AHA-2740/2742
Single-Channel

AHA-2740T/2742T
TwinChannel™

EISA-to-Fast SCSI Host Adapters

User's Manual

** adaptec**

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AHA-2740/2742
Single-Channel

AHA-2740T/2742T
TwinChannel™

EISA-to-Fast SCSI Host Adapters

User's Manual

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Changes

FCC Compliance Statement

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference in residential installations. This equipment generates, uses, and can radiate radio frequency energy, and if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation.

If this equipment does cause interference to radio or television equipment reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- ⊛ Reorient or relocate the receiving antenna

- ⊛ Move the equipment away from the receiver

- ⊛ Plug the equipment into an outlet on a circuit different from that to which the receiver is powered

- ⊛ If necessary, the user should consult the dealer or an experienced radio/television technician for additional suggestions

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

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

Each AHA-2740 Series host adapter is equipped with an FCC compliance label which shows only the FCC identification number. The full text of the associated label follows:

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

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Preface

Inside This Manual

This manual provides complete instructions on how to install and use the Adaptec AHA-2740 Series of EISA-to-Fast SCSI Host Adapters.

Chapter 1, *Introduction*, provides general information about the Adaptec AHA-2740 Series of host adapters. The features, board layout, and default settings are included. It also tells you how to contact Adaptec Technical Support.

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.

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

Appendix D, *Disk Drives Over 1 Gigabyte*, 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.

The *Glossary* has definitions of special terms used in this manual and in SCSI literature in general.

The *Index* helps you locate specific information quickly.

Conventions

The following typographic conventions are used throughout this User's Manual.

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 2, *Setting Up* ..).

ALL CAPITALS
Used for acronyms, such as SCSI and CD-ROM.

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

Numbered Step Marker
The ➤ symbol marks the first in a series of numbered steps.

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

Advisories

Advisories are quick notes that stress an important point or warn of a potential hazard to the system, data, and/or the user. This manual uses three types of advisories which are as follows:

> Note
> Text set off in this way presents reminder, 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
> This type of advisory is a visual alarm. Failure to observe this type of advisory could result in injury to the user.

☐

1

Introduction

About This Chapter

Read this chapter to find out:

- An overview of the AHA-2740 Series of EISA-to-Fast SCSI host adapters

- The features of the AHA-2740 Series

- 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 on-board floppy controller

- How to get help from Adaptec Technical Support

![1]

Overview

This user's manual provides information on how to install and configure the AHA™-2740 and AHA-2742 single-channel, and the AHA-2740T and AHA-2742T TwinChannel™ EISA-to-Fast SCSI host adapters in an EISA computer system.

The AHA-2740 and AHA-2742 support a single SCSI channel (SCSI Channel A), while the AHA-2740T and AHA-2742T support Adaptec's TwinChannel (SCSI Channel A and SCSI Channel B) architecture. Procedures for all adapters are the same except when regarding the on-board floppy controller on both the AHA-2742 and AHA-2742T.

In this manual, the AHA-2740 and AHA-2742 are referred to jointly as the AHA-2740/2742 host adapter; the AHA-2740T and AHA-2742T are referred to jointly as the AHA-2740T/2742T host adapter. Cumulatively, all four host adapters are referred to as the AHA-2740 Series.

The AHA-2740 Series of Host Adapters

The AHA-2740 Series provides a high performance connection between the EISA (Extended Industry Standard Architecture) bus and the SCSI (Small Computer System Interface) bus. The AHA-2740 Series 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-2740 Series has an on-board 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 multi-tasking operating systems.

The AHA-2740 Series supports only single-ended SCSI devices. Most of the SCSI drives on the market today are of this type.

Like all EISA I/O cards, the AHA-2740 Series 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-2742/2742T does have a single jumper (J4) that is used to enable or disable the on-board floppy controller.

Features

Fast Data Transfer Rates

- Up to 33 MBytes/sec on EISA bus

- 2.0 MBytes/sec asynchronous SCSI data rate

- 5.0 MBytes/sec synchronous SCSI data rate

- 10.0 MBytes/sec synchronous Fast SCSI data rate

Maximum Off-loading the Host CPU

- On-board 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 Implementation

- Concurrent support of Fast SCSI, synchronous and asynchronous devices

- Concurrent support of both standard and Fast SCSI devices

- Scatter/Gather operation

- Simultaneous Target/Initiator

- Fully multi-tasking/multi-threading

- Uses the superior SCSI-2 (Alternative 1) external connector and standard internal ribbon connector

- 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-2740/2742 can be used to install up to seven SCSI devices

- The AHA-2740T/2742T can be used to install up to 14 SCSI devices

- The AHA-2742/2742T can be used to install up to two floppy diskette drives

- The AHA-2740 Series 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 seven drives per host adapter, eight total

- The AHA-2740 Series supports both fixed and removable media devices with capacities above 1 Gigabyte (GByte)

- Managers and device module software available for all major operating systems

Board Layout

Figure 1-1 shows the location of the major components on the host adapter; Table 1-1 provides a description of each component.
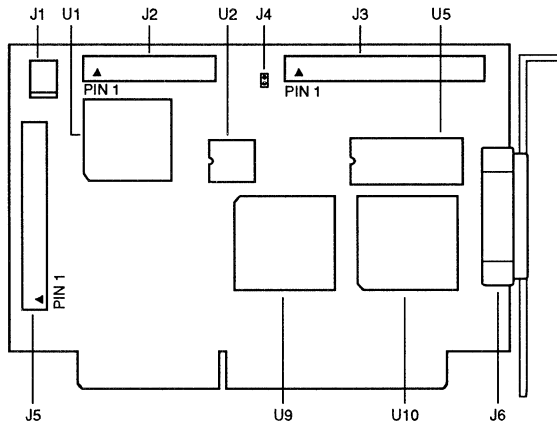
Figure 1-1. Host Adapter Board Layout

Table 1-1. Host Adapter Components

Location	Description
J1	External LED Connector
J2	Floppy Connector (AHA-2742/2742T only)
J3	SCSI Channel A Internal Connector
J4	Floppy Enable Jumper (AHA-2742/2742T only)
J5	SCSI Channel B Internal Connector (AHA-2740T/2742T only)
J6	SCSI Channel A External Connector
U1	Floppy Controller (AHA-2742/2742T only)
U2	RAM
U5	Host Adapter BIOS
U9	AIC-7770 Bus Master SCSI Chip
U10	AIC-701 Configuration Chip

Default Settings

Your host adapter is already configured for the majority of EISA class computers. Table 1-2 lists the default settings of your host adapter. Refer to Chapter 3, *Configuring the Host Adapter* for information on changing any of the settings.

Table 1-2. Host Adapter Default Settings

Description	Default Setting
Interrupt Level	IRQ 11, Level Sensitive
Bus Release Time	60 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	Enabled
Extended Translation for Drives > 1 GByte	Enabled
Support More Than Two Drives	Disabled
Support Removable Disks as Fixed Disks	Boot Device Only

The On-board Floppy Controller (AHA-2742/2742T Only)

The on-board floppy controller on the AHA-2742/2742T is enabled by default and is controlled by Jumper J4.

● If your floppy diskette drives are already running under another controller, disable the on-board floppy controller by removing the jumper shunt on Jumper J4

● To use the on-board floppy controller, leave the jumper shunt installed on Jumper J4 and then disable your existing floppy controller; refer to your computer or floppy controller user documentation

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.

Adaptec Technical Support

The AHA-2740 Series has been specifically developed for easy installation and use. We hope that our manuals, and the on-screen instructions and help available in both the host adapter Configuration Software and Adaptec I/O Operating Environment Software installation programs, are complete and clear enough to meet your needs. If you need further help, please contact us.

- The Adaptec Electronic Bulletin Board Service (BBS) provides information on software upgrades, new releases, technical advice, and other topics. The BBS can be reached 24 hours a day at 408-945-7727; 1200/2400/9600 baud, 8 data bits, 1 stop bit, no parity.

- The Adaptec Technical Support Hot Line can be reached at 800-959-SCSI (7274) or 408-945-2550, M-Th: 6:00 a.m. to 5:00 p.m., F: 6:00 a.m. to 3:00 p.m., PST.

- The Adaptec Technical Support FAX can be reached 24 hours a day at 408-945-6776.

- Adaptec software can be ordered by calling 800-442-7274, M-F: 5:00 a.m. to 6:00 p.m., PST.

