Installation Guide
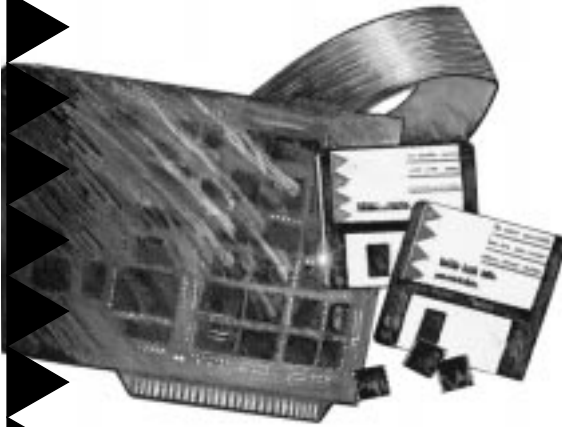
AHA-2740W/2742W Single-ended
AHA-2744W Differential
EISA-to-Fast, Wide SCSI Host Adapters

adaptec®

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• 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

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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.

Table of Contents

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Getting Started

This document provides the steps required for installation of the AHA$^{®}$-2740W and AHA-2742W single-ended, and the AHA-2744W differential EISA-to-Fast, Wide SCSI Host Adapters. The AHA-2740W and AHA-2742W support single-ended SCSI, while the AHA-2744W supports differential SCSI. In this document, the AHA-2740W, AHA-2742W, and AHA-2744W are referred to jointly as the AHA-2740W/2742W/2744W.

Procedures for all three adapters are the same except when regarding the onboard floppy controller on the AHA-2742W and AHA-2744W. Installation of the host adapter includes the following steps:

1   Installing the AHA-2740W/2742W/2744W host adapter in an EISA system.

2   Installing the SCSI cable(s) and SCSI peripheral devices.

3   Terminating the SCSI bus.

4   Setting the SCSI ID.

5   Adjusting the host adapter configuration settings if necessary.

6   Loading software if necessary.

AHA-2740W/2742W/2744W

Board Layout

Figure 1 shows the location of the major components on the AHA-2740W and AHA-2742W host adapters; Table 1 provides a description of each component for the AHA-2740W and AHA-2742W.

Figure 1. Board Layout for the AHA-2740W and AHA-2742W

**Table 1. Host Adapter Components for the AHA-2740W
and AHA-2742W**

Location	Description
J1	Floppy Enable Jumper (AHA-2742W Only)
J2	External LED Connector
J3	Floppy Connector (AHA-2742W Only)
J4	68-pin Wide (16-bit) SCSI Internal Connector
J5	50-pin SCSI Internal Connector
J6	68-pin Wide SCSI External Connector
U1	Floppy Controller (AHA-2742W Only)
U3	RAM
U7	Host Adapter BIOS
U11	AIC-7770 Bus Master SCSI Chip
U12	AIC-701 Configuration Chip

AHA-2740W/2742W/2744W

Figure 2 shows the location of the major components on the AHA-2744W host adapter; Table 2 provides a description of each component for the AHA-2744W.
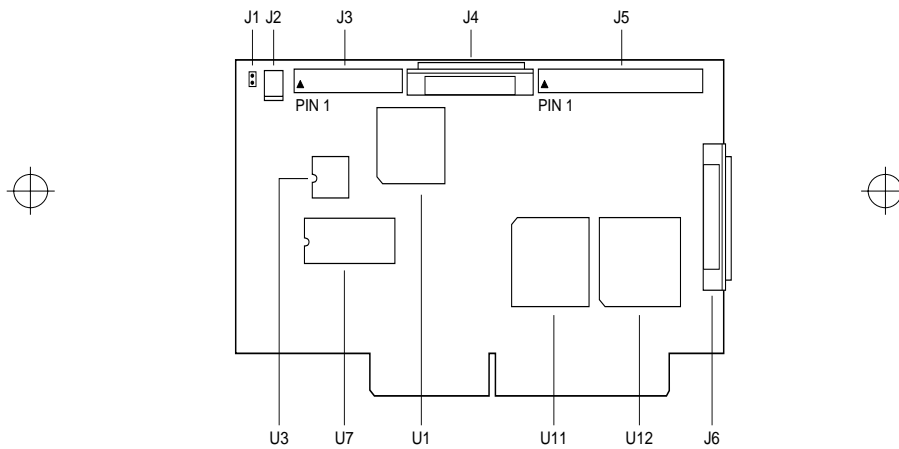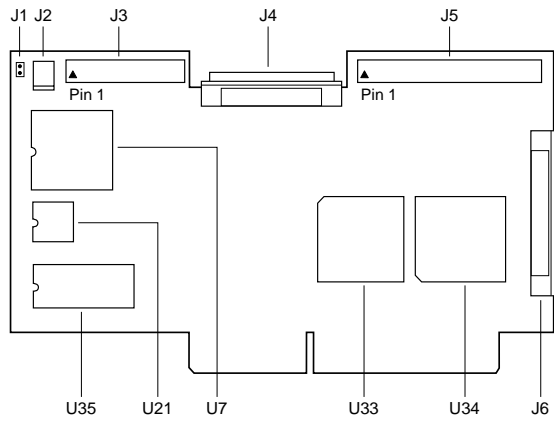

