User's Guide

AHA-2740W / 2742W / 2744W

EISA-to-Fast, Wide SCSI Host Adapters

adaptec®

AHA-2740W/2742W/2744W
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Adaptec products have been specifically developed for easy installation and use. We believe that our documents and the onscreen instructions and help are complete and clear enough to meet your needs. If you need more assistance, please contact us.

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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

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▼▼▼▼ Preface

Inside This Document

This document provides complete instructions on how to install and use the Adaptec AHA®-2740W / 2742W / 2744W EISA-to-Fast, Wide SCSI Host Adapters.

Chapter 1 Introduction
provides general information about the AHA-2740W / 2742W / 2744W host adapters. The features, board layout, and default settings are included.

Chapter 2 Getting Started
has the information needed to install the host adapter and SCSI devices.

Chapter 3 Configuring the Host Adapter
describes the EISA configuration utility and how it is used to configure your host adapter. The chapter also describes the utilities available through the EISA configuration utility.

Chapter 4 Troubleshooting
has information to assist you in troubleshooting problems that may occur during installation and configuration.

Appendix A Specifications
lists technical specifications of the host adapter and its connectors, which may be of use to the advanced user or technician.

Appendix B I/O Operating Environment
provides information on using your host adapter with various operating systems, such as DOS / Windows. A brief discussion on Adaptec's EZ-SCSI™ I/O Operating Environment Software is also included.

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Appendix C Optimizing Performance
has various tips on maximizing the performance of your host adapter.

Appendix D Disk Drives Over 1 GByte
describes Adaptec's extended translation feature which allows you to bypass the DOS 1024 cylinder limit, and supports disk drives up to 8 Gigabytes (GBytes) in size.

Conventions

The following typographic conventions are used throughout this document.

bold
Used for keystrokes (.. press the **Enter** key ..) and screen selection fields (.. select **Backup Device** and ..).

Helvetica
Used for operator entry that must be typed exactly as shown (.. device=c:\adaptec\aspidos.sys ..) and for screen messages (..Enter Password ..).

Helvetica Italics
Used as a place holder for text you must determine and type in (.. enter *nn* for number ..). Also used for program and file names in body text (.. the *autoexec.bat* file ..).

Italics
Used for emphasis (.. is *only* supported ..) and document reference (.. refer to Chapter 1, *Introduction* ..).

Hexadecimal Numbers
Are followed by an 'h', e.g., 330h.

End Mark
The ❒ symbol marks the end of the text for each chapter.

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Advisories

Advisories are quick notes that stress an important point or warn of a potential hazard to your system or your data. This document uses three types of advisories:

Note: Text set off in this way presents reminders, tips, or suggestions which may simplify the assembly and use of the host adapter.

Caution: Failure to observe this type of advisory could result in damage to your system, devices, and/or data.

WARNING: Failure to observe this type of advisory could result in personal injury.

Use caution when handling any electrical equipment. Advisories in this document can only cover the procedures contained here, and not all situations may have been addressed. Adaptec does not claim to have included every condition or situation that might require a Caution or Warning. You must refer to the documentation for your computer peripheral equipment when you are installing equipment or changing its configuration.

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1 Introduction

About This Chapter

Read this chapter to find out

- An overview of the AHA-2740W / 2742W / 2744W EISA-to-Fast SCSI host adapters
- The features of the AHA-2740W / 2742W / 2744W
- The layout of the host adapter and all its major components
- The default settings of the host adapter and how to disable or enable the onboard floppy controller on the AHA-2742W and AHA-2744W

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Overview

This document provides information on how to install and configure the AHA-2740W, AHA-2742W, and AHA-2744W EISA-to-Fast, Wide SCSI host adapters in an EISA computer system.

The AHA-2740W, AHA-2742W and AHA-2744W support 16-bit Wide SCSI via a 68-pin cable. In addition, a 50-pin cable connector is provided to connect 8-bit SCSI devices. The AHA-2742W and AHA-2744W contain an onboard floppy controller.

In this document, the AHA-2740W, AHA-2742W, and AHA-2744W are referred to jointly as the AHA-2740W / 2742W / 2744W.

The AHA-2740W/2742W/2744W Host Adapters

The AHA-2740W / 2742W / 2744W provide a high performance connection between the EISA (Extended Industry Standard Architecture) bus and the Wide SCSI (Small Computer System Interface) bus. The AHA-2740W / 2742W / 2744W is a bus master device that transfers data into host memory at burst rates of 33 MBytes / sec. These transfers are generally 32 bits wide, except when transferring data into 8- or 16-bit memory.

Bus mastering minimizes host CPU overhead, since the AHA-2740W / 2742W / 2744W has an onboard sequencer (SCSI PhaseEngine™) that allows it to independently manage data transfer between SCSI devices and the computer system memory, without requiring the involvement of the CPU. This is the highest performance type of data transfer available for the EISA bus in multitasking operating systems.

The AHA-2740W and AHA-2742W support only single-ended SCSI devices, while the AHA-2744W supports only differential SCSI devices. Most of the SCSI drives on the market today are single-ended.

WARNING: Differential SCSI devices may be damaged if connected to the single-ended SCSI host adapter bus; similarly, single-ended SCSI devices may be damaged if connected to differential host adapters.

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Like all EISA I/O cards, the AHA-2740W/2742W/2744W does not have jumpers to change various EISA configuration options. These options are changed via the EISA configuration utility provided with every EISA system; however, the AHA-2742W and AHA-2744W do have a single jumper (J1) that is used to enable or disable the onboard floppy controller.

Features

Fast Data Transfer Rates

- 16-bit Wide SCSI data transfer
- Up to 33 MBytes/sec burst on EISA bus enabled by large 256-byte FIFO
- 4.0 MBytes/sec asynchronous Wide SCSI data rate
- 10.0 MBytes/sec synchronous Wide SCSI data rate
- 20.0 MBytes/sec synchronous Fast/Wide SCSI data rate

Maximum Off-loading the Host CPU

- Onboard sequencer (SCSI PhaseEngine) automates all SCSI protocol
- Low SCSI processing overhead
- Bus Master DMA implementation
- Task scheduling and message-based communication
- Programmable interrupts
- 32-, 16-, and 8-bit host bus data transfer

Fully Disk Array Capable

- Able to boot from any drive on the SCSI bus
- Background processing permits smooth error recovery
- Extensive support from leading disk array vendors

Advanced Fast SCSI-2/SCSI-3 Implementation

- Concurrent support of both 8-bit SCSI-2 and 16-bit SCSI-3 devices

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- Concurrent support of Fast SCSI, synchronous and asynchronous devices
- Concurrent support of both standard and Fast SCSI devices
- Scatter / Gather operation
- Fully multitasking / multithreading
- Tagged queuing support
- Programmable active SCSI termination
- Multiple LUN support
- Parity handling in Data, Message, and Command phases

Multiple Device and Applications Support

- The AHA-2740W / 2742W / 2744W can be used to install up to 15 SCSI devices
- The AHA-2742W can be used to install up to two floppy disk drives
- The AHA-2740W / 2742W / 2744W BIOS fully supports the extended partitioning capabilities of DOS 3.3 for up to two drives and DOS 5.0 and above for up to eight drives per host adapter
- The AHA-2740W / 2742W / 2744W supports both fixed and removable media devices with capacities above 1 GByte
- Managers and device module software available for all major operating systems

Configuration Flexibility

- One internal 50-pin SCSI connector for connecting standard 8-bit SCSI devices
- Both internal and external 68-pin (P-cable) SCSI-3 connectors for 16-bit Wide SCSI devices
- Configuration utility allows selection of interrupts, BIOS address, SCSI ID, parity checking, synchronous negotiation, and termination

Board Layout

Figure 1-1 shows the location of the major components on the AHA-2740W and AHA-2742W; the table below provides a description of each component.

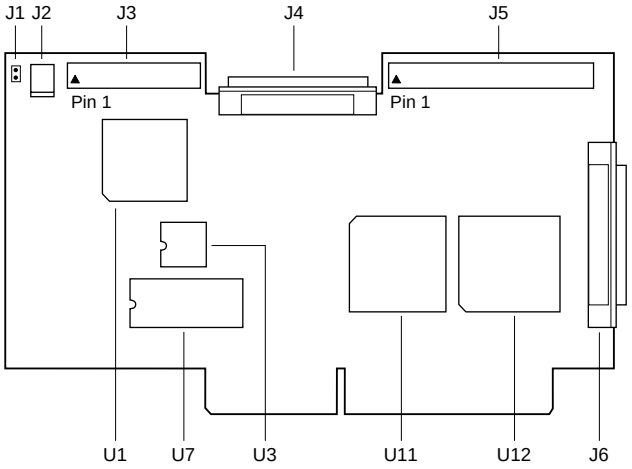

Figure 1-1. Board Layout for the AHA-2740W and AHA-2742W

Location	Description
J1	Floppy Enable Jumper (AHA-2742W Only)
J2	External LED Connector
J3	Floppy Connector (AHA-2742W Only)
J4	16-bit Wide SCSI Channel Internal Connector
J5	8-bit SCSI Channel Internal Connector
J6	16-bit Wide SCSI Channel 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

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Figure 1-1 shows the location of the major components on the AHA-2744W; the table below provides a description of each component.

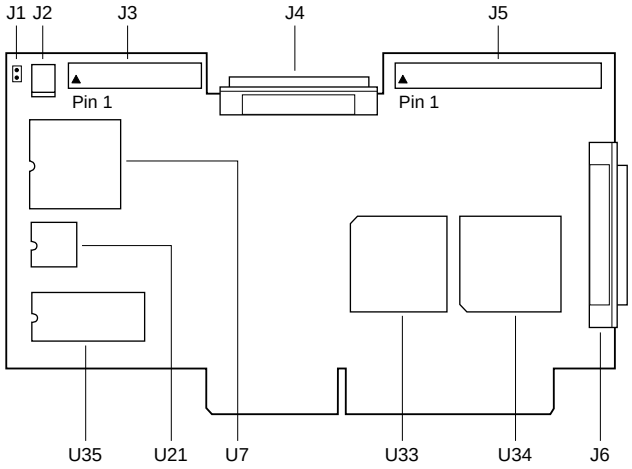

Figure 1-2. Board Layout for the AHA-2744W

Location	Description
J1	Floppy Enable Jumper
J2	External LED Connector
J3	Floppy Connector
J4	16-bit Wide Differential SCSI Channel Internal Connector
J5	8-bit Differential SCSI Channel Internal Connector
J6	16-bit Wide SCSI Channel 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. The table below lists the default settings of your host adapter. Refer to Chapter 3, *Configuring the Host Adapter* for information on changing any of the settings.

Description	Default Setting
Interrupt Level	IRQ 11, Level Sensitive
Bus Release Time	44 BCLKS
Data FIFO Threshold	100%
Host Adapter BIOS Base Address	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
Extended Translation for Drives > 1 GByte	Enabled
Support More Than Two Drives	Disabled
Support Removable Disks as Fixed Disks	Boot Device Only

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

The onboard floppy controller on the AHA-2742W and AHA-2744W is enabled by default and is controlled by jumper J1.

- 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.

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Unpacking and Inspection

Your host adapter should be undamaged when you receive it. The carrier or distributor where you purchased the host adapter is responsible for any damage incurred during storage or shipment.

In case of damage, return the host adapter to your distributor; if the host adapter was delivered to you directly, have the carrier note the damage on both the delivery receipt and the freight bill, then notify the freight company representative so that the necessary insurance claims can be initiated.

Caution: The host adapter is extremely sensitive to static electricity; even a mild shock can destroy a component on the board. Keep the host adapter in its conductive wrapping until you are ready to install it in your system. Before handling the host adapter, always ground yourself by touching the system chassis of your computer.

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2 Getting Started

About This Chapter

Read this chapter to find out

- An overview of the steps involved in installing your host adapter
- A brief discussion about your host adapter and the SCSI bus
- The instructions an experienced user can use to quickly install the host adapter
- The instructions a user who is new to SCSI, or has limited experience, can use to install the host adapter and SCSI devices

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Installation Overview

This chapter provides instructions that guide you through preparing SCSI devices for installation on the SCSI bus, installing the host adapter in the EISA system, connecting the devices to the SCSI bus, cabling and reassembling the system.

For experienced users who are already familiar with SCSI and SCSI installation, refer to *Quick Installation* on page 2-5 for instructions that allow you to get your host adapter up and running quickly.

If you are new to SCSI peripherals, or if you have limited experience installing option boards in your computer, refer to the more comprehensive instructions and illustrations found in *Installation* on page 2-8.

For a brief discussion on how your host adapter works with other SCSI devices on the SCSI bus, refer to *The Host Adapter and the SCSI Bus* on page 2-4.

Installation of your host adapter involves

- Terminating the SCSI bus
- Setting the SCSI ID
- Installing the host adapter board in an EISA system
- Connecting the SCSI cables and SCSI peripheral devices
- Reassembling the system
- Configuring the host adapter with the EISA configuration utility (described in Chapter 3)

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The Host Adapter and the SCSI Bus

The AHA-2740W / 2742W / 2744W acts on your computer's behalf as the host to your suite of SCSI devices. Each chain of SCSI peripheral devices and their host adapter work together, and is referred to as a SCSI bus. When connecting SCSI devices to the SCSI bus, consider the following:

- Each AHA-2740W / 2742W / 2744W installed in your system can be used to form a SCSI bus consisting of up to 15 internal and external SCSI devices.
- The number of host adapters installed in your system is limited only by the number of available EISA slots that support bus master functions.
- As with any standard bus, the wires in a SCSI cable resemble transmission lines which can generate undesirable effects such as signal reflection and uneven loading of the line drivers. To reduce these effects, the SCSI bus must be properly terminated. (Termination on the SCSI bus is discussed in detail later in this chapter.)
- To identify each SCSI device's address, and to determine its priority on the SCSI bus, each SCSI device (including the host adapter) located on the SCSI bus must be set to a unique SCSI ID (0-15 for Wide SCSI devices; 0-7 for standard 8-bit SCSI devices). (SCSI ID setting is discussed in detail later in this chapter.)
- The AHA-2740W / 2742W / 2744W has three cable connectors 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 connector consists of a 68-pin connector. (Cabling the host adapter is discussed in detail later in this chapter.)