- Additional documentation for Adaptec products can be requested by calling 800-934-2766, M-F: 5:00 a.m. to 6:00 p.m., PST, or you can write to:

> Adaptec, Inc.
> Literature Department
> 691 South Milpitas Blvd.
> Milpitas, CA 95035

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 on 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

2

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 re-assembling the system.

For experienced users who are already familiar with SCSI and SCSI installation, refer to the *Quick Installation* section in this chapter 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 the *Installation* section of this chapter.

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

Installing your host adapter involves the following:

- Terminating the SCSI bus

- Setting the SCSI ID

- Installing the host adapter board in the EISA system

- Connecting cables and devices

- Reassembling the system

- Configuring the host adapter with the EISA Configuration utility (described in Chapter 3)

The Host Adapter and the SCSI Bus

The AHA-2740 Series 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-2740/2742 installed in your system can be used to form a SCSI bus consisting of up to seven internal and external SCSI devices on its single-channel (SCSI Channel A).

- Each AHA-2740T/2742T installed in your system can be used to form two SCSI busses using its TwinChannel architecture (SCSI Channel A and SCSI Channel B). SCSI Channel A can control up to seven internal and external SCSI devices, while SCSI Channel B can control up to seven internal SCSI devices only.

- 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 (0-7). (SCSI ID setting is discussed in detail later in this chapter.)

Quick Installation

The following installation procedures are intended to help experienced users quickly install the AHA-2740 Series of host adapters 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 the *Installation* section of this chapter.

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 endpoints of the SCSI bus.

Identify which two SCSI devices (including the host adapter) will form the physical endpoints of your SCSI bus. These devices at the ends of the SCSI bus must have a set of resistors called *terminators* either installed or enabled. All other SCSI devices installed between the ends of the SCSI bus must have their terminators either removed or disabled.

Enabling or disabling host adapter termination is software selectable only. The factory installed bus terminators on the AHA-2740 Series are *enabled* by default.

To *disable* termination on the host adapter, 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).

The default value for your host adapter is SCSI ID 7. 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.

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 For internal SCSI devices, connect one end of the 50-pin SCSI ribbon cable to the internal connector on the host adapter; connect the other end to the connector on the internal SCSI device. Make sure to align Pin 1 of the cable with Pin 1 of the connectors on the host adapter and internal SCSI device.

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

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

5 For external SCSI devices, connect one end of the 50-pin shielded cable to the external connector on the host adapter; connect the other end to one of the SCSI connectors of the external SCSI device. External cable connectors are keyed and can only be plugged in one way.

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

6   If you are using the floppy controller on the AHA-2742/2742T, 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. Run the utility to configure your host adapter for operation in your EISA computer system. Chapter 3, *Configuring your Host Adapter* provides a comprehensive description of how the utility works; however, the basic steps involved include the following:

➤ 1   Run the EISA Configuration utility 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 EISA Configuration diskette or to the directory on your hard disk where the utility is located.

3   Select the option in the utility 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 the *Quick Installation* section described earlier in this chapter.

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.

EXTERNAL LED CONNECTOR   FLOPPY CONNECTOR (AHA-2740T/2742T ONLY)   SCSI CHANNEL A INTERNAL CONNECTOR

PIN 1   PIN 1   PIN 1

SCSI CHANNEL B INTERNAL CONNECTOR (AHA-2740T/2742T ONLY)   SCSI CHANNEL A EXTERNAL CONNECTOR
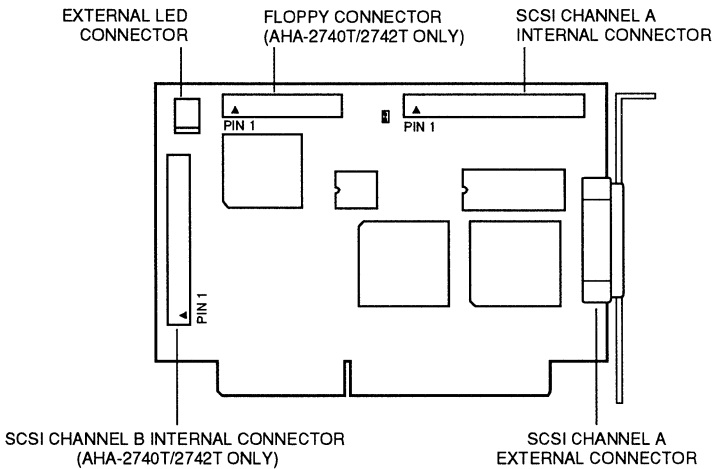
Figure 2-1. Connectors on the Host Adapter

Termination on the SCSI Bus

To reduce signal reflections on the SCSI bus, the first and last physical SCSI devices on the ends of the SCSI bus must have a set of resistors called *terminators* either installed or enabled. All other SCSI devices installed between the ends of the SCSI bus must have their terminators either removed or disabled. Improper termination of the SCSI bus results in erratic device operation or general bus failure. Table 2-1 describes the three possible SCSI device and Adaptec Host Adapter (AHA) configurations.

Table 2-1. SCSI Device and AHA Configuration

Devices Connected To Host Adapter	AHA Termination
Internal and External devices (AHA in between)	Removed/Disabled
Internal devices only (AHA at end of cable)	Installed/Enabled
External devices only (AHA at end of cable)	Installed/Enabled

Internal and External Devices

When both internal and external SCSI devices are connected to the host adapter, the last external device and the last internal device should be terminated, as shown in Figure 2-2.
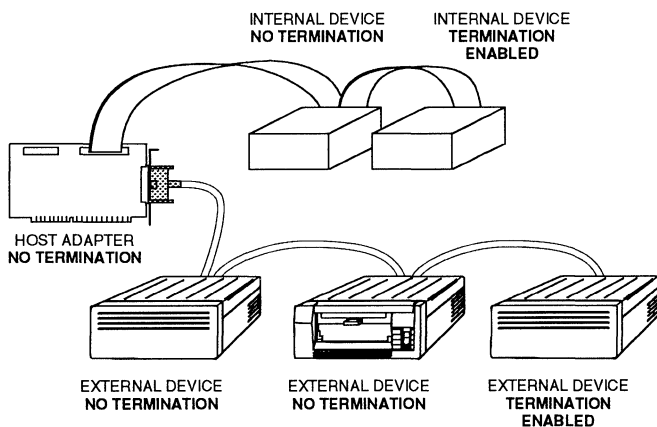
Figure 2-2. Internal and External Devices

Internal Devices Only

When only internal devices are connected to the host adapter, the last device connected to the SCSI ribbon cable and the host adapter itself should be terminated, as shown in Figure 2-3.

INTERNAL DEVICE   INTERNAL DEVICE
NO TERMINATION   **TERMINATION
ENABLED**

HOST ADAPTER
TERMINATION ENABLED
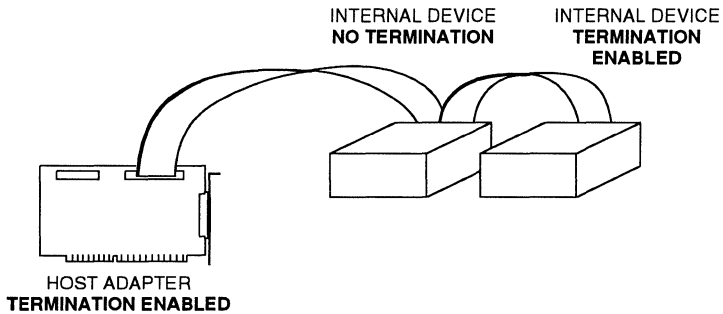
Figure 2-3. Internal Devices Only

External Devices Only

When only external devices are connected to the host adapter, both the last device on the external chain of devices and the host adapter itself should be terminated, as shown in Figure 2-4.

HOST ADAPTER
**TERMINATION
ENABLED**

EXTERNAL DEVICE   EXTERNAL DEVICE   EXTERNAL DEVICE
NO TERMINATION   **NO TERMINATION**   **TERMINATION
ENABLED**
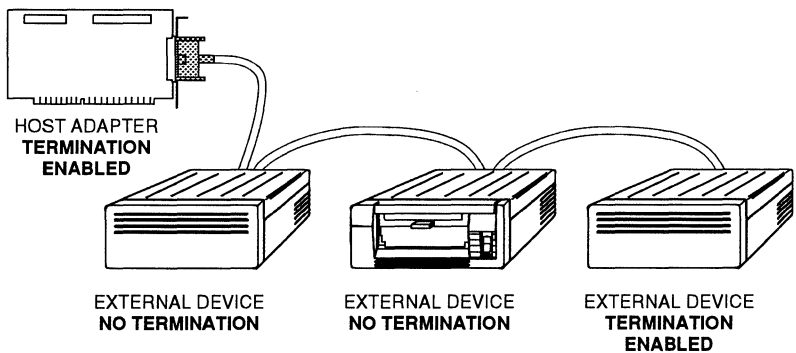
Figure 2-4. External Devices Only

Terminating the Host Adapter

The factory installed bus terminators on the host adapter are *enabled* by default. Host adapter termination should be *disabled* only if you attach SCSI devices to both internal and external connectors, since the host adapter would then be in the middle of the SCSI bus.

