adaptec

AHA-1740/1744
Installation Guide
Using ASW-C174

Version 2

1.0 INTRODUCTION

This guide documents the installation and configuration of the AHA-1740 or AHA-1744 host adapter in an EISA computer system. This requires the ASW-C174 Configuration and Download Utilities software disk in order to perform proper installation or configuration. The ASW-C174 Utilities disk contains the following files:

AHA-1740 Configuration	!ADP0000.CFG
AHA-1744 Configuration	!ADP0400.CFG
Configuration Overlay	!ADP0000.OVL
Download Utility	ADL.EXE
Microcode File(s)	STANDARD.HEX ENHANCED.HEX
Additional Files	HLP, DTA, etc.

Details on the AHA-1740/1744 are available in the AHA-1740/1744 User Manual. Other questions should be directed to your local Adaptec sales office.

2.0 HARDWARE INSTALLATION

The Adaptec AHA-1740/1744 EISA-to-Fast SCSI host adapter has been designed to operate as shipped in standard EISA class computers. The board (or the system in which it is installed) is normally shipped with a configuration disk which permits the board to be configured to the actual slot location in which it is installed. Unlike AT/ISA boards, but like Micro Channel boards, EISA boards do not normally require hardware jumpers.

Ensure that you have the correct version of the AHA-1740/1744 for your system. The AHA-1740 supports the more common single-ended SCSI interface. The AHA-1744 supports the differential interface, more common on SCSI peripherals for minicomputers. While the two use the same signal protocol, they are not electrically compatible.

To perform hardware installation:

1) Turn OFF the power to the computer system.

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

3) Locate an unused EISA slot in your system which supports bus master operations. Refer to the host system documentation for details.

4) Remove the corresponding system expansion slot cover by turning the screw that secures it from the top, counterclockwise.

5) Align the EISA bus connector on the bottom of the AHA-1740/1744 to the open chassis slot with the slot cover removed. Ensure the external connector and bracket pass cleanly through the cutout in the rear wall.

6) Firmly plug the board into the slot. Use the screw from the corresponding expansion slot cover to secure the board bracket to the system frame.

7) If an internal SCSI peripheral is to be used, install a 50-pin SCSI ribbon cable to the host adapter. This cable must be oriented correctly. Pin 1 of the SCSI cable is designated by a red stripe. Multicolor 50-pin ribbon cables signify pin 1 with a brown color. Pin 1 on the host adapter 50-pin SCSI header is located on the lefthand side, farthest from the installation bracket and is designated by the words PIN 1 on the board adjacent to the header. After locating pin 1 on the host adapter and on the SCSI cable, carefully insert the connector located at the end of the long end of the cable into the host adapter connector. After ensuring that all pins are lined up and that the pin 1 orientation is correct, firmly seat the connector to the board such that the locking ears snap into place to hold the cable firmly. If it is ever necessary to remove the cable, gently push the two locking ears horizontally outwards along the axis of the board until the cable connector is pushed upward and free. Ensure that the external device drive types all correspond with the Single-Ended/Differential marking on the bracket of the AHA-1740/1744 respectively.

WARNING: THE AHA-1740 REQUIRES SINGLE-ENDED DEVICES. THE AHA-1744 REQUIRES DIFFERENTIAL DEVICES. FAILURE TO MATCH DRIVE TYPES CAN RESULT IN ELECTRICAL DAMAGE TO THE BOARD AND THE PERIPHERALS.

8) If an internal SCSI device is also being installed, it should be installed in the drive bays in accordance with the directions on the peripheral at this time. The proper power supply connection also must be made to the SCSI peripheral device.

