Class edit box blank.

   To specify a certain host adapter, append Device with the number of the host adapter. For example, type Device0 for the first host adapter, Device1 for the second, etc. If you omit the host adapter number, the configuration information applies to all Ultra160 Family host adapters.
8. Click on the **Device** key.
9. Select **Add Value** from the Edit menu. In the Value Name edit box, enter one of the valid parameter values. Make sure to enter the appropriate data type for the value. To enter additional values, repeat Steps 8 and 9.

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

Using Driver-specific Parameters

Follow the instructions below to enter the registry values that affect the configuration information for Adaptec SCSI PCI device drivers. Each driver has its own key reference in the registry. In this example, the Ultra160 key is used (*adpu160m)*. The other keys are *aic78xx*, *aic78u2*, *adf6u160*, and *2930u2*. All SCSI host adapters supported by

the modified key are affected by the values you enter here. A list of valid parameters follows:

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

- **/MAXTAGS=*nnn***—specifies the tagged command queue depth. If a number is not specified, the tagged queue depth defaults to 128. Valid values are 1-255. The data type for this value is REG_SZ.
- **/MEMMAP**—when set, the SCSI manager is memory mapped. If this key is not used, the default is I/O mapped. There are no *valid values* or *default values*. The data type for this value is REG_SZ.
- **/BUS_FAIRNESS**—when set, the SCSI bus avoids device starvation. There are no *valid values* or *default values.* The data type for this value is REG_SZ.

To enter driver-specific parameters, follow these steps:

1. Select **Run** from the Start button.
2. Type regedt32 and press **Enter**.
3. Open the registry list to the following location:

   \HKEY_LOCAL_MACHINE\System\CurrentControlSet\Services\adpu160m\Parameters\Device

   If the Parameters\Device keys already exist, skip to Step 10 below to begin entering parameters. If the keys do not yet exist, you need to create them by continuing with Step 4.
4. Click on the **adpu160m** key.
5. Select **Add Key** from the Edit menu; type Parameters in the Key Name edit box. Leave the Class edit box blank.
6. Click on the **Parameters** key.
7. Select **Add Key** from the Edit menu; type Device in the Key Name edit box. Leave the Class edit box blank.

To specify a certain host adapter, append Device with the number of the host adapter. For example, type Device0 for the first host adapter, Device1 for the second, etc. If you omit the host adapter number, the configuration information applies to all Ultra160 Family host adapters.

8 Click on the **Device** key.

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

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

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

Installing a New Host Adapter after Windows 2000 Is Already Installed

To install a new host adapter after Windows 2000 is already installed, follow these steps:

1. Install the new host adapter.
2. Start Windows 2000. When the hardware wizard detects the card, click **Yes** to continue the installation.
3. Insert the Adaptec Family Manager Set CD-ROM into the CD-ROM reader and click **OK**.
4. The path will be displayed in the Copy Files from: box.
5. Type the driver path for the model of your new host adapter.

Type of Host Adapter	Driver Path
Adaptec 2930U2	d:\fmsimage\w2kds1\win2k\win2000\2930u2
Adaptec 19160	d:\fmsimage\w2kds\win2k\win2000\adf6u160
Adaptec Ultra (legacy)	d:\fmsimage\w2kds1\win2k\win2000\ultra
Adaptec Ultra160	d:\fmsimage\w2kds1\win2k\win2000\ultra160
Adaptec Ultra2	d:\fmsimage\w2kds1\win2k\win2000\ultra2

6. Click **OK**. The driver is now installed.

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. See the documentation for your host adapter for more information. Windows 2000 boots and functions properly in this configuration.

Note: Windows 2000 Setup does not delete the device driver from your system disk; it only updates Windows 2000 software configuration information so that the device driver is no longer loaded during system bootup.

Swapping a Host Adapter

Swapping a SCSI host adapter for another SCSI host adapter is similar to the procedure for adding a host adapter. The important distinction is that you add the new SCSI adapter into the system first, before removing the old adapter.

Note: If you do not install the new host adapter first, it may result in a Windows 2000 boot failure. If the operating system fails to boot, remove the new host adapter and replace the original.

To swap adapters, follow these steps:

1. Power down your computer.

WARNING: Turn OFF power to the computer and disconnect the power cord.

2. Discharge any static electricity build-up before handling the SCSI adapter by touching a grounded metal object.
3. Insert the new SCSI adapter into an available PCI slot, leaving the existing SCSI card intact.
4. Power up your computer. Windows 2000 should load up as normal and detect the new SCSI card. Install the Windows 2000 driver if prompted to.

5. Reboot if prompted to.
6. Once the new SCSI adapter is functioning properly, power down your computer.
7. Remove the old SCSI adapter and move all desired devices to the new adapter. See *Removing a Host Adapter* on page 4-10, for more information.
8. All attached devices should be recognized.

Troubleshooting

Most problems can be resolved by following the recommendations in *Problems and Solutions*. If you still experience problems after following the recommendations, continue with the rest of this section.

Problems and Solutions

I made changes to the host adapter configuration and Windows 2000 no longer boots!

The boot manager for Windows 2000 contains recovery logic to allow you to return to the last known good configuration. If you have changed your host adapter configuration and Windows 2000 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. When you see the following message at the bottom of the screen, press **F8**:

   Starting Windows...

   This opens the Windows 2000 Advanced Options menu. Select **Last Known Good Configuration**; then select a boot profile.
3. Once your computer is operational again, check all of the hardware and software configuration changes you want to make. Look specifically for conflicts with parts of the existing system configuration that are not being changed.

Error Messages

Error messages generated by the Windows 2000 drivers can be viewed by opening the Windows 2000 Event Viewer error logs.

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

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

   Error messages generated by the driver show up as Event ID 11. Error messages generated by the SCSI port show up as Event ID 9.

2. To view event details, select **System Log** from the Event Viewer tree. Double-click the appropriate Windows 2000 driver event that has an Event ID of 11. (There may be none or multiple driver events.)

   The top portion of the Event Detail dialog box displays information such as the time that the event was generated, the computer on which the event occurred (in case of remote monitoring), and the description of the event. The Data section of the Event Details dialog box displays the error messages generated.

