

USER'S REFERENCE



ADAPTEC SCSI CARD 29160N
ULTRA160 SCSI CONTROLLER



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

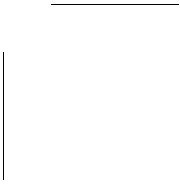
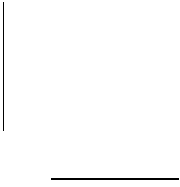
© 1999 Adaptec, Inc.
All rights reserved. Adaptec, and the Adaptec logo
are trademarks of Adaptec, Inc. which may be
registered in some jurisdictions.

Printed in Singapore
STOCK NO.: 512494-03, Rev. A JG 12/99
(SRC: 512494-00, Ver. AA)

▼▼▼▼ **Adaptec SCSI Card 29160N**
Ultra160 SCSI Controller

User's Reference





▼▼▼▼ Contents

Overview 1

Ultra160 SCSI on the Adaptec SCSI Card 29160N 1

Understanding SCSI 2

SCSI IDs 2

Terminating the SCSI Bus 3

Troubleshooting 5

Troubleshooting Checklist 5

Troubleshooting in Windows 95/98 6

Common Error Messages 10

Using the Adaptec SCSI Card 29160N and SCSI Devices 12

Using SCSI Devices 12

 Using SCSI Hard Disk Drives 12

 Using Ultra160 Hard Disk Drives 13

 Using Scanners 13

Combining SCSI and Non-SCSI Devices 14

Installing Multiple SCSI Cards 15

Connecting the LED Connector 16

Configuring the Adaptec SCSI Card 29160N with SCSISelect 17

Starting SCSISelect 19

 Exiting SCSISelect 19

Using SCSISelect Settings 19

 SCSI Bus Interface Definitions 20

 Boot Device Options 20

 SCSI Device Configuration 20

 Advanced Configuration Options 22

Using SCSI Disk Utilities 24

Connecting SCSI Devices 25

Maximum Cable Lengths 26

Overview

Ultra160 SCSI on the Adaptec SCSI Card 29160N

The Adaptec SCSI Card 29160N supports Ultra160 SCSI devices. Ultra160 is a new generation of SCSI technology that transfers data at up to 160 MBytes/sec. In addition to providing much greater performance, Ultra160 SCSI enables a maximum allowable cable length of 12 meters for optimal connectivity and flexibility.¹

The Adaptec SCSI Card 29160N combines this Ultra160 SCSI technology with Adaptec's SpeedFlex™ technology. SpeedFlex allows the Adaptec SCSI Card 29160N to be backwards compatible with previous generations of SCSI products, while allowing newer Ultra160 SCSI devices to operate at the higher 160 MBytes/sec rate.

This *User's Reference* provides information about troubleshooting, SCSI termination, and other important topics. It also explains how to use the built-in SCSISelect® utility if you need to change the Adaptec SCSI Card 29160N settings.



Note: Read the *Adaptec SCSI Card 29160N Installation Guide* if you need instructions on installing the SCSI Card and connecting SCSI devices to it.

¹ When only one Ultra2 or Ultra160 SCSI device is connected, the cable length can be up to 25 meters (82 feet).

Understanding SCSI

SCSI (pronounced “scuzzy”) stands for Small Computer Systems Interface. SCSI is an industry standard computer interface for connecting SCSI devices (such as a hard disk drive, CD-ROM drive, or scanner) to a common SCSI bus.

A SCSI bus is an electrical pathway that consists of a SCSI adapter card (such as the Adaptec SCSI Card 29160N) installed in a computer and one or more SCSI devices. SCSI cables are used to connect the devices to the SCSI adapter card.

For the SCSI bus to function properly, a unique SCSI ID must be assigned to the SCSI card and each SCSI device connected to it, and the SCSI bus must be properly terminated.

SCSI IDs

Each device attached to the Adaptec SCSI Card 29160N, as well as the Adaptec SCSI Card 29160N itself, must be assigned a unique SCSI ID number from 0 to 15. A SCSI ID uniquely identifies each SCSI device on the SCSI bus and determines priority when two or more devices are trying to use the SCSI bus at the same time.

Refer to the device's documentation to set the SCSI ID. Here are some general guidelines for SCSI IDs:

- For internal SCSI devices, the SCSI ID usually is set by configuring a jumper on the device.
- For external SCSI devices, the SCSI ID usually is set with a switch on the back of the device.
- SCSI ID numbers don't have to be sequential, as long as the Adaptec SCSI Card 29160N and each device has a different number. For example, you can have an internal SCSI device with ID 0, and an external SCSI device with ID 6.
- SCSI ID 7 has the highest priority on the SCSI bus. The priority of the remaining IDs, in descending order, is 6 to 0, then 15 to 8.
- The Adaptec SCSI Card 29160N is preset to SCSI ID 7 and should not be changed. This gives it the highest priority on the SCSI bus.
- Most internal SCSI hard disk drives come from the factory preset to SCSI ID 0.

- If you have 8-bit (or Narrow) SCSI devices, they must use SCSI IDs 0, 1, 2, 3, 4, 5, or 6. SCSI ID 0 is recommended for the first SCSI hard disk drive.
- If you are booting your computer from a SCSI hard disk drive connected to the Adaptec SCSI Card 29160N, the Boot SCSI ID setting in the *SCSISelect* utility must correspond to the SCSI ID of the device from which you are booting. By default, the Boot SCSI ID is set to 0. We recommend that you do not change this setting.
- With the *SCSISelect* disk utility feature, you can confirm/view which SCSI ID is assigned to each device. See *Configuring the Adaptec SCSI Card 29160N with SCSISelect* on page 17 for more information.
- In Windows[®] 95/98, you can use the Device Manager to view which SCSI ID is assigned to each installed SCSI device.

Terminating the SCSI Bus

To ensure reliable communication on the SCSI bus, the ends of the SCSI bus must be properly terminated. This is accomplished when the device at the end of each cable, or the end of the cable itself, has a terminator installed (or enabled). Terminators must be removed, or termination must be disabled, on devices between the ends of each cable.