Enabling or disabling host adapter termination is software selectable only, and is done through your computer's EISA Configuration utility. To disable termination on the host adapter, refer to Chapter 3, *Configuring the Host Adapter* for instructions.

Terminating Other SCSI Peripheral Devices

Most SCSI devices use a jumper or a switch located close to their SCSI connector(s). On some SCSI devices, you will have to physically remove resistor module(s). Refer to the manufacturer's documentation for instructions on enabling or disabling SCSI bus termination on your SCSI peripheral device(s).

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-2740 Series of host adapters always supplies termination power on the SCSI bus.

SCSI ID Setting

Each SCSI device located on the SCSI bus must be set to a unique
SCSI ID (0-7). The SCSI ID serves two purposes: it uniquely
defines each SCSI device's address, and it determines the device's
priority on the bus during arbitration phase. The arbitration
phase determines which device will own the bus when two or
more devices simultaneously request to use it. SCSI ID 7 has the
highest priority, and SCSI ID 0 has the lowest. When selecting
the SCSI ID, consider the following:

- The default value for your host adapter is SCSI ID 7

- 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)

- If you are installing more than one SCSI host adapter,
  each host adapter may be set to the same SCSI ID
  (assuming they are on separate SCSI busses)

- SCSI IDs 0 and 1 are best reserved for SCSI hard disk
  drives

- SCSI ID 0 is best reserved for the SCSI hard disk drive
  that will be used as you computer's boot device

- SCSI ID 1 is best reserved for a second hard disk drive

- SCSI ID 2 is often used for tape devices

Refer to Chapter 3, *Configuring the Host Adapter* for instructions
on changing the SCSI ID for the host adapter.

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

Board Installation

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-
2740 Series of host adapters.

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-2740 Series of host adapters in your EISA
computer system:

➤ 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 doc-
       umentation 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. Secure the
       host adapter in your system.

Note

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

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:

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 (J1) on the host adapter as shown in Figure 2-5.

Note

On systems with a two position LED cable, connect the LED cable to pins 1 and 2 of the LED connector.
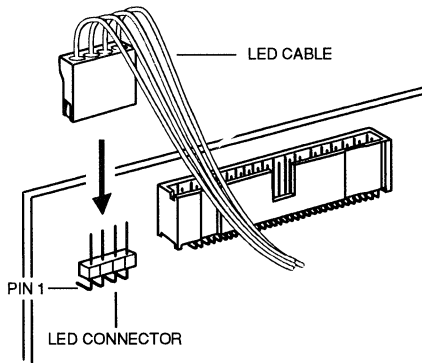
Figure 2-5. SCSI LED Connector

Connecting Peripherals

Up to seven SCSI devices can be connected to the internal and external connectors on the AHA-2740/2742. Up to two floppy diskette drives can be connected to the floppy connector on the AHA-2742/2742T. *Always* refer to the manufacturer's documentation before connecting and installing your SCSI device(s) and/or floppy diskette drive(s).

Note

Only *Single-Ended* SCSI devices are supported by the host adapter. *Differential* SCSI devices may be damaged if connected to the host adapter bus. Most SCSI devices currently produced are *Single-Ended* SCSI devices. Consult your SCSI device user documentation to verify that your SCSI device is a *Single-Ended* SCSI device.

SCSI Devices

SCSI devices are either internal SCSI devices or external SCSI devices. Internal SCSI devices usually have only a single connector and can only be cabled to the internal connector on the host adapter. External SCSI devices usually have two connectors and can be cabled to either the external connector on the host adapter or to the external connector of another external SCSI device.

SCSI devices are cabled together in a single continuous *daisy-chain* of devices. This chain may have no branches, but must run from device to device in a continuous series. If your host adapter includes both internal and external SCSI devices, the host adapter will be at the junction between the internal and external devices.

The AHA-2740/2742 has a single-channel, SCSI Channel A, that can accommodate a SCSI bus with up to seven SCSI devices connected. The AHA-2740T/2742T uses Adaptec's TwinChannel architecture and has two channels, SCSI Channel A and SCSI Channel B, that can each accommodate a SCSI bus with up to seven SCSI devices connected.

SCSI Channel A is comprised of both an internal and external connector, while SCSI Channel B is comprised of only an internal

connector. To connect SCSI devices to SCSI channel A, you will need either an internal SCSI cable and/or external SCSI cable. To connect SCSI devices to SCSI Channel B, you will need only an internal SCSI cable.

Connecting Internal SCSI Devices

The internal connector for your host adapter uses a 50-pin SCSI ribbon cable with a 50-pin header internal connector.

When connecting the 50-pin internal SCSI ribbon cable to both the host adapter and to the internal SCSI device(s), make sure that Pin 1 orientation is maintained throughout the bus. Pin 1 of the SCSI 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 a delta or arrow 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:

≫ 1   Connect one end of the 50-pin SCSI ribbon cable to the internal connector on the host adapter, as shown in Figure 2-6.
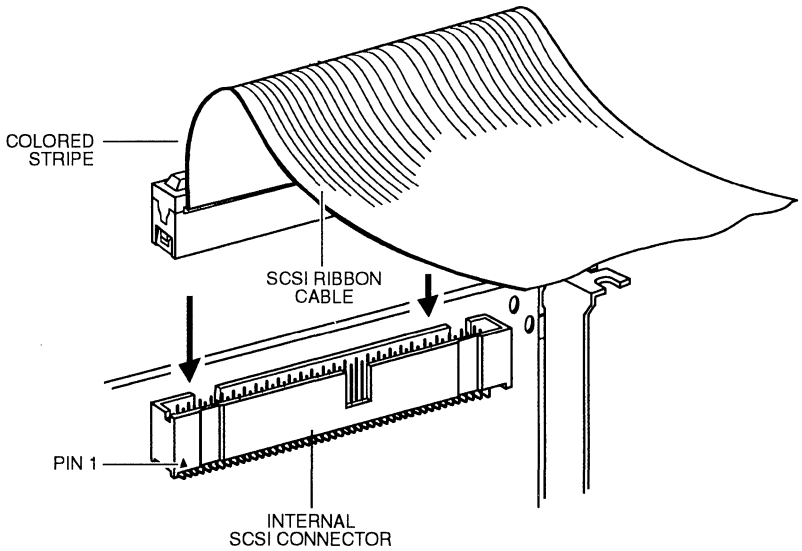
Figure 2-6. Connecting Cable to Internal Connector

2 Connect the other end of the 50-pin SCSI ribbon cable to the
   connector on the internal SCSI device, as shown in Figure 2-7.
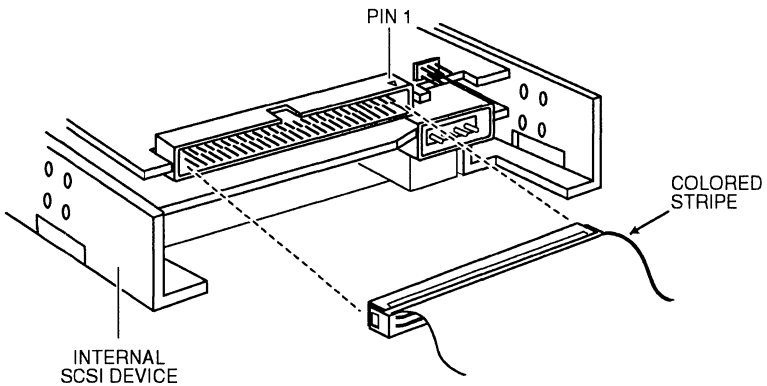
Figure 2-7. Connecting Cable to SCSI Device