9) The 50-pin SCSI ribbon cable can now be attached to each internal SCSI device. Refer to the device's installation instructions to ensure proper pin 1 orientation. Pin 1 orientation must be consistent throughout the system. Keep the ribbon cable neatly dressed away from the ventilation slots in the computer system. Keep the ribbon cable dressed away from possible electrical noise sources or noise sensitive components, particularly large microprocessors, memory boards, switching power supplies, and analog data acquisition boards. If the internal configuration requires the cable to come near noise sensitive circuits, make sure that the cable crosses the boards at right angles and is near the noise sensitive circuits for the shortest distance possible.

10) Carefully reinstall the cover of the computer.

11) If an external SCSI subsystem is being installed, it can now be cabled to the External SCSI Connector projecting from the shielding bracket on the back of the AHA-1740/1744 host adapter. The external connector on the AHA-1740/1744 is a small form factor SCSI alternate-2 D shell connector that ensures correct pin 1 orientation on the host adapter. The correct shielded SCSI cable must be used for proper operation. Ensure that the external device drive types all correspond with the Single-Ended/Differential marking on the bracket of the AHA-1740/1744 respectively.

WARNING: THE AHA-1740 REQUIRES SINGLE-ENDED DEVICES. THE AHA-1744 REQUIRES DIFFERENTIAL DEVICES. FAILURE TO MATCH DRIVE TYPES CAN RESULT IN ELECTRICAL DAMAGE TO THE BOARD AND THE PERIPHERALS.

The subsystem, cables, and SCSI terminators must be installed in accordance with the directions provided with the external SCSI subsystem. The addresses selected for external SCSI devices must not overlap with the addresses of the host adapter or any other SCSI devices attached internally.

12) If both internal and external devices are to be connected, remove the three terminator resistor packages near the internal connector. Only the two devices at either end of a SCSI cable should have terminators installed.

Checklist

Before applying power to your system, the following items should be completed and checked:

1. The 50-pin SCSI ribbon cable is connected to the host adapter with proper pin 1 orientation.
2. The host adapter is firmly seated in the host computer's adapter slot.
3. The correct SCSI addresses are selected on all attached SCSI devices. Address 0 is reserved for the boot hard disk and address 1 is used for a second hard disk.
4. The correct operating modes are selected on all attached SCSI devices.
5. Terminators are installed or removed on the drives and host adapter as required.
6. External SCSI devices are properly installed and cabled.

Terminators

The SCSI bus must also be terminated correctly to ensure proper operation. The first and last physical SCSI devices on the SCSI cable must have terminators installed. All other SCSI devices must have terminators removed. The AHA-1740/1744 host adapter is usually the first device on the SCSI Bus and has terminators installed at the factory.

3.0 SYSTEM CONFIGURATION

When it is being installed in an EISA system, the AHA-1740/1744 requires an EISA system configuration file (file name: !ADP0000.CFG for the AHA-1740 and !ADP0400.CFG for the AHA-1744, with an additional overlay, ADP0000.OVL, for configuring SCSI peripherals on the bus). This may be part of the system software or may be supplied on a separate diskette. If it is separate, installation is easier if the contents of the separate diskette are copied onto the main bootable system configuration disk.

To perform system configuration:

Place the bootable configuration diskette in an operative drive and reset the system to boot from this diskette.

Ignore any error which indicates that an unknown board has been detected in the system. Selection of board configuration varies with the configuration utility supplied with the EISA system. There are two main types, supplied by MCS and Phoenix. The type may be obscured by the screen banner used by the system vendor. Follow the procedure which is closest to your environment. In the case of the MCS configuration, type "CF". For Phoenix configuration type "PTLECU". Select board configuration and press <RTN> .

If the main configuration disk does not contain files for the AHA-1740/1744, place the ASW-C174 diskette with the AHA-1740/1744 configuration files, copy the contents to the boot floppy and run the configuration program (file name: !ADP0000.CFG for the AHA-1740 and !ADP0400.CFG for the AHA-1744, plus ADP0000.OVL for either board).

The program will autoconfigure the system and display a diagram of the motherboard showing which boards have been configured into which slots.