Since the method for terminating a SCSI device can vary widely, refer to the device's documentation for instructions on how to enable or disable termination. Here are some general guidelines for termination:

- Internal Ultra160 and Ultra2 SCSI devices come from the factory with termination disabled and cannot be changed. Proper termination for internal Ultra160 and Ultra2 SCSI devices is provided by a 68-pin Internal LVD (Low Voltage Differential) SCSI cable, which either has a built-in terminator at its end, or has a terminator installed on the last connector on the cable.
- Termination on non-Ultra160 and Ultra2 internal SCSI devices usually is controlled by manually setting a jumper or a switch on the device, or by physically removing or installing one or more resistor modules on the device.

Adaptec SCSI Card 29160N User's Reference

- Termination on most external SCSI devices is controlled by installing or removing a SCSI terminator. However, termination on some external SCSI devices is enabled or disabled by setting a switch on the back of the SCSI device.
- Some devices use automatic termination. Be sure to check the documentation for the device to be certain that the device is correctly terminated.
- By default, termination on the Adaptec SCSI Card 29160N itself is set to *Automatic* (the preferred method). We recommend that you do not change this default setting.

Troubleshooting

Most problems can be resolved by following the recommendations in the Troubleshooting Checklist below. If you still experience problems after following the recommendations, continue with the rest of this section.

Troubleshooting Checklist

- Are all SCSI devices turned on?
- Are all SCSI cables and power cables properly connected?
- Is the Adaptec SCSI Card 29160N firmly seated and secured in the PCI expansion slot?
- Is the PCI expansion slot compliant with PCI Rev. 2.1 or higher, and does it support Bus Mastering?
- Are all SCSI devices and the Adaptec SCSI Card 29160N assigned unique SCSI IDs?
- Are all SCSI devices terminated properly?



Note: If you have problems with a specific SCSI device when other connected SCSI devices are working correctly, please contact the manufacturer of the problem device for troubleshooting information.

Troubleshooting in Windows 95/98

When I start Windows 95/98, the system locks up when the Windows logo is displayed. How can I get the system to start so that I can verify that the SCSI card is functioning normally?

- 1 Start or restart your computer.
- 2 (For Windows 95:) You can force a manual fail-safe mode by pressing the **F8** function key when you boot your machine while the "Starting Windows 95" message appears.
(For Windows 98:) You can force a manual fail-safe mode by pressing the **Ctrl** key when you boot your machine, before the "Windows 98" logo appears.
- 3 From the boot menu, select **Safe Mode**. (It may take several minutes for Windows 95/98 to load.)
- 4 If the system completes the boot to the desktop, the core software is functional; resources, software conflicts, and/or hardware need to be checked.
- 5 If the system still fails to boot, and the boot drive is connected to an EIDE controller, shut down the system, remove the Adaptec SCSI Card 29160N, and restart the computer.
- 6 Verify that an IRQ is available by viewing resources in System Properties.
- 7 Right click on the **My Computer** icon on the Windows desktop.
- 8 Select **Properties** from the menu.
- 9 Click the **Performance** tab.
- 10 Verify that your system is configured for **optimal performance**. (Make sure you are not in Safe Mode.)

How can I tell if the Adaptec SCSI Card 29160N driver is loading properly?

- 1 Right click on the **My Computer** icon on the Windows desktop.
- 2 Select **Properties** from the menu.
- 3 Click the **Device Manager** tab.

- 4 Double-click the **SCSI Controller** icon. The software driver for the Adaptec SCSI Card 29160N is listed as 29160, 29160N, Ultra160 PCI SCSI Controller.
 - If the driver is listed, the Adaptec SCSI Card 29160N driver is loading properly.
 - If the driver is listed but has an exclamation mark inside a yellow circle, the software driver may conflict with other hardware using the same resources. Double-click the icon to see the device status and possible solutions.
 - If the driver is listed but has an “X” inside a red circle, the Adaptec SCSI Card 29160N software driver is disabled and isn’t loading.
 - If the SCSI Controller icon or the Adaptec SCSI Card 29160N software driver is not listed, reinstall the driver that was included with the SCSI card. (For instructions on how to do this, refer to the *Ultra160 Family Manager Set User’s Guide*.)
 - If there is a ? inside a yellow circle under Other in the Device Manager, double-click that device and go to the **Drivers** tab, and click **Update Driver**. Follow the on-screen instructions.

An “X” inside a red circle appears with the Adaptec SCSI Card 29160N software driver in Device Manager. What does this mean?

It means that the Adaptec SCSI Card 29160N software driver is disabled and isn’t loading.

To enable the driver

- 1 Double-click the Adaptec SCSI Card 29160N software driver in Device Manager.
- 2 Under the **General** tab, click the **Original Configuration (current)** box.

What if there is no SCSI Controller icon under Device Manager, or the software driver for the Adaptec SCSI Card 29160N does not appear under Device Manager?

If the SCSI Controller icon or the software driver do not appear, first power down the system and check that the Adaptec SCSI Card 29160N is properly seated. If the problem persists, first:

- 1 Open Control Panel and double-click the **Add New Hardware** icon.

Adaptec SCSI Card 29160N User's Reference

- 2 Click **Next** to begin installing your new hardware.
- 3 Select **Yes (Recommended)** and click **Next** to have Windows search for the Adaptec SCSI Card 29160N.
- 4 Follow the onscreen instructions. If Windows 95/98 does not detect the Adaptec SCSI Card 29160N, get the driver disk or CD included with the SCSI card and click **Next**.
- 5 Click **Next** again to continue to the Manufactures/Models lists.



Note: The 29160N will not appear on the Models list when **Adaptec** is selected from the Manufacturers list.

- 6 Click **Have Disk...** and follow the directions that appear on the screen to install the driver software.
- 7 Select **29160, 29160N, Ultra160 PCI SCSI Controller**.

How can I check the status of a resource such as IRQ, Memory, or I/O?

