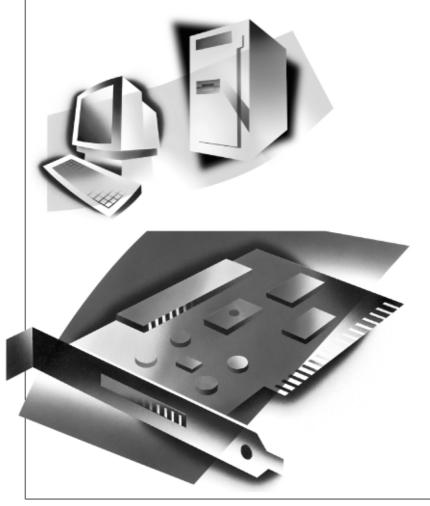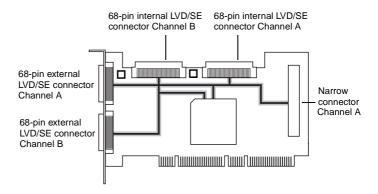# adaptec®

INSTALLATION GUIDE (OEM)

ADAPTEC SCSI CARD 39160
ULTRA160 SCSI CONTROLLER

INTRODUCTION

The Adaptec SCSI Card 39160 enables you to connect up to 30 SCSI devices—such as very large arrays of high-performance HDDs, external storage subsystems, clustered configurations, Ultra160 hard disk drives, scanners, and CD-ROM drives—to any Intel-based computer with 64- or 32-bit PCI expansion slots.

The Adaptec SCSI Card 39160 has two independent SCSI channels, each with a maximum throughput of 160 MBytes/sec. SCSI Channel A (marked "CH 1/A" on the card) has two internal connectors and one external connector. SCSI Channel B (marked "CH 2/B" on the card) has one internal and one external connector.

You can connect Ultra160 and Ultra2 SCSI devices to the 68-pin Low Voltage Differential/Single-Ended (LVD/SE) connectors on both SCSI channels. Or you can operate the newer Ultra160 and Ultra2 devices at their maximum speed on Channel B while at the same time using legacy SCSI devices on Channel A.

Although the Adaptec SCSI Card 39160 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 installation guide explains how to

- Install the Adaptec SCSI Card 39160
- Set up SCSI devices
- Connect SCSI devices

1

NOTE **The Adaptec SCSI Card 39160 is designed for computer system original equipment manufacturers (OEMs). Use this product with the original computer system designed by the OEM; each OEM tailors their product specifications for their specific design needs. Adaptec assumes no responsibility for incompatibility or consequential damages if you use the Adaptec SCSI Card 39160 in another computer system. All product support and services are provided by the OEM.**

Support for Older SCSI Devices

We recommend that if you have single-ended Ultra SCSI and earlier SCSI devices you connect them to Channel A of the Adaptec SCSI Card 39160 and that you connect newer Ultra2 and Ultra160 SCSI devices to Channel B. This allows the Adaptec SCSI Card 39160 to support newer Ultra160 and Ultra2 SCSI devices at speeds up to 160 MBytes/sec while at the same time supporting Ultra (legacy) devices at speeds up to 40 MBytes/sec. It also allows you to use longer cable lengths for the newer SCSI devices. (For more information about the maximum cable lengths see the *Adaptec SCSI Card 39160 User's Reference*.)

NOTE **If you connect Wide Ultra/Ultra SCSI devices to the same SCSI channel as Ultra160 and Ultra2 SCSI devices, the data transfer rate for the Ultra160 and Ultra2 SCSI devices will drop to Ultra SCSI performance levels. To achieve maximum data transfer rates for the newer SCSI devices, be sure to connect them on their own SCSI channel.**
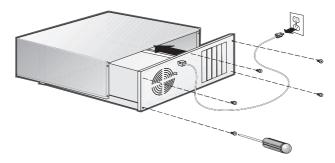
INSTALLING THE ADAPTEC SCSI CARD 39160

STEP 1

Discharge any static electricity build-up before handling your SCSI card by touching a grounded metal object (like the exposed metal parts on the back of your computer).

