

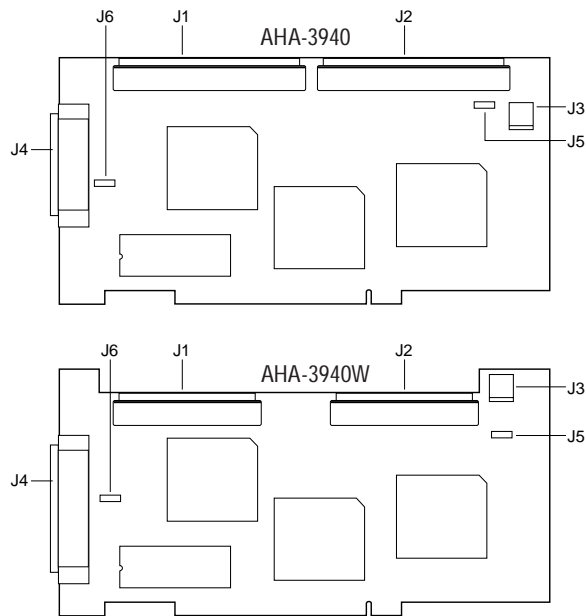
1 Getting Started

This *Installation Guide* tells you how to install and configure AHA®-3940/3940W SCSI-to-PCI host adapters. These host adapters have two SCSI channels which operate like *two independent host adapters*. AHA-3940/3940W host adapters are designed for computers with 5-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 PCI 2.0 compliant, and the motherboard BIOS must support PCI-to-PCI Bridges (PPB).

The AHA-3940 supports up to seven 8-bit SCSI devices on each 8-bit SCSI channel. The AHA-3940W supports up to fifteen 16-bit or 8-bit SCSI devices on each 16-bit Wide SCSI channel; up to seven of these can be 8-bit devices. Installation procedures are the same for both host adapter models.

2 Board Layout

The diagrams and the following table show the major AHA-3940 and AHA-3940W components.



Location	Description
J1	Internal SCSI connector - Channel A ¹
J2	Internal SCSI connector - Channel B ¹
J3	External LED connector
J4	External SCSI connector - Channel A ¹
J5	Multiple computer termination jumper - Channel B ²
J6	Multiple computer termination jumper - Channel A ²

¹ This is a 68-pin connector on the AHA-3940W and a 50-pin connector on the AHA-3940.

² See *Termination in Multiple Computer Environments* on page 5.

3 Default Setting

AHA-3940/3940W 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 6.)

Global Settings for Host Adapter and All SCSI Targets	Default Setting ¹
Host Adapter SCSI ID	7
SCSI Parity Checking	Enabled
Host Adapter SCSI Termination	Enabled
Reset SCSI Bus at IC Initialization	Enabled
Channel BIOS	Enabled
Support Removable Disks under BIOS as Fixed Disks ²	Boot Only
Extended BIOS Translation for DOS Drives > 1 GByte ²	Enabled
BIOS Support for More Than 2 Drives ²	Enabled
Individual Settings for Each SCSI Target	Default Setting
Initiate Sync Negotiation	Yes
Maximum Sync Transfer Rate	20 MBytes/sec ³
Enable Disconnection	Yes
Send Start Unit SCSI Command ²	No
Include In BIOS Scan ²	Yes
Initiate Wide Negotiation ⁴	Yes

¹ Defaults apply to both SCSI Channels.

² Valid only if channel BIOS is enabled.

³ 10 MBytes/sec Maximum Sync Transfer Rate for AHA-3940.

⁴ AHA-3940W only.

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 chassis cover.

- 1 Remove the cover from the computer case.
- 2 Locate an unused 5-volt PCI expansion slot that supports bus mastering. Be sure that 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.
- 4 Position 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 chassis cover or reconnect the power yet!

5 Connecting SCSI Devices



Caution: AHA-3940/3940W host adapters support only *single-ended SCSI* devices. Do not connect *differential SCSI* devices, or the host adapter may be damaged. Read the device documentation if you are not sure whether the device is single-ended or differential.

Connecting Cables

SCSI devices are cabled together in a single, connected series called the *SCSI bus*. SCSI cables must run sequentially from one device to the next, with no branching.

- 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. You will need 50-pin-to-68-pin converters if you are connecting 8-bit SCSI devices to either channel of an AHA-3940W.

On both host adapter models, SCSI Channel A has one external and one internal connector (J1 and J4). SCSI Channel B has an internal connector only (J2).

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, if *only* one computer is connected to the host adapter. Termination for both Channels A and B is *Enabled* by default. You must *disable* host adapter termination for SCSI Channel A if you attach SCSI devices to *both* the internal and external SCSI connectors of Channel A.

If you need to change host adapter termination, complete the physical installation, then run *SCSISelect* as described in *Configuring the Host Adapter* on page 6.

Termination in Multiple Computer Configurations

If you are setting up your SCSI bus with more than one computer attached, 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 J6 if the second computer is connected to SCSI Channel A or on jumper J5 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 the SCSI bus connected to the AHA-3940/3940W 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 6.
- SCSI devices connected to an AHA-3940 can have IDs ranging from 0 to 7. SCSI devices connected to an AHA-3940W can have IDs ranging from 0 to 15. (The host adapter itself uses one SCSI ID on each channel.)
- SCSI ID 0 should be used for the boot SCSI hard disk; ID 1 should be used for a second SCSI hard disk, if there is one.