Note: Only 8-bit internal SCSI devices can be connected to the 50-pin internal connector. The 68-pin internal and external 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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Quick Installation

The following installation procedures are intended to help experienced users quickly install the AHA-2740W / 2742W / 2744W into an EISA computer system.

If you are new to computer peripheral installation or would like more information, refer to the more comprehensive instructions and illustrations found in *Installation* on page 2-8.

Prepare Your SCSI Devices

Before you physically install the host adapter and connect the SCSI devices, you must prepare your SCSI devices for installation on the SCSI bus.

1. Terminate the last device, and only the last device, that will be connected to *each* SCSI connector on the host adapter.

   The device connected at the end of each SCSI connector must have a set of resistors called *terminators* either installed or enabled. All other SCSI devices installed between the last device and the host adapter must have their terminators either removed or disabled. In addition, termination on the host adapter itself must be properly configured. Refer to Chapter 3, *Configuring the Host Adapter* for instructions.

   Refer to the SCSI device documentation for information on enabling or disabling SCSI termination on other SCSI devices.

2. Verify that each SCSI device located on the SCSI bus is set to a unique SCSI ID (0-7 for standard 8-bit SCSI devices; 0-15 for 16-bit Wide SCSI devices).

   The default value for your host adapter is SCSI ID 7. Normally, the host adapter should always be set to SCSI ID 7, which is the ID that has the highest priority on the SCSI bus.

   Refer to Chapter 3, *Configuring the Host Adapter* for instructions on changing the SCSI ID for the host adapter. Refer to the SCSI device documentation for information on changing the SCSI ID on other SCSI devices.

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Install Your Host Adapter and Peripherals

Once the SCSI bus is properly terminated and each SCSI device is set to a unique SCSI ID, you can physically install your host adapter and SCSI devices.

WARNING: Turn OFF and disconnect power to the system and external equipment before removing the chassis cover or attempting any motherboard modifications.

1. Turn power OFF, unplug your computer and remove the cover.
2. Install the host adapter in an available EISA slot which supports bus master operations (refer to the host system documentation for details).
3. To connect standard internal 8-bit SCSI devices, use a 50-pin SCSI ribbon cable to connect the first SCSI device to the 50-pin connector on the host adapter. Make sure to align pin 1 of the cable with pin 1 of the connectors on the host adapter and internal SCSI device.

   To connect additional internal 8-bit SCSI devices, you will need to obtain a 50-pin SCSI ribbon cable with enough connectors to accommodate all of your internal SCSI devices.

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

4. To connect internal 16-bit Wide SCSI devices, use a 68-pin SCSI ribbon cable with 68-pin P-cable connectors to connect the first internal Wide SCSI device to the internal Wide SCSI connector on the host adapter.

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To connect additional internal Wide SCSI devices, you will need to obtain a 68-pin SCSI ribbon cable with enough 68-pin connectors to accommodate all of your internal Wide SCSI devices.

5 To connect external 16-bit Wide SCSI devices, use a 68-pin shielded cable with 68-pin P-cable connectors to connect the first external Wide SCSI device to the external Wide SCSI connector on the host adapter.

To connect subsequent external Wide SCSI devices, you will need to obtain additional 68-pin shielded cables to chain the devices together.

Note: Only two of the three SCSI connectors can have devices connected at any one time. Connecting devices to all three connectors will result in an improperly terminated SCSI bus. The total number of SCSI devices that can be connected to the host adapter is 15.

6 If you are using the floppy controller on the AHA-2742W and AHA-2744W, connect one end of the 34-pin floppy ribbon cable to the floppy connector on the host adapter; connect the other end to the connector on the first floppy drive (Drive *A*).

To connect a second floppy drive, plug the middle connector of the floppy ribbon cable to the connector on the second floppy drive (Drive *B*).

7 Reinstall your cover and reconnect all system and peripheral power cables.

Configure the Host Adapter

All EISA computer systems are shipped with a software program generally known as the EISA Configuration Utility (ECU). Run the ECU to configure your host adapter for operation in your EISA computer system. Chapter 3, *Configuring the Host Adapter* provides a comprehensive description of how the utility works; however, the basic steps involved include the following:

1 Run the ECU as instructed by the EISA system vendor.

2 Copy the *!adp7771.cfg* configuration file and *adp7770.ovl* overlay file needed to configure your host adapter with your

EISA system from the diskette that came with your host adapter to either the bootable ECU diskette or to the directory on your hard disk where the utility is located.

3 Select the option in the ECU that allows you configure the EISA slot in which the host adapter is installed.

4 Configure the host adapter parameters.

Installation

This section is intended primarily for users who are new to SCSI peripherals, or have limited experience in installing an option board in their computer system.

Note: Experienced users may want to refer to *Quick Installation* on page 2-5.

The comprehensive instructions in this section guide you through terminating the SCSI bus, setting the SCSI ID, installing the host adapter, and connecting peripherals and cables.

Once the host adapter is properly installed in your EISA system, you will have to configure it as explained in Chapter 3, *Configuring the Host Adapter*.

To assist you with installation, Figure 2-1 shows the location of all the connectors on the host adapter.

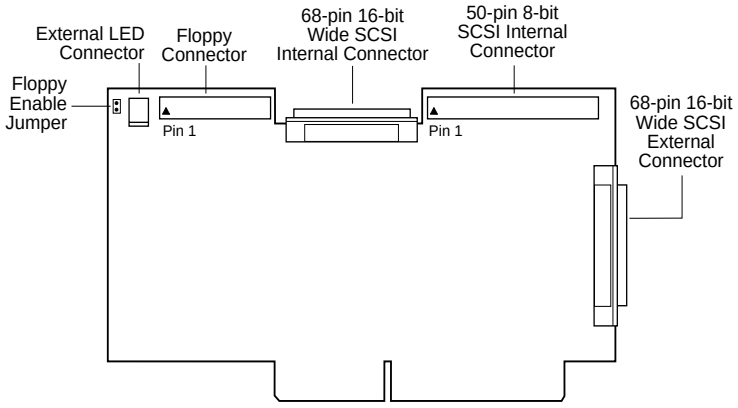

Figure 2-1. Connectors on the Host Adapter

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Termination on the SCSI Bus

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

Most SCSI devices use a jumper or a switch located close to their SCSI connector(s) to control termination. On some SCSI devices, you will have to physically remove resistor module(s). Refer to the manufacturer's documentation to determine how to enable or disable termination on your particular SCSI device(s).

Note: When terminating differential drives, the hard drive should be in the middle of the SCSI bus because most differential drives do not have termination jumpers. Termination must be enabled on the host adapter and at the end of the cable by a cable terminator.

Note: Some drives allow for the option of supplying termination power to their resistor modules from the SCSI bus instead of from the drives power supply. This option is acceptable since the AHA-2740W / 2742W / 2744W always supplies termination power on the SCSI bus.

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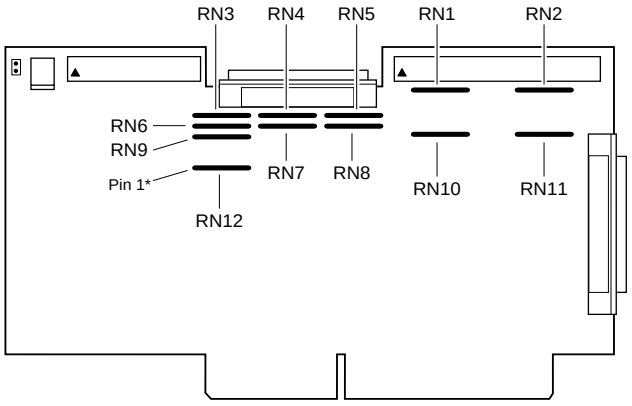
For the AHA-2740W and AHA-2742W, host adapter termination is determined by which SCSI connectors have SCSI devices connected, is software selectable only, and is done through your computer's EISA configuration utility. Refer to Chapter 3, *Configuring the Host Adapter* for instructions. The table below describes the possible configurations for host adapter termination.

	Host Adapter Termination	
Devices Connected To Host Adapter	**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	

For the AHA-2744W, host adapter termination is configured by installing/removing the Resistor Networks (RNs). Figure 2-2 shows the location of the RNs on the AHA-2744W. The following table describes the possible RN configurations.



* Pin 1 is always on the left side of the resistor

Figure 2-2. Location of Resistor Networks on the AHA-2744W

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Install[1]	Remove	Low	High
None	From RN1 to RN12	OFF	OFF
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	ON	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	OFF	ON

[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 a 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.

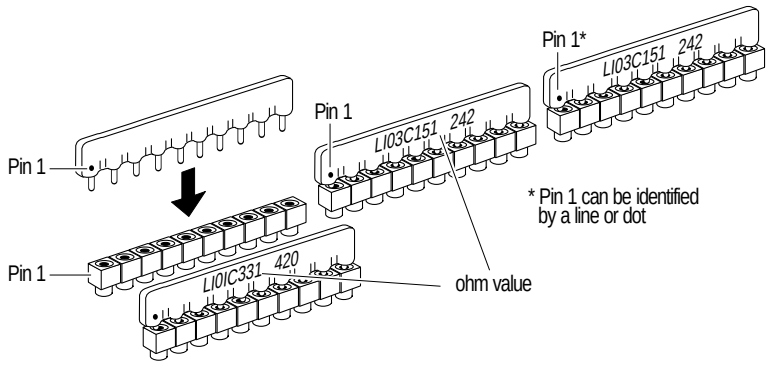

Figure 2-3. Pin-1 Orientation on Resistor Networks

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68-pin Internal Connector Only

When only the 68-pin internal connector has SCSI devices connected, the last SCSI device must be terminated. The host adapter low and high bytes must be set to ON.

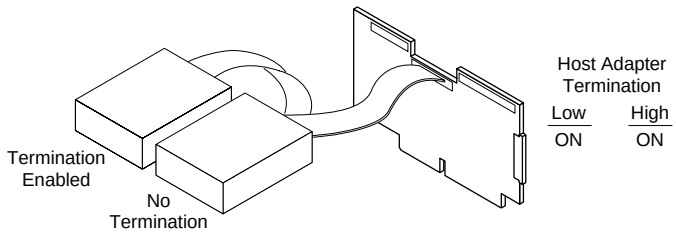

Figure 2-4. Internal Wide SCSI Devices Only

68-pin External Connector Only

When only the 68-pin external connector has SCSI devices connected, the last SCSI device must be terminated. The host adapter low and high bytes must be set to ON.

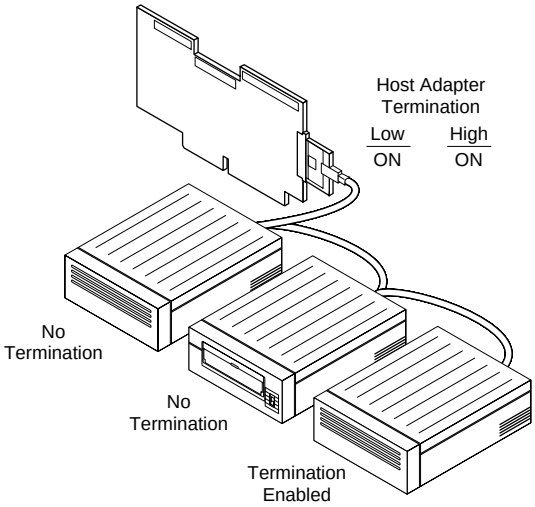

Figure 2-5. External Wide SCSI Devices Only

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68-pin Internal and 68-pin External Connectors

When both the 68-pin internal and external connectors have SCSI devices connected, the last SCSI device connected to each connector must be terminated. The host adapter low and high bytes must be set to OFF.

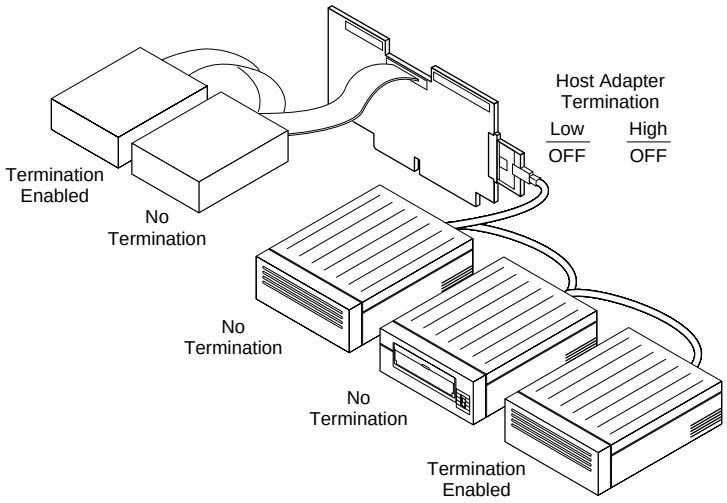

Figure 2-6. Internal and External Wide SCSI Devices

50-pin Internal Connector Only

When only the 50-pin internal connector has SCSI devices connected, the last SCSI device must be terminated. The host adapter low and high bytes must be set to ON.

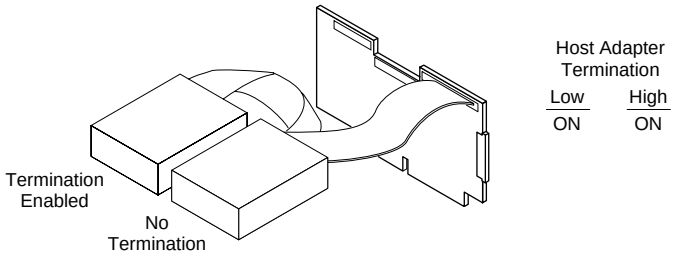

Figure 2-7. Internal 8-bit SCSI Devices Only

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50-pin and 68-pin Internal Connectors

When both the 50-pin and 68-pin internal connectors have SCSI devices connected, the last SCSI device connected to each connector must be terminated. The host adapter low byte must be set to OFF and the high byte set to ON.