3. Click the **Words** option.

   In the Data section of the dialog box, the entry in the second row and second column (to the right of the 0010: entry) lists the error message generated by the driver. The common error messages for the driver are described in *Driver Error Messages* on page 4-13:

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

Driver Error Messages

The following error messages are listed sequentially according to the last three digits of the error message. For example, [xxxxx010], [xxxxx011], [xxxxx012], etc.

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

[xxxxx004] Command completed with error
[xxxxx005] Command completed with error
[xxxxx006] Command completed with error

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

[xxxxx010] Error issuing command

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

[xxxxx011] Error issuing command

The requested command is not supported by this driver.

[xxxxx012] Error issuing command
[xxxxxx99] Error issuing command

The driver does not recognize the target device.

[xxxxx021] Target device protocol error

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

[xxxxx022] Adapter or target device protocol error

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

[xxxxx023] Target device parity error

The driver has detected a parity error by the target device.

[xxxxx024] Data overrun or underrun

The adapter was given more or less data than the expected amount of data.

[xxxxx031] Target device queue full

The target device internal buffer is full.

[xxxxx032] Target device busy

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

[xxxxx050] Host adapter failure
[xxxxxx9A] Host adapter failure

Your host adapter may not be properly installed or is defective. Try resetting the adapter in the PCI slot, or try installing it a different PCI slot.

[xxxxx081] Adapter initialization failure
[xxxxxx8A] Adapter initialization failure
[xxxxxx83] Adapter initialization failure

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

[xxxxx089] Unable to allocate memory

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

[xxxxx096] Adapter hardware initialization failure—possible resource conflict

The driver has attempted to initialize the adapter hardware but failed. This might suggest that an adapter resource (for example, an IRQ) conflicts with another board installed in your system.

[xxxxx097] Unable to allocate memory

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

[xxxxx0af] Unable to de-allocate memory that was allocated for a target device

Normally, this is not a serious problem, unless you get this message frequently over a short period of time. The memory can be reclaimed by rebooting the system.

[xxxxx0ce] Scatter/Gather limit exceeded

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

[xxxxxd4] Adapter hardware failure - adapter reset

The host adapter hardware failed and the miniport driver has to reset the hardware.

[xxxxx0d6] Internal driver error

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

5

Novell NetWare Installation

This chapter explains how to install the Adaptec Ultra160 Family Manager Set driver *adpt160m.ham* for Novell NetWare— NetWare 3.2, 4.2, and 5.0. With the exception of SCSI Card 19160, the *adpt160m.ham* driver supports all other Ultra160 host adapters. Refer to the list on page 1-2.

If you are performing a first time NetWare installation, see *Installing the Driver When Installing NetWare* on page 5-2. If NetWare is already installed in your system, see *Installing the Driver When NetWare is Already Installed* on page 5-7.

Installing the Driver When Installing NetWare

To install the *adpt160m.ham* driver when you install NetWare, follow the instructions below for the version of NetWare you are installing.

NetWare 3.2

Follow these instructions only if you are installing NetWare 3.2 for the first time:

1. To complete NetWare 3.2 installation, go to the Novell Web site at:

   http://developer.novell.com//servlet/knowledgebase

   Use the search function provided at this site for "HAM" and locate and download the patches needed to update your specific version of NetWare to run with Adaptec drivers. If you experience difficulty locating the patches, contact Novell for assistance.

2. Follow the installation instructions provided with the patches you have obtained from Novell.

3. Create the DOS partition on the boot hard disk drive.

4. If you are installing NetWare 3.2 from a CD-ROM attached to an Adaptec Ultra160 Family host adapter, follow the instructions in *Install CD-ROM Drivers on a DOS Bootable Hard Disk* on page 3-2 to configure your computer for CD-ROM access.

   If you are installing NetWare 3.2 from a CD-ROM attached to a host adapter other than an Adaptec Ultra160 Family host adapter, refer to your CD-ROM or computer documentation for instructions on configuring your computer for CD-ROM access.

5. Reboot your computer after configuring for CD-ROM access.

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

7. After NetWare installs the DOS portion of the software, **DOWN** and **EXIT** to DOS from the server prompt.

8. Copy the *adpt160m.ham* and *adpt160m.ddi* from the *\fmsimage\fms111\nw3-4* directory of the Family Manager Set CD-ROM to the *c:\server.312* directory.

9. Run *312ptd.exe*.

10. Create the directory *c:\server.312\cdsave.*

11. Copy *cdrom.nlm* to *c:\server.312\cdsave*

12. Execute the following command lines to swap the server's loader:

    ```
    cd 312ptd\native\loader
    lswap  loader.exe  \server.312\server.exe
    cd  \server.312
    ```

13. Create the *startup.ncf* file in the *c:\server.312* directory using Edit or a text editor with the following lines:

    ```
    load c:\server.312\312ptd\native\start\npapatch
    load c:\server.312\mmattrfx
    load c:\server.312\nbi31x
    load c:\server.312\adpt160m
    ```

    Add any additional driver load lines for dual-channel or multiple-channel host adapters.

14. Run *server.exe*.

15. Note the slot number detected for the Ultra160 adapter.

    The slot number can be added to the *startup.ncf* file, as described in Step 20 below, to automate driver load using the parameter slot=*x*, where *x* is the detected slot number (for example, load c:\server.312\adpt160m slot=2).

16. Load Install. Create the NetWare partition, SYS volume, and mount the volume. Complete the installation of the System and Public Files.

17 Create the *autoexec.ncf* file. Add the following lines and then save the file.

```
load after311
load c:\server.312\nwpaload
search add 1 c:\server.312\cdsave
load cdrom
```

Note: Omit the search add 1 c:\server.312\cdsave and the load cdrom lines if the CD-ROM is attached to an Adaptec Ultra160 Family host adapter.

18 Load, from the console prompt, the following command:

```
load c:\server.312\312ptd\patch312
```

19 Install the patches from the *c:\server.312\312ptd* directory.

20 Edit the driver load command in the *startup.ncf* file to include the slot number detected in Step 15 above (for example, load c:\server.312\adpt160m slot=2).

