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## 1 Getting Started

This guide provides the steps required for basic installation of the AHA-1540C and AHA-1542C ISA-to-SCSI Host Adapters. Procedures are the same for both adapters except when regarding the AHA-1542C on-board floppy controller.

Installation of your host adapter includes:

1. Installing the AHA (Adaptec Host Adapter) board in your computer
2. Installing your SCSI cable(s) and SCSI peripherals
3. Terminating the SCSI cabling bus
4. Adjusting your host adapter configuration settings if necessary
5. Loading software if necessary

### CAUTION

Turn Off and disconnect power to the system and external equipment. Always refer to your personal computer's documentation for instructions on opening the system cover and adding option boards.

### You may not need to change your host adapter settings

Your host adapter is already configured for the majority of ISA (AT compatible) or EISA class computers. Read sections 2 and 3 to determine whether you need to alter the adapter default settings.

- A table identifying the adapter board switch block settings can be found in section 7 at the end of this Installation Guide.

### You may not need to load any software

Your host adapter comes equipped with an on-board BIOS that allows you to use up to seven SCSI disk drives without additional software under MS<sup>®</sup>-DOS version 5.0 and above. Refer to section 5 for your specific software requirements.

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## 2 Installing the Host Adapter

### Board Installation

1. Turn Off and disconnect power to the system and external equipment. Follow your ISA (or EISA) personal computer's instruction manual to remove the system cover and expose the expansion slots and external access covers.
2. Locate an unused expansion slot. Any standard ISA or EISA expansion slot will work.
3. Remove the corresponding expansion board access cover on the computer chassis.
4. Align and insert the ISA I/O bus connector on the bottom of the AHA-1540C/1542C into the chosen slot. Use the screw from the removed expansion slot cover to secure the AHA-1540C/1542C bracket to your ISA system chassis.
5. Do not replace the system cover or reconnect power yet!

### When to Set the Switches

In most cases, you will *never* have to change the switch block settings. There are, however, certain options which do require adjustments to the switch block on the adapter board.

The switch block is on the upper left-hand corner of the host adapter board.

- A table identifying the switch block settings can be found in section 7 at the end of this Installation Guide.

Here are some cases in which the switch block settings should be changed:

#### Controlling Floppy Drives

- If your floppy diskette drives are already running under another controller, *disable* the AHA-1542C floppy controller.
- If you *want to use* the AHA-1542C floppy controller you must disable your existing one; refer to your computer or floppy controller user documentation.

- SW5 on the AHA-1540C must remain in the On/Closed position, even though there is no floppy controller on that host adapter.

#### Multiple Host Adapters

- Select a different I/O *port address* for each host adapter installed. You must know the port address of each installed host adapter in order to adjust its settings with the Configuration Software.
- 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.

#### Not Controlling SCSI Disk Drives

- If you do not want to use the host adapter to control hard disk drives, *disabling* the BIOS may save up to 60 seconds of boot-up time. This would be useful when running only SCSI tape or CD-ROMs, for example.

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## 3 Connecting Peripherals

### Connecting Cables

SCSI devices are cabled together in a single continuous *daisy-chain* of devices, called the *SCSI bus*. The bus may have no branches, but must run from device to device in a continuous series. The host adapter need not be at the end of the SCSI bus, unless only one other device is on the bus.

- Only *Single-Ended SCSI* devices are supported by the AHA-1540C/1542C. *Differential SCSI* devices may be damaged if connected to the AHA-1540C/1542C bus. Consult your SCSI peripheral user documentation.

If your system configuration includes both internal and external SCSI devices, the host adapter will be at the junction *between* the internal and external peripherals.

1. Lay out your cables and find the *pin-1* element of each cable and peripheral connector. On *internal* cables, pin-1 is usually distinguished by a contrasting color on one edge of the ribbon cable.

*External* cable connectors can only be plugged-in one way, so pin-1 orientation is automatic.

2. Attach the SCSI cable(s) to the host adapter and the peripherals, using either the internal and/or external connector(s).
3. Make sure that pin-1 orientation is maintained throughout the bus. The AHA-1540C/1542C uses a 50-pin Centronics style external connector, and a standard 50-pin header internal connector.

## How to Terminate Your SCSI Bus Cable

What is termination?

The first and last physical SCSI devices on the ends of the SCSI bus must have a set of resistors called *terminators*. All other SCSI devices must have terminators removed/disabled.

The AHA-1540C/1542C and most SCSI peripherals come equipped with built-in terminators that can be enabled or disabled. Exactly two devices must be terminated on the SCSI bus, one at each end.