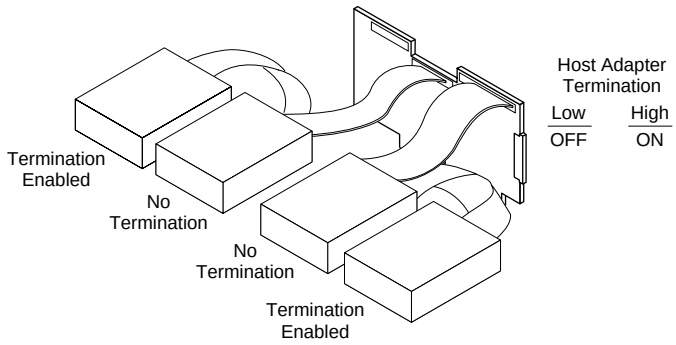

Figure 2-8. Internal 8-bit and Internal Wide SCSI Devices

50-pin Internal and 68-pin External Connectors

When both the 50-pin internal and 68-pin external connectors have SCSI devices connected, the last SCSI device connected to each connector must be terminated. The host adapter low byte must be set to OFF and the high byte set to ON.

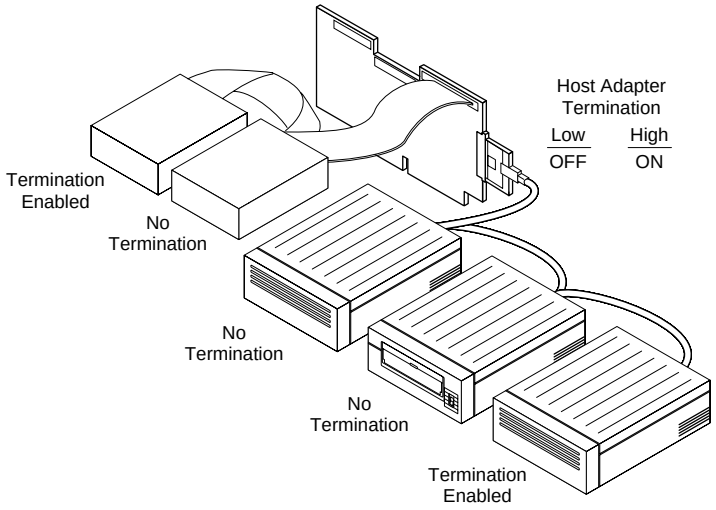

Figure 2-9. Internal 8-bit and External Wide SCSI Devices

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50-pin and 68-pin Internal Connectors, and 68-pin External Connector

This is an *invalid* setup; only two of the three SCSI connectors can have SCSI devices connected at any one time.

Note: Any configuration utilizing all three SCSI connectors will result in an improperly terminated SCSI bus.

SCSI ID Setting

Each SCSI device (including the host adapter) located on the SCSI bus must be set to a unique SCSI ID. The SCSI ID serves two purposes: it uniquely defines each SCSI device's address on the bus, and it determines the device's priority on the bus during the Arbitration phase. The Arbitration phase determines which device will own the bus when two or more devices simultaneously request to use it.

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

When selecting the SCSI ID, consider the following:

- The default value for your host adapter is SCSI ID 7. Normally, the host adapter should always be set to SCSI ID 7, which is the ID that has the highest priority on the SCSI bus.
- Standard 8-bit SCSI devices can be assigned IDs that range from 0 to 7; SCSI ID 7 has the highest priority, and SCSI ID 0 has the lowest.
- 16-bit Wide SCSI devices and the host adapter can be assigned IDs that range from 0 to 15. SCSI IDs 0-7 have higher priority over SCSI IDs 8-15. SCSI ID 7 has the highest priority, and SCSI ID 8 has the lowest.
- 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 hard disk drive.
- 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 Chapter 3, *Configuring the Host Adapter* for instructions.

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

Installing the Host Adapter

To install the host adapter in your EISA system, the chassis cover must be removed and the motherboard exposed. *Always* refer to your EISA system documentation for instructions on removing the chassis cover and adding option boards, such as the AHA-2740W / 2742W / 2744W.

WARNING: Turn OFF and disconnect power to the system and external equipment before removing the chassis cover or attempting any motherboard modifications.

To install the AHA-2740W / 2742W / 2744W in your EISA computer system, follow these steps:

1. Remove the cover of your EISA computer system 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 computer system documentation for details) and remove the corresponding slot cover.
3. Carefully remove the host adapter from the antistatic bag. Place the host adapter on top of the bag if you need to set it down.
4. Align and insert the host adapter in the EISA slot.
5. Secure the host adapter in your system.

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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 connectors 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 connector 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 external 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.

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, while only *differential* SCSI devices are supported by the AHA-2744W host adapters. *Differential* SCSI devices may be damaged if connected to the single-ended SCSI host adapter bus. Similarly, *single-ended* SCSI devices may be damaged if connected to differential host adapters. Most SCSI devices currently produced are single-ended SCSI devices. Consult your SCSI device user documentation.

Connecting Standard 8-bit Internal SCSI Devices

Standard 8-bit internal SCSI devices use a 50-pin flat SCSI ribbon cable with a 50-pin header internal connector. The cable has connectors at each end and additional connectors attached in the middle. One end of the cable is attached to the internal 50-pin SCSI connector on the host adapter, and the 8-bit internal SCSI devices are

attached to the remaining connectors. Up to seven internal 8-bit devices can be connected to the 50-pin SCSI connector.

Note: Only two of the three SCSI connectors on the AHA-2740W / 2742W / 2744W 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.

Note: Refer to the manufacturer's instructions to install and mount internal SCSI devices inside your computer chassis.

To connect internal SCSI devices, follow these steps:

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1 Connect one end of the 50-pin SCSI ribbon cable to the 50-pin internal SCSI connector on the host adapter.

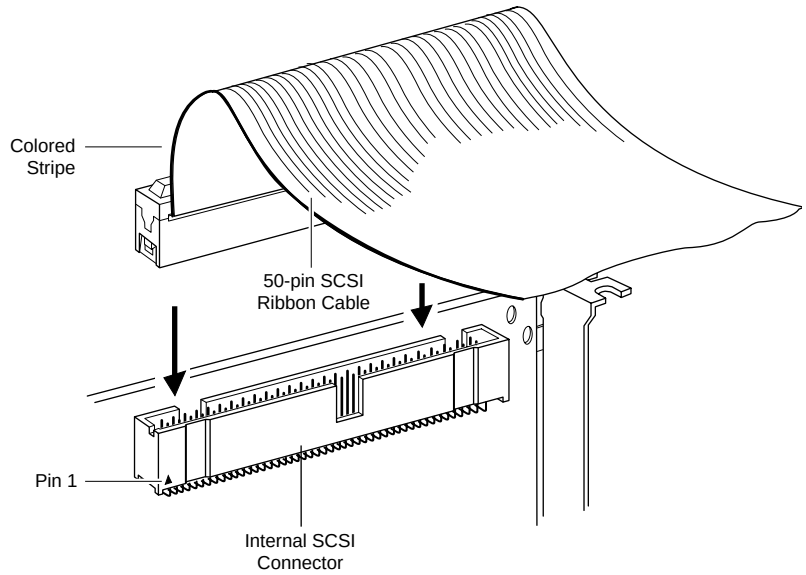

Figure 2-10. 50-pin SCSI Ribbon Cable to Host Adapter

2 Connect the other end of the 50-pin SCSI ribbon cable to the SCSI connector on the internal SCSI device.

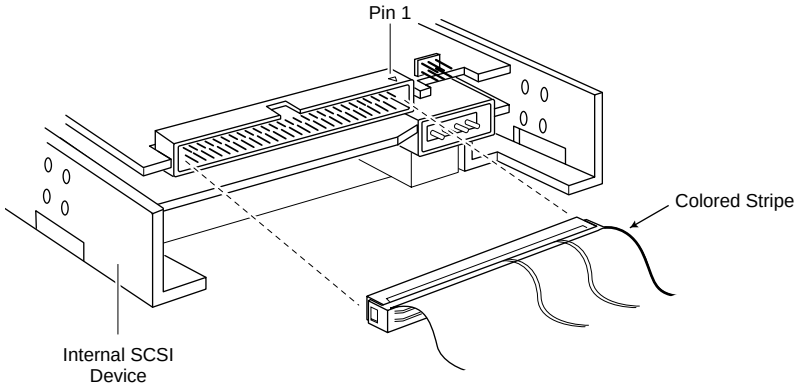

Figure 2-11. 50-pin SCSI Ribbon Cable to Internal SCSI Device

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3 To connect a second internal SCSI device, plug the middle connector of the SCSI ribbon cable to the SCSI connector on the second internal SCSI device.

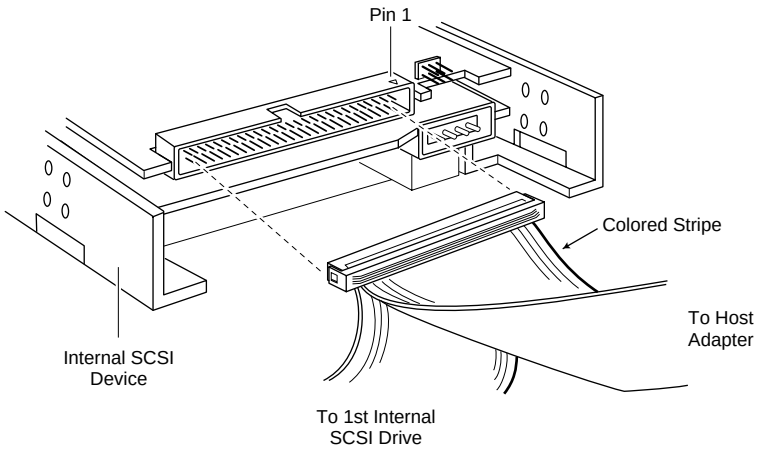

Figure 2-12. Connecting a Second Internal SCSI Device

4 To connect three or more internal 8-bit SCSI devices to a SCSI bus, obtain a 50-pin SCSI ribbon cable with enough connectors to accommodate all of your internal 8-bit SCSI devices.

Connecting 16-bit Internal Wide SCSI Devices

16-bit internal Wide SCSI devices use a 68-pin flat SCSI ribbon cable with P-cable connectors and are connected to the host adapter in the same manner as standard 8-bit SCSI devices. The cable has connectors at each end and additional connectors attached in the middle. One end of the cable is attached to the internal 68-pin Wide SCSI connector on the host adapter, and the Wide SCSI devices are attached to the remaining connectors. Internal Wide cable connectors are keyed and can only be plugged in one way; pin-1 orientation is automatic. Up to 15 internal Wide SCSI devices can be connected to the 68-pin internal SCSI connector.

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Note: Only two of the three SCSI connectors on the AHA-2740W / 2742W / 2744W can have devices connected at any one time. The total number of SCSI devices that can be connected to the host adapter is 15.

To connect internal Wide SCSI devices, follow these steps:

1. Connect one end of the 68-pin Wide SCSI ribbon cable to the internal 68-pin Wide SCSI connector on the host adapter.

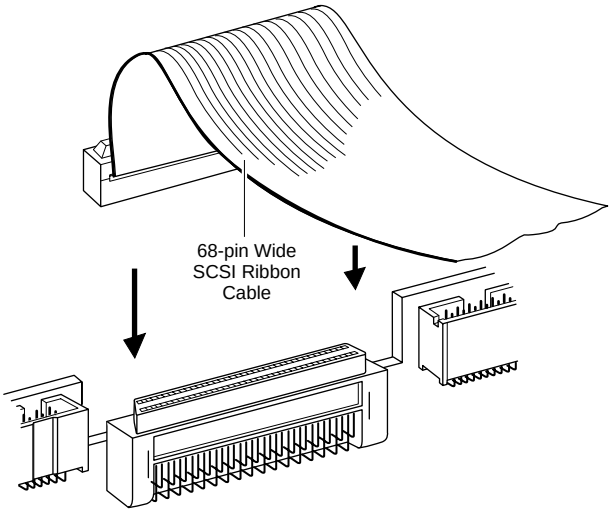

Figure 2-13. 68-pin Internal Cable to Host Adapter

2 Connect the other end of the 68-pin Wide SCSI ribbon cable to the connector on the internal Wide SCSI device.

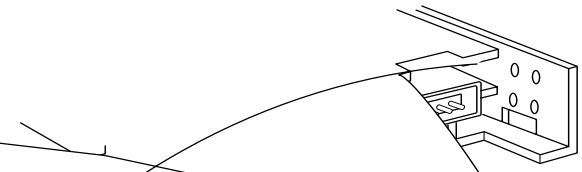

Figure 2-14. 68-pin Internal Cable to Internal Wide SCSI Devic

3 To connect two or more internal Wide SCSI devices to bus, obtain a 68-pin Wide SCSI ribbon cable with enoug nectors to accommodate all of your internal Wide SCSI de Connect each Wide SCSI device to the additional connect

Connecting 16-bit External Wide SCSI Devices

External devices are usually daisy-chained to the host adapter. Th means that a simple two-ended cable runs from the host adapter the connector on the first external device. A second connector or

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back of the external device allows another cable to connect it with the second device in the chain. Up to 15 external Wide SCSI devices can be connected to the 68-pin external connector.

Note: Only two of the three SCSI connectors on the AHA-2740W / 2742W / 2744W 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.

To connect external SCSI devices:, follow these steps:

1. Connect one end of the 68-pin external Wide SCSI cable to the host adapter external connector.

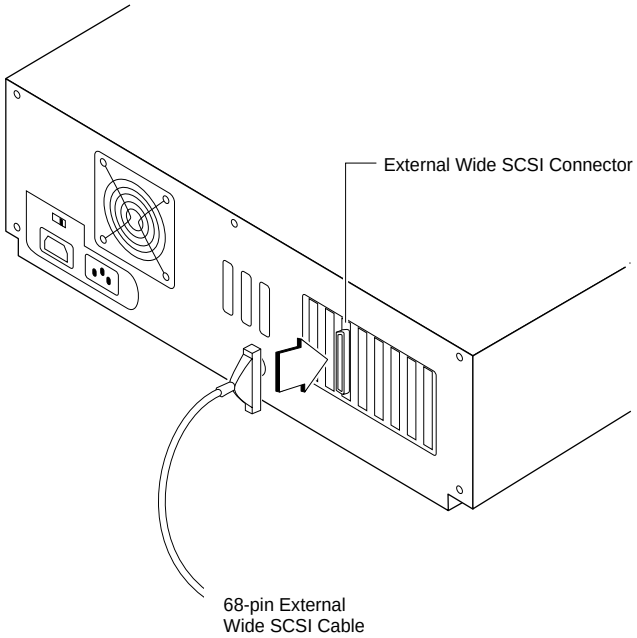

Figure 2-16. 68-pin External Cable to Host Adapter

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2 Connect the other end of the 68-pin external cable to either one of the SCSI connectors on the Wide SCSI device.

