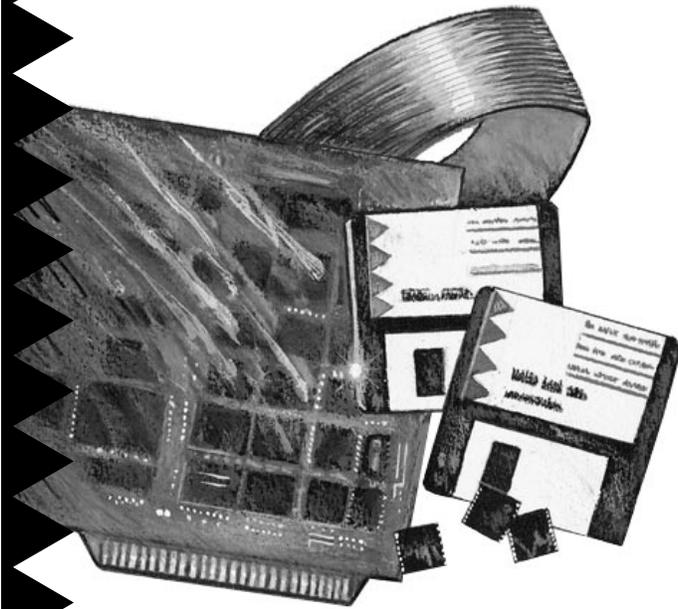


Installation Guide



AHA-3940AUWD
MultiChannel PCI-to-UltraSCSI Host Adapter
with SCSI*Select* Utility

 **adaptec®**

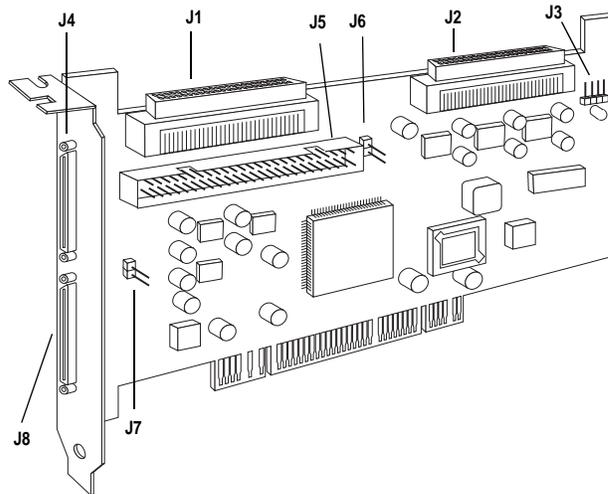
1 Getting Started

This *Installation Guide* tells you how to install and configure the AHA[®]-3940AUWD PCI-to-UltraSCSI host adapter. The host adapter has two SCSI channels which operate like *two independent host adapters* using the AIC-7895. The AHA-3940AUWD host adapter is designed for computers with 5-volt or 3.3-volt PCI slots. PCI is a local bus interface that enables high-speed data transfer. *The computer in which you install the host adapter must be compliant with PCI 2.0 or higher.*

The AHA-3940AUWD supports up to fifteen 16-bit or 8-bit SCSI devices on each SCSI channel; up to seven of these can be 8-bit devices.

2 Board Layout

The following diagram and table show the major AHA-3940AUWD components.



Location	Description
J1	Internal 68 pin SCSI connector, Channel A
J2	Internal 68 pin SCSI connector, Channel B
J3	External LED connector
J4	External 68 pin SCSI connector, Channel B ¹
J5	Internal 50pin SCSI connector, Channel A
J6	Multiple computer termination jumper, Channel B ²
J7	Multiple computer termination jumper, Channel A ²
J8	External 68 pin SCSI connector, Channel A ¹

¹ 68-pin connector, very high density (0.8 mm)

² See *Termination in Multiple Computer Configurations* on page 7.

3 Default Settings

AHA-3940AUWD host adapters operate correctly with their factory default settings in most computers with PCI slots. The following table lists the settings and their default values. You can change these settings with the *SCSISelect* utility. (See *Configuring the Host Adapter* on page 9.)