Figure 2. Board Layout for the AHA-2744W

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Table 2. Host Adapter Components for the AHA-2744W

Location	Description
J1	Floppy Enable Jumper
J2	External LED Connector
J3	Floppy Connector
J4	68-pin Wide Differential (16-bit) SCSI Internal Connector
J5	50-pin Differential (8-bit) SCSI Internal Connector
J6	68-pin Wide SCSI External Connector
U7	Floppy Controller
U21	RAM
U33	AIC-7770 Bus Master SCSI Chip
U34	AIC-701 Configuration Chip
U35	Host Adapter BIOS

Default Settings

Your host adapter is already configured for the majority of EISA class computers. Table 3 lists the default settings of your host adapter. Refer to *Configuring the Host Adapter* for information on changing any of these settings.

Table 3. Host Adapter Default Settings

Description	Default Setting
Interrupt Level	IRQ 11
Bus Release Time	44 BCLKS
Data FIFO Threshold	100%
Host Adapter BIOS Base 21 pgAddress	D8000h
Host Adapter SCSI ID	Device ID 7
SCSI Bus Parity Check	Enabled
SCSI Selection Timeout	256 milliseconds
SCSI Bus Reset at Power-on	Enabled
SCSI Bus Termination (Low/High)	On/On
Support Removable Disks as Fixed Disk	Boot Device Only
Extended Translation for Drives > 1 GByte	Enabled
Support More Than Two Drives	Disabled

The Onboard Floppy Controller
(AHA-2742W and AHA-2744W Only)

- If your floppy diskette drives are already running under another controller, disable the onboard floppy controller by removing the jumper connector on jumper J1.

- To use the onboard floppy controller, leave the jumper connector installed on jumper J1 and then disable your existing floppy controller; refer to your computer or floppy controller user documentation.

Installing the Host Adapter

Always refer to your system's documentation for instructions on removing the system cover and adding option boards.

> **CAUTION**: Turn OFF and disconnect power to the system and external equipment.

To install the AHA-2740W/2742W/2744W in your EISA computer system, complete the following:

1   Remove the cover of your EISA personal computer to expose the EISA bus slots on the motherboard.

2   Locate an unused EISA slot in your system which supports bus master operations (refer to the host system documentation for details) and remove the corresponding slot cover.

3   Align and insert the host adapter in the EISA slot.

4   Secure the host adapter in your system.

> **Note**: EISA boards require firmer seating than typical ISA expansion boards. Make sure the host adapter is fully seated in its slot.

Cabling the Host Adapter

The AHA-2740W/2742W/2744W has three cable connec-
tors for connecting SCSI devices: two for connecting
internal SCSI devices and one for connecting external
SCSI devices. The two internal SCSI connectors consist
of a 50-pin and 68-pin connector. The single external con-
nector consists of a 68-pin connector.

In addition, the AHA-2742W and AHA-2744W has a
cable connector that allows you to connect up to two
floppy disk drives.

Only 8-bit internal SCSI devices can be connected to the
50-pin internal connector. The 68-pin internal and exter-
nal connector normally accepts 16-bit Wide SCSI devices;
however, 8-bit SCSI devices can be connected provided
that they are equipped with 68-pin connectors.

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The AHA-2740W/2742W/2744W can accommodate a
single SCSI bus with up to a total of 15 SCSI devices
connected.