2-17

3   To connect a second internal SCSI device, plug the middle
     connector of the SCSI ribbon cable to the connector on the
     second internal SCSI device, as shown in Figure 2-8.
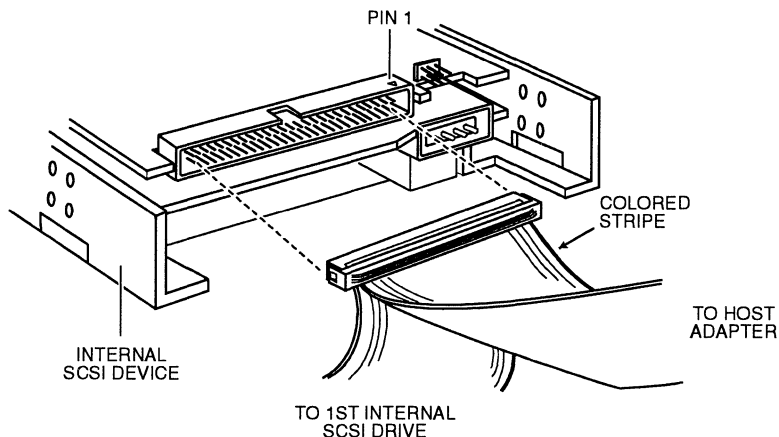
Figure 2-8. Connecting a Second Internal SCSI Device

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

Connecting External SCSI Devices

The external connector for SCSI Channel A uses a 50-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:

➤ 1   Connect one end of the external cable to the host adapter
       external connector, as shown in Figure 2-9.

EXTERNAL
SCSI CABLE

EXTERNAL
CONNECTOR
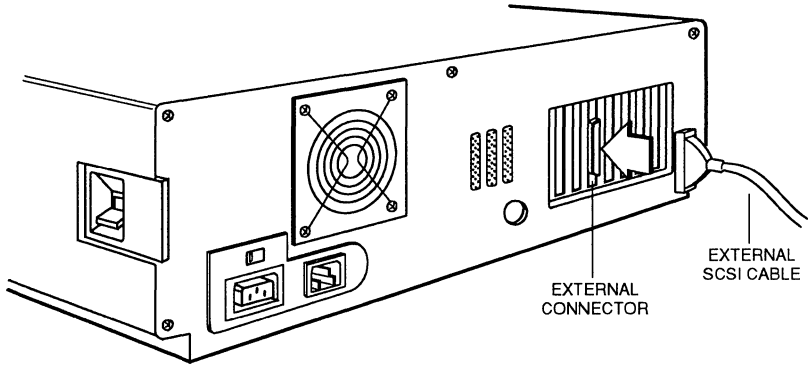
Figure 2-9. Connecting External Cable to Host Adapter

2   Connect the other end of the external cable to either one of the
    SCSI connectors on the SCSI device, as shown in Figure 2-10.

EXTERNAL SCSI
DEVICE

EXTERNAL SCSI
CABLE
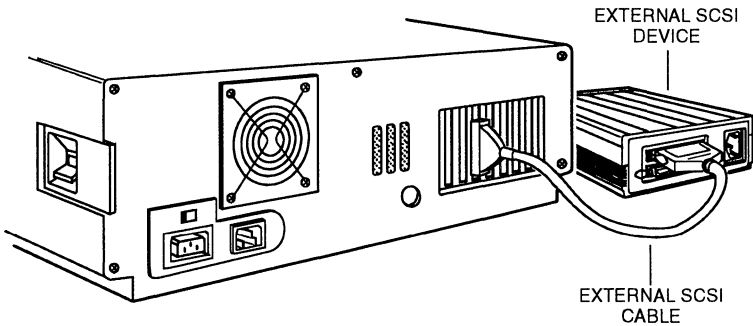
Figure 2-10. Connecting External Cable to SCSI Device

3 To connect subsequent external SCSI devices, obtain addi-
tional external cables and chain each device to the previous
device until all external SCSI devices have been connected, as
shown in Figure 2-11.
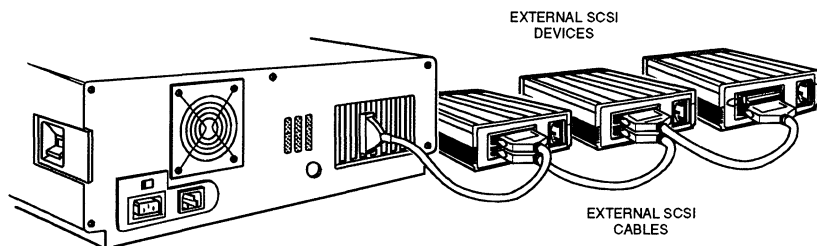
Figure 2-11. Connecting Multiple External SCSI Devices

Floppy Diskette Drives

Floppy diskette drives connected to the floppy connector on the
host adapter are not part of the SCSI bus; floppy diskette drives
are controlled by the non-SCSI floppy diskette controller on the
host adapter.

Connecting Floppy Diskette Drives (AHA-2742/2742T Only)

The floppy connector on the AHA-2742/2742T uses a 34-pin floppy
ribbon cable with a 34-pin header connector. Make sure to main-
tain Pin 1 orientation as described in previous section *Connecting
Internal SCSI Devices.*

Note

If you are not using the floppy controller on the AHA-2742/2742T,
be sure to disable it by removing the jumper shunt on Jumper J4.

To connect floppy diskette drives:

➤ 1   Connect one end of the 34-pin floppy ribbon cable to the
        floppy connector on the host adapter, as shown in Figure 2-12.

COLORED
STRIPE

FLOPPY RIBBON
CABLE

PIN 1   FLOPPY
         CONNECTOR
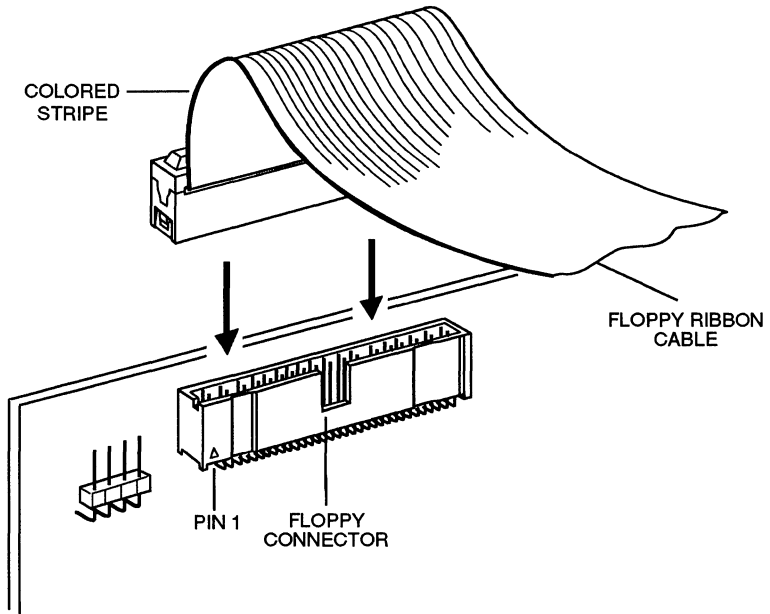
Figure 2-12. Connecting Floppy Cable to Host Adapter

2   Connect the other end of the 34-pin floppy ribbon cable to the connector on the first floppy drive (Drive A), as shown in Figure 2-13.
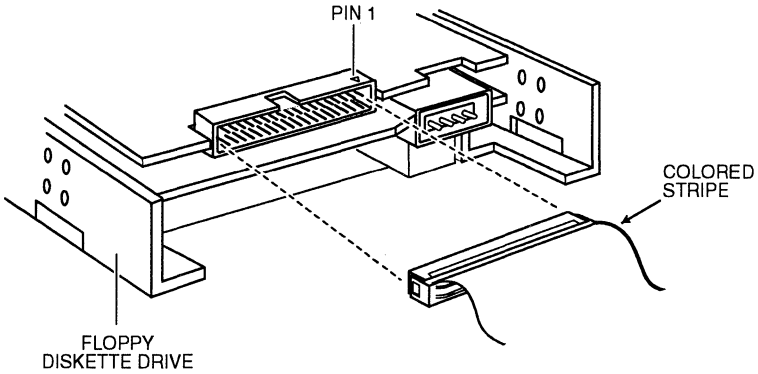
Figure 2-13. Connecting Floppy Cable to Floppy Drive

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), as shown in Figure 2-14.
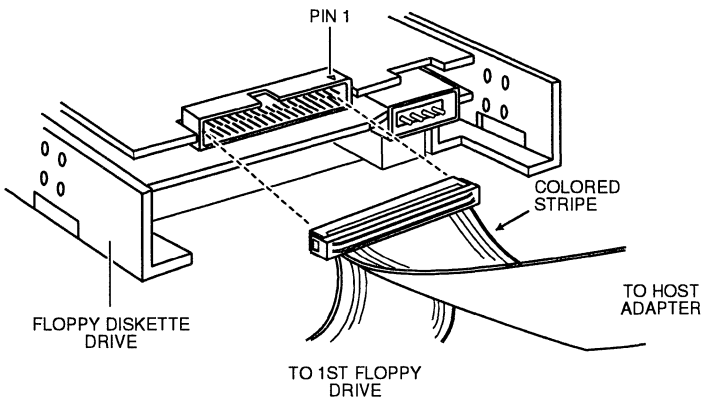
Figure 2-14. Connecting a Second Floppy Drive

Before Re-booting Your System

Before re-booting your system and configuring your host adapter, make sure you have completed the following:

➤ 1   The SCSI bus is properly terminated.