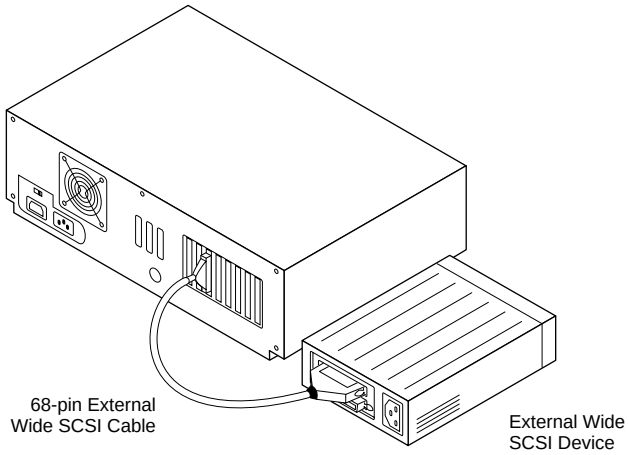

Figure 2-17. 68-pin External Cable to Wide SCSI Device

3 To connect subsequent external Wide SCSI devices, obtain additional external cables and chain each device to the previous device until all external SCSI devices have been connected.

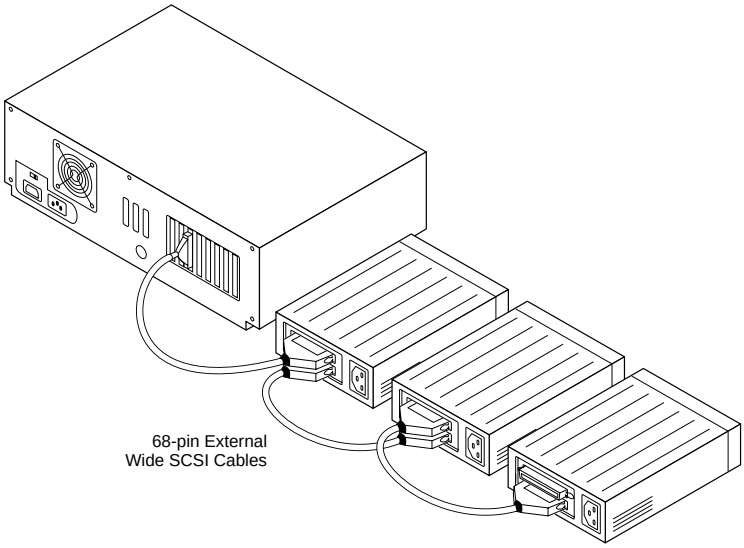

Figure 2-18. Connecting Multiple External Wide SCSI Devices

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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.

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.

When connecting your floppy drives, make sure to maintain pin-1 orientation as previously described in *Maintaining Pin-1 Orientation* on page 2-18.

Note: 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.

To connect floppy diskette drives, follow these steps:

1. Connect one end of the 34-pin floppy ribbon cable to the floppy connector on the host adapter.

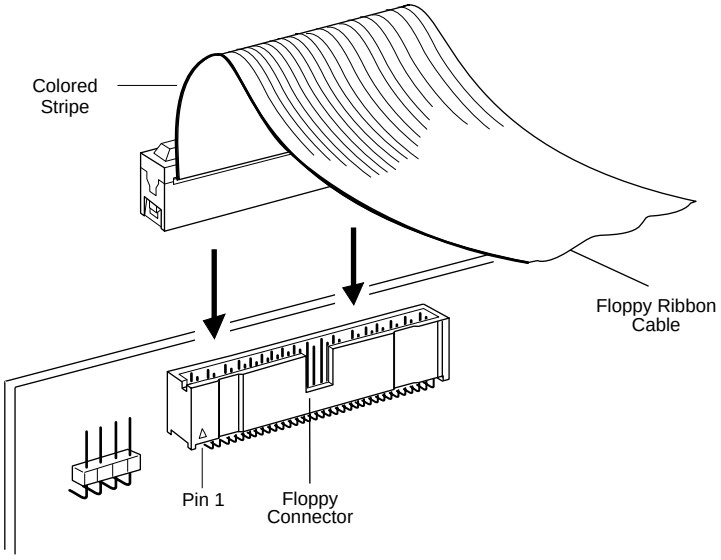

Figure 2-19. 34-pin Floppy Cable to Host Adapter

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2 Connect the other end of the 34-pin floppy ribbon cable to the connector on the first floppy drive (Drive *A*).

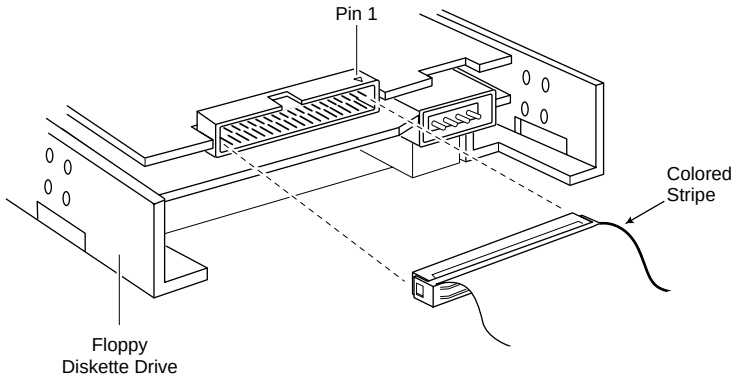

Figure 2-20. 34-pin Floppy Cable to First Floppy Drive

3 To connect a second floppy drive, plug the middle connector of the floppy ribbon cable to the connector on the second floppy drive (Drive *B*).

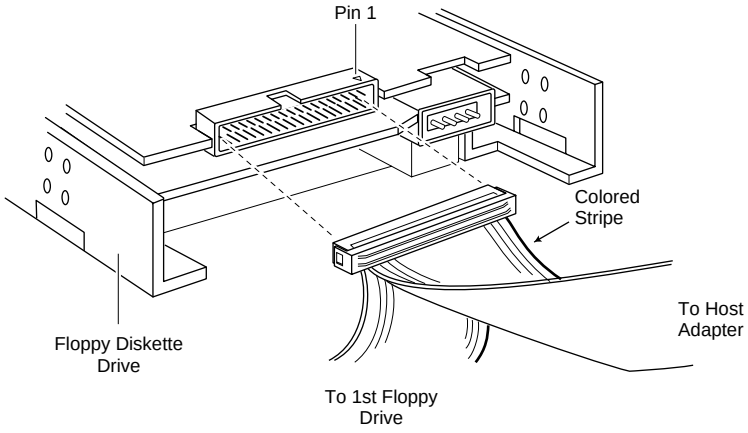

Figure 2-21. Connecting a Second Floppy Drive

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SCSI Bus Activity LED Connector

Most computer systems have a disk drive activity light, usually an LED (Light Emitting Diode) on the front panel. If you connect your system's LED cable to the host adapter, the LED will light to indicate data transfer on the SCSI bus.

Note: If you connect your computer's LED to the host adapter, the LED will no longer indicate non-SCSI disk activity. So you may not want to use this feature if you are running non-SCSI disk drives.

To connect the SCSI bus LED connector, follow these steps:

1. Refer to your system's documentation to locate and unplug the LED cable from the connector on the system board.
2. Connect the LED cable to the SCSI activity LED connector (J2) on the host adapter.

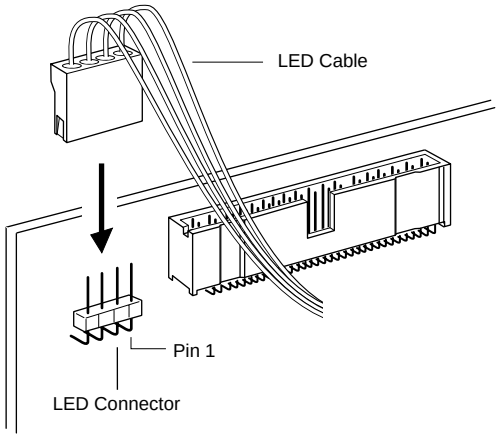

Figure 2-22. SCSI LED Connector

Note: On systems with a two position LED cable, connect the LED cable to pins 1 and 2 of the LED connector.

Before Rebooting Your System

Before rebooting your system and configuring your host adapter, make sure the following is completed:

1. The SCSI bus is properly terminated.
2. Each SCSI device on the SCSI bus is set to a unique SCSI ID (0-15 for Wide SCSI devices and the host adapter; 0-7 for standard 8-bit SCSI devices).
3. The host adapter is firmly seated in the host computer's EISA slot.
4. 8-bit internal SCSI devices are connected to the host adapter with a 50-pin SCSI ribbon cable and that proper pin-1 orientation is maintained.
5. 16-bit internal Wide SCSI devices are connected to the host adapter with a 68-pin Wide SCSI ribbon cable.
6. 16-bit external Wide SCSI devices are connected to the host adapter with a 68-pin external Wide SCSI cable.
7. If using the onboard floppy controller on the AHA-2742W and AHA-2744W, the floppy diskette drive is connected to the host adapter with the 34-pin SCSI ribbon cable and that proper pin-1 orientation is maintained.
8. All system and power cables are properly connected.

Reassemble the System

Refer to your system and SCSI device documentation to replace the system cover and connect all system and SCSI device power cables.

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3 Configuring the Host Adapter

About This Chapter

Read this chapter to find out

- The steps involved in configuring your host adapter with the EISA configuration utility provided with your EISA system
- The host adapter parameters that can be configured
- The options available to configure the host adapter BIOS and the devices connected to the host adapter
- The utilities available in the EISA configuration utility

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▼▼▼▼ 3

The EISA Configuration Utility

All EISA machines are shipped with a bootable EISA configuration diskette that contains a software program generally known as the EISA Configuration Utility (ECU). This utility is used to automate the configuration of the motherboard and all option boards installed in your EISA system.

The ECU must be run every time an adapter card is physically added, removed, or moved. The ECU operates on the information provided by the *.cfg* (configuration) files and *.ovl* (overlay) files that accompany the EISA system board and/or adapter card.

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

Depending on the ECU supplied with your system, host adapter configuration will vary; however, the basic steps include the following:

- Run the ECU.
- Copy the configuration and overlay files.
- Select the host adapter.
- Configure the host adapter parameters.
- Configure BIOS and SCSI devices.
- Exit the ECU.

Note: The screens displayed in this chapter may vary from the screens displayed by the ECU supplied with your system.

Run the EISA Configuration Utility

Run the ECU as instructed by the EISA system vendor.

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Place the bootable EISA configuration diskette in an operative drive and reset the system to boot from this diskette. If you have the ECU installed on your hard disk, reboot your system and run it from your hard disk.

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 copy the *!adp7771.cfg* and the *adp7770.ovl* files from the host adapter diskette to either the bootable EISA configuration diskette or to the directory on your hard disk where the ECU is located.

If the configuration utility does not provide such an option, use the DOS Copy command to copy these files.

Select the Host Adapter

Once the configuration and overlay files have been copied, choose the option in the ECU that allows you to configure the EISA slot in which the host adapter is installed. If necessary, scroll down the screen until you find a screen that lists the host adapter and its parameters and looks similar to Figure 3-1.

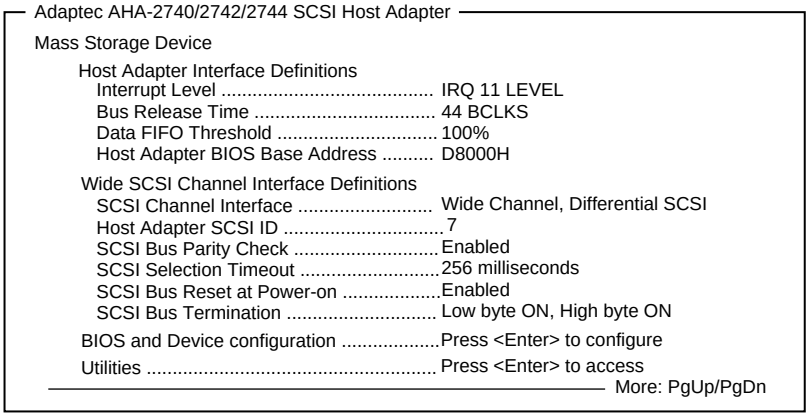

Figure 3-1. Host Adapter Parameters

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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

Select **Interrupt Level** to configure the interrupt channel (IRQ) used by the host adapter. Figure 3-2 displays your choices. The default setting is *IRQ 11*.

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.

Note: The IRQ cannot be shared with ISA mode SCSI host adapters such as the Adaptec AHA-1540 and AHA-1520 Series adapters. If those adapters are installed in your EISA system, they must be assigned unique IRQs.

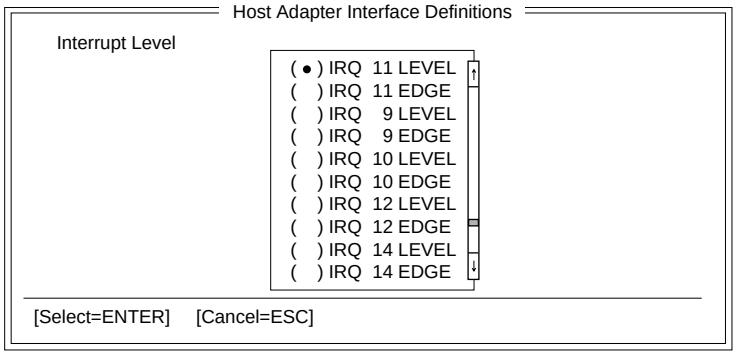

Figure 3-2. Interrupt Level Selection

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Bus Release Time

Select **Bus Release Time** to configure the amount of time, in BCLKS (Bus Clocks), the host adapter will continue to transfer data *after* being pre-empted in Bus Master mode. Figure 3-3 displays your choices. The default setting is *44 BCLKS*.

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.