Note: Only *single-ended* SCSI devices are supported by
the AHA-2740W/2742W host adapters and only *differential*
SCSI devices are supported by the AHA-2744W host
adapter. *Differential* SCSI devices may be damaged if con-
nected to the single-ended SCSI host adapter bus;
similarly, *single-ended* SCSI devices may be damaged if con-
nected to differential host adapters. Most SCSI devices
currently produced are single-ended SCSI devices. Consult
your SCSI device user documentation.

Connecting Internal SCSI Devices

Internal devices are usually connected to the host
adapter by a flat SCSI ribbon cable. This cable has con-
nectors at each end and additional connectors attached
in the middle. One end of the cable is attached to the
internal connector on the host adapter, and the SCSI
devices are attached to the remaining connectors. The
50-pin internal connector uses a 50-pin SCSI ribbon
cable with a 50-pin header internal connector. The 68-pin
internal connector uses a 68-pin SCSI ribbon cable with
a 68-pin high-density SCSI internal connector.

Up to 7 internal 8-bit devices can be connected to the
50-pin internal connector, and up to 15 internal 16-bit

Wide SCSI devices can be connected to the 68-pin internal connector.

> **Note**: Only two of the three SCSI connectors can have devices connected at any one time. The total number of SCSI devices that can be connected to the host adapter is 15.

Maintaining Pin-1 Orientation

When connecting the 50-pin internal SCSI ribbon cables to both the host adapter and internal SCSI device(s), make sure that pin-1 orientation is maintained throughout the bus. Pin-1 of the SCSI ribbon cable is designated by a colored stripe on one edge of the ribbon cable. Pin 1 of the host adapter or SCSI device connector is usually designated by an arrow or delta symbol (▲) on the connector.

The 68-pin internal cable connectors are keyed and can only be plugged in one way; pin-1 orientation is automatic.

Connecting External SCSI Devices

External devices are usually daisy-chained to the host adapter. This means that a simple two-ended cable runs from the host adapter to the connector on the first external device. A second connector on the back of the external device allows another cable to connect it with the second device in the chain.

To connect subsequent external SCSI devices, obtain additional external cables and chain each device to the

previous device until all external SCSI devices have been connected. Up to 15 external Wide SCSI devices can be connected to the 68-pin external connector.

Note: Only two of the three SCSI connectors can have devices connected at any one time. The total number of SCSI devices that can be connected to the host adapter is 15.

The external connector on the host adapter uses a 68-pin shielded cable with a high-density external connector. External cable connectors are keyed and can only be plugged in one way; pin-1 orientation is automatic.

Connecting Floppy Drives (AHA-2742W and AHA-2744W Only)

Floppy disk drives are connected to the host adapter by a 34-pin floppy ribbon cable with a 34-pin header connector. Up to two floppy diskette drives can be connected to the host adapter.

When connecting your floppy drives, make sure to maintain pin-1 orientation as previously described in *Connecting Internal SCSI Devices*.

Note: If you are not using the floppy controller on the AHA-2742W and AHA-2744W, be sure to disable it by removing the jumper connector on jumper J1.

The AHA-2742W and AHA-2744W support only floppy primary address 3F0h - 3F7h. The IRQ channel is hard-wired for channel 6 and the DMA channel is hard-wired for channel 2.

Terminating the SCSI Bus

To reduce signal reflections on the SCSI bus, the first and last physical SCSI devices on the ends of the SCSI bus must have a set of resistors called *terminators* either installed or enabled. In addition, termination on the host adapter itself must be properly configured. All other SCSI devices installed between the ends of the SCSI bus must have their terminators either removed or disabled.

Note: The last device, and only the last device, connected to any SCSI connector *must* have its termination either installed or enabled. Many differential SCSI drivers currently produced have no provisions for terminators; therefore, they need some external means of I/O line termination.

Refer to the manufacturer's documentation to determine how to enable or disable termination on your SCSI device(s).

Configuring Host Adapter Termination

For the AHA-2740W and AHA-2742W, host adapter termination is determined by the devices connected to the host adapter, is software selectable only, and is done through your computer's EISA configuration utility. Refer to *Configuring the Host Adapter* for instructions. Table 4 describes the possible configurations for host adapter termination.