MCS Configuration

For configuration under MCS, select the slot in which the AHA-1740/1744 is installed and press <RTN>. The screen will display the System Configuration Detailed View. These settings should normally not be changed for standard mode operation. Use the cursor arrows to make selections and the <RTN> key to enter the selection. When installing multiple AHA-1740/1744s in Standard Mode, ensure that none share the same configuration parameters for port address. The configuration utility normally automatically ensures that there is no conflict. SCSI ID can be the same provided that the boards do not share the same SCSI bus. Normally, the host adapter is given address 7. A typical selection detailed view is shown in Figure 1. Use the arrow keys to move around in a selection and the Enter or Return key to choose a highlighted selection. If a mouse is installed, it may also be used.

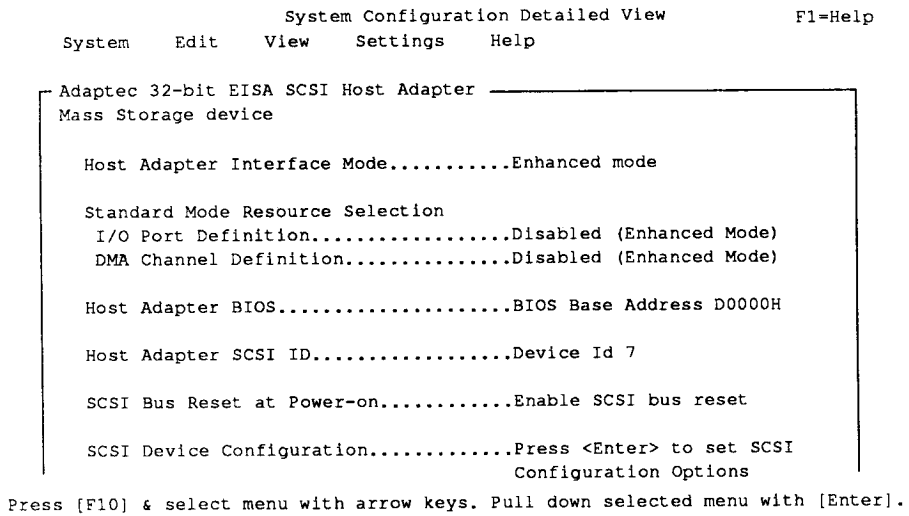

Figure 1. System Configuration Detailed View

Normally, it is not necessary to alter any settings for configuration. Selection of the appropriate interrupt request will also select between Compatible and Enhanced Mode. If selecting Enhanced Mode, it is not necessary to alter the system resource selection, but if resources are left selected, they will be allocated, even if not used.

Select the AHA-1740/1744 installation configuration as follows:

1) Select the host adapter interface. There are two available. Standard allows software written for the AHA-1540 or AHA-1640 families to run the AHA-1740/1744. Enhanced Mode allows a higher-performance interface to be used. If Standard Mode is selected, the host adapter interrupt level must also be selected (see Figure 2).