Global Settings for Host Adapter	Default Setting
Host Adapter SCSI ID	7
SCSI Parity Checking	Enabled
Host Adapter SCSI Termination	Automatic
Boot Device Options	Default Setting
Boot Channel	A First
Boot SCSI ID	0
Boot LUN Number ¹	0
SCSI Device Configurations	Default Setting
Initiate Sync Negotiation	Yes (Enabled)
Maximum Sync Transfer Rate	20 MBytes/sec ²
Enable Disconnection	Yes (Enabled)
Initiate Wide Negotiation	Yes (Enabled)
Send Start Unit SCSI Command ²	No (Disabled)
BIOS Multiple LUN Support ²	No (Disabled)
Include in BIOS Scan	Yes (Enabled)
Advanced Configuration Options	Default Setting
Plug and Play SCAM Support	Enabled
Reset SCSI Bus at IC Initialization	Enabled
Extended BIOS Translation for DOS Drives > 1 GByte ³	Enabled
Host Adapter BIOS (Configuration Utility Reserves BIOS Space)	Enabled
Support Removable Disks under BIOS as Fixed Disks ²	Boot Only
Display <Ctrl-A> Message During BIOS Initialization ²	Enabled
BIOS Support for Bootable CD-ROM ²	Enabled
BIOS Support for Int 13h Extensions ²	Enabled

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

² 26.8, 32.0, 40.0 MBytes/sec is for Ultra devices only.

³ Settings are only valid if channel BIOS is enabled.

4 Installing the Host Adapter

Inserting the Host Adapter in a PCI Slot



WARNING: Turn OFF and disconnect the power to your computer and attached devices before you remove the cover of the computer.

- 1 Remove the cover from the computer case.
- 2 Locate an unused 5-volt or 3.3-volt PCI expansion slot that supports bus mastering. Make sure this slot is not obstructed by other system hardware.

PCI bus slots are usually white or ivory and are shorter than ISA or EISA slots. Usually there are three PCI slots. One of these may be a shared slot. That is, it may have an ISA or EISA connector *and* a PCI connector, but only one kind of board can be inserted in the slot at any one time.
- 3 Remove the corresponding expansion slot cover from the computer chassis and save the screw.
- 4 Hold the host adapter directly over the bus master PCI slot and insert the end of the board in the card guide. Carefully press the bus connector on the bottom of the host adapter down into the slot.
- 5 Attach the host adapter bracket to the computer chassis with the screw from the expansion slot cover that you removed.



Note: *Do not* replace the computer cover or reconnect the power yet!

5 Connecting SCSI Devices



Caution: AHA-3940AUWD host adapters support only *single-ended* SCSI devices. Do *not* connect *differential* SCSI devices, because they may damage the host adapter. Read the SCSI device documentation to determine if the device is single-ended or differential.

Connecting SCSI Cables

SCSI devices are cabled together in a single, connected series called the *SCSI bus*.

- 1 Lay out the cables and find the pin-1 element of each cable and device connector.

On *internal* cables, pin 1 is usually marked with a contrasting color on one edge of the ribbon cable, and a small triangle or number *1* marks pin 1 on the SCSI connector. *External* cables can only be plugged in one way, so pin-1 orientation is automatic.

- 2 Attach the SCSI cable(s) to the host adapter and the device(s), using the internal and/or external connector(s). Be sure to maintain correct pin-1 orientation throughout the bus for each channel.

The AHA-3940AUWD host adapter has two external connectors (J4 and J8) and three internal connectors (J1, J5, and J2), as shown in the diagram on page 2. If you are connecting 8-bit SCSI devices to channel B of an AHA-3940AUWD, you will need 68-pin-to-50-pin converters. The following table shows the maximum SCSI cable length you can use for each combination of device types and number of SCSI devices.

Device Type	Number of Devices	Max Cable Total Length
SCSI-1	Up to 14	6.0m (19.7 feet)
SCSI-2 and/or SCSI-1	Up to 14	3.0m (9.8 feet)
Ultra(SCSI-3) and/or SCSI-2	Up to 4	3.0m (9.8 feet)
Ultra(SCSI-3) and/or SCSI-2	Up to 14	1.5m (4.9 feet)



Caution: Channel A has three SCSI connectors: J1, J5, and J8. Do not connect devices to all three connectors at one time. At most, only two of the three channel A connectors can be used at the same time.