Table 4. SCSI Device and Host Adapter Configuration

Devices Connected To Host Adapter	Host Adapter Termination	
	Low	High
68-pin internal connector only	ON	ON
68-pin external connector only	ON	ON
68-pin internal and 68-pin external connectors	OFF	OFF
50-pin internal connector only	ON	ON
50-pin and 68-pin internal connectors	OFF	ON
50-pin internal and 68-pin external connectors	OFF	ON
50-pin and 68-pin internal connectors, and 68-pin external connector	INVALID	

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For the AHA-2744W, host adapter termination is config-ured by installing/removing the Resistor Networks (RNs). Figure 3 shows the location of the RNs on the AHA-2744W. Table 5 describes possible RN configurations.
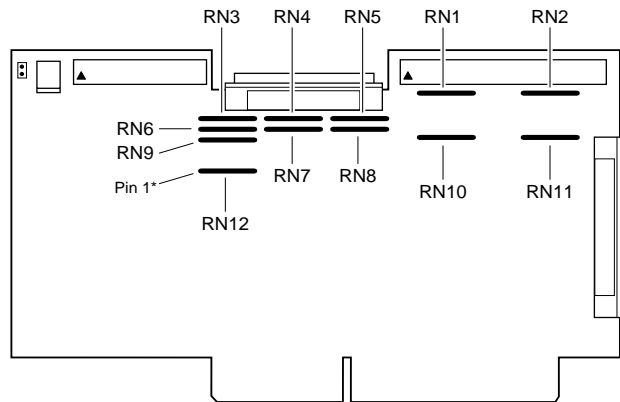
* Pin 1 is always on the left side of the resistor

Figure 3. Location of Resistor Networks on the AHA-2744W

Table 5. Termination Configuration for the AHA-2744W

Low	High	Install[1]	Remove
OFF	OFF	None	From RN1 to RN12
ON	ON	RN1, RN2, RN9, RN10, RN11, and RN12 with 10-pin 330 ohm bussed RNs. RN3, RN4, RN5, RN6, RN7, and RN8 with 10-pin 150 ohm isolated RNs.	None
OFF	ON	RN9 and RN12 with 330 ohm bussed RNs. RN3 and RN6 with 150 ohm isolated RNs.	RN1, RN2, RN4, RN5, RN7, RN8, RN10, and RN11

[1]RN1, RN2, RN9, RN10, RN11, and RN12 are 330 ohm resistor networks. RN3, RN4, RN5, RN6, RN7, and RN8 are 150 ohm resistor networks.

CAUTION: When reinstalling resistors, you cannot install a 330 ohm resistor into a 150 ohm socket and vice versa. The ohm value can be found in the part number printed on the resistor. A 330 ohm resistor will have 330 or 331 included in the part number printed on the resistor and a 150 ohm resistor will have 150 or 151.

Note: When reinstalling resistors, make sure to maintain pin-1 orientation as shown below.
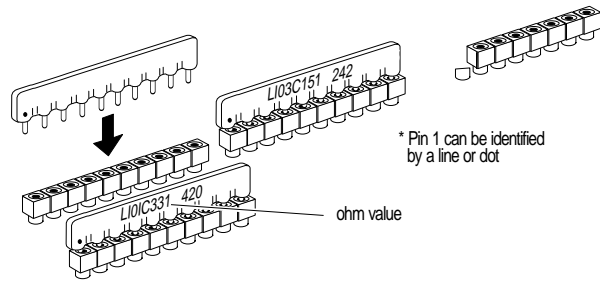

Figure 4. Pin-1 Orientation on Resistor Networks

Setting the SCSI ID

For each device located on the SCSI bus, a unique SCSI ID must be assigned. The default value for your host adapter (which is just another device on the SCSI bus) is SCSI ID 7.

8-bit SCSI devices can be assigned IDs that range from 0 to 7. 16-bit Wide SCSI devices can be assigned IDs that range from 0 to 15.

> Note: If any SCSI device is connected to the 50-pin internal SCSI connector, the host adapter SCSI ID must be assigned a value that ranges from 0 to 7; SCSI ID 7 is recommended for the host adapter.

When configuring the SCSI ID, consider the following:

- You only need to change a device's SCSI ID if it conflicts with the SCSI ID of another device or another host adapter (assuming they are on the same SCSI bus).

- SCSI ID 0 is best reserved for the SCSI hard disk drive that will be used as your computer's boot device; SCSI ID 1 is best reserved for a second SCSI hard disk drive.

AHA-2740W/2742W/2744W

- If you are installing more than one SCSI host adapter, each adapter implements a different SCSI bus, so SCSI IDs can be reused.

Changing the SCSI ID setting for the host adapter is software selectable only, and is done through your computer's EISA configuration utility. Refer to *Configuring the Host Adapter* for instructions.

