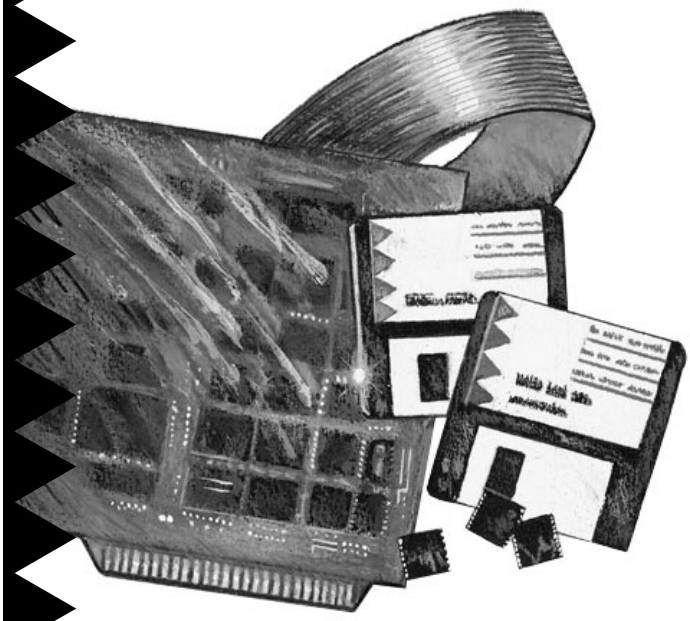
Installation Guide



AHA-3940AU / AUW

MultiChannel PCI-to-UltraSCSI Host Adapters with SCSI*Select* Utility

adaptec®

AHA-3940AU/AUW Installation Guide
Part Number: 511418-00, Rev. A
Print Spec Number: 496346-00
Current Date: 3/12/97 ECN Date: 3/10/97

1 Getting Started

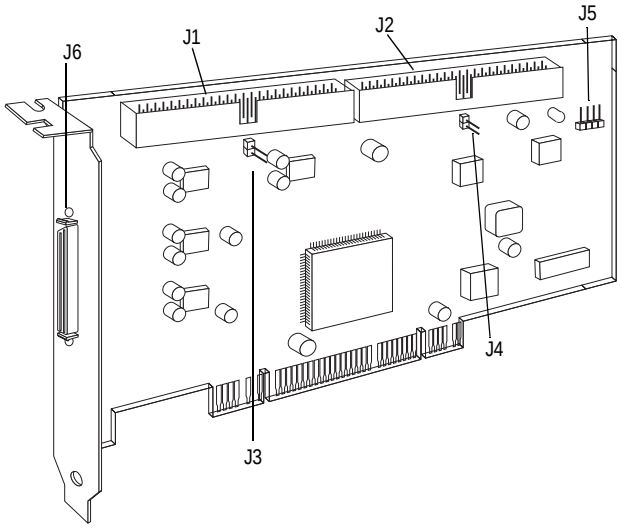
This *Installation Guide* tells you how to install and configure AHA®-3940AU / AUW PCI-to-UltraSCSI host adapters. These host adapters have two SCSI channels which operate like *two independent host adapters.* AHA-3940AU / AUW host adapters are designed for computers with PCI slots. PCI is a local bus 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 and the motherboard BIOS must support PCI-to-PCI Bridges.* If you are not sure whether the motherboard BIOS supports PCI-to-PCI Bridges, ask the motherboard or computer manufacturer.

The AHA-3940AU supports up to seven 8-bit SCSI devices on each 8-bit SCSI channel. The AHA-3940AUW supports up to fifteen 16-bit or 8-bit SCSI devices on each 16-bit Wide SCSI channel; up to seven of the devices can be 8-bit devices. Installation procedures are the same for the AHA-3940AU and the AHA-3940AUW.

2 Board Layout

The following diagrams and table show the major AHA-3940AU, AHA-3940AUW components.