21 Install any recommended vendor specific patches. See the Novell Web site for details.

22 **DOWN** and **EXIT** the server

23 Run *server.exe*

24 Installation of the driver for NetWare 3.2 is complete.

Note: To complete NetWare 3.2 installation, go to the Novell Web site and locate the patches needed to update your specific version of NetWare to run with Adaptec drivers. See Step 1 on page 5-2 for more information.

NetWare 4.2

Follow these instructions only if you are installing NetWare 4.2 for the first time:

1. Begin installation of NetWare 4.2 on your server as instructed in your NetWare documentation.
2. When a screen appears that asks you to select a disk driver, press **Insert**.
3. Insert the Adaptec Family Manager Set CD-ROM into your CD-ROM drive.
4. Press **F3** and type d:\fmsimage\fms111\netware\nw3-4 as the path to the *adpt160m.ham* driver for NetWare.
5. Select **adpt160m.ham** and press **Enter**.
6. Select **No** not to save existing file, **Yes** to save existing file *cdrom.nlm*.
7. Select **No** not to save existing file, **Yes** to save existing file *nbi.nlm*.
8. Select **No** not to save existing file, **Yes** to save existing file *nwpa.nlm*.
9. Select **No** not to save existing file, **Yes** to save existing file *nwpaload.nlm*.
10. Select **Save parameter and continue**, and press **Enter**.
11. To install additional adapters, follow the procedures from Step 5.
12. When complete, select **Continue the installation** to complete the installation.

NetWare 5.0

Follow these instructions only if you are installing NetWare 5.0 for the first time:

1. Begin installation of NetWare 5.0 on your server as instructed in your NetWare documentation.
2. When a screen appears that asks you to add device drivers, select **Modify** and press **Enter.**
3. Select **Storage adapters**, and press **Enter**.
4. Press **Insert** to add storage drivers.
5. Press **Insert** to add an unlisted driver.
6. Insert the Adaptec Family Manager Set CD-ROM into your CD-ROM drive.
7. Press **F3** and type d:\fmsimage\fms111\netware\v5_xx as the path to the *adpt160m.ham* driver for NetWare.
8. Select **adpt160m.ham** and press **Enter**.
9. Select **Return to driver list**, and press **Enter**.
10. To install additional adapters, follow the procedures from Step 4.
11. When complete, select **Continue** to complete the installation.

Installing the Driver When NetWare is Already Installed

To update or install the *adpt160m.ham* driver when NetWare is already installed, follow the instructions in this section. The procedures are similar for all versions of NetWare. Procedures that are specific to a NetWare version are noted when necessary.

1. Make a backup copy of the old driver (if it exists) before installing the new driver.
2. Copy the *adpt160m.ham* driver from the Family Manager Set CD-ROM into the server's startup directory (for example, *c:\nwserver*, *c:\server.40*) on your hard disk. This overwrites any existing version of the driver in the directory.

Note: For NetWare 3.2 and 4.2, the file is in *\fmsimage\fms111\netware\nw3-4*. For NetWare 5.0, the file is in *\fmsimage\fms111\netware\v5_xx*

3. If necessary, modify the load command line in the *startup.ncf* file so that the proper path to the driver and all appropriate command line options are specified. See *Loading the Driver at Server Bootup* on page 5-8.

   The correct syntax to load the Ultra160 Family driver is:

   load [*pathname*]adpt160m [*options*]

   Command line options are *not* case sensitive. Placing commas between command line options is optional. See *Loading the Driver at Server Bootup* on page 5-8 for possible values.

Loading the Driver at Server Bootup

To automatically load the *adpt160m.ham* at server bootup, the *startup.ncf* file (usually located in your server's startup directory) must contain a load command line that specifies the location of the driver and any appropriate command line options (see *Using the Load Command Line Options* on page 5-9). For additional information on the *startup.ncf* file, refer to your NetWare documentation.

The correct syntax to load the driver is

load [*pathname*]adpt160m.ham [*options*]

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

load c:\nwserver\adpt160m verbose=y

Command line options are *not* case sensitive. Placing commas between command line options is optional. See *Using the Load Command Line Options* on page 5-9 for possible values.

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

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

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

Using the Load Command Line Options

You can specify several command line options when the driver is loaded. The available options are described in the table below. This table describes command line options for the *adpt160m.ham* driver for Ultra160 products.

adpt160m.ham Command Line Options

Option	Values	Default	Description
auto_disable_tagq=	on, off	off	Enables/disables auto disable Tagged Queuing algorithm.
dev_enable=	0-FFFF	FFFF	Allows you to enable the driver's registration of SCSI devices on a per target basis. By default, all targets are scanned. A bit value of 0 causes the target not to register under the operating system. These devices are still accessible via ASPI. This enable bit mask is entered in hex (see *Bit Mask Options* on page 5-11).
flush_diskreq=	0-FFFF	0	A bit mask to send occasionally ordered tags to specific targets. By default, no targets receive occasionally ordered tags. This bit mask is entered in hex (see *Bit Mask Options* on page 5-11).
instr=	on, off	off	Enables/disables recording of I/O statistics.

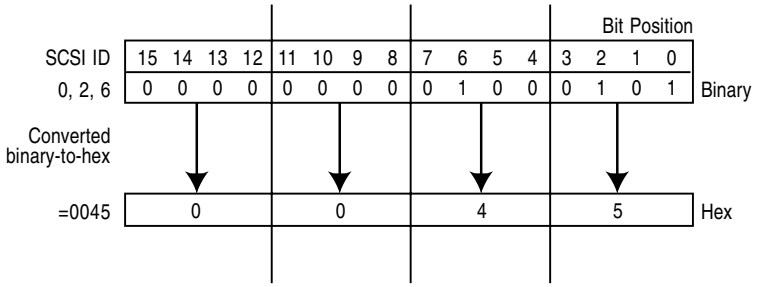
Option	Values	Default	Description
lun_enable=[1]	0-FF	01	A bit mask to enable scanning for specific LUNs on all targets. The default value of 01 causes the driver to scan LUN 0 only. This enable bit mask is entered in hex (see *Bit Mask Options* on page 5-11.)
max_tags=	1-128	16	Specifies maximum number of tagged commands per device.
multlun_targets=	0-FFFF	FFFF	A bit mask to enable LUNs on selected targets. By default, LUNs on all targets are enabled. This bit mask is entered in hex (see *Bit Mask Options* on page 5-11).
slot=	0-xxxx[2]	0	Defines a physical slot number for the host adapter. If 0 is specified, or if this option is not specified, then the driver loads for all Ultra160 Family host adapters.
verbose=	yes, no	no	Displays host adapter configuration information at load time.