- 1 Right click the **My Computer** icon on the desktop.
- 2 Select **Properties** from the menu.
- 3 Click the **Device Manager** tab.
- 4 Double-click the **Computer** icon.
- 5 On the View Resources tab, click the option button for the type of resource you want to check:
 - Interrupt Request (IRQ)
 - Input/Output Address (I/O)
 - Direct Memory Access (DMA)
 - Memory
- 6 The setting, and the hardware using the setting, are displayed.
 - If a specific resource is not listed, the resource is not used by a device.
 - If a resource is listed more than once, the resource is used by more than one device.
 - If a resource is used by an unknown device, the resource is used but the device using the resource cannot be detected. (This condition is most common.)

Troubleshooting

- 7 Click **Cancel** to close the windows, then close Control Panel.

How do I use the Hardware Conflict Troubleshooter in Windows 95/98?

- 1 Click the **Start** button, then click **Help**.
- 2 From the Contents tab, double-click **Troubleshooting**. (In Windows 98, click **Troubleshooting** and then click **Windows 98 Troubleshooting**.)
- 3 Double-click **if you have a hardware conflict**.
- 4 Follow the step-by-step instructions in Windows Help.

Common Error Messages

Here is what you should do if the following messages appear at bootup:

“Device connected, but not ready”

The host received no answer when it requested data from an installed SCSI device.

- 1 Run *SCSISelect* and set the Send Start Unit Command to **Yes** for the particular SCSI device ID. See *Starting SCSISelect* on page 19.
- 2 Ensure that the device is set to spin up when the power is switched on. The spin up option is typically set by a jumper. (See the documentation for the device.)

“Start unit request failed”

The SCSI card BIOS was unable to send a Start Unit Command to the device. Run *SCSISelect* and enable the Send Start Unit Command for the device. Verify that all cables are properly connected. If the error still occurs, the SCSI device may be defective.

“Time-out failure during...”

An unexpected time-out occurred.

- 1 Verify that the SCSI bus is properly terminated.
- 2 Verify that all cables are properly connected.
- 3 Verify that *SCSISelect*'s Device Configuration Options are set correctly. See *SCSI Device Configuration* on page 20.

Try disconnecting the SCSI device cables from the SCSI card and then starting the computer. If the computer successfully restarts, one of the SCSI devices may be defective.



Note: The following error message entries refer to the SCSI connectors and SCSI segments on the Adaptec SCSI Card 29160N. See *Using Ultra160 Hard Disk Drives* on page 13.

“Attention! Too many devices are terminated on the SE connectors”²

The SCSI card BIOS has detected more than two terminated devices on the SE (single-ended) segment. Verify the termination on both the 50-pin internal SE and 50-pin external SE connectors. Terminate *only* the last SCSI device at the end of each cable. Remove or disable the terminators on the SCSI devices between the ends of the cables. If no SCSI devices are connected to either of the connectors, set the *SCSISelect* termination option for the SE connector to **Automatic** or **Enable**.

“Attention! Insufficient termination detected on the SE connectors”²

The SCSI card BIOS has detected only one terminated device, or no terminated devices, on the SE (single-ended) segment. Verify the termination on both the 50-pin internal SE and 50-pin external SE connectors. Terminate *only* the last SCSI device at the end of each cable. Remove or disable the terminators on the SCSI devices between the ends of the cables. If no SCSI devices are connected to either of the connectors, set the *SCSISelect* termination option for the SE connector to **Automatic** or **Enable**.

² The termination detection feature is only implemented on the internal narrow SE connectors. The 68-pin LVD/SE connector does not support this feature.

Using the Adaptec SCSI Card 29160N and SCSI Devices

This section provides useful information on using the Adaptec SCSI Card 29160N and your SCSI devices. For more information about a specific SCSI device, refer to the documentation for that device.

Using SCSI Devices

Using SCSI Hard Disk Drives

- If you connect a SCSI hard disk drive to the Adaptec SCSI Card 29160N that was previously connected to a different SCSI card, you may need to low-level format the drive before you can use it. Back up the data on the drive before you move it! (See *Using SCSI Disk Utilities* on page 24 for information on using the *SCSISelect* format utility.)

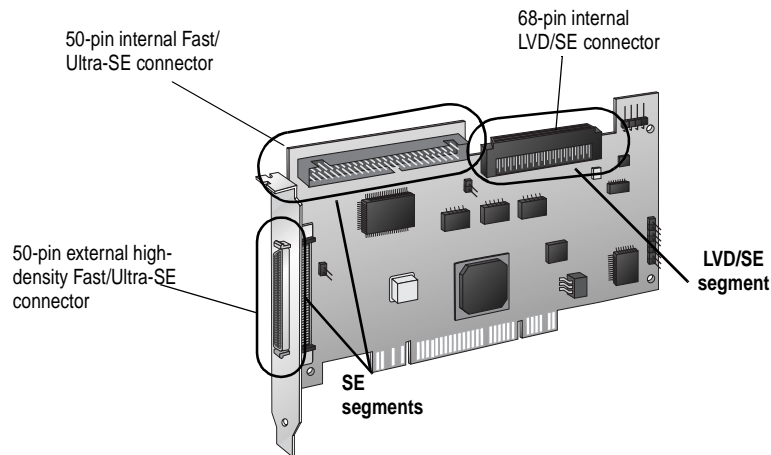


Caution: A low-level format destroys all data on the drive. Be sure to back up the data before performing a low-level format.

- Every SCSI hard disk drive must be physically low-level formatted, partitioned, and logically formatted before it can be used to store data. Most SCSI drives are pre-formatted at the factory. If your SCSI hard disk drive has *not* been pre-formatted at the factory, and if your computer is running under DOS, Windows® 3.x, or Windows 95/98, you can format the disk with the DOS Fdisk and Format commands. (See the DOS and Windows documentation for more information.) To format SCSI hard disk drives running under other operating systems, see the operating system documentation.