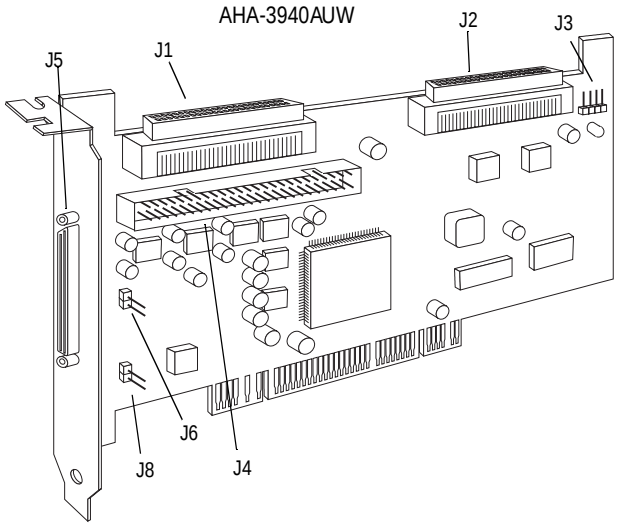
AHA-3940AU



AHA-3940AU/AUW Installation Guide
Part Number: 511418-00, Rev. A
Print Spec Number: 496346-00
Current Date: 3/12/97 ECN Date:3/10/97

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

1. See *Termination in Multiple Computer Configurations* on page 6.
2. High density 50-pin SCSI-2 connector.



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

1. High density 68-pin SCSI-2 connector.
2. See *Termination in Multiple Computer Configurations* on page 6.

AHA-3940AU/AUW Installation Guide
Part Number: 511418-00, Rev. A
Print Spec Number: 496346-00
Current Date: 3/12/97 ECN Date:3/10/97

3 Default Settings

AHA-3940AU / AUW 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 SCSI*Select* utility. (See *Configuring the Host Adapter* on page 8.)

SCSI Bus Interface Definitions	Default Setting
Host Adapter SCSI ID	7
SCSI Parity Checking	Enabled
Host Adapter SCSI Termination	Automatic
Boot Device Settings	**Default Setting**
Boot Channel	A First
Boot SCSI ID	0
Boot LUN Number[1]	0
SCSI Device Configuration	**Default Setting**
Initiate Sync Negotiation	Yes (Enabled)
Maximum Sync Transfer Rate	10 MBytes/sec[2,3]
Enable Disconnection	Yes (Enabled)
Initiate Wide Negotiation[4]	Yes (Enabled)
Send Start Unit Command[5]	No (Disabled)
BIOS Multiple Lun Support [5]	No (Disabled)
Include in BIOS Scan	Yes (Enabled)
Advanced Configuration Options	**Default Setting**
Plug and Play SCAM Support	Disabled
Reset SCSI Bus at IC Initialization	Enabled
Extended BIOS Translation for DOS Drives > 1 GByte[5]	Enabled
Host Adapter BIOS (Configuration Utility Reserves BIOS Space)	Enabled
Support Removable Disks under BIOS as Fixed Disks[5]	Boot Only
Display <Ctrl-A> Message During BIOS Initialization[5]	Enabled
BIOS Support for Bootable CD-ROM[5]	Enabled
BIOS Support for Int 13h Extensions[5]	Enabled

1. Setting is valid only if Multiple LUN Support is enabled.
2. Default Setting for the AHA-3940AU is 10 MBytes/sec.
   Default Setting for the AHA-3940AUW is 20 MBytes/sec.
3. Ultra speed for the AHA-3940AU is 20 MBytes/sec.
   Ultra speed for the AHA-3940AUW is 40 MBytes/sec.
4. AHA-3940AUW only
5. Settings are only valid if channel BIOS is enabled.

AHA-3940AU/AUW Installation Guide
Part Number: 511418-00, Rev. A
Print Spec Number: 496346-00
Current Date: 3/12/97 ECN Date:3/10/97

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 computer cover.

1. Remove the cover from the computer case.
2. Locate an unused 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!

AHA-3940AU/AUW Installation Guide
Part Number: 511418-00, Rev. A
Print Spec Number: 496346-00
Current Date: 3/12/97 ECN Date:3/10/97

5 Connecting SCSI Devices

Caution: AHA-3940AU / AUW 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 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. If you are connecting 8-bit SCSI devices to Channel A of an AHA-3940AUW, you may use the internal 50-pin connector. If you must connect 8-bit SCSI devices to Channel B you will need 68-pin-to-50-pin converters. Refer to the User's Guide for detailed information or Adaptec's homepage under Cables.