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

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

Bit Mask Options

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



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

Sample Load Commands

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

```
load  a:\netware\adpt160m.ham
```

If an error message appears when attempting to load the driver, refer to *Troubleshooting* on page 5-16.

Here is an example of the *adpt160m.ham* driver being loaded with command line options (if loaded from drive *A*):

```
load  a:\netware\adpt160m.ham  verbose=y  slot=2
```

Using NetWare and the Host Adapter

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

Using Removable Media

The *adpt160m.ham* driver module fully supports removable-media disk drives, including magneto-optical drives. Removable media is treated as a standard SCSI hard disk, with some exceptions:

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

NetWare's *monitor.nlm* program supports several removable-media options. Follow these steps to view and configure these options:

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

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

[1] Valid for both removable and nonremovable types of SCSI disk drives.
[2] Valid for removable media only

Mount Status

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

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

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

Lock Status

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

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 *adpt160m.ham*, load *tsaxxx.nlm (tsa312.nlm*, *tsa400.nlm*, *tsa410.nlm)* and *sbackup* with these options:

   ```
   :load scsi2tp.cdm
   :load tsaxxx
   :load sbackup
   ```

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

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 (for example, even if the tape drive is manufactured by Wangtek, *do not* select the Wangtek driver).

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

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

Using a CD-ROM with NetWare

To use a CD-ROM with NetWare, follow these instructions:

1. Load *adpt160m.ham* by entering the following line:

   :load [*pathname*]adpt160m

2. The *scsicd.cdm* driver will auto-load if the device(s) are detected.

Note: For multiple LUN CDs, enable multiple LUN scanning with the lun_enable switch (for example, load adpt160m lun_enable=FF). The lun_enable switch is needed for *adpt160m.ham*.

Enter the following line at the prompt:

scan all luns

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

   :cd device list

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

   :cd mount *[x] [name]*

5. Edit the *startup.ncf* file to include the load commands in Step 1 and 2 above, if auto-mounting devices.

6. Edit the driver load command in the *startup.ncf* file to include the slot number (for example, load c:\server.312\adpt160m slot=2).

Optimizing Performance

The Adaptec Ultra160 Family SCSI Bus Master firmware increases the SCSI performance of the Adaptec Ultra160 Family host adapters under multitasking environments. The firmware uses a paging mechanism to handle up to 255 simultaneous SCSI commands. The Sequencer can simultaneously manage up to 128 tagged, or 1 nontagged, SCSI commands for each SCSI device, up to a limit of 255 SCSI commands. The firmware can queue as many commands as the operating system is able to send to the host adapter. To set this feature, enter the following command:

max_tags=*n*

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

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

Troubleshooting

Error Messages

The error messages listed below are the messages associated with the *adpt160m.ham* driver. Messages are listed sequentially according to the last three digits of the error code. For example, [xxxxx080], [xxxxx081], [xxxxx082], etc.

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

[xxxxx080] Unable to allocate memory

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

[xxxxx081] Adapter software initialization failure

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

[xxxxx082] Internal driver error

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

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

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

[xxxxx084] Adapter software initialization failure

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

[xxxxx085] Unable to allocate memory

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

[xxxxx087] Internal driver error

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

[xxxxx088] Adapter software initialization failure

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

[xxxxx089] Unable to allocate memory

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

[xxxxx096] Adapter hardware initialization failure - possible resource conflict

The driver has attempted to initialize the adapter hardware but failed. This might suggest that the adapter resources (for example, IRQ) conflict with the resources of another board installed in your system.

[xxxxx099] Adapter software initialization failure
[xxxxx09a] Adapter software initialization failure
[xxxxx09b] Adapter software initialization failure

An error has occurred initializing one of the driver's internal data structures for a device connected to the adapter. This may result in problems accessing the device. Try installing the most up-to-date version of the driver available from the Adaptec Web site.

[xxxxx0ab] Driver already loaded for this host bus adapter

The driver is already loaded for this adapter. Verify that the correct adapter is specified in your command line or startup file.

[xxxxx0ac] Driver already loaded for all host bus adapters

The driver is already loaded for all the supported adapters in this system.

[xxxxx0a4] SCSI bus reset by third-party hardware

Hardware such as an array enclosure may have reset the SCSI bus. This is a normal condition unless you receive additional errors.

[xxxxx0a7] Unable to allocate memory
[xxxxx0a8] Unable to allocate memory

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

[xxxxx0a9] Possible interrupt conflict

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

[xxxxx0c9] Invalid command line parameter

A command line option for the driver is invalid. See *Using the Load Command Line Options* on page 5-9 for valid command line options.

[xxxxx0ca] Invalid command line syntax
[xxxxx0cb] Invalid command line syntax
[xxxxx0cc] Invalid command line syntax

The command line syntax for the driver is incorrect. See *Using the Load Command Line Options* on page 5-9 for entering the correct syntax.

[xxxxx07c] Unable to allocate memory
[xxxxx07d] Unable to allocate memory
[xxxxx07e] Unable to allocate memory
[xxxxx07f] Unable to allocate memory

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

6

SCO UNIX Installation

This chapter explains how to install the Adaptec Ultra160 Family Manager Set driver *ad160* for SCO OpenServer 5.0.*x*. The *ad160* driver supports Adaptec Ultra160 SCSI products.