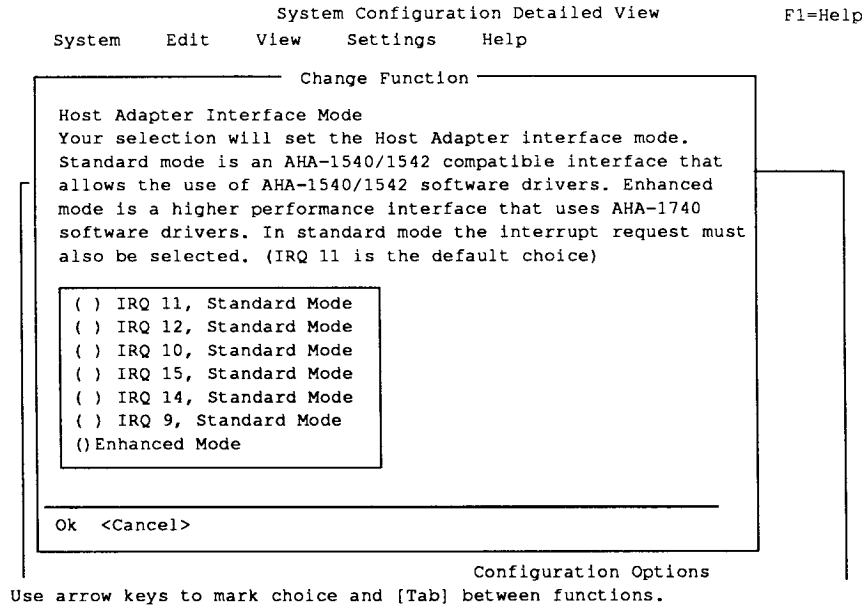

Figure 2. Interface Mode and Interrupt Selection Display

If the Enhanced Mode is selected for a board which has Compatible Mode firmware loaded, the LED on the board will blink repeatedly and the only operation the board will perform is a Microcode Download.

2) If Standard Mode is selected, choose both the host adapter port address and DMA channel. For Enhanced Mode, both should be disabled.

3) Select the base address of the bootstrap BIOS on the host adapter.

4) Select the device address for the host adapter on the SCSI bus.

5) Select whether the host adapter generates a reset on the SCSI bus at power-on or reset.

6) If required, select the device configuration to select parameters on the SCSI bus. A pop-up window appears. Select the host adapter interface mode chosen in Step 1.

Standard Mode SCSI Configuration

The view for Standard Mode is a simple selection for those variables which apply to all SCSI peripherals connected. This is shown in Figure 3. Normally, the default of one device at SCSI ID#0 with normal default parameters is selected.

```
                    System Configuration Detailed View          F1=Help
 System    Edit    View    Settings    Help
 ┌──────────────────────────────────────────┐
 │ Global Host Adapter SCSI Configuration Options │
 │                                          │
 │ Enable Parity Checking     yes           │
 │ Initiate Synch Negotiation yes           │
 │ Enable Disconnection       yes           │
 │                                          │
 │ Ok  <ESC>                                │
 └──────────────────────────────────────────┘
  I/O Port Definition.................Disabled (Enhanced Mode)
  DMA Channel Definition..............Disabled (Enhanced Mode)

  Host Adapter BIOS...................BIOS Base Address D0000H

  Host Adapter SCSI ID................Device Id 7

  SCSI Bus Reset at Power-on..........Enable SCSI bus reset

  SCSI Device Configuration...........Press <Enter> to set SCSI
                                      Configuration Options
Press <Enter> to make changes or <Escape> to save/abandon changes.
```

Figure 3. Standard Mode SCSI Configuration

Select "Enable Parity Checking" to allow the host adapter to generate parity on data sent and check parity on data received on the SCSI bus.

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

Select "Enable Disconnection" to allow a peripheral to go "off-line" while it completes a lengthy operation like a seek. This allows the host adapter to perform other operations on the SCSI bus while the device is temporarily disconnected.

Enhanced Mode SCSI Configuration

The view for Enhanced Mode allows more flexible selection and is shown in Figure 4.

```
                    System Configuration Detailed View          F1=Help
 System    Edit    View    Settings    Help
   Host Adapter Interface Mode.....Enhanced mode
   ┌──────── Configuration Settings for SCSI Devices ────────┐
   │ SCSI Device ID              #0  #1  #2  #3  #4  #5  #6  #7 │
   │ Error if Device Not Found   no  no  no  no  no  no  no  no │
   │ BIOS Support Option         HD  HD  HD  HD  HD  HD  HD  no │
   │ Send Start Command          no  no  no  no  no  no  no  no │
   │ Enable Parity Check         yes yes yes yes yes yes yes yes│
   │ Initiate Synch Negotiation  yes yes yes yes yes yes yes yes│
   │ Enable Disconnection        yes yes yes yes yes yes yes yes│
   │ Maximum Synch Xfer Rate     10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0│
   │    (MBs per second)                                      │
   │                                                          │
   │ Ok  <ESC>                                                │
   └──────────────────────────────────────────────────────────┘
                                                Slot 4
```

Figure 4. Enhanced Mode SCSI Configuration Screen

The enhanced mode offers a greater selection of SCSI configuration options. Use the Tab or Cursor keys or a mouse to highlight a particular selection and press <Return> to toggle between "no" and "yes." Each device can have a number of parameters selected individually.