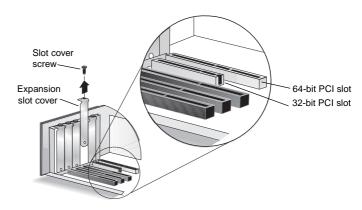**WARNING** **Turn OFF power to the computer and disconnect the power cord.**

STEP 2

After you turn off your computer and unplug the power cord, remove the cover from the computer.

STEP 3

Locate an unused 64-bit PCI expansion slot and remove the expansion slot cover. If the computer does not have a 64-bit slot, you can install the card in a 32-bit PCI slot. (The expansion slot must be compliant with PCI Rev. 2.1 or higher and must support Bus Mastering.) Save the slot cover screw for use in Step 4.

3

Computers may have vertical or horizontal expansion slots. Refer to your computer manual to locate the PCI slots. If your computer is a tower model, lay it on its side to allow for easier installation of the Adaptec SCSI Card 39160.
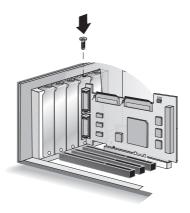
> **WARNING** **Be careful when inserting the Adaptec SCSI Card 39160 in a PCI slot. Some 32-bit slots will not accommodate it, and the card may break if you force it into the slot.**

STEP 4

Insert the Adaptec SCSI Card 39160 in the 64-bit (or 32-bit) PCI expansion slot; press down firmly until the card clicks into place, then replace the slot cover screw. When installed properly, the card should appear level with the expansion slot, as shown below.

SETTING UP SCSI DEVICES

There are several things you may need to do to your SCSI devices before you connect them to the Adaptec SCSI Card 39160:

- Check the SCSI IDs
- Set the termination
- Connect the power cables

Since setup can vary from device to device, always refer to the device's documentation for specific instructions.

Below are some guidelines for setting SCSI IDs and termination on your devices. Refer to the *Adaptec SCSI Card 39160 User's Reference* for more information on these topics.

Check the SCSI IDs

The Adaptec SCSI Card 39160 and each device you connect to it must have a unique SCSI ID number ranging from 0 to 15 on each channel. No two devices on the same SCSI channel can have the same SCSI ID.

The Adaptec SCSI Card 39160 is preset to ID 7 for each channel and should not be changed. If you boot from a SCSI hard disk, make sure the hard disk SCSI ID is set to 0. (Most SCSI hard disks are preset to SCSI ID 0 at the factory.) The SCSI IDs for internal devices are usually set with jumpers; SCSI IDs for external devices are usually set with a switch on the back of the device.

Terminate the Ends

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

> **NOTE** **When connecting Ultra160 or Ultra2 SCSI devices, the SCSI bus must be terminated either on the end of the cable (with a permanent terminator) or with a separate terminating connector. Ultra SCSI and earlier single-ended devices can terminate the bus directly from the device. If you use an Ultra SCSI terminator on an LVD Ultra160 and Ultra2 SCSI bus you will force the bus to Single-ended mode, limiting the speed and cable distance. For this reason be sure that you have the necessary Ultra160 or Ultra2 cable or terminator before installing the Ultra160 SCSI devices.**

CONNECTING SCSI DEVICES

You can connect a total of 30 SCSI devices to the Adaptec SCSI Card 39160,with up to 15 devices on each SCSI channel. Before connecting devices, be sure to review *Setting Up SCSI Devices* on page 4.

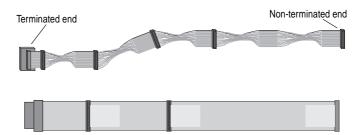## *Connecting Internal Ultra160 and Ultra2 Devices*

A special 68-pin internal LVD cable is needed to connect internal Ultra160 or Ultra2 SCSI devices. If your cables are not marked, you can identify most LVD cables as having twisted pairs of the flat ribbon cable between the device connectors. Some cables are laminated so that they lay flat. Internal LVD cables usually have a terminator built into the end of the cable.

