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USER'S REFERENCE



ADAPTEC SCSI CARD 29160
ULTRA160 SCSI CONTROLLER

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▼▼▼▼ Adaptec SCSI Card 29160

Ultra160 SCSI Controller

User's Reference

Ultra 160 SCSI

adaptec®

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Overview

Ultra160 SCSI on the Adaptec SCSI Card 29160

The Adaptec SCSI Card 29160 supports Ultra160 SCSI devices. Ultra160 is a new generation of SCSI technology that expands SCSI performance from 80 MBytes/sec 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 29160 combines this Ultra160 SCSI technology with Adaptec's SpeedFlex™ technology. SpeedFlex allows the Adaptec SCSI Card 29160 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.

Although the Adaptec SCSI Card 29160 is a 64-bit PCI card, it also works in a 32-bit PCI slot. When installed in a 32-bit PCI slot, the card automatically runs in the slower 32-bit mode.

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

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



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

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 29160) 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 29160, as well as the Adaptec SCSI Card 29160 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 29160 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 29160 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 29160, the Boot SCSI ID setting in the SCSI*Select* 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.
- In Windows® 95/98, you can use the Device Manager to determine 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 has a built-in terminator at its end.

- 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.
- 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.
- The last external Ultra160 or Ultra2 SCSI device *must* be terminated with an LVD/SE (low voltage differential/single ended) terminator plug to ensure that the device will operate at its maximum speed. If you use a different kind of terminator plug, the data I/O rate will decrease.
- By default, termination on the Adaptec SCSI Card 29160 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

Most problems with using the Adaptec SCSI Card 29160 result from errors in preparing and connecting devices on the SCSI bus. If you have problems, check these items first.

- Are all SCSI devices turned on?
- Are all SCSI cables and power cables properly connected?
- Is the Adaptec SCSI Card 29160 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 29160 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:*) When the message "Starting Windows 95" appears, press and release the **F8** function key while the text is on your screen.
   (*For Windows 98:*) When the message "Starting Windows 98" appears, press and release the **Ctrl** key while the text is on your screen.)
3. From the menu that is displayed, 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 29160, and restart the computer.
6. Verify that an IRQ is available by viewing resources in System Properties.
7. Under the Control Panel, verify that the operating system is set to **Optimal Performance** by checking the Performance tab under System Properties. (Make sure you are not in Safe Mode.)

How can I tell if the Adaptec SCSI Card 29160 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 29160 is listed as 29160, 29160N, 29160B, CPQ29160, Ultra160 PCI SCSI Controller.

- If the driver is listed, the Adaptec SCSI Card 29160 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 29160 software driver is disabled and isn't loading.
- If the SCSI Controller icon or the Adaptec SCSI Card 29160 software driver is not listed, reinstall the driver that was included with the SCSI card.

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

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

To enable the driver

1 Double-click the Adaptec SCSI Card 29160 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 29160 does not appear under Device Manager?

If the SCSI Controller icon or the software driver do not appear

1 Double-click the **Add New Hardware** icon in Control Panel.

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 29160.

4 Follow the on-screen instructions.

If Windows 95/98 does not detect the Adaptec SCSI Card 29160, get the driver disk or CD included with the SCSI card and run the Add New Hardware Wizard again:

1. Double-click the **Add New Hardware** icon in Control Panel.
2. Click **Next** to begin installing your new hardware.
3. Select **No** and click **Next** to select the type of hardware you want to install.
4. Select **SCSI controllers** and click **Next**.



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

5. Click **Have Disk...** and follow the directions that appear on the screen to install the driver software.
6. Select **29160, 29160N, 29160B, CPQ29160, Ultra160 PCI SCSI Controller.**

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

1. Right click on **My Computer**.
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.)

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 SCSI*Select*® and set the Send Start Unit Command to **Yes** for the particular SCSI device ID. See *Starting SCSISelect* on page 18.
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 SCSI*Select* and disable the Send Start Unit Command for the device.

"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.

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 29160. See the figure on page 13.

"Attention! Too many devices are terminated on the SE connectors"
The SCSI card BIOS has detected more than two terminated devices on the SE (single-ended) segment. Verify the termination on both the 68-pin internal SE and 50-pin internal 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

SCSI*Select* termination option for the SE connector to **Automatic** or **Enable**.