If you are performing a first time SCO UNIX installation, see *Installing the Driver When Installing SCO UNIX* on page 6-2, below, to begin driver installation. If SCO UNIX is already installed in your system, see *Installing the Driver When SCO UNIX is Already Installed* on page 6-3.

Set the SCSI IDs of your devices as recommended by SCO:

- 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
- Set the Boot SCSI hard disk drive to SCSI ID 0

Note: SCO UNIX installation requires that the host adapter driver be installed from a disk. Refer to the *QuickStart Guide* for SCO UNIX driver disk creation.

Installing the Driver When Installing SCO UNIX

To install the *ad160* driver at the same time you install SCO UNIX, follow the instructions below.

Installing SCO OpenServer 5.0.*x*

Follow these instructions only if you are installing SCO OpenServer 5.0.*x* for the first time.

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

1. Insert the SCO OpenServer 5.0.*x* boot disk into the primary floppy disk drive and turn ON the computer. Alternatively, insert the SCO OpenServer 5.0.*x* boot CD into the primary CD-ROM drive and turn ON the computer.
2. When you see these prompts:

   ```
   SCO OpenServer (TM) Release 5
   Boot
   :
   ```

   Type ahslink and press **Enter**.
3. Type ad160 as the package you want to link to the system and press **Enter**.
4. Insert the requested volume (the Ultra160 Family Manager Set disk for SCO UNIX) in the floppy disk drive and press **Enter**.
5. If the driver is properly loaded, the following message appears:

   ```
   ad160.ad160:Loading module
   fd(52)/ad160/driver/ad160/Driver.o text.....
   :
   :
   ad160: Driver "ad160" successfully loaded.
   ```
6. Follow the procedures in your SCO UNIX documentation for completing the installation.

Installing the Driver When SCO UNIX is Already Installed

To update or install the *ad160* driver if SCO UNIX is already installed, follow the instructions in this section. The procedures are similar for all versions of SCO UNIX. Procedures that are specific to a SCO version are noted when necessary.

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

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

- Back up the old UNIX kernel and any other important files.
- Use *installpkg* to load the driver.
- Change the primary host adapter to an Ultra160 Family host adapter, if necessary.
- Rebuild the kernel to reflect the new changes.
- Reboot the computer with the new kernel.

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

1 Perform a System Backup

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

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

a Log in as *root*.

b To back up the current kernel configuration, type the following and press **Enter** after each line:

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

Note: If you ever need to boot up 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.**

c This step is optional. For extra security, you may back up the *mdevice* file and the *sdevice.d* directory. To perform this backup, type the following and press **Enter:**

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

2 To load the driver using *installpkg*, follow these steps:

a At the UNIX system prompt, type installpkg and press **Enter**. The screen displays the following messages:

```
Confirm
Please insert the floppy disk
:
:
Strike Enter when ready
or Esc to stop.
```

b Insert the Ultra160 Family Manager Set disk for SCO UNIX and press **Enter**. The screen displays the following messages:

```
Installation is in progress - do not remove the floppy disk.
The following packages are on this disk:

NAME DESCRIPTION
ad160 Adaptec Ultra160 Family Driver for SCO
OpenServer 5.0.x/dxx

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

c At this point, type ad160 and press **Enter**. The screen then displays this message and various installation status prompts:

```
Installing ad160
```

When the driver is loaded, the following message appears, indicating that the *ad160* driver has been loaded into the Link Kit for kernel addition:

```
Installed ad160
#
```

3 Modify the *mscsi* file, if necessary, to change your primary host adapter to an Ultra160 Family host adapter, using the procedure below:

a Enter the following command:

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

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