### Terminating the Host Adapter

The factory installed bus terminators on the AHA-1540C/1542C are *enabled* by default. Host adapter termination should be *disabled* 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.

The table below describes the three possible SCSI device and host adapter (AHA) configurations. Host adapter termination should be adjusted to suit:

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

If you need to *disable* termination on the AHA-1540C/1542C:

1. Complete this physical installation section.
2. Disable Host Adapter SCSI Termination by following the instructions in the following section, **4** *Configuring the Host Adapter*.

## Terminating Other SCSI Peripherals

1. Check the manufacturer's literature to determine how to enable or disable SCSI bus termination on your SCSI peripheral device(s).
2. Install/enable termination on SCSI devices on the *ends* of the SCSI bus (cable).
3. Make sure that termination is disabled/disconnected on devices in between those at the end of the SCSI bus.
4. Check SCSI cable connections, they may have been loosened if terminating your peripherals involved physically manipulating them.

## Reassembling the System

Follow your personal computer and SCSI peripheral installation manual instructions to:

1. Replace the system cover.
2. Make sure all power switches are in the Off position, and connect system and peripheral power cables.

### Starting the System

After you have completed installing and connecting the host adapter:

1. Turn on peripheral and personal computer system power.
2. The host adapter BIOS sign-on message will appear on your computer display. The sign-on includes a listing of installed SCSI devices and should end with a BIOS status message.
3. In most cases your personal computer, host adapter, and SCSI peripherals are now ready to use.

## **4** Configuring the Host Adapter

Your host adapter includes a built-in, menu-driven program which allows you to change most of the option settings of the host adapter without opening the case of your computer or handling the board.

You may never need to reconfigure the host adapter. If you do, however, the following instructions tell you how to access the program.

### Run the Configuration Software:

- To change software controlled host adapter options, such as interrupt channel
- To install new SCSI devices; you may need to low-level format their media, or change host adapter termination
- To run Host Adapter Diagnostics

### Running the Configuration Software

There are several ways to run the Configuration Software:

- Press **Ctrl-A** when prompted at boot time.
- Using DOS DEBUG: **-g=xxxx:6** where *xxxx* = host adapter BIOS address in Hex; **DC00:6** is a typical example.

Pressing **F6** while running the Configuration Software resets the host adapter to the original settings. Press **Esc** to return to the previous menu. Use the arrow (↑↓) and **Enter** keys to make selections.

### Host Adapter Selection

The Host Adapter Port Address screen is the first screen to appear in the Configuration Software.

1. Select the **Port Address** of the adapter to be reconfigured. You may reconfigure any installed AHA-1540C/1542C. (Refer to *Multiple Host Adapters*, in section **2** *When to Set the Switches*)
2. Press **Enter** to select the address and automatically move to the main menu screen.

### Main Menu Options

Configure/View Host Adapter Settings

Configuration Screen: Selecting **Configure/View Host Adapter Settings** gives you access to the basic software configurable options. These options are those

most often requiring adjustment in reconciling I/O conflicts, setting Host Adapter Termination, and changing transfer rates. The host adapter BIOS Base Address is also displayed.

SCSI Device Configuration and Advanced Configuration Options: These screens are accessed from the Configuration screen described above. The AHA-1540C/1542C offers a number of options for advanced applications.

Note

To protect you from data loss, the host adapter will suspend operation if it detects old software. Certain advanced features are incompatible with early SCSI driver software versions.

#### SCSI Disk Utilities

Select **SCSI Disk Utilities** from the main options menu. SCSI IDs 0 through 7 are then displayed, showing SCSI devices installed at each address, including non-disk devices. Selecting one of the installed devices causes the utilities menu to appear.

Format Disk accesses the Adaptec SCSI Low-Level format utility. Most SCSI devices are pre-formatted, and do not need re-formatting.

Verify Disk Media scans the selected device's media for defects. If bad blocks are encountered, a prompt will ask if you want the block *re-assigned*; if you select **Yes**, that block will no longer be used.

#### Host Adapter Diagnostics

Not all ISA class systems properly support bus master DMA transfers, necessary for running multi-tasking OS/2, Windows, Unix, and others.

Host Adapter Diagnostics will do a bus master DMA test to memory. There should be no device drivers or TSR (terminate and stay resident) programs loaded when the test is run. If the test fails, try lowering the DMA transfer rate to a lower setting from the **Configure/View Host Adapter** settings menu.

## 5 Loading the I/O Operating Environment Software

### DOS/Windows

Under MS<sup>®</sup>-DOS 5.0 or higher, up to seven SCSI hard disk drives can be connected to the AHA-1540C/1542C without additional software. (Older versions of DOS support up to two hard disk drives.)