2   Each SCSI device on the SCSI bus is set to a unique SCSI ID between 0 and 7.

3   The host adapter is firmly seated in the host computer's EISA slot.

4   Internal SCSI devices are connected to the host adapter with the 50-pin SCSI ribbon cable and that proper Pin 1 orientation is maintained.

5   External SCSI devices are properly installed and cabled.

6   If using the on-board floppy controller on the AHA-2742/2742T, 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.

7   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 two utilities available in the EISA Configuration utility

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. This utility is used to automate the configuration of the motherboard and all option boards installed in your EISA system.

The EISA Configuration utility must be run every time an adapter card is physically added, removed, or moved. The utility 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 EISA Configuration utility supplied with your system, host adapter configuration will vary; however, the basic steps include:

- Run the EISA Configuration utility

- Copy the configuration and overlay files

- Select the host adapter

- Configure the host adapter parameters

- Configure BIOS and SCSI device

- Exit the EISA Configuration utility

Note

The screens displayed in this chapter may vary from the screens displayed by the EISA Configuration utility supplied with your system.

Run the EISA Configuration Utility

Run the EISA Configuration utility as instructed by the EISA system vendor.

Place the bootable EISA configuration diskette in an operative drive and reset the system to boot from this diskette. If you have the Configuration utility installed on your hard disk, reboot your system and run the utility 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 EISA Configuration utility 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 EISA Configuration utility 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 EISA Configuration utility that allows you to con-figure the EISA slot in which the host adapter is installed. If neces-sary, scroll down the screen until you find a screen that lists the host adapter and its parameters and looks similar to Figure 3-1.

```
Slot 1 - Adaptec AHA-2470/AHA-2740T SCSI Host Adapter
    Host Adapter Interface Definitions
        Interrupt Level ......................................... IRQ 11
        Bus Release Time ................................... 60 BCLKS
        Data FIFO Threshold ............................... 100%
    BIOS Definitions
    Host Adapter BIOS Base Address .......... D8000H

    SCSI Channel A Configuration
        Host Adapter SCSI ID ................................ 7
        SCSI Bus Parity Check ............................. Enabled
        SCSI Selection Timeout ............................ 256 milliseconds
        SCSI Bus Reset at Power-on .................... Enabled
        SCSI Bus Termination ............................. Enabled
    BIOS and Device configuration ................... Press <Enter> to configure
    Utilities ....................................................... Press <Enter> to access
                                                    ──────── More: PgUp/PgDn
    Edit=Enter   <Edit Resources=F6>   <Advanced=F7>   <Done=F10>
```

Figure 3-1. Host Adapter Parameters

Note

If your host adapter is an AHA-2740T/2742T, a set of parameters for SCSI Channel B is displayed and can be configured.

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-2740 Series 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.                          │
└──────────────────────────────────────────────────┘
```

```
╔═══════════════ Host Adapter Interface Definitions ═══════════════╗
║                                                                  ║
║   Interrupt Level                                                ║
║                      ┌──────────────┐                            ║
║                      │ ( • ) IRQ  11 │                            ║
║                      │ (   ) IRQ   9 │                            ║
║                      │ (   ) IRQ  10 │                            ║
║                      │ (   ) IRQ  12 │                            ║
║                      │ (   ) IRQ  14 │                            ║
║                      │ (   ) IRQ  15 │                            ║
║                      └──────────────┘                            ║
║                                                                  ║
║   ───────────────────────────────────────────────────────────  ║
║   Done=F10   <Edit Resources=F6>   <Cancel=ESC>                  ║
╚══════════════════════════════════════════════════════════════════╝
```
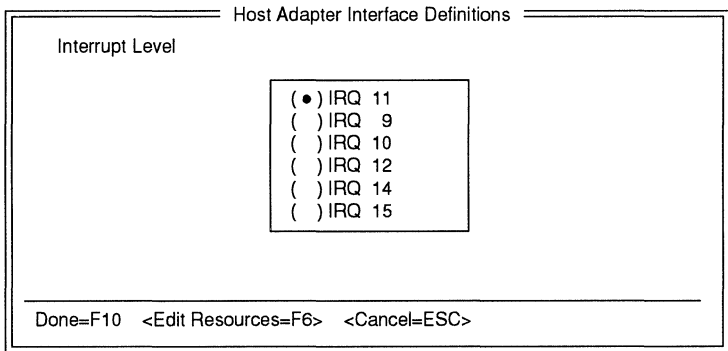
Figure 3-2. Selecting Interrupt Level

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 *60 BCLKS*.

Normally 60 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.

```
╔═══════════════════════════════════════════════════════════╗
║ ══════════════ Host Adapter Interface Definitions ══════   ║
║   Bus Release Time                                         ║
║                        ┌──────────────────┐                ║
║                        │ ( • ) 60 BCLKS   │                ║
║                        │ (   ) 44 BCLKS   │                ║
║                        │ (   ) 28 BCLKS   │                ║
║                        │ (   ) 12 BCLKS   │                ║
║                        │ (   )  2 BCLKS   │                ║
║                        └──────────────────┘                ║
║                                                            ║
║  ────────────────────────────────────────────────────     ║
║   Done=F10   <Edit Resources=F6>   <Cancel=ESC>            ║
╚═══════════════════════════════════════════════════════════╝
```

Figure 3-3. Selecting Bus Release Time

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.

```
╔═══════════════════════════════════════════════════════════╗
║ ══════════════ Host Adapter Interface Definitions ══════   ║
║   Data FIFO Threshold                                      ║
║                        ┌──────────────────┐                ║
║                        │ ( • ) 100%       │                ║
║                        │ (   )  75%       │                ║
║                        │ (   )  50%       │                ║
║                        │ (   )   0%       │                ║
║                        └──────────────────┘                ║
║                                                            ║
║  ────────────────────────────────────────────────────     ║
║   Done=F10   <Edit Resources=F6>   <Cancel=ESC>            ║
╚═══════════════════════════════════════════════════════════╝
```

Figure 3-4. Selecting Data FIFO Threshold

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 3-5 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.

```
============================ BIOS Definitions ============================

   Host Adapter BIOS Base Address

                        ( • ) D8000H
                        (   ) CC000H
                        (   ) D0000H
                        (   ) D4000H
                        (   ) DC000H
                        (   ) E0000H
                        (   ) E4000H
                        (   ) E8000H
                        (   ) BIOS disabled


   ─────────────────────────────────────────────────

   Done=F10   <Edit Resources=F6>   <Cancel=ESC>
```
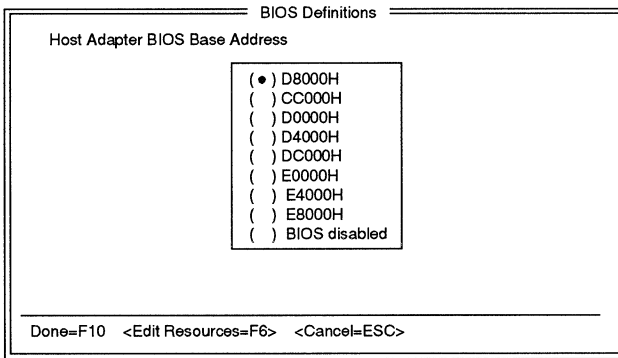
Figure 3-5. Selecting Host Adapter BIOS Base Address

Host Adapter SCSI ID

Select **Host Adapter SCSI ID** to configure the SCSI ID (0-7) setting for the host adapter. Figure 3-6 displays your choices. The default setting is 7.

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.

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 Chapter 2, *Getting Started* for additional information on SCSI ID.