```
vi mscsi
```

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

Host Adapter Prefix	SCSI Device Type	Host Adapter Number	Target ID	Logical Unit Number	Bus[1]
xx	Stp	0	2	0	0
xx	Sdsk	0	0	0	0
xx	Srom	0	5	0	0

[1] This field applies to SCO OpenServer 5 and later.

d Modify the *mscsi* file according to your hardware setup:

– If you are booting from an Ultra160 Family host adapter, make sure the host adapter prefix for the host adapter number 0 is *ad160*.

– If you are not booting from an Ultra160 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 above.

e Save the file and exit the text editor.

4 Rebuild the UNIX kernel by following these steps:

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

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

Status messages appear on-screen.

b When the kernel has been built, shut down the system by typing shutdown-g0 and pressing **Enter**.

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

If you need to reconfigure your system, you may do so now.

d Add or remove host adapters or devices as needed.

5 Boot the new kernel by following these steps:

a Follow the on-screen instructions to reboot your system, usually by pressing **Enter**.

b 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.

c Wait for UNIX to boot with the new kernel.

See *Troubleshooting* on page 6-9 if the system crashes or if "panic" (UNIX error) messages are displayed at boot time.

The *ad160* driver for your Ultra160 Family host adapter should now be ready for use.

Using SCO UNIX and the Host Adapter

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

Using Multiple Host Adapters

If you are adding an additional Ultra160 Family host adapter to a system with an Ultra160 Family host adapter already installed, follow the instructions in the SCO UNIX documentation for adding devices using the mkdev command. When the system asks for the host adapter prefix, type ad160 and press **Enter**.

Changing the Boot Disk

If you are changing the boot device from a non-SCSI hard disk to a SCSI hard disk attached to an Adaptec Ultra 160 Family host adapter, you must reinstall SCO UNIX.

If you are already booting from a SCSI hard disk attached to an Adaptec PCI SCSI host adapter, and wish to boot from the same SCSI hard disk attached to an Adaptec Ultra160 Family host adapter, you may elect to either reinstall SCO UNIX with the new driver, or update SCO UNIX with the new driver. See *Installing the Driver When Installing SCO UNIX* on page 6-2, and *Installing the Driver When SCO UNIX is Already Installed* on page 6-3 for instructions.

Using Wide SCSI Host Adapters and Devices

SCO OpenServer 5.0.*x* supports SCSI IDs 0 to 15. If your Ultra160 Family host adapter is a Wide SCSI adapter, up to 15 SCSI devices can be attached and supported.

Using Tunable Parameters for the ad160 Driver

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

/etc/conf/pack.d/ad160/space.c

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 values specified by your SCSI*Select* utility for your Ultra160 Family host adapter. However, you can override the parameters by modifying the *space.c* file. The information you need to change the parameters is included 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:

The following specifies whether the host adapter checks parity on incoming SCSI data:

ad160_parity[SCSI_NAD160]

If the second number is set to **0**, parity checking is enabled. If it is set to **1**, parity checking is disabled.

ad160_parity[SCSI_NAD160] = {First number, second number}

In this example you want the host adapter not to check parity on incoming SCSI data; define parameters as

ad160_parity[SCSI_NAD160] = {1,0};

Changing the Maximum Number of LUNs Supported

The default setting for maximum number of LUNs supported is *Disable*. To enable this setting, you may have to use *vi* to edit the *space.c* file located at */etc/conf/pack.d/ad160*. Modify the following line so that lun=1:

int ad160_scan_lun=0;

Enabling Scatter/Gather and Tagged Queuing

The *ad160* 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 located at:

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

Troubleshooting

My computer does not recognize my SCSI devices.

At boot time, check to see if the BIOS messages for your primary Ultra160 Family host adapter lists all installed SCSI devices. If some or all devices do not appear, check your host adapter User's Guide for additional troubleshooting information, and check the following:

- Are all SCSI devices powered on?
- Are all SCSI bus cables and power cables properly connected?
- Do the host adapter and all devices on the SCSI bus have unique SCSI IDs?
- Are all devices on the SCSI bus terminated properly?
- Do you have an older SCSI peripheral installed? Some older SCSI peripherals, especially CD-ROM drives, do not properly respond to synchronous negotiation. As a result, these peripherals may lock or reset the SCSI bus. To solve this problem, turn off synchronous negotiation for this device ID through the SCSI*Select* utility for the host adapter. See the host adapter's User's Guide.

My computer does not recognize my host adapter.

At boot time, check to see if the BIOS message for your primary Ultra160 Family host adapter appears. If the messages do not appear, the host adapter may not be properly configured; check the following:

- The Ultra160 Family host adapter supports level-triggered interrupts and can share the same interrupt with another Ultra160 Family host adapter or PCI hardware that also supports level-triggered interrupts. Check your host adapter User's Guide and the documentation supplied with your

computer for information about configuring IRQs and other parameters in the system CMOS setup.

- The boot host adapters should be installed into the lowest PCI device number. The device number is determined by the slot number on the PCI bus.

  To find out the device number of your Ultra160 Family host adapter(s):

  a Run the SCSI*Select* utility (by pressing a key combination displayed on-screen at boot time).

  b Look on the first screen of SCSI*Select* in the upper right hand corner for Bus:Device xx:xxh (shown in hexadecimal).

- If the device number is high, power OFF the computer, move the Ultra160 Family host adapter to a PCI slot at the other end of the motherboard, and run SCSI*Select* again to see if the number is lower.

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

I am having problems booting the computer from a SCSI drive.

Note: If both SCSI and non-SCSI disk drives (such as IDE) are installed, a non-SCSI disk drive must be the boot device, unless your system supports Bios Boot Specification (BBS). Refer to the documentation supplied with your system for more information.

Make sure your host adapter is installed and configured correctly, as described in the documentation that came with it. Check the following if the host adapter is correctly installed:

- Ensure 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 required for SCSI hard disk drives. See the documentation supplied with your computer for more information.
- Ensure the Host Adapter BIOS setting in the SCSI*Select* utility is *Enabled*.

- Ensure the Extended BIOS Translation feature in the SCSI*Select* utility is *Disabled*. The OS automatically selects the correct translation method as needed.
- Examine the SCO UNIX *mscsi* file to make sure the correct host adapter and device are specified as the boot entry. The boot entry is the first Sdsk entry in the *mscsi* file (see Step 3 on page 6-5 for additional information).

  For SCO OpenServer 5.0.*x*, the boot entry looks like the example below:

  ```
  ad160 Sdsk 0 0 0 0
  ```

Note: Each field is separated by a tab. *Do not* use the spacebar to separate fields.

The meanings of the fields are as follows:

Host Adapter Prefix	SCSI Device Type	Host Adapter Numbe	Target ID	Logical Unit Number	Bus[1]
ad160	Sdsk	0	0	0	0

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

- *Host Adapter Prefix:* Identifies the name of the host adapter driver. If you are booting from an Ultra160 Family host adapter, the Host Adapter Prefix must be ad160.
- *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 Ultra160 Family host adapter is *0*, the second Ultra160 Family host adapter is *1*.
- *Target ID:* Identifies the SCSI ID of the SCSI device.
- *Logical Unit Number*: Identifies the Logical Unit Number (LUN) of the SCSI device. This field is usually *0*.

- *Bus:* Identifies the SCSI bus that the SCSI device is attached to. For most Adaptec host adapters, 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 Step 4 on page 6-6).

If you are booting from an Ultra160 Family host adapter and are using ISA/EISA-based host adapters as secondary devices, you must disable the BIOS on all ISA/EISA-based host adapters.

If you are booting from ISA/EISA-based host adapters and are using an Ultra160 Family host adapter as a secondary device, see your ISA/EISA-based host adapter documentation to ensure the host adapter is at the lowest BIOS base address. ISA/EISA-based host adapters boot before the Ultra160 Family host adapters.

My computer crashes or displays panic messages at boot time.

You may have to boot from the backup kernel created earlier. To boot from the backup kernel, follow these steps:

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

My computer hangs during heavy system load activity

You may have to increase the maximum size available for configuration information. To change the maximum size available for configuration information, follow these steps:

1. At the prompt, type the following command and press **Enter**:

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

2. Type ./configure and press **Enter**.
3. Under the Configuration tunables, select the **Miscellaneous System Parameters.**
4. Enter the new value for the maximum size of configuration information.

5 After increasing the maximum size of configuration information, type q to quit.

6 Type Y to update the system configuration files.

7 Type ./link_unix and press **Enter** to relink the kernel.

8 Type Y to boot from the new kernel by default.

9 Type Y to rebuild the kernel environment.

10 Reboot the system.

Error Messages

The error messages listed below are the messages associated with the *ad160* driver. Messages are listed sequentially according to the last three digits of the error code. For example, [xxxxx020], [xxxxx021], [xxxxx022], and so forth.

[xxxxx020] Adapter or target device not responding or not connected

The target device did not respond to the adapter. If the device is present, refer to your host adapter User's Guide for troubleshooting information. If the device is no longer connected to the system, ignore this error.

[xxxxx022] Adapter or target device protocol error

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

[xxxxx030] Target device busy
[xxxxx032] Target device busy

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

[xxxxx09D] Unexpected interrupt

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

[xxxxx0a3] Adapter diagnostic failure - possible resource conflict

The driver failed the internal software or hardware diagnostic. Refer to your host adapter User's Guide for troubleshooting information.

[xxxxx0ca] Cannot initialize device

The system, host adapter, or target device is busy or is not responding. The target device could not be initialized.

[xxxxx0cb] Unable to allocate memory. Decrease ad160_instr_buffersz in space.c

The driver has requested a larger buffer size than the available RAM. Either add RAM to the system, or decrease the user option ad160_inotr_buffersz in the */etc/conf/pack.d/ad160/space.c* file.

[xxxxx0cc] CONFLICT: Disconnection must be enabled in order for Tagged Queueing to work

Use the SCSI*Select* utility of your host adapter to enable Disconnection for each device reporting this message. Alternatively, disable Tagged Queuing in */etc/conf/pack.d/ad160/space.c* file by setting ad160_do_tagged = 0. If Tagged Queuing is disabled, performance may be negatively affected.

7

UnixWare Installation

This chapter explains how to install the Adaptec Ultra160 Family Manager Set drivers *adst21* and *adst70* for UnixWare—UnixWare 2.1x and UnixWare 7.01/7.1.

The *adst21* driver (or package) is used with UnixWare 2.1x. The *adst70* driver (or package) is used with UnixWare 7.01/7.1. The *adst21* and *adst70* drivers support Ultra160 SCSI ASICs and host adapters. Refer to the Adaptec Ultra160 Family host adapters on page 1-2.

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

Note: UnixWare installation requires that the host adapter driver be installed from a disk. Refer to the *QuickStart Guide* for UnixWare driver disk creation.

Installing the Driver When Installing UnixWare

To install either the *adst21* or *adst70* driver at the same time you install UnixWare, follow the instructions below. The procedures are the same for UnixWare 2.1x and 7.01/7.1.

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

   Wait for the first UnixWare installation screen and prompt to appear, then follow the on-screen instructions.

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

3. Insert the Ultra160 Family Manager Set disk for UnixWare 2.1x or 7.1 into the primary floppy disk drive and press **Enter** (you cannot load drivers from a secondary floppy disk drive).

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

4. If you have additional HBA disks, insert the next HBA disk, select **Install Another HBA Disk**, and press **Enter**.

   If all of your HBA disks have been installed, remove the last HBA disk, 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 on-screen instructions to continue with installation. Refer to the UnixWare documentation and on-screen help files for help in selecting options.

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

Installing the Driver When UnixWare is Already Installed

To update or install the *adst21* driver or *adst70* driver on a system where UnixWare is already installed, follow the instructions in this section. The procedures are similar for UnixWare 2.1x and 7.1. Procedures that are specific to a UnixWare version are noted when necessary.

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

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

1. *Back Up the Computer*—Backs up the old UnixWare kernel and any other important files.
2. *Load the Package*—Uses pkgadd to load the Ultra160 Family driver package.
3. *Modify the New System File*—For computers booting from a device connected to a Ultra160 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.
4. *Rebuild the UnixWare Kernel*—Rebuilds the kernel with the new driver.
5. *Boot the New Kernel*—Reboots the computer with the new kernel.

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

Back Up the Computer

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

1. Log in 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
   ```

Load the Package

To load the driver, follow these steps:

1. At the system prompt, type the following and press **Enter**:

   ```
   pkgadd  -d  diskette1
   ```

   Follow the instructions on-screen to insert the IHV HBA disk (or Ultra160 Family Manager Set disk for UnixWare 2.1x or UnixWare 7.01/7.1) into the boot floppy disk drive.

2. Select the *adst21* or the *adst70* package from the on-screen menu and press **Enter**. The package is loaded into your UnixWare operating system.
3. When the package has loaded, you may be prompted to install the disk again.

   Do not reinsert the IHV HBA disk (or Adaptec Ultra160 Family Manager Set disk for UnixWare 2.1x or UnixWare 7.01/7.1). Instead, type `q` (quit) and press **Enter**.

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

   If a mail message informs you that the installation has failed, turn to *Troubleshooting* on page 7-9.

5 Type pkginfo -l adstxx and press **Enter**.

6 Verify that the *adst21* or *adst70* driver is now listed.

If the *adst21* or *adst70* driver does not appear in the pkginfo listing, turn to *Troubleshooting* on page 7-9.

The listing should be similar to

```
PKGINST:  adst21
NAME:  Ultra160 Driver for UnixWare 2.1x
```

or

```
PKGINST:  adst70
NAME:  Ultra160 Driver for UnixWare 7.1
```

Modify the New System File

1 Display the contents of the *adst21* file by typing the following and pressing **Enter**:

For UnixWare 2.1x:

```
cat  /etc/conf/sdevice.d/adst21
```

For UnixWare 7.1:

```
cat  /etc/conf/sdevice.d/adst70
```

2 If your computer *is to boot* from a device connected to a Ultra160 Family host adapter, verify that the line $static is present immediately below the line $version 2.

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

Rebuild the UnixWare Kernel

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

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

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

   Status messages appear.

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

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

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

The UnixWare kernel is now ready for host adapter operation.

Boot the New Kernel

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

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

2. Check the bootup messages to verify that all your installed SCSI devices are listed.

   If some or all of your installed SCSI devices do not appear at this time, your SCSI cables may be loose, or the SCSI device setup may not be complete. If so, go back and correct any problems before proceeding.