   On the AHA-3940AU host adapter, SCSI Channel A has one internal 50-pin connector J1. Channel B has one external J2 and one internal 50-pin connector J6. The AHA-3940AUW Channel A has one internal 68-pin connector J1, one internal 50-pin connector J4. Channel B has one internal 68-pin J2 and one external 68-pin connector J5.

AHA-3940AU/AUW Installation Guide
Part Number: 511418-00, Rev. A
Print Spec Number: 496346-00
Current Date: 3/12/97 ECN Date:3/10/97

If you want to connect only SCSI-1 or SCSI-2 devices (no *Ultra*SCSI devices), the maximum total cable length 6 meters (19.7 feet). If you want to connect 4 or fewer *Ultra*SCSI devices, the maximum total cable length is 3 meters (9.8 feet). For configurations with 5 or more *Ultra*SCSI devices, maximum total cable length is 1.5 meters(4.9 feet). See your device's documentation to determine whether it is an *Ultra*SCSI device.

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 SCSI*Select* utility. The default setting is *Automatic*, which works like this:

- If the host adapter detects that devices are connected to both connectors on Channel B, it disables its terminators. Otherwise, the terminators are enabled.
- For the AHA-3940AU, since there is only one connector for Channel A, termination for this channle is always enabled.

  For the AHA-3940AUW, if the host adapter detects that devices are connected to two of the three connectors on Channel A, it disables its terminators. Otherwise, the terminators are enabled.

If you need to change host adapter termination, complete the physical installation, then run SCSI*Select* as described in *Configuring the Host Adapter* on page 8.

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 J3 on the 3940AU or J6 on the 3940AUW if the second computer is connected to SCSI Channel A

AHA-3940AU/AUW Installation Guide
Part Number: 511418-00, Rev. A
Print Spec Number: 496346-00
Current Date: 3/12/97 ECN Date:3/10/97

or on jumper J8 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-3940AU / AUW 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 SCSI*Select*, if necessary. See *Configuring the Host Adapter* on page 8.
- SCSI devices connected to an AHA-3940AU can have IDs from 0 to 7. SCSI devices connected to an AHA-3940AUW can 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 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 computer 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.

AHA-3940AU/AUW Installation Guide
Part Number: 511418-00, Rev. A
Print Spec Number: 496346-00
Current Date: 3/12/97 ECN Date:3/10/97

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 SCSI*Select*.

7 Configuring the Host Adapter

Your AHA-3940AU / AUW host adapter includes the built-in SCSI*Select* configuration utility. SCSI*Select* 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 SCSI*Select*, press **Ctrl-A** immediately when the SCSI*Select* Ctrl-A message appears on the screen at the time your computer boots.

Use the arrow (↑↓) and **Enter** keys to make selections in the SCSI*Select* 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 SCSI*Select* 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,

AHA-3940AU/AUW Installation Guide
Part Number: 511418-00, Rev. A
Print Spec Number: 496346-00
Current Date: 3/12/97 ECN Date:3/10/97

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(for 3940AUW only), 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: Host Adapter BIOS (Configuration Utility Reserves BIOS Space), Support Removable Disks as Fixed Disks, and Extended BIOS Translation for DOS Drives > 1 GByte.

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

Your AHA-340AU/AUW host adapters are supported by the following: DOS, Windows 3.x, Windows 95, Windows NT, Novell NetWare, OS/2, Unix, and UnixWare.

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.

AHA-3940AU/AUW Installation Guide
Part Number: 511418-00, Rev. A
Print Spec Number: 496346-00
Current Date: 3/12/97 ECN Date:3/10/97

You can make the host adapter treat removable-media drives as hard disk drives. To do this, run the SCSI*Select* 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 will need the the Adaptec 7800 Family Manager Set, which is included in the kitted version of the AHA-3940AU / AUW, to do the following:

- 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 for DOS, Windows® 3.x, Windows 95®, and Windows NT™ is included in the kitted version of the AHA-3940AU / AUW. Use the menu-driven software to install drivers and configure your DOS / Windows operating system automatically.