Using Ultra160 Hard Disk Drives

- We recommend that you connect your LVD (Ultra160 and Ultra2) SCSI devices to the 68-pin connector on the LVD-SE SCSI segment and that you connect your non-LVD SCSI devices (if any) to the two SE connectors on the SE SCSI segment. This allows the LVD SCSI devices to run at their maximum performance levels of 160 MBytes/sec or 80 MBytes/sec. If you combine LVD and non-LVD SCSI devices on the same SCSI segment, the data transfer rate of the LVD SCSI devices will drop down to non-LVD SCSI performance levels of up to 40 MBytes/sec.



- Internal Ultra160 SCSI devices come from the factory with termination disabled and cannot be changed. Proper termination is provided by the terminator at the end of the internal Ultra160 SCSI cable.

Using Scanners

If you connect a scanner to the Adaptec SCSI Card 29160N, you must install the scanner manufacturer's proprietary software drivers. See your scanner's documentation for details.

Combining SCSI and Non-SCSI Devices

You can install the Adaptec SCSI Card 29160N in a computer that already has a non-SCSI controller, such as an EIDE controller. However, you cannot cross-connect the disk drives and other devices: SCSI devices must be connected to the Adaptec SCSI Card 29160N or other SCSI cards, EIDE devices must be connected to the EIDE controller, and so on.

When you install the Adaptec SCSI Card 29160N and SCSI disk drives in a computer that boots from a non-SCSI disk drive, the computer will continue to boot from the non-SCSI disk drive unless you change the computer's CMOS configuration. You do not need to change the configuration if you just want to use the SCSI drives for additional file storage space.

If your computer's motherboard BIOS supports the BIOS Boot Specification (BBS) feature, you can select a different boot device without much difficulty. (To determine if the motherboard BIOS supports BBS, read the computer documentation or contact your motherboard manufacturer.)

The following table shows what to do, after you physically install the SCSI card and SCSI devices, to enable you to use different kinds of disk drives in the same computer:

Does computer BIOS support BBS?	Want computer to boot from SCSI drive?	Then do this:
No	No	No action required. SCSI drives and non-SCSI drives can be used together.
No	Yes	Run CMOS Setup program. Change primary Hard Disk setting to None or No Drives Installed (see computer documentation). <i>You will not be able to use the non-SCSI drive(s) at all</i> when you boot from the SCSI drive.
Yes	No	No action required. SCSI drives and non-SCSI drives can be used together.
Yes	Yes	Run CMOS Setup program and select SCSI drive as boot device. SCSI drives and non-SCSI drives can be used together.

Installing Multiple SCSI Cards

- You can install multiple SCSI cards in your computer; you are limited only by the available system resources (for example, IRQ settings, I/O port addresses, BIOS addresses, and so forth) and the system's ability to share them.
- Each SCSI card you install forms a separate SCSI bus with a different set of SCSI devices. SCSI IDs can be reused as long as the ID is assigned to a device on a different SCSI card (for example, each SCSI card can have a device with SCSI ID 2).
- If you have two or more SCSI cards and your computer boots from a SCSI disk drive, leave the SCSI card BIOS enabled on the SCSI card to which the boot disk drive is connected. Disable the BIOS on the other SCSI card(s).



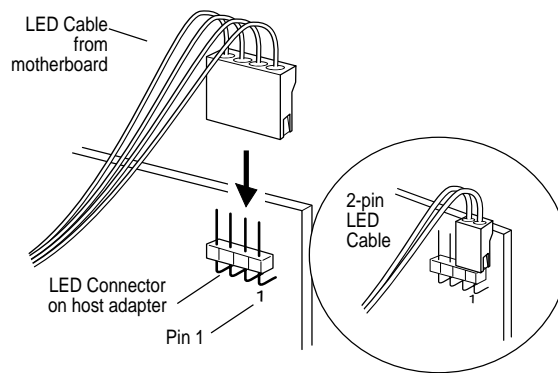
Note: Drives not under SCSI BIOS control, will not be accessible in the operating system unless the correct drivers are loaded. See that SCSI card's documentation for instructions on loading its drivers.

Connecting the LED Connector

(Optional feature) Most computers have an LED disk activity light on the front panel of the system case. If you choose to disconnect the cable from the LED connector on the motherboard and connect it to the LED connector on the SCSI card as shown in the diagram below, the LED on the front panel of the computer will light whenever there is activity on the SCSI bus.



Note: If you connect the LED cable to the SCSI card, the LED disk activity light will no longer indicate disk activity on the non-SCSI disk drives.



Configuring the Adaptec SCSI Card 29160N with SCSISelect

SCSISelect, included with the Adaptec SCSI Card 29160N, enables you to change SCSI settings without opening the computer or handling the card. SCSISelect also enables you to low-level format or verify the disk media of your SCSI hard disk drives. The following table lists the available and default settings for each SCSISelect option.



Note: The default settings are appropriate for most systems. Run SCSISelect if you need to change or view current settings, or if you would like to run the SCSI disk utilities. See the descriptions of each option starting on page 19.

SCSISelect Options	Available Settings	Default Setting
SCSI Bus Interface Definitions:		
Host Adapter SCSI ID	0-15	7
SCSI Parity Checking	Enabled, Disabled	Enabled
Host Adapter SCSI Termination		
LVD/SE Connectors	Automatic, Enabled, Disabled	Automatic
SE Connectors	Automatic Enabled Disabled	Automatic
Boot Device Options:		
Boot SCSI ID	0-15	0
Boot LUN Number ¹	0-7	0
SCSI Device Configuration:		
Sync Transfer Rate (MBytes/sec)	160, 80.0, 53.4, 40.0, 32.0, 26.8, 20.0, 16.0, 13.4, 10.0, ASYN	160
Initiate Wide Negotiation	Yes, No	Yes (Enabled)

Adaptec SCSI Card 29160N User's Reference

SCSISelect Options	Available Settings	Default Setting
Enable Disconnection	Yes, No	Yes (Enabled)
Send Start Unit Command	Yes, No	Yes (Enabled)
Enable Write Back Cache ²	N/C (No Change) Yes, No	N/C (No Change)
BIOS Multiple LUN Support ²	Yes, No	No (Disabled)
Include in BIOS Scan ²	Yes, No	Yes (Enabled)
Advanced Configuration Options:		
Reset SCSI Bus at IC Initialization	Enabled, Disabled	Enabled
Display <Ctrl> <A> Messages during BIOS Initialization	Enabled, Disabled	Enabled
Extended BIOS Translation for DOS Drives > 1 GByte	Enabled, Disabled	Enabled
Verbose/Silent Mode	Verbose, Silent	Verbose
Host Adapter BIOS	Enabled Disabled: Not Scan Disabled: Scan Bus	Enabled
Domain Validation ²	Enabled, Disabled	Enabled
Support Removable Disks Under BIOS as Fixed Disks ²	Disabled, Boot Only, All Disks	Disabled
BIOS Support for Bootable CD-ROM ²	Enabled, Disabled	Enabled
BIOS Support for Int 13 Extensions ²	Enabled, Disabled	Enabled

¹ Setting is valid only if Multiple LUN Support is enabled.