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

   Refer to *Troubleshooting* on page 7-9 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 UnixWare and the Host Adapter

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

Using Tunable Parameters

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

```
/etc/conf/pack.d/adst21/space.c
```

or

```
/etc/conf/pack.d/adst70/space.c
```

These parameters can be tuned for either the *adst21* driver or the *adst70* driver. Please refer to the comments in the appropriate *space.c* file for a description of these parameters. After modifying the *space.c* file, you must rebuild the kernel then reboot the system for the new parameters to take effect. To rebuild the kernel, type the following, and press **Enter** after each line:

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

Note: The drivers support Tagged Queuing and Reinitialization.

Using Multiple Host Adapters

When using multiple host adapters, consider the following:

- The host adapter and computer must be configured for multiple host adapters as explained in the host adapter's user's guide.
- To boot from the Ultra160 Family host adapter, make sure the host adapter is installed in the lowest PCI slot number. See your host adapter's user's guide.
- UnixWare 2.1x and UnixWare 7.01/7.1 supports auto-configuration. When adding multiple host adapters to an existing UnixWare 2.1x and 7.01/7.1 system, simply install the board and reboot; the system automatically reconfigures and rebuilds the kernel. If you want to select a host adapter to boot from, simply disable the BIOS on all other host adapters.

Removing the Driver

If you no longer need the *adst21* or *adst70* driver, you can use the following procedure to remove it completely:

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

   For UnixWare 2.1x:

   ```
   /etc/conf/bin/idinstall -d adst21
   ```

   The following files will be deleted:

   ```
   /etc/conf/mdevice.d/adst21
   /etc/conf/pack.d/adst21/Driver.o
   /etc/conf/pack.d/adst21/space.c
   /etc/conf/pack.d/adst21/disk.cfg
   /etc/conf/sdevice.d/adst21
   ```

   For UnixWare 7.01/7.1:

   ```
   /etc/conf/bin/idinstall -d adst70
   ```

   The following files will be deleted:

   ```
   /etc/conf/mdevice.d/adst70
   /etc/conf/pack.d/adst70/Driver.o
   /etc/conf/pack.d/adst70/space.c
   /etc/conf/pack.d/adst70/disk.cfg
   /etc/conf/sdevice.d/adst70
   ```

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

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

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

Troubleshooting

Problems and Solutions

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

To boot from the old kernel, follow these steps:

1. Reboot the computer.
2. At the Booting UNIX System… prompt or loading UnixWare graphics, press the **Spacebar**.
3. For UnixWare 2.1x: From the [boot]# prompt, first type KERNEL=old kernel (for example, KERNEL=unix.work) and press **Enter**. Then, type go and press **Enter**. Your computer should now boot from the backup kernel created earlier in *Installing the Driver When UnixWare is Already Installed* on page 7-3.
4. For UnixWare 7.01/7.1: From the [boot]# prompt, first type BOOTPROG=old kernel (for example, BOOTPROG=unix.work) and press **Enter**. Then, type go and press **Enter**. Your computer should now boot from the backup kernel created earlier in *Installing the Driver When UnixWare is Already Installed* on page 7-3.

To repeat the driver update procedure, follow these steps:

1. Follow the instructions in *Removing the Driver* on page 7-8 to delete the driver from your computer.
2. Perform the driver update procedure again. See *Installing the Driver When UnixWare is Already Installed* on page 7-3.

Error Messages

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

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

[xxxxx003] Command completed with error
[xxxxx004] Command completed with error
[xxxxx005] Command completed with error
[xxxxx006] Command completed with error
[xxxxx007] Command completed with error
[xxxxx008] Command completed with error
[xxxxx009] Command completed with error

A request issued to a target device completed with an indication that there is an error. In most cases, the error is recovered and normal operation continues.

[xxxxx010] Error issuing command

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

[xxxxx011] Error issuing command

The requested command is not supported by this driver.

[xxxxx012] Error issuing command

The driver does not recognize the target device.

[xxxxx013] Error issuing command
[xxxxx014] Error issuing command

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

[xxxxx015] Error issuing command

An error has occurred with the driver. Try installing the most up-to-date version of the driver available from the Adaptec Web site.

[xxxxx020] Adapter or target device not responding or not connected

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

[xxxxx021] Target device protocol error

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

[xxxxx022] Adapter or target device protocol error

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

[xxxxx023] Target device parity error

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

[xxxxx024] Data overrun or underrun

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

[xxxxx030] Target device busy

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

[xxxxx031] Target device queue full

The target device internal buffer is full.

[xxxxx032] Target device busy

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

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

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

[xxxxx046] Target device did not respond to abort sequence

The target device did not abort the command requested by the driver. Some devices do not support the abort command properly. Normally, this indicates a faulty or noncompliant target device.

[xxxxx047] Command aborted

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

[xxxxx048] Unable to abort command

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

[xxxxx049] Command abort in progress

This indicates an abort command has been issued. This is a normal operating condition.

[xxxxx051] Target device did not respond to reset sequence

The target device did not reset correctly as requested by the driver. Normally, this indicates a faulty or noncompliant target device.

[xxxxx081] Adapter initialization failure

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

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

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

[xxxxx096] Adapter hardware initialization failure - possible resource conflict

The driver has attempted to initialize the adapter hardware but failed. This might suggest that the adapter resources (for example, IRQ) conflict with another board installed in your system.

[xxxxx097] Unable to allocate memory

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

[xxxxx098] Exceeded maximum number of host bus adapters

The driver has detected more host bus adapters than is supported by this version of the driver or operating system.

[xxxxx0a4] SCSI bus reset by third party

Hardware such as an array enclosure may have reset the SCSI bus. This is a normal condition unless you receive additional errors.

[xxxxx0a5] SCSI bus reset by host adapter

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

[xxxxx0cf] System configuration error

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

[xxxxx0d0] Command timeout

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

[xxxxx0d7] Target device scan failed

The driver encountered an error scanning the target device. Refer to your host adapter's user's guide for troubleshooting information.

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Adaptec, Inc.
691 South Milpitas Boulevard
Milpitas, CA 95035

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