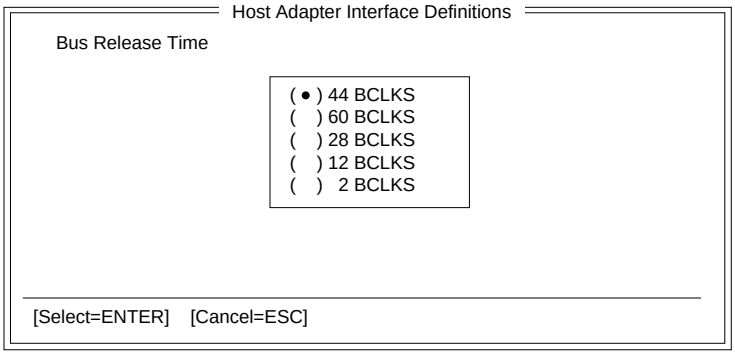

Figure 3-3. Bus Release Time Selection

Data FIFO Threshold

Select **Data FIFO Threshold** to configure the percentage used by the host adapter. Figure 3-4 displays your choices. The default setting is *100%*.

Normally a Data FIFO Threshold of 100% is optimum.

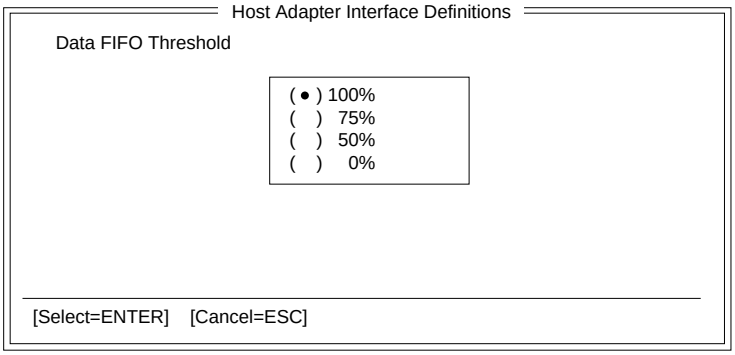

Figure 3-4. Data FIFO Threshold Selection

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Host Adapter BIOS Base Address

Select **Host Adapter BIOS Base Address** to configure the BIOS base address for the host adapter, or to disable the host adapter BIOS. Figure 3-6 displays your choices. The default setting is a base address of *D8000h*.

When choosing the base address, verify that there is no conflict with other devices using the same address–often the configuration utility will notify you if there is a conflict.

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

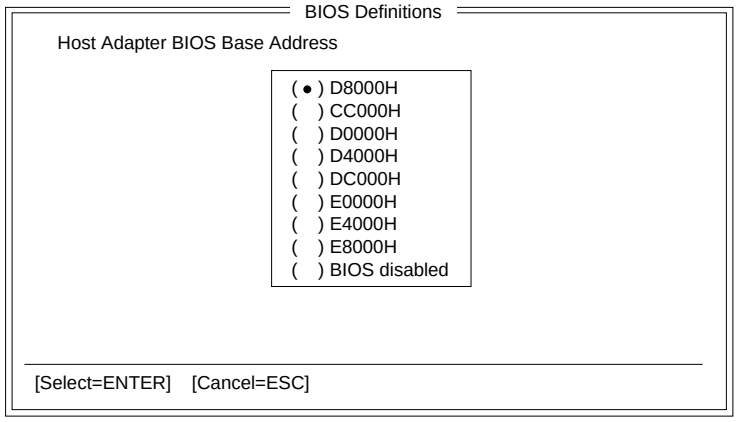

Figure 3-5. Host Adapter BIOS Base Address Selection

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Wide SCSI Channel Interface Definitions

Select **Wide SCSI Channel Interface Definitions** to display the following screen. Only one function displays and no other choices are available.

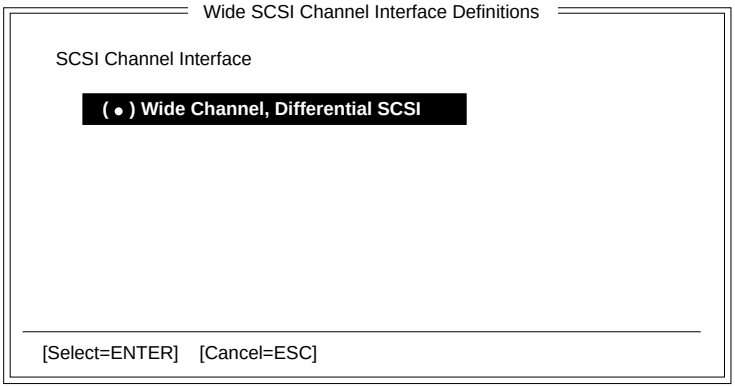

Figure 3-6. Wide SCSI Channel Interface Definitions

Host Adapter SCSI ID

Select **Host Adapter SCSI ID** to configure the SCSI ID (0-15) setting for the host adapter. Figure 3-7 displays your choices. The default setting is *7*.

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

Each installed SCSI device must have a unique SCSI ID. SCSI ID 7 is normally assigned to the host adapter; SCSI IDs 0 and 1 should be reserved for SCSI hard disk drives.

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If two host adapters are installed, each would have its own SCSI bus, thus each host adapter would still be set to SCSI ID 7. Refer to *SCSI ID Setting* on page 2-15 for additional information on SCSI ID.

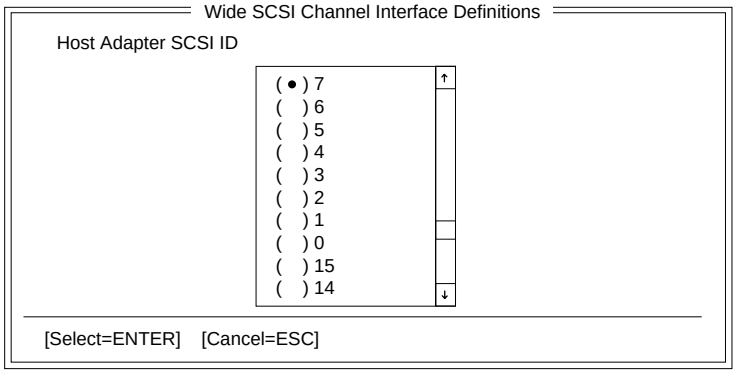

Figure 3-7. Host Adapter SCSI ID Selection

SCSI Bus Parity Check

Select **SCSI Bus Parity Check** to enable or disable SCSI bus parity checking on the host adapter. Figure 3-8 displays your choices. The default setting is *Enabled*.

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.

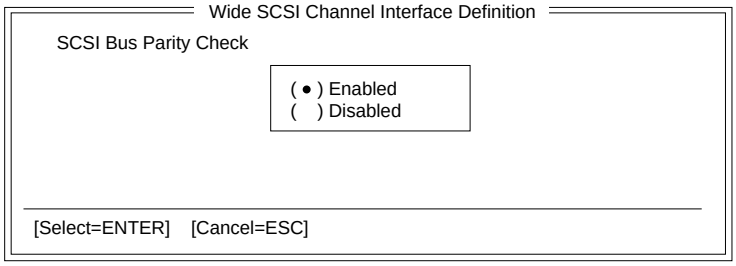

Figure 3-8. SCSI Bus Parity Check Selection

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SCSI Selection Timeout

Select **SCSI Selection Timeout** to configure the time, in milliseconds, used by the host adapter during the SCSI Selection phase. Figure 3-9 displays your choices. The default setting is *256 milliseconds.*

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.

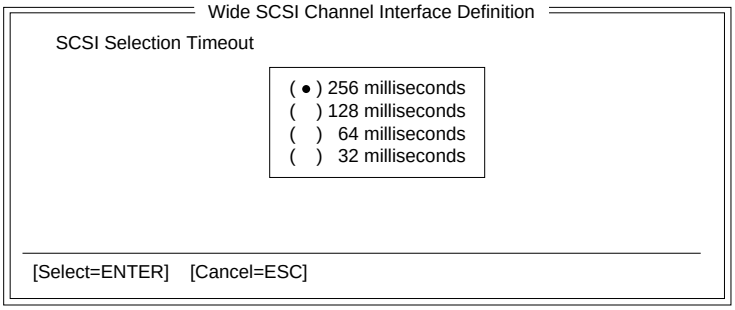

Figure 3-9. SCSI Selection Timeout Selection

SCSI Bus Reset at Power-on

Select **SCSI Bus Reset at Power-on** to enable or disable a SCSI bus reset generated by the host adapter during its power-on initialization, and after a hard reset. Figure 3-10 displays your choices. The default setting is *Enabled.*

Normally, SCSI Bus Reset at Power-on should always be enabled.

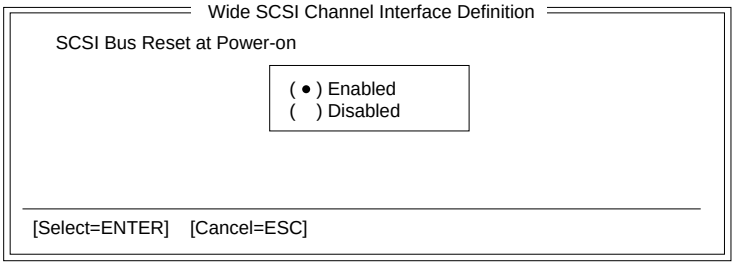

Figure 3-10. SCSI Bus Reset at Power-on Selection

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SCSI Bus Termination (AHA-2740W and AHA-2742W Only)

Select **SCSI Bus Termination** to configure SCSI termination on the host adapter. Figure 3-11 displays your choices. The default setting is *ON* for both the Low and High byte.

Host adapter termination is determined by which SCSI connectors on the AHA-2740W / 2742W have SCSI devices connected. Refer to *Termination on the SCSI Bus* on page 2-9 for configuration options.

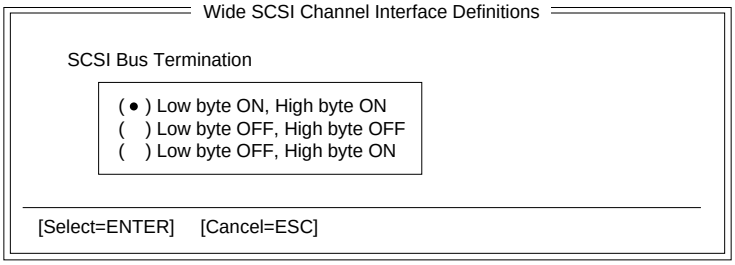

Figure 3-11. SCSI Bus Termination Selection

BIOS and Device Configuration

Select **BIOS and Device Configuration** to configure the BIOS and SCSI device options. Figure 3-12 displays your choices.

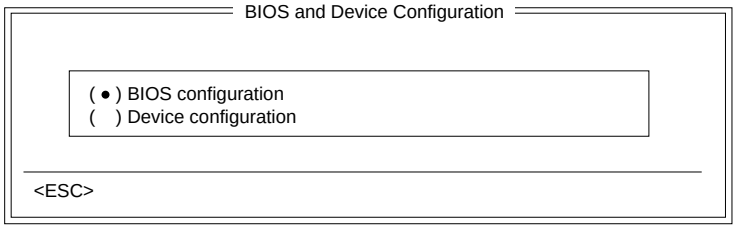

Figure 3-12. BIOS and Device Configuration

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BIOS Configuration

BIOS Configuration allows you to configure the host adapter BIOS. Figure 3-13 displays your choices. Use the cursor keys to move between options. To toggle values for each option, press the **Enter** key.

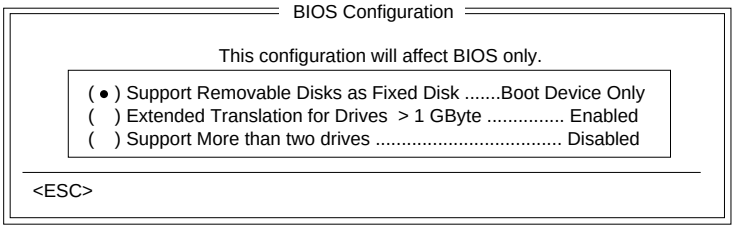

Figure 3-13. BIOS Configuration Selection

Support Removable Disks as Fixed Disk

This option allows you to configure removable media drives supported by the BIOS. The default setting is *Boot Device Only*. 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.

Disabled – No removable drives will be treated as fixed disks. In this situation, software drivers are needed because the drives are not controlled by the BIOS.

Note: Support for removable drives means that only 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. Removing the media during operation can result in the loss of data.

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Extended Translation for Drives > 1 GByte

This option allows you to enable or disable extended translation for SCSI hard disks with a capacity greater than 1 GByte. The default setting is *enabled*. Appendix D, *Disk Drives Over 1 GByte* discusses the extended translation feature in detail.

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 > 1 GByte use a translation scheme of 255 heads, 63 sectors per track

Note: Enabling this option for operating systems that do not need extended translation (e.g., NetWare® 386 and UNIX®) can cause drive failure and / or data loss)

Support More than Two Drives

This option allows you to enable or disable BIOS support for more than two SCSI hard disks (supported by DOS 5.0 and above). The default setting is *Disabled*.

Device Configuration

Device Configuration allows you to customize the configuration of each SCSI device connected on the SCSI bus. When this option is selected, a screen similar to Figure 3-14 is displayed. All SCSI IDs are displayed on the screen even if no SCSI device is attached; however, to configure a specific SCSI device, you will need to know which SCSI ID corresponds to that SCSI device.

Use the cursor keys to move between options. To toggle values for each option, press the **Enter** key.

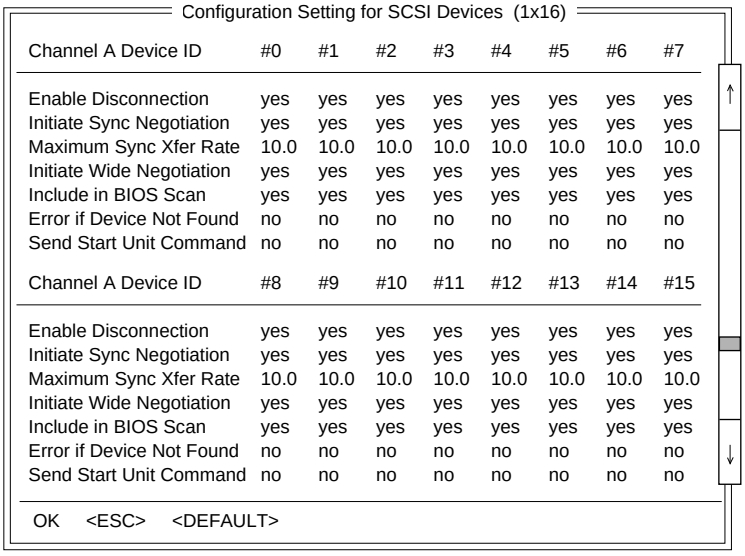

Figure 3-14. SCSI Device Configuration

Enable Disconnection

This option is used to determine whether or not the host adapter will allow a SCSI device to disconnect from the SCSI bus (sometimes referred to as disconnect / reconnect). This allows the host adapter to perform other operations on the SCSI bus while the SCSI device is temporarily disconnected.