```
╔═══════════════ SCSI Channel A Configuration ═══════════════╗
║                                                            ║
║   Host Adapter SCSI ID                                     ║
║                        ┌─────────────┐                     ║
║                        │ ( • ) 7     │                     ║
║                        │ (   ) 6     │                     ║
║                        │ (   ) 5     │                     ║
║                        │ (   ) 4     │                     ║
║                        │ (   ) 3     │                     ║
║                        │ (   ) 2     │                     ║
║                        │ (   ) 1     │                     ║
║                        │ (   ) 0     │                     ║
║                        └─────────────┘                     ║
║                                                            ║
║   ──────────────────────────────────────────────────────  ║
║   Done=F10   <Edit Resources=F6>   <Cancel=ESC>            ║
╚════════════════════════════════════════════════════════════╝
```

Figure 3-6. Selecting Host Adapter SCSI ID

SCSI Bus Parity Check

Select **SCSI Bus Parity Check** to enable or disable SCSI bus parity checking on the host adapter. Figure 3-7 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.

```
┌══════════════ SCSI Channel A Configuration ══════════════┐
│                                                          │
│  SCSI Bus Parity Check                                   │
│                          ┌─────────────────┐             │
│                          │ ( ● ) Enabled   │             │
│                          │ (   ) Disabled  │             │
│                          └─────────────────┘             │
│                                                          │
│  ──────────────────────────────────────────────────     │
│  Done=F10   <Edit Resources=F6>   <Cancel=ESC>           │
└──────────────────────────────────────────────────────────┘
```
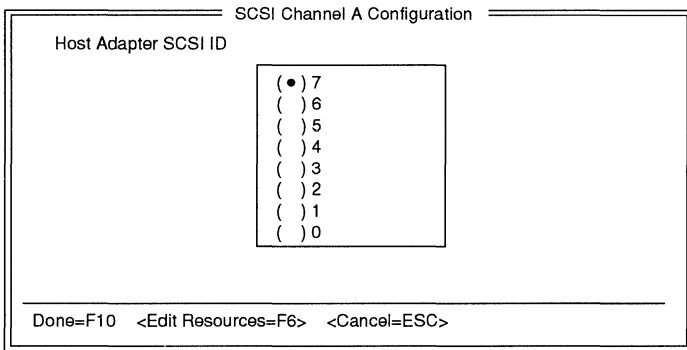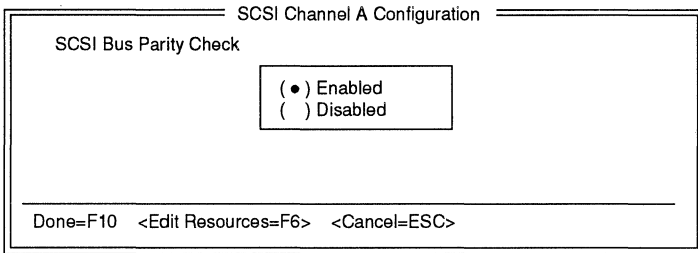
Figure 3-7. Selecting SCSI Bus Parity

SCSI Selection Timeout

Select **SCSI Selection Timeout** to configure the time, in milliseconds, used by the host adapter during the SCSI selection phase. Figure 3-8 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.

```
╔═══════════════ SCSI Channel A Configuration ═══════════════╗
║  SCSI Selection Timeout                                     ║
║                    ┌──────────────────────┐                ║
║                    │ ( ● ) 256 milliseconds │               ║
║                    │ (   ) 128 milliseconds │               ║
║                    │ (   )  64 milliseconds │               ║
║                    │ (   )  32 milliseconds │               ║
║                    └──────────────────────┘                ║
║  ─────────────────────────────────────────────────────     ║
║  Done=F10   <Edit Resources=F6>   <Cancel=ESC>             ║
╚════════════════════════════════════════════════════════════╝
```
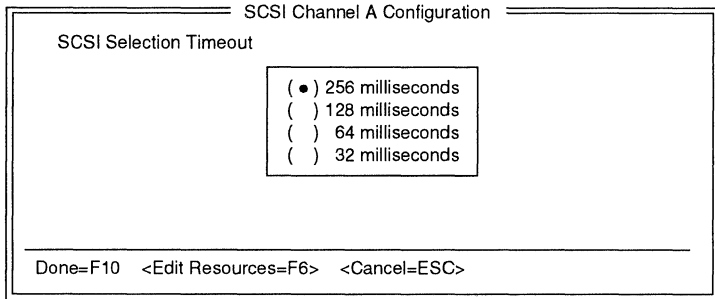
Figure 3-8. Selecting SCSI Selection Timeout

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 3-9 displays your choices. The default setting is *enabled*.

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

```
╔═══════════════ SCSI Channel A Configuration ═══════════════╗
║  SCSI Bus Reset at Power-on                                 ║
║                    ┌──────────────┐                        ║
║                    │ ( ● ) Enabled │                       ║
║                    │ (   ) Disabled │                      ║
║                    └──────────────┘                        ║
║  ─────────────────────────────────────────────────────     ║
║  Done=F10   <Edit Resources=F6>   <Cancel=ESC>             ║
╚════════════════════════════════════════════════════════════╝
```
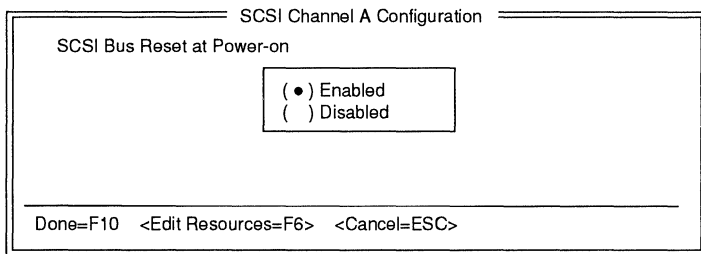
Figure 3-9. Selecting SCSI Bus Reset at Power-on

SCSI Bus Termination

Select **SCSI Bus Termination** to enable or disable SCSI termination on the host adapter. Figure 3-10 displays your choices. The default setting is *enabled*.

Host adapter termination should be disabled only if you attach SCSI devices to both internal and external connectors, since the host adapter would then be in the middle of the SCSI bus. Refer to Chapter 2, *Getting Started* for information on termination.
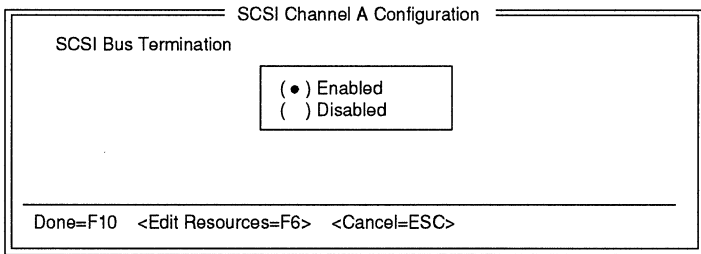
```
┌═════════════════ SCSI Channel A Configuration ═════════════════┐
│  SCSI Bus Termination                                          │
│                        ┌──────────────────┐                   │
│                        │ ( • ) Enabled    │                   │
│                        │ (   ) Disabled   │                   │
│                        └──────────────────┘                   │
│                                                                │
│     ────────────────────────────────────────────────────      │
│     Done=F10   <Edit Resources=F6>   <Cancel=ESC>             │
└────────────────────────────────────────────────────────────────┘
```

Figure 3-10. Configuring SCSI Bus Termination

BIOS and Device Configuration

Select **BIOS and Device Configuration** to configure the BIOS and SCSI device options. Figure 3-11 displays your choices.
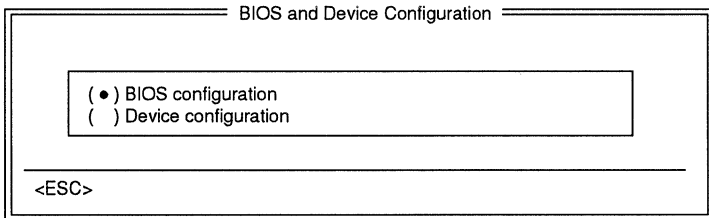
```
┌═════════════════ BIOS and Device Configuration ═══════════════┐
│                                                                │
│    ┌──────────────────────────┐                               │
│    │ ( • ) BIOS configuration  │                               │
│    │ (   ) Device configuration│                               │
│    └──────────────────────────┘                               │
│   ───────────────────────────────────────────────────────     │
│   <ESC>                                                        │
└────────────────────────────────────────────────────────────────┘
```

Figure 3-11. BIOS and Device Configuration

BIOS Configuration

BIOS Configuration allows you to configure the host adapter BIOS. Figure 3-12 displays your choices. Use the cursor keys to move between options. To toggle values for each option, press the **Enter** key.
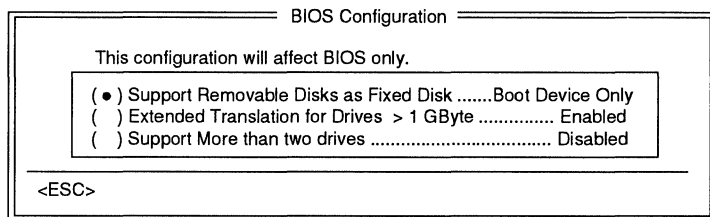
```
╔══════════════════ BIOS Configuration ═══════════════════╗
║                                                          ║
║         This configuration will affect BIOS only.        ║
║   ┌──────────────────────────────────────────────────┐  ║
║   │ ( • ) Support Removable Disks as Fixed Disk .......Boot Device Only │  ║
║   │ (   ) Extended Translation for Drives  > 1 GByte ............... Enabled │  ║
║   │ (   ) Support More than two drives ..................................... Disabled │  ║
║   └──────────────────────────────────────────────────┘  ║
║  ─────────────────────────────────────────────────────  ║
║   <ESC>                                                  ║
║                                                          ║
╚══════════════════════════════════════════════════════════╝
```

Figure 3-12. 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. Software drivers are needed for drives not controlled by the BIOS.

Note

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

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 Gigabyte* 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.*

SCSI Device Configuration

SCSI 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 3-13 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.