Terminating the SCSI Bus

The last physical SCSI device on each end of the SCSI bus must be terminated. Termination must be disabled on all other devices in the middle of the SCSI bus. You may need to change the termination setting on some devices in your computer system.

Terminating the Host Adapter

Host adapter termination is controlled by the *SCSISelect* utility. The default setting is *Automatic*, which works like this:

- If the host adapter detects that devices are attached to at least two connectors on channel A, it disables its terminators. Otherwise, the terminators are enabled. If the 50-pin connector is used, the high byte termination is always enabled.
- Termination for Channel B is the same as channel A, except that the internal 50-pin connector does not apply.

If you need to change host adapter termination, complete the physical installation, then run *SCSISelect* as described in *Configuring the Host Adapter* on page 9.

Termination in Multiple Computer Configurations

If you are setting up your SCSI bus so that SCSI devices are shared by host adapters in two different computers, you can enable your host adapter to provide termination power even when one computer is powered OFF. To do this, place a jumper shunt on jumper J7 if the second computer is connected to SCSI Channel A or on jumper J6 if the second computer is connected to SCSI Channel B.

This feature works only when one computer is turned off, and the other computer connected to the

same SCSI bus accesses the disk drives and other SCSI devices on the bus.

Setting SCSI IDs

You must assign a *different* SCSI ID to each device on each of the SCSI buses connected to the AHA-3940AUWD host adapter. See your SCSI device documentation to learn how to determine the ID and change it.

- ID 7 is the default SCSI ID for the host adapter on both SCSI Channels A and B. You can change the ID(s) in *SCSISelect*, if necessary. See *Configuring the Host Adapter* on page 9.
- SCSI devices that are connected to channel A and use the 50-pin connector should have IDs from 0 to 7. SCSI devices that are connected to the 68-pin connector should have IDs from 0 to 15. (The host adapter itself uses one SCSI ID on each channel.)
- The SCSI IDs on one SCSI channel do not interfere with the IDs on another SCSI channel.
- If two host adapters are connected to the same SCSI bus, be sure to assign them different SCSI IDs, preferably IDs 7 and 6.

6 Completing the Installation

- 1 Put the cover back on the computer, following the directions in the documentation.
- 2 Be sure all power switches are OFF, then reconnect power cables to your computer.
- 3 Turn ON the power for the peripheral device(s) and then for the computer.
- 4 If your system CMOS *Setup* requires you to enable PCI bus parameters, do so now. Refer to your computer documentation.



Note: The PCI bus is supposed to automatically assign Interrupt channels (IRQs) and port addresses. But because PCI is currently combined with other bus architectures such as ISA and EISA, you may need to edit the PCI bus parameters in your CMOS *Setup*.

When the computer boots, the host adapter BIOS sign-on message appears on the screen. This message includes a list of installed SCSI devices and information about the BIOS. In most cases your computer, host adapter, and SCSI devices are ready to use, and you do not need to run *SCSISelect*.

7 Configuring the Host Adapter

Your AHA-3940AUWD host adapter includes the built-in *SCSISelect* configuration utility. *SCSISelect* lets you change host adapter settings, such as SCSI Parity Checking and Host Adapter SCSI ID, without opening your computer or flipping switches.

To run *SCSISelect*, press **Ctrl-A** immediately when the *SCSISelect* message appears on the screen at the time your computer boots.

Use the arrow (\updownarrow) and **Enter** keys to make selections in the *SCSISelect* Options menu. Press **Esc** at any time to return to the previous menu. You can press **F6** to restore the *original* default settings. To abandon changes you made in the Configure/View Host Adapter Settings menu, press **Esc** and select **No** when asked if you want to save the changes.

The first *SCSISelect* screen asks you to choose SCSI Channel A or Channel B. You can only configure one SCSI channel at a time. If you have multiple host adapters, the screen displays a list of SCSI channels for all installed host adapters.

Configure/View Host Adapter Settings

The Configuration screen displays the basic options for *each* SCSI channel: Host Adapter SCSI ID, SCSI Parity Checking, Host Adapter SCSI Termination, Boot Device Options, SCSI Device Configuration,

and Advanced Configuration Options. Highlight an option and press **Enter** to see a list of possible values.