When set to *yes*, the SCSI device may disconnect from the SCSI bus. The SCSI device, however, may choose not to disconnect, even if allowed to by the host adapter (this is usually configurable on the SCSI device). When set to *no*, the SCSI device will not be allowed to disconnect from the SCSI bus. The default setting is *yes*.

In general, disconnect should be allowed for the most efficient SCSI bus utilization and highest overall system performance. If only one SCSI device is attached to the SCSI host adapter, disconnects are not required for efficient SCSI bus utilization since only one SCSI device is using the SCSI bus. A slight performance increase may be realized if disconnect is not allowed in this case, due to the decreased SCSI

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overhead. In multidevice environments, disconnect should normally be enabled to take advantage of the disconnect / reconnect feature.

If a particular SCSI device does not support disconnect / reconnect, then Enable Disconnection should be disabled (set to *no*). If a particular SCSI device does support disconnect / reconnect, then Enable Disconnection should be enabled (set to *yes*). Most SCSI devices today do support disconnect / reconnect.

Initiate Sync Negotiation

This option determines whether or not the host adapter will initiate synchronous negotiation with the SCSI device.

When set to *yes*, the host adapter will initiate synchronous negotiation with the SCSI device. When set to *no*, the host adapter will not initiate synchronous negotiation with the SCSI device. The host adapter, however, will always respond to synchronous negotiation initiated from the SCSI device. The default setting is *yes*.

If neither the host adapter nor the SCSI peripheral negotiate for synchronous data transfers, all data transfers will be asynchronous.

Note: Some older SCSI-1 devices may have trouble handling synchronous negotiation, which may result in erratic behavior or a hang condition. For these devices, set Initiate Sync Negotiation to *no*.

Maximum Sync Xfer Rate

This option determines the maximum synchronous transfer rate (MBytes / sec), that the host adapter will support. The host adapter supports rates up to the Fast SCSI maximum of 10 MBytes / second. The default value is *10.0 MBytes/sec*. Valid values are 10.0, 8.0, 6.67, 5.7, 5.0, 4.4, 4.0, and 3.6 MBytes / sec

Note: These values refer to 8-bit data transfers only. If 16-bit data transfers are enabled, the effective rate is doubled.

The Fast SCSI synchronous data transfer rates are 10.0, 8.0, 6.67, and 5.7 MBytes / sec. If the host adapter is set not to negotiate for synchronous data transfer (i.e., Initiate Sync Negotiation is set to *no*),

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then the value selected here will be the maximum rate that the host adapter will accept.

In most cases, the maximum value of 10.0 MBytes/sec can be used. If the drive is not a Fast SCSI drive and cannot support the fast data transfer rates, it can negotiate for a slower rate (this is standard SCSI protocol). However, if a drive cannot accept values greater than 5.0 MBytes/sec (the highest standard synchronous transfer rate), then the Fast data transfer rates should not be used for the device. Older SCSI-1 devices may not accept the Fast data transfer rates, which may result in erratic behavior or a *hang* condition**.**

Initiate Wide Negotiation

This option determines whether or not the host adapter will attempt 16-bit data transfer instead of 8-bit data transfer. The default setting is *yes*.

When set to *yes*, the host adapter BIOS attempts 16-bit data transfer. When set to *no*, the BIOS transfers data at 8-bits unless the SCSI device itself request Wide negotiation.

For 16-bit data transfer, the effective transfer rate is doubled. For example, a transfer rate of 10 MBytes/sec becomes 20 MBytes/sec, 8 MBytes/sec becomes 16 MBytes/sec, etc.

Note: Some 8-bit SCSI devices may have trouble handling Wide negotiation, which may result in erratic behavior or a hang condition. For these devices, set Initiate Wide Negotiation to *no*.

Include in BIOS Scan

This option determines whether or not the host adapter BIOS supports devices attached to the SCSI bus without the need for device driver software.

When set to *yes*, the host adapter BIOS controls the SCSI device. When set to *no*, the host adapter BIOS will not search the SCSI ID for devices to control; device driver software is needed to control the SCSI device. The default setting is *yes*.

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Caution: If a removable media SCSI device is controlled by the host adapter BIOS, do not remove the media while the system is powered-on or data loss could occur! The host adapter BIOS does not support *removability* while the system is turned on. If removability is desired while the system is powered-on, the removable media device should be installed with device drivers and not the host adapter BIOS.

Error if Device Not Found

This option determines whether or not the host adapter BIOS generates an error message when the BIOS is unable to find the device during bootup.

When set to *yes*, the BIOS checks the SCSI ID for a SCSI device; if none is found, an error message is displayed during bootup similar to the following:

Channel A, Target #1 – Device Not Found

When set to *no*, the BIOS does not attempt to display an error message if the SCSI device is not found. The default setting is *no*.

Send Start Unit Command

This option, which is supported by some SCSI devices, determines whether or not the SCSI Start Unit Command (SCSI command 1B) is sent to the SCSI device (most devices do not require this). The Start Unit Command reduces the load on your computer's power supply by allowing the host adapter to powerup SCSI devices one-at-a-time when you boot your system. Otherwise, the devices will all powerup at the same time. Most drives usually require that a jumper on the drive be set to respond to this command.

When set to *yes*, the SCSI Start Unit Command is sent to the SCSI device during bootup. When set to *no*, the SCSI device will powerup in its normal fashion. The default setting is *no*.

If this option is selected for more than one SCSI device, the SCSI device with the lowest SCSI ID will be sent the SCSI Start Unit Command first. When the first device is ready and responds to the host adapter, the next highest SCSI ID with a setting of *yes* is sent the SCSI Start Unit Command. This process continues until all supported devices respond to the host adapter.

Note: If many drives are set to *yes* for the SCSI Start Unit Command, system boot time will vary depending on how long each drive takes to spin up.

Exit SCSI Device Configuration

When configuration of SCSI devices is complete, press **Esc** to Exit SCSI Device Configuration; you will be prompted to either save or abandon device configurations, as shown in Figure 3-15.

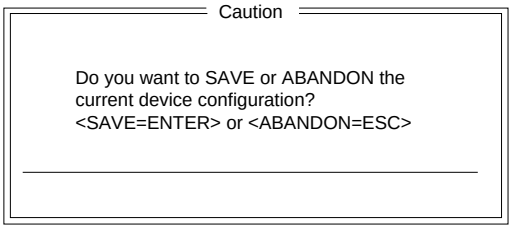

Figure 3-15. Exiting SCSI Device Configuration

Exit the EISA Configuration Utility

Once the host adapter and SCSI devices are properly configured, save and exit the ECU as instructed on the screen's menu. The following section, *Utilities,* describes the utilities available in the ECU.

Utilities

Select **Utilities** from the ECU to access the utilities that are available with your host adapter, as shown in Figure 3-15.

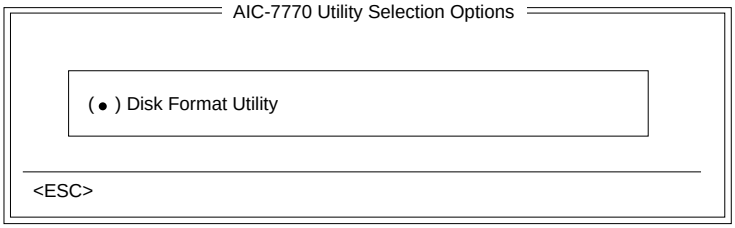

Figure 3-16. Utility Selection

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Disk Format Utility

This utility allows you to low-level format your SCSI disk and/or verify disk media for defects.

Note: When migrating hard disk drives and/or removable media drives from other manufacturers host adapters, the Disk Format Utility should be run to low-level format your drive.

Disk Format

Your fixed disk media must be low-level formatted before you can use your operating system's partitioning and file preparation commands, such as MS-DOS *fdisk* and *format*.

Most SCSI disk devices are preformatted, and do not need reformatting. The Adaptec low-level formatting utility is compatible with the vast majority of today's SCSI disk drives.

Caution: All data on the drive will be lost when performing a low-level format. Be sure to back up your data before performing this operation.

Disk Verify

Once your SCSI disk is low-level formatted, Disk Verify scans the disk's media for defects. If bad blocks are found, you are prompted to reassign them.

❒

4 Troubleshooting

About This Chapter

Read this chapter to find out

- How to use the troubleshooting checklist to diagnose problems that may occur when you install a host adapter in your system
- Problems you may encounter and how to fix them
- How to resolve conflicts with other options

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If your problem is still not resolved, continue with the next section.

Problems and Solutions

The screen is difficult to read when I run the ECU.
Try pressing **F5** to toggle the display between color and monochrome modes. This may enable you to read the screen more easily.

I installed the host adapter, and my computer will not boot from the SCSI disk drive.
If both SCSI and non-SCSI disk drives are installed, then the non-SCSI disk drive is *always* the boot device. If your system has only SCSI disk drives, check the following:

1. Make sure your computer system's CMOS *setup* is set to **No Drives Installed**, as is required for SCSI host adapters.
2. Try setting the SCSI boot drive to SCSI ID 0. This is normally done by changing jumpers or switches on the drive. On each SCSI bus, SCSI devices must be set to a unique SCSI ID. See *SCSI ID Setting* on page 2-15.
3. Try disabling Wide Negotiation for any 8-bit SCSI devices connected to the host adapter. See *Initiate Wide Negotiation* on page 3-16.
4. Try enabling **Include in BIOS Scan** in the **BIOS and SCSI Device Configuration** option. See *BIOS and Device Configuration* on page 3-11.
5. Make sure the SCSI bus is properly terminated. See *Termination on the SCSI Bus* on page 2-9.
6. You may need to low-level format the SCSI hard drive. If so, first back up all data on the disk, then run the *format* utility accessible through the ECU. See *Utilities* on page 3-18.

Similar formatting utilities for removable media devices are included in the Adaptec EZ-SCSI software package for the DOS / Windows environment. Refer to Appendix B, *I/O Operating Environment*.

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When I tried to use the format/verify utility on a disk device, I got an Unexpected SCSI Command Failure pop-up box with a lot of error information. What does this mean?

This probably means that the utility encountered a problem with the disk device or the media and therefore cannot run. The following information appears in the pop-up window:

- SCSI Target ID of the device
- SCSI CDB Sent (e.g., 2F 00 00 00 00 00 00 08 00 00)
- Host Adapter Status (e.g., 11h - Selection timeout)
- Target Status (e.g., 00h - Good status)
- Sense Key (e.g., 06h - Unit attention)
- Additional Sense Code
- Additional Sense Code Qualifier

You can probably determine from the Sense Key information both the cause of the problem and its solution. The following are some of the more common Sense Key values and their meanings:

02h - Not ready
The media is not ready to format. Be sure that media is inserted in the drive and that the media is spun up.

03h - Medium error
The disk media may be defective. If it is a removable media drive, try using a different media. If it is a fixed disk drive, the disk may be physically damaged.

04h - Hardware error
The disk drive may be defective. Consult the hardware documentation and contact the manufacturer.

05h - Illegal request
The Adaptec formatting utility does not support a low-level format of this device. The device may already be low-level formatted by the manufacturer. (This error rarely occurs.)

06h - Unit Attention
The removable media may be write-protected. Remove write protection and run the utility again.

The Additional Sense Code field provides more information about the error. The meaning of these codes may be listed in your hardware manual.

My computer locks up when I press Esc to exit the ECU.

If this happens, turn your machine off and then on to reboot. Any settings you changed before you tried to exit the program have been registered in the EEPROM and will not be lost.

One of the SCSI devices on my system does not allow termination to be disabled. How can I attach it to the SCSI bus?

You might be able to attach this device on the end of the SCSI bus so you do not need to disable termination on it. If this is not possible, contact the manufacturer about possible work-arounds.

I installed my host adapter board at IRQ12, and it does not work properly. What is wrong?

Another device such as a mouse may be using IRQ12. Change the adapter board's IRQ to the default value (11) or to some other value. See *Configure the Host Adapter Parameters* on page 3-5.

When I install my host adapter it either does not get automatically added by my ECU, or an error is reported by the motherboard as not being a valid board, even after running the ECU.

Verify that you are using the correct *.cfg* file and *.ovl* file for the host adapter. Also, other EISA boards and their position on the bus could be causing the board to be misidentified.

Conflicts With Other Options

You will encounter problems if your host adapter and peripheral devices use overlapping extended BIOS and I/O addresses. To correct this problem, complete the following:

1. Change the IRQ settings with the ECU.
2. Use the ECU to view BIOS addresses for the host adapter and, if necessary, change them.

A Specifications

About This Appendix

Read this appendix to find out

- Technical specifications of the AHA-2740W / 2742W / 2744W, EISA interface, SCSI interface, and floppy disk interface
- Pin assignments for the internal and external SCSI connectors

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▼▼▼▼ A

Technical Information

The basic technical specifications of the host adapter are described below. If you need more detailed information, contact Adaptec's Literature Hotline at the phone number listed on page iii.

Product Specifications

Physical Dimensions

Length: 8.5 inches
Width: 0.625 inches
Height: 5.0 inches

Standard EISA-compatible form factor

Power Requirements

+5.0 +/- 0.25 Volts at 2.0 Amps maximum

Environmental Requirements

Temperature: 0-55^{o} C (operating or storage)

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Extended Industry-Standard Architecture Interface

Driver Output Signals:		
V_{OL}	0 volts minimum	0.4 volts maximum
I_{OL}	24 mA	
V_{OH}	2.4 volts minimum	5.25 volts maximum
I_{OH}	8 mA	
Receiver Input Signals:		
V_{IL}	0.8 volts maximum	
V_{IH}	2.0 volts minimum	

SCSI Interface

Electrical Interface

These are the specifications listed in ANSI X3.131-1986 for single-ended and differential operation.