² Settings are valid only if host adapter BIOS is enabled.

Starting SCSISelect

Follow these steps to start SCSISelect:

- 1 Turn on or restart your system.
During the startup process, pay careful attention to the messages that appear on your screen.
- 2 When the following message appears on your screen, press the **Ctrl-A** keys simultaneously (this message appears for only a few seconds):

Press <Ctrl><A> for SCSISelect (TM) Utility!
- 3 From the menu that appears, use the arrow keys to move the cursor to the option you want to select, then press **Enter**.



Note: If you have difficulty viewing the display, press **F5** to toggle between color and monochrome modes. (This feature may not work on some monitors.)

Exiting SCSISelect

Follow these steps to exit SCSISelect:

- 1 Press **Esc** until a message prompts you to exit (if you changed any settings, you are prompted to save the changes before you exit).
- 2 At the prompt, select **Yes** to exit, then press any key to reboot the computer. Any changes you made in SCSISelect take effect after the computer boots.

Using SCSISelect Settings

To select an option, use the arrow keys to move the cursor to the option, then press **Enter**.

In some cases, selecting an option displays another menu. You can return to the previous menu at any time by pressing **Esc**.

To restore the original SCSISelect default values, press **F6** from the main SCSISelect screen.

SCSI Bus Interface Definitions

- **SCSI Card SCSI ID**—(Default: 7) Sets the SCSI ID for the SCSI card. The Adaptec SCSI Card 29160N is set at 7, which gives it the highest priority on the SCSI bus. We recommend that you do not change this setting.



Note: Some operating systems will not work if the SCSI card has an ID other than 7.

- **SCSI Parity Checking**—(Default: *Enabled*) When set to **Enabled**, verifies the accuracy of data transfer on the SCSI bus. Leave this setting enabled unless any SCSI device connected to the Adaptec SCSI Card 29160N does not support SCSI parity.
- **SCSI Card SCSI Termination**—(Default: *Automatic*) Determines the termination setting for the SCSI card. The default setting for both the LVD/SE connector and SE connectors is *Automatic*, which allows the SCSI card to adjust the termination as needed depending on the configuration of the connected SCSI devices. We recommend that you do not change these settings.

Boot Device Options

- **Boot SCSI ID**—(Default: 0) Specifies the SCSI ID of your boot device. We recommend that you do not change the default setting.
- **Boot LUN Number**—(Default: 0) Specifies which LUN (Logical Unit Number) to boot from on your boot device. This setting is not valid unless Multiple LUN Support is **Enabled** (see *Advanced Configuration Options* on page 22).

SCSI Device Configuration

SCSI Device Configuration options can be set individually for each connected SCSI device.



Note: To configure settings for a SCSI device, you must know its SCSI ID (see *Using SCSI Disk Utilities* on page 24).

- **Sync Transfer Rate**—(Default: 160) Determines the maximum synchronous data transfer rate that the SCSI card supports. Use the maximum value of 160 MBytes/sec. If a device is not Ultra160, select the transfer rate of the device (80, 53, 40, ...).



Note: If you are connecting a device that does not support sync transfers, use the async setting.

- **Initiate Wide Negotiation**—(Default: Yes) When set to **Yes**, the SCSI card attempts 16-bit data transfer (wide negotiation). When set to **No**, the SCSI card uses 8-bit data transfer unless the SCSI device requests wide negotiation.



Note: Set Initiate Wide Negotiation to **No** if you are using an 8-bit SCSI device that hangs or exhibits other performance problems with 16-bit data transfer rate enabled.

- **Enable Disconnection**—(Default: Yes) When set to **Yes**, allows the SCSI device to disconnect from the SCSI bus. Leave the setting at **Yes** if two or more SCSI devices are connected to the SCSI card. If only one SCSI device is connected, changing the setting to **No** results in slightly better performance.
- **Send Start Unit Command**—(Default: Yes) When set to **Yes**, the Start Unit Command is sent to the SCSI device at bootup.

The following three options have no effect if the SCSI Card BIOS is disabled. (The SCSI Card BIOS is normally enabled by default.)

- **Enable Write Back Cache**—(Default: N/C) Can be used to enable or disable the write-back cache on SCSI disk drives connected to the host adapter. Leave this option at its default setting at N/C (no change), which usually allows for optimum drive performance.
- **BIOS Multiple LUN Support**—(Default: No) Leave this setting at **No** if the device does not have multiple Logical Unit Numbers (LUNs). When set to **Yes**, the SCSI card BIOS provides boot support for a SCSI device with multiple LUNs (for

example, a CD “jukebox” device in which multiple CDs can be accessed simultaneously).

- **Include in BIOS Scan**—(Default: *Yes*) When set to **Yes**, the SCSI card BIOS includes the device as part of its BIOS scan at bootup.

Advanced Configuration Options



Note: Do not change the Advanced Configuration Options unless absolutely necessary.