The Adaptec SCSI Card 39160 has two separate Ultra160 SCSI channels, as shown in the figure on page 1. Each channel has an internal LVD/SE connector to which you can connect internal SCSI devices. Follow these steps to connect your internal Ultra160 and Ultra2 devices:
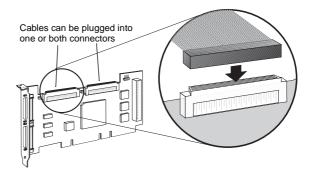
NOTE **We recommend that you keep your Ultra160 and Ultra2 SCSI devices on a separate SCSI channel from your Ultra SCSI devices. This allows the newer Ultra160 and Ultra2 SCSI devices to transfer data at their maximum speed.**
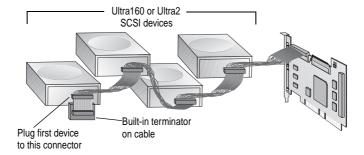
STEP 1 Locate a 68-pin internal LVD SCSI cable, which may have either twisted wires or flat wires, as shown here.

Terminated end   Non-terminated end

STEP 2   Plug the non-terminated end of the cable(s) to the internal LVD/SE connector(s).

Cables can be plugged into one or both connectors

STEP 3   Plug the internal Ultra160 and Ultra2 SCSI devices to the other cable connectors, starting with the connector at the terminated end of the cable.

Ultra160 or Ultra2 SCSI devices

Built-in terminator on cable

Plug first device to this connector

NOTE   **Internal Ultra 160 and Ultra2 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 LVD SCSI cable.**

STEP 4   Connect a power cable from your computer's internal power supply to each internal SCSI device.
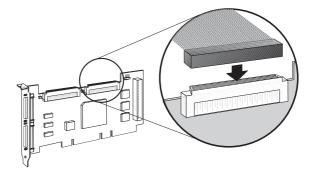
Connecting Wide SCSI Devices

You can connect Wide SCSI devices to the internal LVD/SE connectors. If you do this, we recommend that you connect them to the SCSI Channel A LVD/SE connector and that you connect all Ultra160 and Ultra2 devices to the SCSI Channel B connector. Follow these steps to connect Wide SCSI devices:

STEP 1   Locate a 68-pin internal Wide SCSI cable.

STEP 2   Plug one end of the cable to the Channel A internal 68-pin connector on the Adaptec SCSI Card 39160.

STEP 3   Plug the other end of the cable to a *terminated* Ultra/Fast Wide SCSI device.

STEP 4   If you have other Ultra/Fast Wide SCSI devices, attach them to the connectors between the two ends of the cable. Be sure these other devices are *unterminated*.

STEP 5   Connect a power cable from your computer's internal power supply to each internal device.

Connecting Internal Ultra/Fast Narrow SCSI Devices

> **CAUTION** **Do not connect SCSI devices to more than two of the three SCSI Channel A connectors at the same time.**

If you have internal Ultra/Fast Narrow SCSI devices with standard 50-pin connectors, you can connect them to the 50-pin internal SE Narrow SCSI connector. Follow these steps to connect the devices:

STEP 1 Locate a 50-pin internal Ultra Narrow SCSI cable.

STEP 2 Plug one end of the cable to the 50-pin internal SE Narrow SCSI connector, positioned vertically on the right side of the Adaptec SCSI Card 39160 (refer to the figure on page 1).

STEP 3 Plug the other end of the cable to a terminated Ultra/Fast Narrow SCSI device.

STEP 4 If you have other Ultra/Fast Narrow SCSI devices, attach them to the connectors between the two ends of the cable. Be sure these other devices are *un-terminated*.

STEP 5 Connect a power cable from your computer's internal power supply to each internal device.
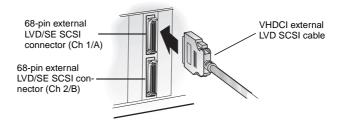
Connecting External SCSI Devices

You can connect external Ultra160 and Ultra2 SCSI devices to the 68-pin external LVD/SE SCSI connectors. Each external device will require a 68-pin VHDCI external LVD SCSI cable.