Single-ended Output Signals

All signals use open-collector or three-state drivers. Each signal driven by a SCSI device has the following output characteristics when measured at the SCSI device's connector:

Signal	Definition	Characteristics
V_{OL}	Low-level output voltage	0.0 to 0.5 volts DC at 48 mA sinking (signal assertion)
V_{OH}	High-level output voltage	2.5 to 5.25 volts DC (signal negation)

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Single-ended Input Signals

SCSI inputs meet the following electrical characteristics on each signal, including both receivers and passive drivers:

Signal	Definition	Characteristics
V_{IL}	Low-level input voltage	0.0 to 0.8 volts DC (signal true)
V_{IH}	High-level input voltage	2.0 to 5.25 volts DC (signal false)
I_{IL}	Low-level input current	-0.4 to 0.0 mA at V_1=0.5 volts DC
I_{IH}	High-level input current	0.0 to 0.1 mA at V_1=2.7 volts DC

Minimum input hysteresis = 0.2 volts DC.
Maximum input capacitance = 25 pF (measured at the device connector closest to the stub, if any, within the device).

Differential Output Signals

Each signal sourced by a SCSI device shall have the following output characteristics when measured at the SCSI device's connector:

- VOD (differential output voltage) = 1,0V minimum
- Shall conform to EIA RS-485 (ISO 8482-1982 TIA TR30.2)

All differential drivers shall maintain the high output impedance during power-up and power-down cycles until the driver is enabled.

Differential Input Signals

Each signal of a SCSI device shall have the following characteristics when measured at the SCSI device's connector (including both receivers and passive drivers):

- Maximum input capacitance = 25 pF
- Minimum input hysteresis = 35 millivolts

The input characteristics shall additionally conform to EIA RS-485 (ISO 8482-1982 TIA TR30.2).

50-pin SCSI Connector

The 50-pin internal SCSI connector must be an unshrouded 50-pin header, compatible with unshielded Alternative 1 connector, as specified in ANSI X3.131-1986. Table A-1 lists the pin assignments for the 50-pin single-ended connector. Table A-3 lists the pin assignments for the 50-pin differential connector.

68-pin SCSI Connectors

The 68-pin internal Wide SCSI connector is a high-density unshielded (Alternative 1) connector. Table A-2 lists the cross reference to connector contact assignments for both the 68-pin internal and external Wide SCSI connectors. Table A-4 lists the cross reference to connector contact assignments for both the 68-pin internal and external differential Wide SCSI connectors.

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Table A-1. Internal Connector Pin Assignments

Pin	Signal Name	Pin	Signal Name
1	Ground	2	-DB(0)
3	Ground	4	-DB(1)
5	Ground	6	-DB(2)
7	Ground	8	-DB(3)
9	Ground	10	-DB(4)
11	Ground	12	-DB(5)
13	Ground	14	-DB(6)
15	Ground	16	-DB(7)
17	Ground	18	-DB(P)
19	Ground	20	Ground
21	Ground	22	Ground
23	Reserved	24	Reserved
25	Open	26	Term Power (Fused)
27	Reserved	28	Reserved
29	Ground	30	Ground
31	Ground	32	-ATN
33	Ground	34	Ground
35	Ground	36	-BSY
37	Ground	38	-ACK
39	Ground	40	-RST
41	Ground	42	-MSG
43	Ground	44	-SEL
45	Ground	46	-C/D
47	Ground	48	-REQ
49	Ground	50	-I/O

Table A-2. Single-ended Contact Assignments for P-cable

Signal Name	Connector Contact Number	Cable Conductor Number		Connector Contact Number	Signal Name
Ground	1	1	2	35	-DB(12)
Ground	2	3	4	36	-DB(13)
Ground	3	5	6	37	-DB(14)
Ground	4	7	8	38	-DB(15)
Ground	5	9	10	39	-DB(P1)
Ground	6	11	12	40	-DB(0)
Ground	7	13	14	41	-DB(1)
Ground	8	15	16	42	-DB(2)
Ground	9	17	18	43	-DB(3)
Ground	10	19	20	44	-DB(4)
Ground	11	21	22	45	-DB(5)
Ground	12	23	24	46	-DB(6)
Open	13	25	26	47	-DB(7)
Ground	14	27	28	48	-DB(P)
Ground	15	29	30	49	Ground
Ground	16	31	32	50	Ground
Term Power	17	33	34	51	Term Power
Term Power	18	35	36	52	Term Power
Reserved	19	37	38	53	Reserved
Ground	20	39	40	54	Ground
Ground	21	41	42	55	-ATN
Ground	22	43	44	56	Ground
Ground	23	45	46	57	-BSY
Ground	24	48	48	58	-ACK
Ground	25	49	50	59	-RST
Ground	26	51	52	60	-MSG
Ground	27	53	54	61	-SEL
Ground	28	55	56	62	-C/D
Ground	29	57	58	63	-REQ
Ground	30	59	60	64	-I/O
Ground	31	61	62	65	-DB(8)
Ground	32	63	64	66	-DB(9)
Ground	33	65	66	67	-DB(10)
Ground	34	67	68	68	-DB(11)

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Table A-3. Differential Contact Assignments for A-cable

Pin	Signal Name	Pin	Signal Name
1	Ground	2	Ground
3	+DB(0)	4	-DB(0)
5	+DB(1)	6	-DB(1)
7	+DB(2)	8	-DB(2)
9	+DB(3)	10	-DB(3)
11	+DB(4)	12	-DB(4)
13	+DB(5)	14	-DB(5)
15	+DB(6)	16	-DB(6)
17	+DB(7)	18	-DB(7)
19	+DB(P)	20	-DB(P)
21	Diffsens	22	Ground
23	Reserved	24	Reserved
25	Term Power	26	Term Power
27	Reserved	28	Reserved
29	ATN	30	-ATN
31	Ground	32	Ground
33	+BSY	34	-BSY
35	+ACK	36	-ACK
37	+RST	38	-RST
39	+MSG	40	-MSG
41	+SEL	42	-SEL
43	+C/D	44	-C/D
45	+REQ	46	-REQ
47	+I/O	48	-I/O
49	Ground	50	Ground

Table A-4. Differential Contact Assignments for P-cable

Signal Name	Connector Contact Number	Cable Conductor Number		Connector Contact Number	Signal Name
+DB(12)	1	1	2	35	-DB(12)
+DB(13)	2	3	4	36	-DB(13)
+DB(14)	3	5	6	37	-DB(14)
+DB(15)	4	7	8	38	-DB(15)
+DB(P1)	5	9	10	39	-DB(P1)
Ground	6	11	12	40	Ground
+DB(0)	7	13	14	41	-DB(0)
+DB(1)	8	15	16	42	-DB(1)
+DB(2)	9	17	18	43	-DB(2)
+DB(3)	10	19	20	44	-DB(3)
+DB(4)	11	21	22	45	-DB(4)
+DB(5)	12	23	24	46	-DB(5)
+DB(6)	13	25	26	47	-DB(6)
+DB(7)	14	27	28	48	-DB(7)
+DB(P)	15	29	30	49	-DB(P)
Diffsens	16	31	32	50	Ground
Term Power	17	33	34	51	Term Power
Term Power	18	35	36	52	Term Power
Reserved	19	37	38	53	Reserved
+ATN	20	39	40	54	-ATN
Ground	21	41	42	55	Ground
+BSY	22	43	44	56	-BSY
+ACK	23	45	46	57	-ACK
+RST	24	48	48	58	-RST
+MSG	25	49	50	59	-MSG
+SEL	26	51	52	60	-SEL
+C/D	27	53	54	61	-C/D
+REQ	28	55	56	62	-REQ
+I/O	29	57	58	63	-I/O
Ground	30	59	60	64	Ground
+DB(8)	31	61	62	65	-DB(8)
+DB(9)	32	63	64	66	-DB(9)
+DB(10)	33	65	66	67	-DB(10)
+DB(11)	34	67	68	68	-DB(11)

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Floppy Disk Interface

Standard Electronic and Physical Interface

Driver Output Signals:		
V_{OL}	0 volts minimum	0.5 volts maximum
V_{OH}	Open collector	5.25 volts maximum
I_{OL}	60 mA	
I_{OH}	0.1 mA	
Receiver Input Signals:		
V_{T-}	1.0 volts maximum	
V_{T+}	1.4 volts minimum	
Tied to +5 volt supply through 150 ohm resistors. Schmitt Trigger with 0.8-volt hysteresis.		

Connector

The floppy disk interface connector should be an unshrouded 34-pin header.

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B I/O Operating Environment

About This Appendix

Read this appendix to find out

- If embedded support for your host adapter is available with your operating system
- Whether or not you need additional software for your host adapter in the DOS/Windows environment
- Information on Adaptec's EZ-SCSI I/O Operating Environment Software that makes driver installation easier than ever before

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Host Adapter Support

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 for ordering Adaptec software listed on page iii.

DOS/Windows

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

- Support more than two fixed disk drives under versions of DOS prior to MS-DOS 5.0
- Support more than eight fixed disk drives (seven per host adapter) under MS-DOS 5.0 or higher
- Remove or switch removable media (for example, Bernoulli® cartridges) while your computer is running
- Support CD-ROM drives
- Support devices other than CD-ROM drives and disk drives. For example: SCSI tape drives, scanners, plotters, or worm drives

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Adaptec EZ-SCSI

If you are running MS-DOS or MS-DOS with Windows, Adaptec 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.

Adaptec EZ-SCSI has a number of utility programs including *afdisk* and *scsifmt*, which are used to partition and format SCSI disk devices. Adaptec EZ-SCSI also includes an ASPI device driver called *aspicd* that supports most models of CD-ROM drives and the *aspidisk* device driver, which supports up to 24 fixed-disk devices.

To install support for SCSI devices other than fixed disk devices and CD-ROM drives, check the hardware documentation for those devices. If the device requires ASPI support, you first need to run Adaptec EZ-SCSI to install an ASPI manager, and then install any other software provided with the device. If the device is designed to interface directly with the host adapter, then no ASPI manager is required. Refer to the *Adaptec EZ-SCSI User's Guide* for instructions on installing and running Adaptec EZ-SCSI.

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C Optimizing Performance

About This Appendix

Read this appendix to find out

- How to optimize your system's performance after installing the host adapter

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Performance Tips

The AHA-2740W / 2742W / 2744W is designed to maximize the performance of your SCSI devices and computer. The following tips will help you take full advantage of the host adapter's advanced design features.

Enabling Synchronous Negotiation

Synchronous Negotiation is enabled (set to *yes*) by default on the AHA-2740W / 2742W / 2744W. You should normally enable this option on the host adapter because most SCSI devices support it and because it allows data to be transferred faster on the bus. however, because a few SCSI devices (e.g., certain CD-ROM drives) do not support Synchronous Negotiation and may malfunction if they receive a request for it, you may want to disable Synchronous Negotiation for that particular device. See *Device Configuration* on page 3-13.

Note: Even when Synchronous Negotiation is disabled on the host adapter, the host adapter will still switch to Synchronous mode if it receives a request from the SCSI device.

Enabling Wide Negotiation

Wide Negotiation is enabled (set to *yes*) by default on the AHA-2740W / 2742W / 2744W. For each 16-bit SCSI device connected to the host adapter, Wide Negotiation should normally be enabled to allow for 16-bit data transfer instead of 8-bit. See *Device Configuration* on page 3-13.

Note: Even when Wide Negotiation is disabled on the host adapter, the host adapter will still switch to Wide Negotiation if it receives a request for it from the SCSI device.

Disabling the Host Adapter BIOS

Disabling the host adapter BIOS saves you 16 KBytes of memory address space and can also shorten boot-up time by as much as 60 seconds. See *BIOS Configuration* on page 3-12.

You should disable the host adapter BIOS if the peripherals on the SCSI bus (for example, CD-ROM drives) are all controlled by device drivers and do not require BIOS control.

Enabling SCSI Bus Parity

Parity checking is a hardware function on the host adapter to verify the accuracy of data transfer on the SCSI bus. Data verification is a desirable option, so SCSI Bus Parity Check is normally *Enabled* by default. To use this option most effectively, be sure that it is enabled on each SCSI device, as well as, on the host adapter. To enable / disable SCSI Bus Parity Check on the host adapter, See *SCSI Bus Parity Check* on page 3-9. Consult your hardware documentation for instructions on enabling parity checking on peripherals.

Note: The only time when you should disable parity checking on the host adapter is when your system includes a SCSI device that does not support this option. Again, consult the hardware documentation for the device.

Setting Enable Disconnection

In the DOS environment you can increase performance slightly if you set Enable Disconnection to *no* when there is only a host adapter and a single disk device on the SCSI bus. You should set this option to *yes*, however, if you have more devices on the SCSI bus. See *Device Configuration* on page 3-13.

Send Start Unit Command

This option, which is supported by some SCSI devices, reduces the load on your computer's power supply by allowing the host adapter to powerup disk devices and other peripherals one-at-a-time when you boot your system. Otherwise, the peripherals will all powerup at the same time.

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Send Start Unit Command is disabled (set to *no*) by default. Check your hardware documentation before you enable (set to *yes*) this option to make sure your devices support it. Then change the switch or jumper settings on the device to enable the option. To enable/disable Send Start Unit Command, See *Device Configuration* on page 3-13.

Try enabling Send Start Unit Command for one peripheral at a time, rebooting each time to make sure each SCSI device works properly. (Some older disk devices do not support this option and may malfunction if they receive the command.)

Note: The Send Start Unit Command has no effect if the host adapter BIOS is disabled.

DOS/Windows Performance

Adaptec's EZ-SCSI I/O Operating Environment Software is designed not only to simplify installation of device drivers under DOS, but also includes ASPI management software to provide Virtual DMA Services (VDS) support and enhanced Windows support. The drivers that are installed will give DOS users the best performance possible under not only DOS, but Windows.