The host adapter treats removable media drives as hard disk drives provided you *enable Treat Removable Disks Under BIOS as Fixed Disks in Advanced Configuration Options*, and do not remove the media while your computer system power is on.

Additional software is required if you desire to do the following:

- Treat removable media devices as removable while your computer is running.
- Support more than two hard disk drives under versions of DOS prior to MS-DOS 5.0
- Use devices other than hard disk drives such as SCSI tape, CD-ROM, scanners, etc.

Refer to the documentation received with your environment software package for instructions on loading your SCSI I/O Operating Environment for versions of DOS prior to 5.0.

### Novell NetWare

NetWare<sup>®</sup> 4.x includes the Adaptec I/O Operating Environment and *does not* require additional software.

- To load software for Novell<sup>®</sup> NetWare 286 2.x and 386 3.x, follow the instructions included in the ASW-1440 software package.

### OS/2

IBM<sup>®</sup> OS/2<sup>®</sup> 2.0 and Microsoft<sup>®</sup> OS/2<sup>®</sup> 1.30.1 include the Adaptec I/O Operating Environment and do not require additional software.

- To use the AHA-1540C/1542C under MS or IBM OS/2 1.3, follow the instructions in the ASW-1220/1420 version 1.3 software product.

### UNIX

Major versions of UNIX<sup>®</sup> include the Adaptec I/O Operating Environment and support the AHA-1540C/1542C without additional software. Current versions of SCO<sup>®</sup> UNIX, USL<sup>®</sup> UNIX, and Sunsoft<sup>®</sup> Interactive UNIX support the AHA-1540C/1542C directly.

## 6 Troubleshooting

If Your Computer Will Not Boot From a 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 there is no non-SCSI disk drive:

1. Make sure your computer system's CMOS Setup is set to **No Drives Installed**, as is required for SCSI host adapters.
2. Try enabling **Dynamically Scan SCSI Bus for BIOS Devices in the Advanced Configuration Options** area of the Configuration Software. See section 4
3. Make sure the SCSI hard disk drive SCSI ID is set to ID 0. The drive SCSI ID is normally set with jumpers or switches on the drive. All SCSI devices should be set to unique SCSI IDs, which range from 0 to 7.
4. Make sure the SCSI termination is set correctly. (See section 3, *Connecting Peripherals*, for information on SCSI termination.)
5. A low-level format of the SCSI hard disk may be necessary. Be sure to backup first, then run the format utility accessible through the Configuration Software program.

Similar utilities for removable media devices are included in Adaptec's DOS I/O Operating Environment Software, or via the BBS. See section 8

6. Make sure SW5 on the AHA-1540C is in the **On/Closed** position. It must remain in that position, even though there is no floppy controller on that host adapter.

## Conflicts With Other Options

Your host adapter and all other peripherals may not use or occupy overlapping memory and I/O addresses:

1. IRQ and DMA Channels may be altered with the Configuration Software.
2. Port addresses and BIOS addresses for the host adapter may be viewed with the Configuration Software and changed with the switch block on the adapter board.

## 7 Switch Block Settings

Settings controlled by the switch block on the upper left-hand corner of the host adapter board are as follows:

sw1	On	Termination Installed		sw5	On	Disable Floppy <sup>+</sup>	
	Off	Software Controlled*			Off	Enable Floppy*	
sw2	sw3	sw4	I/O Port	sw6	sw7	sw8	BIOS Address
Off	Off	Off	330-333h*	Off	Off	Off	DC000h*
On	Off	Off	334-337h	On	Off	Off	D8000h
Off	On	Off	230-233h	Off	On	Off	D4000h
On	On	Off	234-237h	On	On	Off	D0000h
Off	Off	On	130-133h	Off	Off	On	CC000h
On	Off	On	134-137h	On	Off	On	C8000h
Off	On	On	Reserved	Off	On	On	Reserved
On	On	On	Reserved	On	On	On	BIOS Disable

Off = Open

\* = Standard setting: Standard settings on your host adapter may be different; Adaptec custom configurations for proprietary customers and resellers.

\* = Standard on AHA-1540C

- A table and text explaining host adapter termination can be found in sections **2** and **3**

### Note

If switch **sw1** is switched to **On**, host adapter termination will always be enabled regardless of the setting in the Configuration Software.

## 8 Adaptec Customer Support

- The Adaptec Electronic Bulletin Board Service (BBS) provides information on software upgrades, new releases, technical advice, and more.

The BBS can be reached 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 (408) 945-2550.
- Additional documentation for Adaptec products can be requested by calling (800) 934-2766.

## 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.



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