"Attention! Insufficient termination detected on the SE connectors"
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 68-pin internal SE and 50-pin internal 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 SCSI*Select* termination option for the SE connector to **Automatic** or **Enable**.

"Attention! Too many devices are terminated on the LVD/SE connectors"[2]
The SCSI card BIOS has detected more than two terminated devices on the LVD-SE SCSI segment. Verify the termination on both the internal and external 68-pin LVD / 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 SCSI*Select* termination option for the LVD / SE connector to **Automatic** or **Enable**.

"Attention! Insufficient termination detected on the LVD/SE connectors"[2]
The SCSI card BIOS has detected only one terminated device, or no terminated devices, on the LVD-SE segment. Verify the termination on both the internal and external 68-pin 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 SCSI*Select* termination option for the LVD / SE connector to **Automatic** or **Enable**.

[2] For the SE segment, the termination detection feature is only implemented when the segment is running in SE mode. No message is displayed if it is running in Ultra160 / Ultra2 SCSI mode.

Using the Adaptec SCSI Card 29160 and SCSI Devices

This section provides useful information on using the Adaptec SCSI Card 29160 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 29160 that was previously connected to a different SCSI card, you must 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 23 for information on using the SCSI*Select* format utility.)

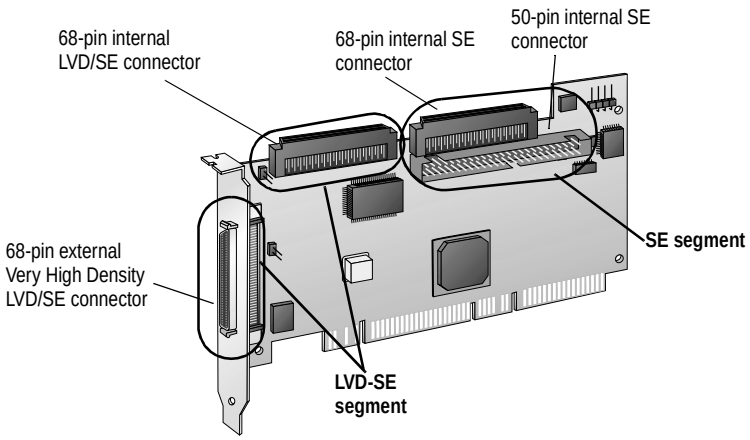


Caution: A low-level format destroys all data on the drive. Be sure to back up the data before performing a low-level format.

- 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 two 68-pin connectors on the LVD-SE SCSI segment and that you connect your non-LVD SCSI devices (if any) to the two SE (single-ended) 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 29160, 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 29160 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 29160, EIDE devices must be connected to the EIDE controller, and so on.

When you install the Adaptec SCSI Card 29160 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). *You will not be able to use the non-SCSI drive(s) at all* 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.

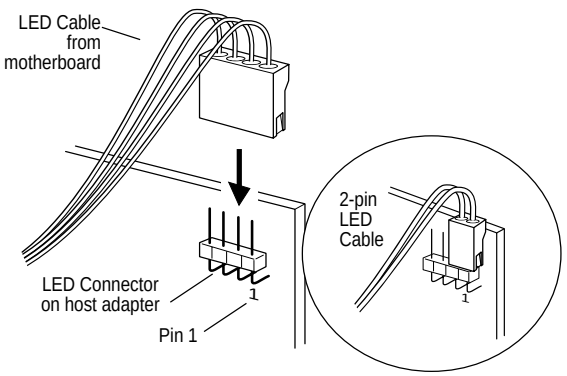
Installing Multiple SCSI Cards

- 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).
- 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 host adapter BIOS enabled on the SCSI card to which the boot disk drive is connected. Use SCSI*Select* to disable the host adapter BIOS on the other SCSI cards.

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 29160 with SCSI*Select*

SCSI*Select*, included with the Adaptec SCSI Card 29160, enables you to change SCSI settings without opening the computer or handling the card. SCSI*Select* 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 SCSI*Select* option.



Note: The default settings are appropriate for most systems. Run SCSI*Select* 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 18.

SCSI*Select* 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 Low On / High On Low Off / High Off Low Off / High On	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)

SCSI*Select* 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 SCSI*Select*

Follow these steps to start SCSI*Select*:

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 SCSI*Select*

Follow these steps to exit SCSI*Select*:

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 SCSI*Select* take effect after the computer boots.

Using SCSI*Select* 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 SCSI*Select* default values, press **F6** from the main SCSI*Select* screen.