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D Disk Drives Over 1 GByte

About This Appendix

Read this appendix to find out

- An overview of extended translation and the DOS 1 GByte limit
- When to use the extended translation feature
- Questions and answers about extended translation

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Extended Translation (Using DOS 5.0)

Adaptec host adapters have always supported the full range of disk drive sizes under all major operating systems. As disk drives have recently grown beyond 1 GByte in fo(t)-15(n Tcı˝t)-21(e in)-2.(D c Tcı˝tpaciin)-2.y(s)4(, s)-1 (e in)as-

Adapter726(ipo)320(h)9(9((Ad)32ucedec)324(321nexipo)32endedec)324(39)7(t)31(rsec)32l6(atio)-2nngsch4(em)321
-24disctpaciiny li(em)-2i(s)7(721a1(ns1(uppo)4(t)-1012(18)1(s)-24(31(5(d)-2isk(s)-24(31(5(d)-2r(-24)4(riv)-24(up

Drives With Mixed Partitions

Do not use extended translation on drives formatted with two or more partitions for different operating systems. Use standard translation. The sum of the DOS partitions will be less than 1 GByte. Partitions for UNIX and NetWare can be larger than 1 GByte when using standard translation.

Note: UNIX is understood to be AT&T® / USL all versions, SCO® v3.2.4 (or later) and ISC v3.0 (or later).

Using Fdisk

To install a new disk, or to repartition an existing disk, use the *fdisk* DOS utility as you normally would. The cylinder size increases to 8 MBytes when you enable extended translation. The size of the partition you request must therefore be a multiple of 8 MBytes. If you request a partition size that is not a multiple of 8 MBytes, *fdisk* will round up to the nearest whole multiple of 8 MBytes.

Questions and Answers About Extended Translation

What happens if I enable extended translation with SCSI drives that are less than 1 GByte in capacity?

Drives handled by the BIOS will use extended translation provided they are over 1 GByte in formatted capacity. Drives with less than 1 GByte of formatted capacity will use standard translation regardless of whether extended translation is enabled.

What if I have more than two fixed disk drives on the host adapter?

You can use up to seven fixed disk drives under the BIOS provided you are running DOS 5.0.

What if I use older versions of software drivers when extended translation is enabled?

To protect your data, the host adapter will lock out any driver that does not identify itself as capable of extended translation. If you need to use software that is not compatible with extended translation, *do not* enable extended translation.

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▼▼▼▼ Glossary

A

Adaptec EZ-SCSI
A user-friendly software program that automatically installs software drivers for SCSI devices such as fixed disks and CD-ROM drives on a PC. Adaptec EZ-SCSI copies the required software programs to the PC's fixed disk and edits the configuration files so the host adapter can access the devices.

Advanced SCSI Programming Interface
See ASPI.

AIC-7770
Adaptec's single-chip EISA-to-Fast SCSI host adapter.

ASPI
Advanced SCSI Programming Interface. A standard SCSI software interface that acts as a liaison between host adapters and SCSI device drivers. ASPI enables host adapters and device drivers to share a single SCSI hardware interface.

ASPI Manager
A software module that provides an interface between ASPI modules, a host adapter board, and the SCSI devices connected to the adapter. A single ASPI manager can handle multiple I/O requests from multiple ASPI modules. ASPI managers are written for a specific operating system—such as DOS, OS/2, or NetWare—and a specific family of host adapter boards.

Asynchronous Data Transfer
A data transfer method that involves interlocking a signal to the initiator and a signal to the SCSI target in such a way that each step of the data transfer must occur before the next step can begin. Asynchronous data transfer is usually slow. The rate is not affected by external timing constraints such as cable length and circuit response time.

AT Bus
See ISA.

B

BIOS
Basic Input/Output System. Software coded into computer chips for various purposes. The BIOS on the motherboard of a PC is the special program used to boot and control the computer. There are other kinds of BIOS, such as Host Adapter BIOS.

Bus
A pathway for data in a computer system. All PCs have an expansion bus which is designed to host add-on (expansion) devices such as modems,

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adapter boards, and video adapters. Expansion devices use the bus to send data to and receive data from the PC's CPU or memory. ISA, EISA, and Micro Channel® are the major bus standards used in PCs.

Bus Device Reset
A SCSI message that clears all pending activity in the SCSI peripheral device target to which it is addressed.

Bus Mastering
A high performance method of data transfer in which the host adapter's onboard processor handles the transfer of data directly to and from a computer's memory without intervention from the computer's microprocessor. This is the fastest method of data transfer available for multitasking operating systems. The AHA-2740W / 2742W / 2744W host adapters use bus mastering.

Byte
An 8-bit unit of data. A byte is normally the smallest addressable unit of memory and the smallest unit of transfer on the SCSI bus.

C

CCB
See Command Control Block.

CCS
See Common Command Set.

CDB
See Command Descriptor Block

Command Control Block
A software object prepared by the host microcomputer software for the host adapter to provide it all the control information it needs to execute a SCSI command. Abbreviated CCB.

Command Descriptor Block
A block of information passed across the SCSI bus to provide the command, parameter, and address information necessary for the target to execute the desired functions. Prepared by the host software and placed in the CCB to be passed to the target by the host adapter. Abbreviated CDB.

Common Command Set
A de facto standard SCSI command set for communication with fixed disk drives. The Common Command Set (CCS) is the basis for the SCSI-2 command set for all types of peripheral devices.

D

Device Driver
A software program that enables a PC to communicate with peripheral devices such as fixed disk drives and CD-ROM drives. Each kind of device requires a different driver. Device driver programs are stored on a PC's fixed disk and

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are loaded into memory at boot time.

Differential
A term referring to the electrical characteristics of the signals used on the SCSI bus interface. Differential signals occupy two conductors with a positive (+) and negative (-) polarity component of the signal. This minimizes the effect of common mode signal noise and allows the SCSI bus to operate reliably over greater distances at a higher speed.

Direct Memory Access
A mechanism that allows hardware control of the transfer of streams of data to or from the main memory of a computing system. The mechanism may require setup by the host software. After initialization, it automatically sequences the required data transfer and provides the necessary address information.

Disconnect/Reconnect
Disconnect is the function that occurs when a target releases control of the SCSI bus, allowing the bus to go to the Bus Free phase. Reconnect is the function that occurs when a target selects an initiator to continue an operation after a disconnect.

DMA
See Direct Memory Access

E

EEPROM
Electrically-Erasable Programmable Read Only Memory. An integrated circuit used to store the host adapter configuration. The data stored in the EEPROM can be updated while it is installed on the host adapter.

EISA
Extended Industry Standard Architecture. A kind of computer bus. EISA, an extension of the 16-bit ISA bus standard, allows expansion devices like network cards, video adapters, and modems to transfer data across the PC bus 32 bits at a time. This standard was introduced in 1988.

EISA Configuration
The operation of configuring a device on the EISA bus through accessing registers in the device by the host. This replaces the method of using jumpers commonly found on ISA bus devices.

EPROM
Erasable Programmable Read Only Memory. An integrated circuit used to store the host adapter BIOS and firmware.

EZ-SCSI
See Adaptec EZ-SCSI.

F

FIFO
First In / First Out. A queuing order in which items are removed from the queue for execution in the same order in which they are placed in the queue. An integrated circuit that buffers data in such a manner that each byte placed in the buffer is removed from the buffer in the same order.

Firmware
The software that controls and manages the host adapter. It is *firm* as opposed to *soft* because it is designed into the host adapter and cannot be modified by the user.

G

GByte
Gigabyte. A measure of computer storage. One GByte equals approximately one billion bytes. (A byte is the amount of storage needed to hold one character.)

H

Host
A microcomputer system in which a host adapter is installed. The host uses software to request the services of the host adapter in transferring information to and from peripheral devices attached to the SCSI host adapter.

Host Adapter
A printed circuit board or integrated circuit that installs in a standard microcomputer system and provides a SCSI bus connection so that SCSI devices can be connected to the microcomputer.

I

IBM PC-AT Compatible
Any computer system that emulates exactly the IBM® PC-AT® and that uses an ISA backplane bus.

Industry Standard Architecture
See ISA

Initiator
A SCSI device that requests an operation to be performed by another SCSI device (the target). The initiator provides all the command information and parameters required to perform the operation, but the details of the operation are actually sequenced by the target. The host adapter is sometimes called the initiator.

I/O Operating Environment Software
Additional software that may be required in certain operating system environments in order to use some kinds of SCSI devices with the AHA-2740W / 2742W / 2744W. For example, additional software is needed in order to install CD-ROM drives on the SCSI bus in the DOS / Windows environment.

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ISA
Industry Standard Architecture expansion bus. A type of computer bus used in most PCs. ISA enables expansion devices like network cards, video adapters, and modems to send data to and receive data from the PC's CPU and memory 16 bits at a time. Expansion devices are plugged into sockets in the PC's motherboard. ISA is sometimes called the AT bus, because it was originally introduced with the IBM PC-AT in 1983.

K

KByte
Kilobyte. A measure of computer storage. One KByte equals 1024 bytes. (A byte is the amount of storage needed to hold one character.)

L

Logical Unit
A physical or virtual device addressed through a target. Each target can have up to eight Logical Units.

Logical Unit Number
An encoded 3-bit identifier for a logical unit.

LU
See Logical Unit

LUN
See Logical Unit Number

M

Manager
See ASPI Manager.

MByte
Megabyte. A measure of computer storage. One MByte equals 1,048,576 bytes. (A byte is the amount of storage needed to hold one character.)

Micro Channel
A 32-bit computer bus standard introduced by IBM with the PS/2 series of PCs. Micro Channel is an extension of the 16-bit ISA standard, allowing expansion devices to move data 32 bits at a time on the PC bus (also called Micro Channel architecture).

Multitasking Operation
The execution of commands in such a way that more than one command is in progress at the same time. Multitasking allows a computer system to take advantage of overlapping activities by using resources that are temporarily not required for other operations. More than one program or more than one portion of a program may be operating in parallel.

Multithreaded I/O
A method by which data is accessed simultaneously from multiple SCSI devices to increase a system's data transfer rate. For example, if the system needs data from two disk

devices it requests data from the first device, which temporarily disconnects from the SCSI bus while it is seeking the data. During this delay the system requests data from the second device, and while that device disconnects from the bus to seek the data, the first device starts sending the requested data over the bus, etc. The AHA-2740W / 2742W / 2744W and all other Adaptec host adapters fully support multithreaded I/O.

P

PC-AT
A family of small computers sold by IBM, also called the Personal Computer / AT family of computers. The name is trademarked by IBM.

PIO
See Programmed Input / Output.

Programmed Input/Output
A method of data transfer in which the host microprocessor transfers data to and from memory via the computer's I/O ports. PIO enables very fast data transfer rates, especially in single-tasking operating systems like DOS.

R

RAM
Random Access Memory. Memory of which any byte can be accessed directly in a single memory cycle. Information can be read from and written to the memory.

ROM
Read-Only Memory. Memory in which any byte can be read but not written.

S

Scatter/Gather
A device driver feature that allows the host adapter to modify the transfer data pointer so that a single host adapter transfer can transfer to many segments of memory in a single transfer, minimizing interrupts and overhead.

SCB
SCSI Control Block. The mechanism used in Emulation mode to transfer control information to and from the board.

SCSI
Small Computer Systems Interface. A bus interface standard that defines physical and electrical characteristics for hardware devices. SCSI provides a standard interface that enables many different kinds of devices such as disk drives, magneto-optical disks, CD-ROM drives, and tape drives to interface with the host computer.

SCSI Bus
One or more SCSI peripheral devices and a host adapter, connected by cables in a daisy-chain

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configuration. The bus may include both internal and external SCSI devices. In systems that have more than one host adapter, each adapter has its own separate SCSI bus.

SCSI Device
A device such as a host adapter board, fixed disk drive, or CD-ROM drive that conforms to the SCSI interface standard and is attached to a SCSI bus cable. The device may be an initiator, a target, or capable of both types of operation.

SCSI ID
An identifier assigned to SCSI devices that enables them to communicate with a computer when they are attached to a host adapter via the SCSI bus. Each SCSI host adapter board has 8 available SCSI IDs with the numbers 0 through 7. Usually the host adapter itself is assigned SCSI ID 7, and fixed disk devices are assigned to SCSI IDs 0 and 1.

Single-ended
A term referring to the electrical characteristics of the signals used on the SCSI bus interface. Single-ended signals occupy a single conductor and are references to a common ground carried on the cable between the SCSI components attached. Most SCSI devices use *single-ended* grounding.

Some SCSI devices use a *differential* grounding scheme. These devices are not supported by the AHA-2740W / 2742W. Differential devices may be damaged if you connect them and the AHA-2740W / 2742W to the same SCSI bus.

Single-threaded Operation
Operation of the computer system such that only one program can be operating or active at a time. The system must wait until all resources are available before starting an operation, and it cannot start another operation until the first one is completed.

Small Computer Systems Interface
See SCSI.

Synchronous Data Transfer
A method of data transfer in which data on the SCSI bus is clocked with fixed-length, fixed-frequency strobe pulses. The acknowledgments may be delayed several clock periods from the data requests. Synchronous data transfer can be used only for data transmission on the SCSI bus. It cannot be used for command, message, and status transmission.

Synchronous Data Transfer Negotiation
The message exchange between the initiator and the target that allows the negotiation of the data transfer frequency and delay between requests and acknowledgments required for synchronous data transfer. Once

negotiated, synchronous data transfer parameters remain unchanged until certain reinitialization activities occur.

T

Tagged Queuing
A SCSI-2 feature that allows the SCSI device to queue return data commands in a different order than requested by the SCSI host adapter, thereby increasing performance.

Target (or Target Device)
A SCSI device that performs an operation requested by an initiator. The target may be a peripheral device such as a disk drive performing a service for an initiator. The target may also be a host adapter performing a processor-type device service for an initiator.

Termination
A physical requirement of the SCSI bus. The devices at the physical ends of the SCSI bus must have terminating resistors either installed or enabled; devices in the middle of the bus must have terminating resistors either removed or disabled.

W

Wide Data Transfer
Transferring 16 bits or 2 bytes of data at the data phase.

Wide Data Transfer Negotiation
When SCSI devices negotiate to transfer 16-bit data at the transfer rate.

Word
A 2-byte (16-bit) unit of data.

Z

Zero Latency Reads
A Method of minimizing mechanical limitations of fixed disk by requesting data in an unordered sequence. The data is reordered by the host adapter.

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