- The SCSI IDs on one SCSI channel do not interfere with the IDs on another SCSI channel.
- If you have two host adapters 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 chassis 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 computer and the peripheral device(s).
- 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-3940/3940W host adapter includes the built-in *SCSISelect* configuration utility. *SCSISelect* lets you change host adapter settings, such as 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 (↑↓) and **Enter** keys to make selections in *SCSISelect*. 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 allows 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, 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 view another menu of the following options for each device on the SCSI bus: Initiate Sync Negotiation, Maximum Sync Transfer Rate, Enable Disconnection, Send Start Unit Command, Include in BIOS Scan, and Initiate Wide Negotiation (AHA-3940W only). These settings apply to individual SCSI devices.

Select **Advanced Configuration Options** to view a menu of these advanced options: Reset SCSI Bus at IC Initialization, Channel BIOS (Configuration Utility Reserves BIOS Space), Support Removable Disks under BIOS as Fixed Disks, Extended BIOS Translation for DOS Drives > 1 GByte, and BIOS Support for More Than 2 Drives (MS-DOS® 5.0 and above).

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

DOS/Windows

Under MS-DOS 5.0 or above, you can install up to eight hard disk drives (either 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 the media while your computer is powered.

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 two hard disk drives under versions of DOS prior to MS-DOS 5.0
- Support more than eight hard disk drives under MS-DOS 5.0 or later

Other Operating Systems

AHA-3940/3940W host adapters support DOS, Novell® NetWare®, OS/2®, Windows NT, SCO® and Novell Unixware® operating systems. Contact Adaptec or your operating system vendor for information on the current schedule for operating system support.

9 Troubleshooting Checklist

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

- Is your computer PCI 2.0 compliant, and does the motherboard BIOS support PCI-to-PCI Bridges (PPB)? If the host adapter banner does not appear when you boot your computer (and the host adapter BIOS is enabled), this may indicate that the motherboard BIOS does not support PPB. Contact your computer manufacturer for a BIOS upgrade.
- 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**, which is required for SCSI host adapters.
- 2 Make sure the SCSI ID of the boot hard disk is 0 and that the boot partition is active. (The SCSI ID is usually set with jumpers or switches on the drive.)
- 3 If this does not solve the problem, *back up all data* on the SCSI hard disk and perform a low-level format with the SCSI*Select* Format Disk option.
- 4 Partition the disk. See the *MS-DOS User's Guide* for instructions.

10 Adaptec Customer Support

- For information on software upgrades, new releases, technical advice, and other topics, call Adaptec's Electronic Bulletin Board Service (BBS) 24 hours a day at 408-945-7727; 1200, 2400, 9600, or 14400 baud, 8 data bits, 1 stop bit, no parity.
- For the latest online information about Adaptec products and services, call the Interactive FAX Service 23 hours a day at 408-957-7150.
- For technical assistance, call Adaptec's Technical Support Hot Line at 800-959-SCSI (7274), or 408-945-2550. M-F: 6:00 a.m.-5:00 p.m., Pacific Time.
- To order Adaptec software, call 800-442-SCSI (7274) or 818-365-6264. M-F: 6:00 a.m.-5:00 p.m., Pacific Time. If you are calling from outside the U.S. and Canada, the number is 408-957-SCSI (7274).
- To request additional documentation for Adaptec products, call 800-934-2766. M-F: 5:00 a.m.-6:00 p.m., Pacific Time.

FCC Compliance Statement

NOTE: 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 residential installations. This equipment generates, uses, and can radiate radio frequency energy, and if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation.

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
- Move the equipment away from the receiver
- Plug the equipment into an outlet on a circuit different from that to which the receiver is powered
- If necessary, the user should consult the dealer or an experienced radio/television technician for additional suggestions

CAUTION: Only equipment certified to comply with Class B (computer input/output devices, terminals, printers, etc.) should be attached to this equipment, and must have shielded interface cables.

Finally, any change or modifications to the equipment by the user not expressly approved by the grantee or manufacturer could void the user's authority to operate such equipment.

Each host adapter is equipped with an FCC compliance label which shows only the FCC Identification number. The full text of the associated label follows:

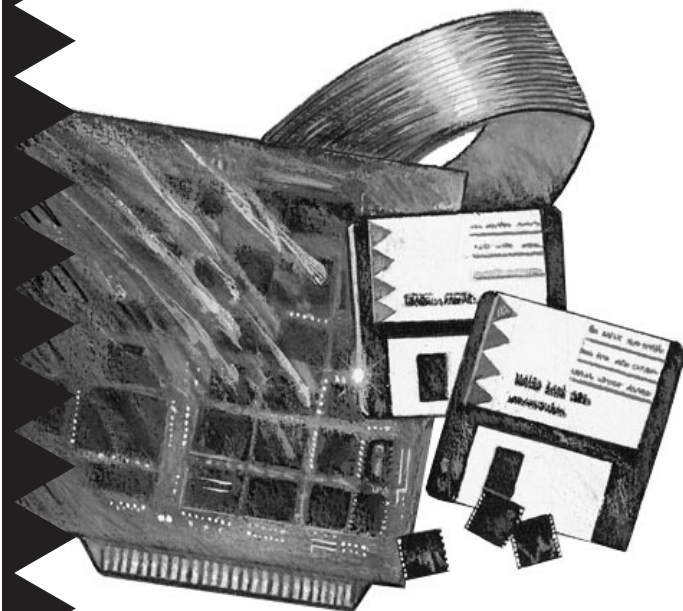
This device complies with part 15 of the FCC rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference and (2) this device must accept any interference received, including interference that may cause undesired operation.

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

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Printed in Singapore
Stock No.: 510595-00, Rev. A KL 8/94
Information subject to change without notice.

Installation Guide



AHA-3940/3940W MultiChannel SCSI-to-PCI Host Adapters with SCSI*Select* Utility



AHA-3940/3940W Installation Guide
Part Number: 510595-00, Rev. A
Print Spec Number: 492699-00
Current Date: 8/25/94 ECN Date: 08/30/94