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

"BIOS Support Option" allows up to two devices attached to the SCSI bus to be recognized by the host adapter BIOS and installed as devices on the system without the need for driver software. Only fixed and removable hard disks are supported under the BIOS, with default for hard disks only. Select this option to allow removable support or to remove any disk support for each SCSI address. Note that support for removable disks does not allow the disk media to be removed during operation — only use of a removable disk as if it were a fixed disk.

When this option is selected, use the cursor keys to move among the options shown in Figure 5.

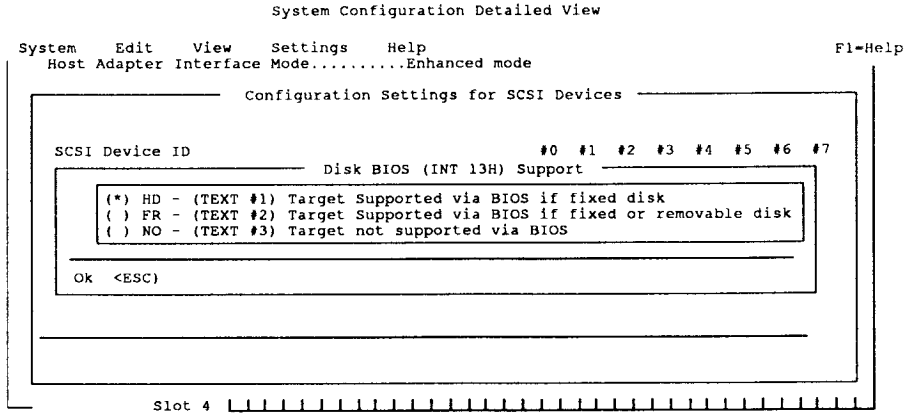

Figure 5. BIOS Support Selection Screen

"Send Start Command" is used for devices which require a command to start up after power on. Most devices do not require this.

"Enable Parity Check" is similar to Standard Mode where the host adapter will generate and check for parity on SCSI bus data.

"Initiate Synch Negotiation" is similar to Standard Mode and allows the host adapter to attempt to communicate with the device using the faster synchronous SCSI protocol. Most disk drives support synchronous protocol.

"Enable Disconnection" is similar to Standard Mode. It allows the device to go off-line while performing an operation, freeing up the SCSI bus and host adapter for other operations in parallel.

"Maximum Synch Transfer Rate" allows selection of the highest data transfer speed that the host adapter will attempt with that peripheral. The AHA-1740/1744 supports rates up to the Fast SCSI maximum of 10 MBytres/second.

When the selection is completed, press <ESC> to reach the SCSI configuration exit menu shown in Figure 6.