Select **SCSI Device Configuration** to see a menu of the following options for each device on the SCSI bus: Initiate Sync Negotiation, Maximum Sync Transfer Rate, Enable Disconnection, Initiate Wide Negotiation, Send Start Unit Command, BIOS Multiple LUN Support, and Include in BIOS Scan. These settings apply to individual SCSI devices.

Select **Advanced Configuration Options** for a menu that includes these advanced options: Plug and Play SCAM Support, Reset SCSI Bus at IC Initialization, Extended BIOS Translation for DOS Drives > 1 GByte, Host Adapter BIOS (Configuration Utility Reserves BIOS Space), Support Removable Disks as Fixed Disks, Display <Ctrl-A> Message During BIOS Initialization, BIOS Support for Bootable CD-ROM, and BIOS Support for Int 13h Extensions. For more details please refer to the table on page 3.

SCSI Disk Utilities

When you select **SCSI Disk Utilities** from the Options menu, a list of installed SCSI devices appears. When you select a device the Utilities menu appears, giving you the following two choices:

- **Format Disk**—runs the Adaptec SCSI low-level format utility. Most SCSI devices are preformatted and do not need to be formatted again.
- **Verify Disk Media**—scans the selected device's media for defects. If bad blocks are found, you are prompted to reassign them; if you select **Yes**, those blocks are no longer used.

8 Operating System Software

Under MS-DOS 5.0 or later, you can install up to eight hard disk drives (SCSI or non-SCSI) in your computer without using additional software. Older versions of DOS support up to two hard disk drives. You can make the host adapter treat removable-media drives as hard disk drives. To do this, run the *SCSISelect* utility, select **Advanced Configuration**

Options, and set the **Support Removable Disks Under BIOS as Fixed Disks** option to **All Disks**.



Caution: If you use this setting, you *cannot* remove media while your computer is ON.

You need additional software if you want to do the following (contact Adaptec for additional drivers):

- Use devices other than hard disk drives, such as SCSI tape drives, CD-ROM drives, scanners, etc.
- Remove and insert CD-ROM discs and other removable media while your computer is running
- Support more than eight hard disk drives under MS-DOS 5.0 or later

Adaptec EZ-SCSI® Software

Adaptec EZ-SCSI software provides support for DOS, Windows® 3.x, Windows 95®, and Windows NT™. Use the menu-driven software to install drivers and configure your DOS/Windows operating system automatically. Contact Adaptec if you need these drivers.

Other Operating Systems

The Adaptec 7800 Family Manager Set provides support for Novell NetWare, OS/2, SCO Unix, and SCO UnixWare. Contact Adaptec if you need these drivers.

9 Troubleshooting Checklist

If you have a problem during installation, check these items first:

- Is your computer compliant with PCI 2.0 or higher?
- Are all SCSI devices powered?
- Are all SCSI bus cables and power cables properly connected?
- Does the host adapter and each device on each SCSI bus channel have a unique SCSI ID?

- Are all devices on the SCSI bus terminated properly?
- Does your system CMOS *Setup* require you to enable PCI bus parameters? If so, see your computer documentation. Confirm the IRQ channel assignment.
- Is the host adapter installed in a PCI slot that supports bus mastering? Refer to your computer documentation or move the host adapter to a different PCI slot.

Computer Will Not Boot from a SCSI Disk Drive

If both SCSI and non-SCSI disk drives are installed in your computer, the non-SCSI drive is always the boot device. If the computer has only SCSI disk drives, check the following:

- 1 Make sure your computer's CMOS *Setup* is set to **No Drives Installed**.
- 2 Make sure the boot partition of the boot hard disk is active.
- 3 Partition the disk. See the *MS-DOS User's Guide* for instructions.

If nothing else works, *back up all data* on the SCSI hard disk and perform a low-level format with the *SCSISelect* Format Disk option.

10 Product Support

Please refer to your Adaptec Sales Agreement or contact your Adaptec sales representative for information on how to obtain product support.

**Federal Communications Commission Radio Frequency
Interference Statement**

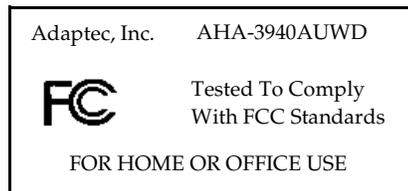
WARNING: Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

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.



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.

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