- **Reset SCSI Bus at IC Initialization**—(Default: *Enabled*) When set to **Enabled**, the SCSI card generates a SCSI bus reset during its power-on initialization and after a hard reset.
- **Display <Ctrl> <A> Messages during BIOS Initialization**—(Default: *Enabled*) When set to **Enabled**, the SCSI card BIOS displays the Press <Ctrl> <A> for SCSISelect (TM) Utility! message on your screen during system bootup. If this setting is disabled, you can still invoke the SCSISelect utility by pressing <Ctrl> <A> after the SCSI card BIOS banner appears.
- **Extended BIOS Translation for DOS Drives > 1 GByte**—(Default: *Enabled*) When set to **Enabled**, provides an extended translation scheme for SCSI hard disks with capacities greater than 1 GByte. This setting is required only for MS-DOS 5.0 or above. It may be required for other operating systems.



Caution: Changing the translation scheme may destroy all data on the drive. Be sure to back up your disk drives before changing the translation scheme. If you change this setting we recommend that you low level format the drive after changing the setting.

Use the MS-DOS Fdisk command to partition a disk larger than 1 GByte controlled by the SCSI card BIOS, when using DOS, Windows 95/98, or Windows NT®. Check the operating system documentation for information on any partition size limitations.

- **Verbose/Silent Mode**—(Default: *Verbose*) When set **Verbose**, the SCSI card BIOS displays the host adapter model on the screen during system buildup. When set to **Silent**, the message is not displayed during bootup.
- **Host Adapter BIOS (Configuration Utility Reserves BIOS Space)**—(Default: *Enabled*) Enables or disables the SCSI card BIOS.
 - Leave at **Enabled** to allow the SCSI card BIOS to scan and initialize all SCSI devices.
 - Set to **Disabled: Not scan** if the devices on the SCSI bus (for example, CD-ROM drives) are controlled by software drivers and do not need the BIOS, and you do not want the BIOS to scan the SCSI bus.
 - Set to **Disabled: Scan Bus** if you do not need the BIOS, but you want it to scan the SCSI devices on the bus and you need to spin up the devices.

The following four options have no effect when the SCSI Card BIOS is disabled. (The SCSI Card BIOS is normally enabled by default.)

- **Domain Validation**—(Default: *Enabled*) Determines the optimal transfer rate for each device on the SCSI bus and sets transfer rates accordingly. Displays the resulting data transfer rate.
- **Support Removable Disks Under BIOS as Fixed Disks**—(Default: *Disabled*) Determines which removable-media drives are supported by the SCSI card BIOS. Choices are as follows:
 - **Disabled**— No removable-media drives are treated as hard disk drives. Software drivers are required because the drives are not controlled by the BIOS.



Caution: *You may lose data* if you remove a removable-media cartridge from a SCSI drive controlled by the SCSI card BIOS while the drive is on. If you want to be able to remove the media while the drive is on, install the removable-media software driver and set Support Removable Disks Under BIOS as Fixed Disks to **Disabled**.

- **Boot Only**—Only the removable-media drive designated as the boot device is treated as a hard disk drive.
- **All Disks**—All removable-media drives supported by the BIOS are treated as hard disk drives.
- **BIOS Support for Bootable CD-ROMs**—(Default: *Enabled*) When set to **Enabled**, the SCSI card BIOS allows the computer to boot from a CD-ROM drive.
- **BIOS Support for Int 13 Extensions**—(Default: *Enabled*) When set to **Enabled**, the SCSI card BIOS supports Int 13h extensions as required by Plug-and-Play. The setting can be disabled if your computer does not support Plug-and-Play.

Using SCSI Disk Utilities

To access the SCSI disk utilities, follow these steps:

- 1 Select the **SCSI Disk Utilities** option from the menu that appears after starting *SCSISelect*. *SCSISelect* scans the SCSI bus (to determine the devices installed) and displays a list of all SCSI IDs and the devices assigned to each ID.
- 2 Use the arrow keys to move the cursor to a specific ID and device, then press **Enter**.
- 3 A small menu appears, displaying the options Format Disk and Verify Disk Media.
 - **Format Disk**—Allows you to perform a low-level format on a hard disk drive. *Most SCSI disk devices are preformatted at the factory and do not need to be formatted again.*



Caution: A low-level format destroys all data on the drive. Be sure to back up your data before performing this operation. You *cannot* abort a low-level format once it is started.

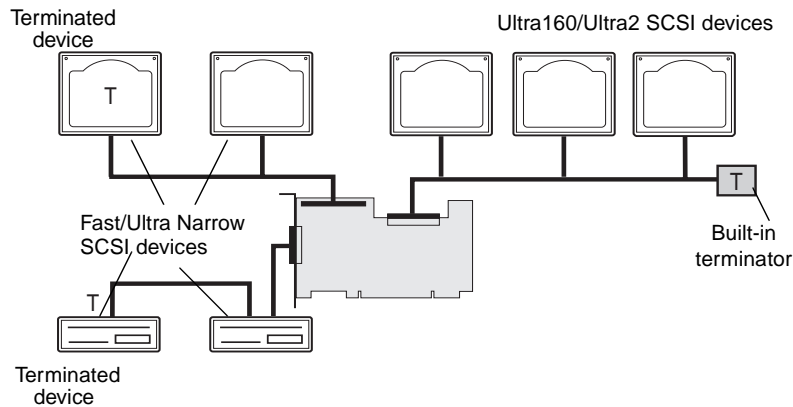
- **Verify Disk Media**—Allows you to scan the media of a hard disk drive for defects. If the utility finds bad blocks on the media, it prompts you to reassign them; if you select **Yes**, those blocks are no longer used. Pressing **Esc** at any time aborts the utility.

Connecting SCSI Devices

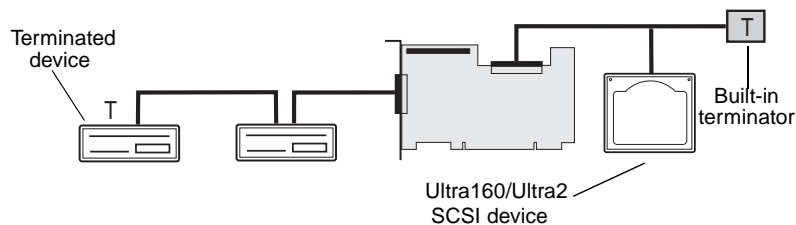
Here are some examples of how you can connect internal and external SCSI devices to the Adaptec SCSI Card 29160N.