```
╔══════════════ Configuration Setting for SCSI Devices (1x8) ══════════════╗
║                                                                          ║
║   Channel A Device ID      #0    #1    #2    #3    #4    #5    #6    #7    ║
║  ─────────────────────────────────────────────────────────────────────   ║
║   Enable Disconnection     yes   yes   yes   yes   yes   yes   yes   yes   ║
║   Initiate Sync Negotiation yes  yes   yes   yes   yes   yes   yes   yes   ║
║   Maximum Sync Xfer Rate   10.0  10.0  10.0  10.0  10.0  10.0  10.0  10.0  ║
║   Include in BIOS Scan      yes  yes   yes   yes   yes   yes   yes   yes   ║
║   Error if Device Not Found no   no    no    no    no    no    no    no    ║
║   Send Start Unit Command   no   no    no    no    no    no    no    no    ║
║  ─────────────────────────────────────────────────────────────────────   ║
║   OK   <ESC>   <DEFAULT>                                                  ║
╚══════════════════════════════════════════════════════════════════════════╝
```

Figure 3-13. 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 overhead. In multi-device 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 Synch 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 MBytes/sec

- 8.0 MBytes/sec

- 6.67 MBytes/sec

- 5.7 MBytes/sec

- 5.0 MBytes/sec

- 4.4 MBytes/sec

- 4.0 MBytes/sec

- 3.6 MBytes/sec

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*), 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.

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*.

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 boot-up.

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

Channel A, Target #1 – Device Not Found

When set to *no*, the BIOS does not attempt to display en 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 power-up SCSI devices one-at-a-time when you boot your system. Otherwise, the devices will all power-up at the same time.

When set to *yes*, the SCSI Start Unit Command is sent to the SCSI device during boot-up. When set to *no,* the SCSI device will power-up 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 3-14.

```
╔═══════════════ Save/Abandon device configuration ═══════════════╗
║                                                                  ║
║   ┌──────────────────────────────────────────────────────┐      ║
║   │ ( ● ) Save device configurations                      │      ║
║   │ (   ) Abandon device configurations                   │      ║
║   └──────────────────────────────────────────────────────┘      ║
║                                                                  ║
║  ────────────────────────────────────────────────────────────   ║
║   <ESC>                                                          ║
╚══════════════════════════════════════════════════════════════════╝
```
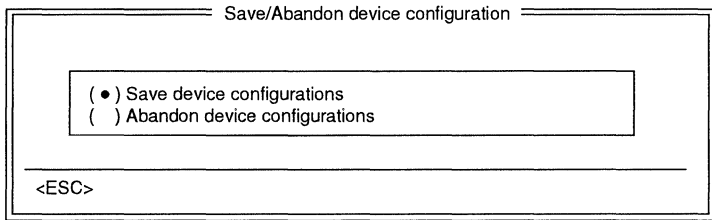
Figure 3-14. Exiting SCSI Device Configuration

Exit the EISA Configuration Utility

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

Utilities

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