Other Operating Environments

AHA-3940AU / AUW host adapters support Novell NetWare, OS / 2, SCO Unix, and SCO UnixWare operating systems. The Adaptec 7800 Family Manager Set is included in the kitted version so that you can install the appropriate driver for your system. Refer to the Adaptec *7800 Family Manager Set User's Guide* (included) for detailed information.

Troubleshooting Checklist

If˝0.0ao --18()-8(e)25a(O)-8( )-2p(a)-5(y)9(o)1(bIf˝0l8(e)2m(g)-15d(r)-1u(t)-r(n)9()12(n)411(g))4(s(a)-11(c)

AHA-3940AU/AUW Installation Guide
Part Number: 511418-00, Rev. A
Print Spec Number: 496346-00
Current Date: 3/12/97 ECN Date:3/10/97

PCI-to-PCI Bridges (PPB)? If not, 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**.
2. Make sure the boot partition of the boot hard disk is active. (The SCSI ID is usually set with jumpers or switches on the drive.)
3. Partition the disk. Follow the instructions in the documentation for the operating system you are using.

If this does not solve the problem, see the troubleshooting information in the *User's Guide*. As a last resort, *back up all data* on the SCSI hard disk and perform a low-level format with the SCSI*Select* Format Disk option.

AHA-3940AU/AUW Installation Guide
Part Number: 511418-00, Rev. A
Print Spec Number: 496346-00
Current Date: 3/12/97 ECN Date:3/10/97

Adaptec Technical Support and Services

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

Electronic Support

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

- Adaptec World Wide Web (WWW) site at `http://www.adaptec.com`.
- File Transfer Protocol (FTP) server at `ftp.adaptec.com`.
- Adaptec USA Bulletin Board Service (BBS) at 408-945-7727; supports up to 28,800 bps (bits per second), 8 data bits, 1 stop bit, no parity. No product literature is available on the Adaptec BBS.
- Interactive Fax System at 408-957-7150; available 24 hours a day, 7 days a week.

Technical and Product Support

- For technical support and information about many of Adaptec's electronic support services, call 800-959-7274 or 408-945-2550, 24 hours a day, 7 days a week.
- To use the Adaptec Interactive Support System, call 800-959-7274 or 408-945-2550, 24 hours a day, 7 days a week. The system prompts you with questions regarding your problem and then provides step-by-step troubleshooting instructions.
- To speak with a product support representative, call 408-934-7274, M–F, 6:00 A.M. to 5:00 P.M., Pacific Time. After hours, on weekends, and on holidays, product support is also available for a fee at 800-416-8066.

Sales and Ordering Information

- For sales information, call 800-959-7274 or 408-945-2550, M–F, 6:00 A.M. to 5:00 P.M., Pacific Time.
- To order Adaptec software and SCSI cables, call 800-442-7274 or 408-957-7274, M–F, 6:00 A.M. to 5:00 P.M., Pacific Time.
- To request additional documentation for Adaptec products, call 800-934-2766 or 510-732-3829, M–F, 6:00 A.M. to 5:00 P.M., Pacific Time.

AHA-3940AU/AUW Installation Guide
Part Number: 511418-00, Rev. A
Print Spec Number: 496346-00
Current Date: 3/12/97 ECN Date:3/10/97

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. AHA-3940AU
AHA-3940AUW

Tested To Comply
With FCC Standards

FOR HOME OR OFFICE USE

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 matérial brouilleur du Canada.

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

© 1997, Adaptec, Inc. All rights reserved. Adaptec, the Adaptec logo, AHA, and EZ-SCSI are trademarks of Adaptec, Inc. which may be registered in some jurisdictions. Windows NT is a trademark, and Windows and Windows 95 are registered trademarks of Microsoft Corporation used under license. All other trademarks used are owned by their respective owners.

Printed in Singapore
Stock No.: 511418-00, Rev. A MR 3/97
Information subject to change without notice.

AHA-3940AU/AUW Installation Guide
Part Number: 511418-00, Rev. A
Print Spec Number: 496346-00
Current Date: 3/12/97 ECN Date:3/10/97