> **NOTE** **We recommend that you connect *only* Ultra160 and Ultra2 SCSI devices to the external SCSI connectors in order to achieve the maximum data transfer rate. We also recommend that you not combine older SCSI devices with the newer Ultra160 and Ultra2 SCSI devices on the same SCSI channel of the Adaptec SCSI Card 39160. Do not connect SCSI devices to more than two of the three SCSI Channel A connectors at the same time.**
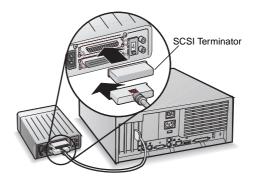
Follow these steps to connect your external SCSI devices:

STEP 1   Connect one end of an external SCSI cable to one of the external Ultra160 connectors on the Adaptec SCSI Card 39160.

68-pin external
LVD/SE SCSI
connector (Ch 1/A)

68-pin external
LVD/SE SCSI con-
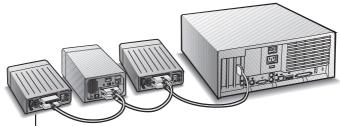nector (Ch 2/B)

VHDCI external
LVD SCSI cable

STEP 2
Connect the other end of the cable to a SCSI connector on the back of an external device. If you are installing only one external device, terminate the device and skip to Step 4.

SCSI Terminator

STEP 3
Connect the other external SCSI devices by linking each device to the previous one, as shown below. Terminate only the device at the end of the chain.
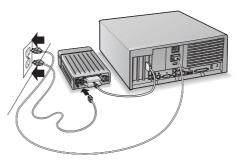
Terminated SCSI Device

STEP 4 Connect power cables to all external device(s) and to the computer.

MORE INFORMATION ABOUT TERMINATION

The last SCSI device on the end of each SCSI bus cable must be terminated, and termination must be *disabled* for all other devices in the middle of the cables. Ultra160 and Ultra2 SCSI devices are automatically un-terminated, but Ultra SCSI and Fast/Wide SCSI devices do have termination that you must check. For more information, refer to the documentation for each SCSI device.

If you are using external Ultra2 or Ultra160 devices, be sure to use an LVD terminator to terminate the last device in the chain. If you use a single-ended, active terminator (sometimes called an Ultra terminator) the SCSI devices will not operate at their maximum speed.

TROUBLESHOOTING

If you have any problems while installing the Adaptec SCSI Card
39160, check the following items first:

- Are all SCSI devices powered on?
- Are all SCSI cables and power cables properly connected?
- Does each device on each SCSI bus have a unique SCSI ID?
- Does the total SCSI cable length exceed the maximum allow-
  able length? (See the *Adaptec SCSI Card 39160 User's Guide*
  for more information.)
- Is the SCSI bus properly terminated?

If you are still unable to resolve a problem, contact the system
manufacturer for help.

ADAPTEC SCSI CARD DRIVER SOFTWARE

> **NOTE** **To use the Adaptec SCSI Card 39160, driver software must be installed for your operating system. Installation of the driver software varies depending on how and where you purchased the Adaptec SCSI Card 39160.**

Pre-Loaded Adaptec Drivers

If the Adaptec SCSI Card 39160 was included as part of a computer system you purchased, the system already has the appropriate Adaptec driver pre-installed by the computer manufacturer. No further action is necessary to install the driver.

Embedded Adaptec Drivers

Some operating systems have embedded driver support for the Adaptec SCSI Card 39160. To determine if the card is supported by the operating system you are using, read the operating system manual or contact the operating system vendor for information.

Copyright

Trademarks

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.

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.

Adaptec, Inc.   Adaptec SCSI Card 39160

FCC   Tested to Comply
With FCC Standards

FOR HOME OR OFFICE USE

CE   **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®

We move the information that
moves **your world.™**