```
┌══════════════ AIC-7770 Utility Selection Options ══════════════┐
│                                                                │
│   ┌──────────────────────────────────────────────────┐        │
│   │ ( ● ) Disk Format Utility                          │        │
│   │ (   ) Host Adapter Diagnostic Utility              │        │
│   └──────────────────────────────────────────────────┘        │
│                                                                │
│  ─────────────────────────────────────────────────────────    │
│   <ESC>                                                        │
└────────────────────────────────────────────────────────────────┘
```
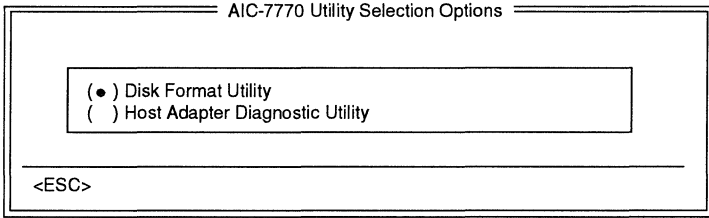
Figure 3-15. Utility Selection

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 perparation
commands, such as MS-DOS *fdisk* and *format*.

Most SCSI disk devices are pre-formatted, and do not need
re-formatting. 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 for- │
│ mat. 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.

Host Adapter Diagnostic Utility

This utility runs a diagnostic on your host adapter by doing DMA transfers between the SCSI host adapter and system memory. This test will run indefinitely until **Esc** is pressed.

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

4

SCSI Troubleshooting Checklist

The AHA-2740 Series has been extensively tested for compatibility with popular SCSI peripheral devices across various operating systems. Most problems that might occur during installation can be traced to errors in preparing devices on the SCSI bus.

The following suggestions should help you to solve any problems that you may encounter. If you need additional help in getting the host adapter running properly, information on contacting Adaptec Technical Support is included in Chapter 1, *Introduction*.

If a problem occurs during installation, check these items first:

➤ 1 Be sure all SCSI peripheral devices are connected to power.

Connect internal peripherals to your computer's power supply; plug external peripheral power cables into a grounded line power outlet. Follow the instructions in the hardware documentation.

2 Be sure all cables are properly connected. Check both power and SCSI interface cables. See *Installation* in Chapter 2.

3 Be sure the SCSI devices and host adapter on each SCSI bus are each set to different SCSI IDs. See *SCSI ID Setting* in Chapter 2.

4 Check SCSI bus termination. The ends of the bus must be terminated. See *Termination on the SCSI Bus* in Chapter 2.

5 If you have installed more than one SCSI host adapter make sure that each host adapter is set to a separate BIOS address, or disable the BIOS on all but one of the host adapters. See *Configure the Host Adapter Parameters* in Chapter 3.

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 EISA Configuration utility.

Try pressing **F5** to toggle the display between color and mono-chrome 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:

➤ 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, which range from 0 to 7. See *SCSI ID Setting* in Chapter 2.

3   Try enabling **Include in BIOS Scan** in the **BIOS and SCSI Device Configuration** option. See *Configure BIOS and SCSI Device* in Chapter 3.

4   Make sure the SCSI bus is properly terminated. See *Termination on the SCSI Bus* in Chapter 2.

5   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 EISA Configuration utility. See *Utilities* in Chapter 3.

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*. These utilities are also available from the Adaptec BBS.

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. Here 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 - Data protect

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 EISA Configuration utility.

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* in Chapter 3.

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

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 mis-identified.

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:

➤ 1 Change the IRQ settings with the EISA Configuration utility.

2 Use the EISA Configuration utility 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-2740 Series host adapter, EISA interface, SCSI interface, and floppy disk interface

- Pin assignments for the internal and external SCSI connectors

A

Technical Information

The basic technical specifications of the host adapter are described below. If you need more detailed information, contact Adaptec's Literature Department at the address or phone numbers listed in Chapter 1, *Introduction*.

Product Specifications

Physical Dimensions

Length:	7.0 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° C (operating or storage)

Extended Industry-Standard Architecture Interface

Table A-1. Standard EISA Bus Electronic and Physical 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 operation.

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:

Table A-2. Output Signals

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)

Input Signals

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

Table A-3. Input Signals

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).		

Internal SCSI Connector

The 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-4 lists the pin assignments for the internal connector.

Table A-4. 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	Ground	24	Ground
25	Open	26	Term Power (Fused)
27	Ground	28	Ground
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

External SCSI Connector

The external SCSI connector must be a shielded 50-pin high den-
sity (Alternative 1) connector, as specified in proposed ANSI
standard X3T9.2/86-109 Revision 10h, Section 4, Figure 5. Table
A-5 lists the pin assignments for the external connector.

Table A-5. External Connector Pin Assignments

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

Floppy Disk Interface

Standard Electronic and Physical Interface

Table A-6. Output and Input Signals

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.

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

B

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-2740 Series may be available from Adaptec. To order Adaptec software, call the number for ordering Adaptec software listed in the *Adaptec Technical Support* section found in Chapter 1, *Introduction*.

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 do any of the following:

- 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

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 format and partition 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 Manual* for instructions on installing and running Adaptec EZ-SCSI.

▢

C

Optimizing Performance

About This Appendix

Read this appendix to find out:

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

C

Performance Tips

Ther AHA-2740 Series 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-2740 Series. 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. See *Configure BIOS and SCSI Device* in Chapter 3.

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.

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 *Configure the Host Adapter Parameters* in Chapter 3.

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 procedure used by the host adapter to verify the accuracy of data transfer on the SCSI bus. Data verification is a desirable option, so SCSI bus parity checking 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 *Configure the Host Adapter Parameters* in Chapter 3. 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 *Configure the BIOS and SCSI Device* in Chapter 3.

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 power-up disk devices and other peripherals one-at-a-time when you boot your system. Otherwise, the peripherals will all power-up at the same time.

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 options. To enable/disable Send Start Unit Command, See *Configure the BIOS and SCSI Device* in Chapter 3.

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.

❐

D

Disk Drives Over 1 Gigabyte

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

D

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 formatted capacity, they have run up against the DOS 1024 cylinder limit.

To continue its support for all SCSI disk drive capacities under DOS, Adaptec has introduced an extended translation scheme for the AHA-2740 Series of host adapters. This new feature bypasses the DOS disk capacity limit and supports disk drives up to 8 GBytes in size under DOS, providing room for years of disk drive evolution. To enable this feature, refer to *Configure BIOS and SCSI Device* in Chapter 3.

The DOS 1 Gigabyte Limit

All versions of DOS are limited to 1024 cylinders per drive. The standard translation scheme for SCSI host adapters, using 64 heads and 32 sectors, provides a maximum accessible capacity of 1 GByte.

To eliminate the 1 GByte limit, Adaptec's new extended translation feature uses 255 heads and 63 sectors, extending the disk drive capacity limit under DOS to 8 GBytes.

Caution

If you have already partitioned a large disk drive with one translation method, conversion to another method will erase your data. Be sure to backup your disk drive prior to any change in the translation method used.

When to Use Extended Translation

With DOS Version 5 Only

NetWare 386 and the newer versions of UNIX do not share the 1024 cylinder limit of DOS and do not require extended translation to support large disk drives.

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 re-partition 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.

Glossary

About This Glossary

Read this glossary to find out:

● Definitions of technical terms used in this manual

● Definitions of terms commonly used in other documents and publications which discuss the SCSI-to-microcomputer peripheral connection
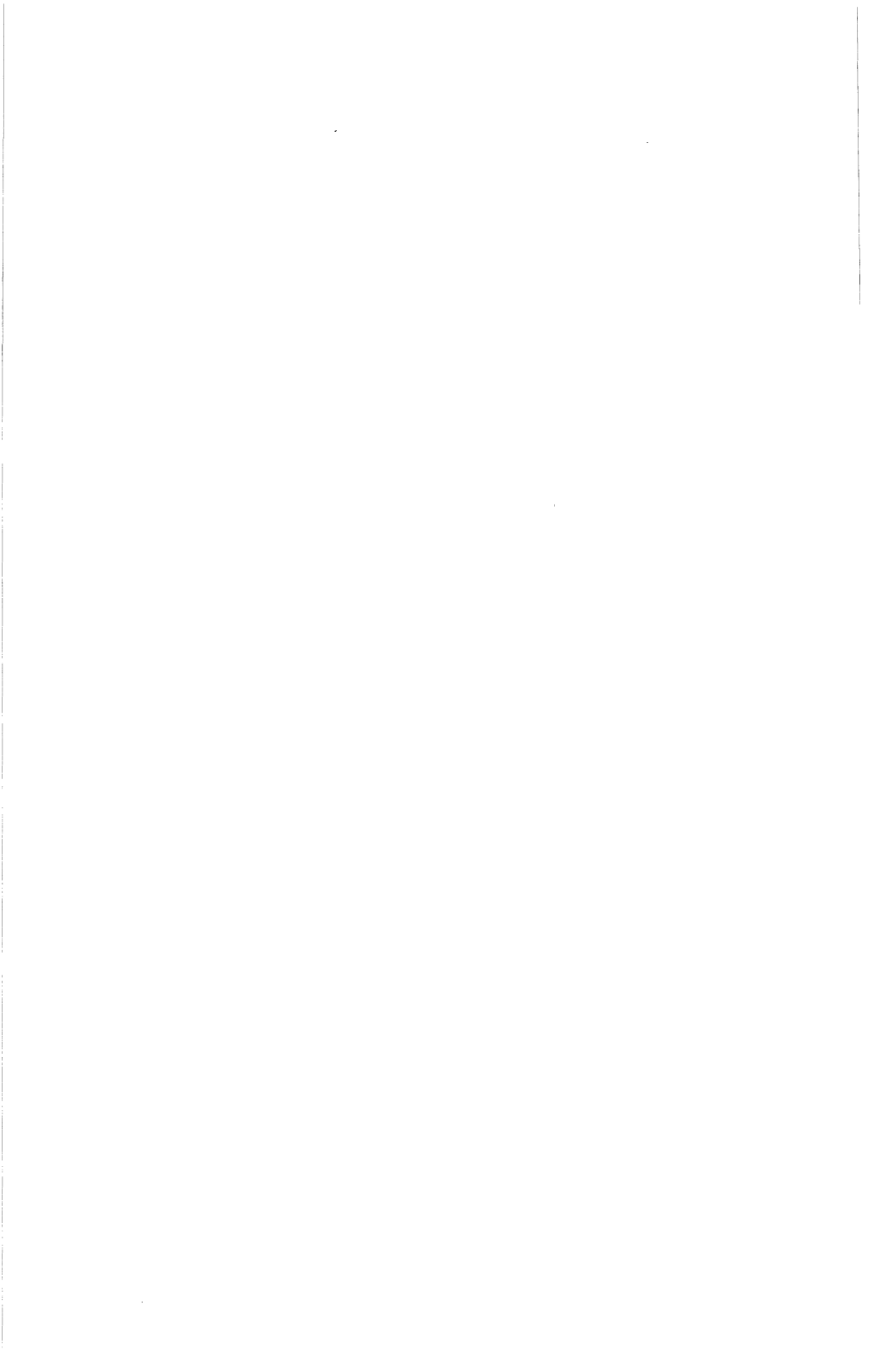
Glossary

A

Adaptec EZ-SCSI
A user-friendly software program that automatically installs 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 UNIX—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, 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 on-board 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 multi-tasking operating systems. Adaptec's AHA-2740 Series of host adapters use bus mastering.

Byte
An eight-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 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 connec-
tion 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-2740 Series of host adapters. For example, additional software is needed in order to install CD-ROM drives on the SCSI bus in the DOS/Windows environment.

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 three-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).

Multi-tasking Operation
The execution of commands in such a way that more than one command is in progress at the same time. Multi-tasking 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.

Multi-threaded 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-2740 Series and all other Adaptec host adapters fully support multi-threaded 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 trans-
fers 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 dif-
ferent 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, con-
nected by cables in a daisy chain 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 sepa-
rate 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 eight 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-2740 Series. Differential devices may be damaged if you connect them and the AHA-2740 Series 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 re-initialization activities occur.

T

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

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

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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