The SCSI ID on most SCSI devices is typically set with jumpers or switches on the SCSI device. Refer to the SCSI device documentation for information on changing the SCSI ID on other SCSI devices.

Configuring the Host Adapter

A configuration diskette containing an EISA Configuration Utility (ECU) is normally supplied by the EISA system vendor. Depending on the ECU supplied with your system, host adapter configuration will vary. The basic steps involved in running the ECU are explained in this section.

> Note: Always refer to the documentation provided with your EISA system for instructions on adding and configuring adapter boards.

Run the EISA Configuration Utility

Place the bootable configuration diskette in an operative drive and reset the system to boot from this diskette. Run the ECU as instructed by the EISA system vendor.

After booting with the host adapter installed, ignore any error that indicates that an unknown board has been detected in the system.

Copy Configuration and Overlay Files

The *!adp7771.cfg* configuration file and *adp7770.ovl* overlay file needed to configure your host adapter with your EISA system are located on the diskette that came with your host adapter.

The ECU typically allows you to select among a number of options, including copying new configuration files. Select this option to install the *!adp7771.cfg* and *adp7770.ovl* files from the host adapter diskette to the bootable configuration diskette. If the ECU does not provide such an option, you can also use the DOS Copy command to copy these files to the bootable configuration diskette.

Select the Host Adapter

Once the files have been copied, run the option in the ECU that allows you to configure the EISA slot in which the host adapter is installed. A screen listing the host adapter parameters is displayed.

Configure the Host Adapter Parameters

Use the cursor keys and/or function keys as instructed on the screen's menu to move between each parameter, or to select and configure each parameter.

Interrupt Level

Configures the interrupt channel (IRQ) used by the host adapter. Multiple AHA-2740W/2742W/2744W host adapters installed in your system can share the same IRQ; however, to increase system performance, you may want to select a different IRQ for each host adapter installed.

Bus Release Time

Configures the amount of time, in BCLKS (Bus Clocks), the host adapter will continue to transfer data after being pre-empted in Bus Master mode. Normally 44 BCLKS is optimum; however, if multiple bus master cards are installed in the system, you may want to lower the value to free the EISA bus sooner.

Data FIFO Threshold

Configures the percentage used by the host adapter to manage its internal data FIFO. Normally a Data FIFO Threshold of 100% is optimum.

Host Adapter BIOS Base Address

Configures the base BIOS address for the host adapter, or disables the host adapter BIOS. When choosing the base address, verify that there is no conflict with other devices using the same address.

> **Note:** The BIOS must be enabled in order to boot from a SCSI fixed disk drive attached to the host adapter.

Host Adapter SCSI ID
Configures the SCSI ID (0-15) setting for the host adapter. Each installed SCSI device must have a unique SCSI ID. Refer to *Setting the SCSI ID* for additional information.

> **Note**: If any SCSI device is connected to the 50-pin internal SCSI connector, the host adapter SCSI ID must be assigned a value that ranges from 0 to 7; SCSI ID 7 is recommended for the host adapter.

SCSI Bus Parity Check
Enables or disables SCSI bus parity checking on the host adapter. The host adapter always generates parity when writing to the SCSI bus. If any attached SCSI devices do not support SCSI parity checking, then SCSI Bus Parity Check should be disabled. Most devices today, however, do support SCSI parity checking.

SCSI Selection Timeout
Configures the time, in milliseconds, used by the host adapter during the SCSI Selection phase. Lowering the SCSI Selection Timeout will speed up SCSI bus scans considerably; however, before lowering this value, make sure that all the devices on the SCSI bus can respond to the shorter selection time.

SCSI Bus Reset at Power-on

Enables or disables a SCSI bus reset generated by the host adapter during its power-on initialization, and after a Hard Reset. Normally, SCSI Bus Reset at Power-on should always be enabled.

SCSI Bus Termination

Configures host adapter termination. Refer to *Configuring Host Adapter Termination* for appropriate settings.

BIOS and SCSI Device Configuration

BIOS Configuration

This option allows you to configure the host adapter BIOS. Use the cursor keys to move between options. To toggle values for each option, press the **Enter** key.

Support Removable Disks as Fixed Disk
Allows you to configure removable media drives supported by the BIOS. The following choices are available:

- Boot Device Only — Only the removable media drive designated as the boot device will be treated as a fixed disk.

- All Devices — All removable media drives supported by the BIOS will be treated as fixed disk drives.