To achieve maximum performance, attach the first internal device to the end connector (furthest from the SCSI card); attach other internal devices to the connectors that are closer to the SCSI card.

The first example shows SCSI devices connected to all three internal and external connectors. Note the built-in terminator on the end of the internal LVD SCSI cable. The last external SCSI device *must* be terminated with an SE terminator plug.



The following example shows an Ultra160/Ultra2 SCSI device connected to the 68-pin LVD/SE internal connector and Fast/Ultra Narrow devices connected to a 50-pin external SE connector.



The following example shows two Fast/Ultra Narrow SCSI devices connected to the external connector. As in the previous diagrams, the last device on the SCSI bus must use an SE terminator plug.



Maximum Cable Lengths

The total length of cabling (internal and external) on the SCSI bus cannot exceed the maximum lengths listed in the following table. The third column lists the maximum number of SCSI devices you can connect to the SCSI card.

Maximum Cable Length	Data Transfer Rate	Maximum Devices Supported
25 m (82.0 ft)	Ultra160 SCSI (160 MBytes/sec) and Ultra2 SCSI (80 MBytes/sec)	1
12 m (39.4 ft)	Ultra160 SCSI (160 MBytes/sec) ¹ and Ultra2 SCSI (80 MBytes/sec)	15
3 m (9.8 ft)	Fast Wide SCSI (20 MBytes/sec)	15
3 m (9.8 ft)	Fast SCSI (10 MBytes/sec)	7
3 m (9.8 ft)	Ultra SCSI (40 MBytes/sec for 16-bit, 20 MBytes/sec for 8-bit)	4
1.5 m (4.9 ft)	Ultra SCSI (40 MBytes/sec for 16-bit, 20 MBytes/sec for 8-bit)	5-7 ²

¹ Mixing Fast/Ultra devices with Ultra160 and Ultra2 SCSI devices on the LVD Ultra 160 segment causes the entire SCSI bus to default to Ultra SCSI speeds and cable length requirements.

² Ultra SCSI data transfer rates do not currently support more than seven devices connected to the SCSI card.



Copyright

© 1999 Adaptec, Inc. All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, electronic, mechanical, photocopying, recording or otherwise, without the prior written consent of Adaptec, Inc., 691 South Milpitas Blvd., Milpitas, CA 95035.

Trademarks

Adaptec, the Adaptec logo, AHA, SpeedFlex, and SCSI*Select* are trademarks of Adaptec, Inc. which may be registered in some jurisdictions. Window and Windows 95/98, and Windows NT are registered trademarks of Microsoft Corporation in the U.S. and other countries used under license. All other trademarks are owned by their respective owners.

Changes

The material in this document is for information only and is subject to change without notice. While reasonable efforts have been made in the preparation of this document to assure its accuracy, Adaptec, Inc. assumes no liability resulting from errors or omissions in this document, or from the use of the information contained herein.

Adaptec reserves the right to make changes in the product design without reservation and without notification to its users.

Disclaimer

IF THIS PRODUCT DIRECTS YOU TO COPY MATERIALS, YOU MUST HAVE PERMISSION FROM THE COPYRIGHT OWNER OF THE MATERIALS TO AVOID VIOLATING THE LAW WHICH COULD RESULT IN DAMAGES OR OTHER REMEDIES.

Adaptec Customer Support

If you have questions about installing or using your Adaptec product, check this User's Reference first—you will find answers to most of your questions here. If you need further assistance, please contact us. We offer the following support and information services.

Technical Support Identification (TSID) Number

- The TSID is a 12-digit number that can be found on the white label included in the box with your product. It helps to provide more efficient service to you by accurately identifying your product and support status. The TSID is required when you contact Technical Support.
- Affix your TSID label here:



Contacting Support

Technical information including product literature, answers to commonly asked questions, and information on software upgrades is available through the following:

- For information about Adaptec's support options, call 408-945-2550, 24 hours a day, 7 days a week.
- Search the Adaptec Support Knowledgebase (A.S.K.) at <http://ask.adaptec.com> for articles, troubleshooting tips, and frequently asked questions for your product.
- Connect to the File Transfer Protocol (FTP) server at <ftp://ftp.adaptec.com>.
- For email support, send technical questions to Adaptec's Technical Support Specialists via WebMail at <http://www.adaptec.com/support/webmail.html>.
- To speak with a Technical Support Specialist, call 408-934-7274, Monday–Friday, 6:00 A.M. to 5:00 P.M., Pacific Time.
- After-hours, weekend, and holiday support is available for a fee at 800-416-8066.

Sales and Ordering Information

- For pre-sales assistance with Adaptec products; to place an order for software, hardware, or cables; or to request additional documentation for Adaptec products, call 800-442-7274 or 408-957-7274, Monday–Friday, 6:00 A.M. to 5:00 P.M., Pacific Time.
- For sales information in Europe, call
 - France: +33 1 34 523434
 - Germany: +49 89 4564060
 - UK: +44 1276 854500

Regulatory Compliance Statements

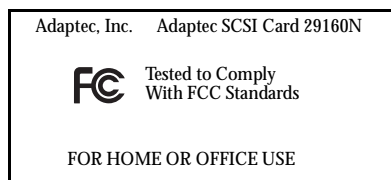
Federal Communications Commission Radio Frequency Interference Statement

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

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

- Reorient or relocate the receiving antenna.
- Increase the separation between equipment and receiver.
- Connect the equipment to an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/television technician for help.
- Use a shielded and properly grounded I/O cable and power cable to ensure compliance of this unit to the specified limits of the rules.

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



European Union Compliance Statement

This Information Technology Equipment has been tested and found to comply with the following European directives:

EMC Directive 89/336/EEC

EN 50081-1 (1992):
EN55022 (1994) Class B

EN 50082-1 (1992):
EN61000-4-2 (1998)
EN61000-4-3 (1998)
EN61000-4-4 (1995)



Australian/New Zealand Compliance Statement

This device has been tested and found to comply with the limits for a Class B digital device, pursuant to the Australian/New Zealand standard AS/NZS 3548 set out by the Spectrum Management Agency.