SCSI Bus Interface Definitions

- **Host Adapter SCSI ID**—(Default: *7*) Sets the SCSI ID for the SCSI card. The Adaptec SCSI Card 29160 is set at **7**, which gives it the highest priority on the SCSI bus. We recommend that you do not change this setting.
- **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 29160 does not support SCSI parity.
- **Host Adapter SCSI Termination**—(Default: *Automatic*) Determines the termination setting for the SCSI card. The default setting for both the LVD / SE (low voltage differential / single ended) connectors 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 21).

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 23).

- **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.

- **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 of 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 "juke box" 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 SCSI*Select* 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 necessary only for MS-DOS 5.0 or above; it is not required for other operating systems, such as NetWare or UNIX.

  Caution: Changing the translation scheme destroys all data on the drive. Be sure to back up your disk drives before changing the translation scheme.

  Use the MS-DOS Fdisk command to partition a disk larger than 1 GByte controlled by the SCSI card BIOS, when using DOS, Windows 3.1.x, or Windows 95/98.
- **Verbose/Silent Mode**—(Default: *Verbose)* When set to **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.
  - **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.



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**.

- **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 either enabled or disabled if your system is not 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 SCSI*Select*. SCSI*Select* 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.

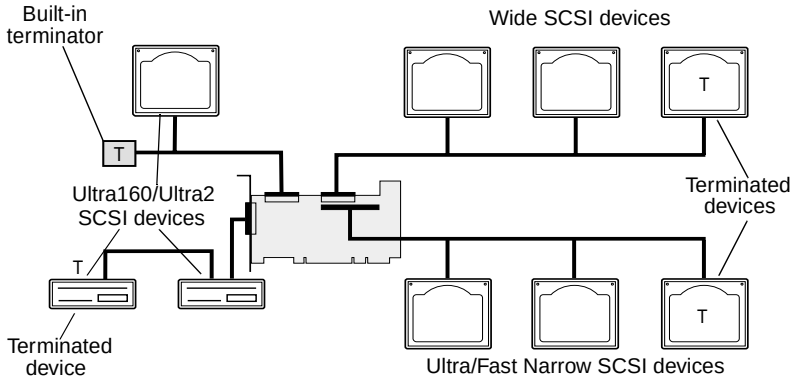
   - **Verify Disk Media**—Allows you to scan the media of a hard disk drive for defects. If the utility finds bad blocks on the media, it prompts you to reassign them; if you select *yes*, those blocks are no longer used. Pressing **Esc** at any time aborts the utility.

Connecting SCSI Devices

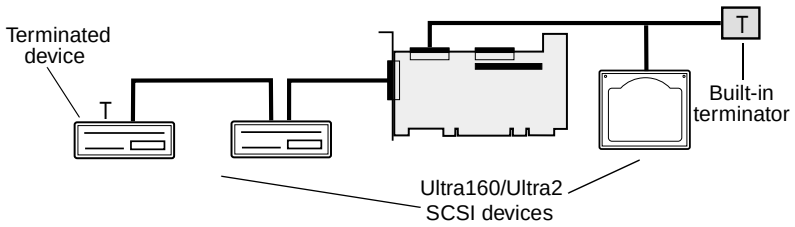
Here are some examples of how you can connect internal and external SCSI devices to the Adaptec SCSI Card 29160.

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

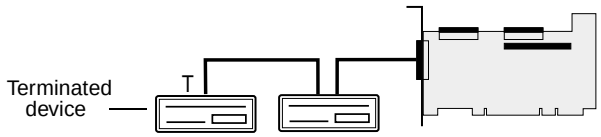
The first example shows SCSI devices connected to all four internal and external connectors. Note the built-in terminator on the end of the internal LVD SCSI cable. The last external SCSI device *must* be terminated with an LVD / SE terminator plug to ensure that all devices will operate at their maximum speed.



The following example shows Ultra160 and Ultra2 SCSI devices connected to the 68-pin LVD / SE internal and external connectors.



The following example shows two Ultra160 / Ultra2 SCSI devices connected to the external connector. As in the previous diagrams, the last device on the SCSI bus must use an LVD / SE terminator plug in order to operate at its maximum speed.



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 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.

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- 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.

Adaptec, Inc. Adaptec SCSI Card 29160

Tested to Comply
With FCC Standards

FOR HOME OR OFFICE USE

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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)

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