- Disable — No removable drives will be treated as fixed disks. Software drivers are needed for drives not controlled by the BIOS.

CAUTION: Support for removable drives means only that the BIOS allows for use of a removable drive as if it were a fixed disk drive; it does not mean that the disk media can be removed during operation. Loss of data can occur if the media is removed during operation.

Extended Translation for Drives > 1 GByte

Provides a mechanism for using hard disks with capacities greater than 1 GByte. If this option is enabled, the following translation schemes are used:

- SCSI hard disks ≤ 1 GByte use a translation scheme of 64 heads, 32 sectors per track.

- SCSI hard disks > 1GByte use a translation scheme of 255 heads, 63 sectors per track.

Support More Than Two Drives

Allows BIOS to support more than two SCSI hard disks (supported by DOS 5.0 and above).

SCSI Device Configuration

This option allows you to customize the configuration of the SCSI devices connected on the SCSI bus. Use the cursor keys to move between options. To toggle values for each option, press the **Enter** key.

Enable Disconnection

Allows the device to go off-line while performing an operation. This allows the host adapter to perform other operations on the SCSI bus while the SCSI device is temporarily disconnected.

Initiate Sync Negotiation
Allows the host adapter to attempt to use the faster synchronous protocol for data transfers on the SCSI bus. If deselected, the transfer will be done asynchronously, unless a SCSI device itself requests synchronous negotiation.

Maximum Sync Transfer Rate
Allows selection of the highest data transfer speed that the host adapter will attempt with that peripheral. The host adapter supports rates up to the Fast SCSI maximum of 10 MBytes/sec.

Initiate Wide Negotiation
Allows the host adapter to attempt 16-bit data transfer instead of 8-bit. If deselected, the transfer will be 8-bit unless the SCSI device itself requests Wide negotiation.

Include in BIOS Scan
Allows devices attached to the SCSI bus to be recognized by the host adapter BIOS and installed as devices on the system without the need for device driver software.

Error if Device Not Found
Selects whether the operator will be notified if the BIOS is unable to find the device during the boot procedure.

Send Start Command
Used for devices that require a command to start up after power-on. Most devices do not require this.

Utilities

Select Utilities from the ECU to access the two SCSI utilities that are available with your host adapter.

Disk Format Utility

Accesses the Adaptec SCSI Low-Level Format utility. Most SCSI disk drives are preformatted, and do not need reformatting.

Operating Environment Software

DOS/Windows

Under MS-DOS® 5.0 or higher, up to eight SCSI hard disk drives can be connected to the SCSI bus without additional software (older versions of DOS support up to two hard disk drives). Additional software is required if you desire to do the following:

- Support more than two fixed disk drives under versions of MS-DOS prior to version 5.0.

- Support up to eight fixed disk drives under MS-DOS 5.0 or higher.

- Use devices other than hard disk drives such as SCSI tape drives, CD-ROM, scanners, plotters, etc.

- Treat removable media devices as removable while your computer is running.

Adaptec EZ-SCSI™ Software

If you are running MS-DOS or MS-DOS with Windows, EZ-SCSI I/O Operating Environment Software makes driver installation easier than ever before. Adaptec EZ-SCSI is a menu-driven software package that configures your operating environment automatically.

Novell NetWare®, OS/2®, and UNIX®

You may not need to install additional environment software in order to use your host adapter. Adaptec is working with major operating system suppliers to provide embedded support in their operating systems. Please contact Adaptec or your operating system vendor for information on the current schedule for I/O operating environment software support.

Note: Until embedded support is provided for your particular operating system, host adapter drivers for the AHA-2740W/2742W/2744W may be available from Adaptec. To order Adaptec software, call the number listed in *Adaptec Customer Support*.

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Troubleshooting Checklist

Most problems that might occur during installation can be traced to errors in preparing devices on the SCSI bus. The following suggestions should help you to solve any problems that you may encounter. If a problem occurs during installation, check the following items first:

1   Be sure all SCSI devices are connected to power. Connect internal devices to your computer's power supply; plug external devices into a grounded line power outlet.

2   Be sure all cables are properly connected. Check both power and SCSI interface cables.

3   Be sure the SCSI devices and host adapter are each set to different SCSI IDs.

4   Check SCSI bus termination. The ends of the SCSI bus must be terminated.

5   If you have installed more than one SCSI host adapter, make sure that each is set to a separate BIOS base address, or disable the BIOS on all but one of the host adapters.

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