Canadian Compliance Statement

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

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



Japanese Compliance

Adaptec Software License Agreement

In return for acquiring a license to use the software ("Software") and related documentation, you agree to the following terms and conditions:

- 1 License: This Agreement grants you, the Licensee, a license to:
 - a use the Software on a single computer system which incorporates an Adaptec SCSI Card, or in the case of a multi-user or networked system which permits access to the Software by more than one user at the same time, at a single working location.
 - b make one copy of the Software in machine readable form solely for back-up purposes provided you reproduce Adaptec's copyright notice and any proprietary legends.
- 2 Restrictions: You may not distribute copies of the Software to others or electronically transfer the Software from one computer to another over a network. You may not use the Software from multiple locations of a multi-user or networked system at any one time. The Software contains trade secrets and in order to protect them you may not decompile, reverse engineer, disassemble, or otherwise reduce the Software to a human-perceivable form. YOU MAY NOT MODIFY, ADAPT, TRANSLATE, RENT, LEASE, LOAN, RESELL FOR PROFIT, DISTRIBUTE, NETWORK OR CREATE DERIVATIVE WORKS BASED UPON THE SOFTWARE OR ANY PART THEREOF.
- 3 Ownership of Software: As Licensee, you own the media upon which the software is fixed, but Adaptec retains title and ownership of the Software recorded on the original media and all subsequent copies of the Software regardless of the form or media in which or on which the original and other copies may exist. This license is not a sale of the Software or any copy.
- 4 Confidentiality: You agree to maintain the Software in confidence and to not disclose the Software to any third party without the express written consent of Adaptec. You further agree to take all reasonable precautions to preclude access of unauthorized persons to the Software.
- 5 Term: This license is effective until January 1, 2042, unless terminated earlier. You may terminate the license at any time by destroying the Software (including the related documentation) together with all copies or modifications in any form. Adaptec will have the right to terminate your license immediately if you fail to comply with any term or condition of this Agreement. Upon any termination, including termination by you, you must destroy the Software (including the related documentation) together with all copies or modifications in any form.
- 6 Limited Warranty: Adaptec warrants only that the media upon which the Software is furnished will be free from defects in material or workmanship under normal use and service for a period of thirty (30) days from the date of delivery to you. ADAPTEC DOES NOT AND CANNOT WARRANT THE PERFORMANCE OR RESULTS YOU MAY OBTAIN BY USING THE SOFTWARE OR DOCUMENTATION. THE FOREGOING STATES THE SOLE AND EXCLUSIVE REMEDIES ADAPTEC WILL PROVIDE FOR BREACH OF WARRANTY. EXCEPT FOR THE FOREGOING LIMITED WARRANTY, ADAPTEC MAKES NO WARRANTIES, EXPRESS OR IMPLIED, AS TO NONINFRINGEMENT OF THIRD PARTY RIGHTS, MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. Some states do not allow the exclusion of implied warranties or limitations on how long an implied warranty may last, so the above limitations may not apply to you. This warranty gives you specific legal rights and you may also have other rights which vary from state to state.
- 7 Limitation of Liability: IN NO EVENT WILL ADAPTEC BE LIABLE TO YOU FOR ANY SPECIAL DAMAGES, INCLUDING ANY LOST PROFITS, LOST SAVINGS OR OTHER INCIDENTAL OR CONSEQUENTIAL DAMAGES, EVEN IF ADAPTEC HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES, OR FOR ANY CLAIM BY ANY OTHER PARTY. Some states do not allow the exclusion or limitation of special, incidental, or consequential damages, so the above limitation or exclusion may not apply to you.
- 8 Limitation of Remedies: Adaptec's entire liability and your exclusive remedy shall be:
 - a the replacement of any media not meeting Adaptec's limited warranty which is returned to Adaptec; or
 - b if Adaptec or its distributor is unable to deliver replacement media which is free of defects in materials or workmanship, you may terminate this Agreement by returning the Software and your money will be refunded.

- 9 Export: You acknowledge that the laws and regulations of the United States restrict the export and re-export of the Software. You agree that you will not export or re-export the Software or media in any form without the appropriate United States and foreign government approval.
- 10 U.S. Government Restricted Rights Legend for Units of the DoD: Use, duplication or disclosure by the Government is subject to restrictions as set forth in subparagraph (c)(1)(ii) of the Rights in Technical Data and Computer Software clause at 252.227-7013. Adaptec, Inc., 691 South Milpitas Boulevard, Milpitas, California 95035.
- 11 U.S. Government Restricted Rights Legend for Civilian Agencies: Use, reproduction or disclosure is subject to restrictions as set forth in subparagraphs (a) through (d) of the Commercial Computer Software - Restricted Rights clause at 52.227-19 and the limitations set forth in Adaptec, Inc.'s standard commercial agreement for this software. Unpublished - rights reserved under the copyright laws of the United States.
- 12 General: You acknowledge that you have read this Agreement, understand it, and that by opening the package you agree to be bound by its terms and conditions. You further agree that it is the complete and exclusive statement of the agreement between Adaptec and you which supersedes any proposal or prior agreement, oral or written, and any terms of this Agreement or any different terms will be enforceable against Adaptec unless Adaptec gives its express consent, including an express waiver of the terms of this Agreement, in a writing signed by an officer of Adaptec. You assume full responsibility for the use of the Software and agree to use the Software legally and responsibly. This Agreement shall be governed by California law except as to copyright matters which are covered by Federal law. This Agreement is deemed entered into at Milpitas, California by both parties. Should any provision of this Agreement be declared unenforceable in any jurisdiction, then such provision shall be deemed to be severable from this Agreement and shall not affect the remainder hereof. All rights in the Software not specifically granted in this Agreement are reserved by Adaptec.

Should you have any questions concerning this Agreement, you may contact Adaptec by writing to: Adaptec, Inc., Legal Department, 691 South Milpitas Boulevard, Milpitas, California 95035.