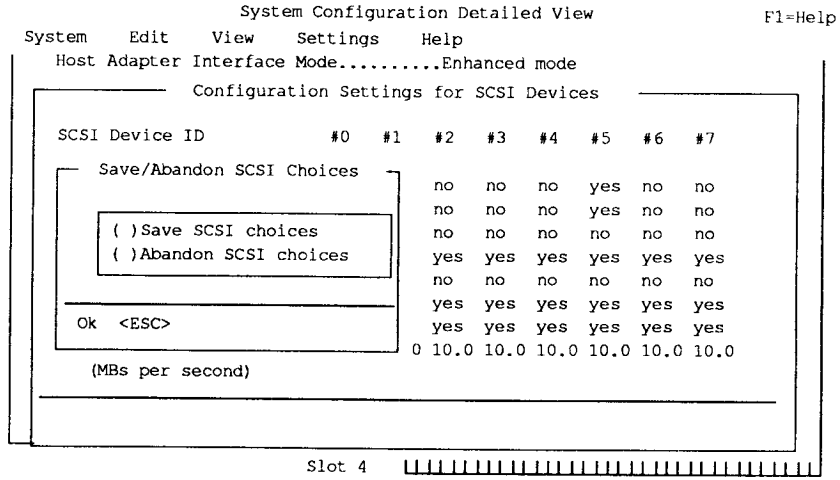

Figure 6. Enhanced Mode Configuration Exit Screen

Use the cursor keys or mouse to select whether to make the changes or abandon all changes made on this attempt. When the correct line is highlighted, press <ESC> to select.

Exit the configuration utility by hitting CTRL + X

Select the Save Configuration and Exit option using the cursor arrows and press <RTN>.

Reboot from the original boot diskette.

Phoenix Configuration

Configuration using the Phoenix utility is similar to that under MCS. Use the arrow keys to select the board to configure after entering the Configuration menu, selecting function choices and pressing <RTN>. Press <RTN> when the appropriate board slot is highlighted.

Selection among the available system options is made by using the up/down arrows. Press the spacebar at the option to alter for a toggling among options available. There is no facility for selection of peripheral options under Phoenix. To exit, skip to the bottom of the page and press <RTN> when "OK" is highlighted.

4.0 FIRMWARE DOWNLOAD

The AHA-1740/1744 has the unique flexibility of allowing firmware to be altered or upgraded while the board is installed in a system. This is done by using a utility on the ASW-C174 and either the firmware files supplied or new files supplied with ASW-M174. Note that it is not necessary to perform a download when installing a system for the first time or to select between Standard and Enhanced Mode.

The microcode with which the AHA-1740/1744 is equipped is available in two main versions:

- Standard Mode
- Enhanced Mode

Selection between these modes affects the software manager required to support the board. It has no effect on the SCSI or host bus hardware. The firmware download can either be used to configure the board for one of the two main modes or to upgrade the board to a later revision of firmware for a particular mode.

The Standard Mode allows software drivers written for the AHA-1540 or AHA-1640 families to run unaltered on the AHA-1740 family. There is no performance penalty for this — the AHA-1740/1744 performs 32-bit transfers at speeds up to 33 MBytes/second and can operate 10 MByte/second Fast SCSI transfers.

The Enhanced mode allows the board to take advantage of a number of features which were not available on earlier host adapters. These include:

- 32-bit addresssing capability
- Single fast mailbox handling
- Contingent allegiance (SCSI)
- Tagged queueing (SCSI)

Adaptec's AHA-1740/1744 Download Utility should be used to perform a firmware download or to upgrade the installed microcode to a new revision to retrieve firmware information and also format attached drives. This utility contains three main features:

- Download Firmware
- Firmware Information
- Low-level disk format

Firmware download causes the host adapter to overwrite its program memory with microcode supplied by the user from an external source like the ASW-C174. After the data is written to the host adapter's internal RAM, and a successful checksum test done by the host adapter, the host adapter will then reprogram its EEPROM with the new firmware. In order to change the host adapter current interface mode, the user must reconfigure the system memory by running the Configuration Utility (described above).

Firmware Information is used to obtain release information and revision level of the host adapter's firmware. Use this command to ensure that proper firmware is loaded or to confirm the mode in which the board is currently operating.

CONFIGURATION OPERATION

Insert the utility floppy into Floppy Drive A. At the DOS prompt, type "ADL" to bring up Adaptec's AHA-1740/1744 Download Utility. The following will describe the procedures and the screen display. During the operation, <F1> can be pressed to display help messages and <ESC> to exit the current message box and the utility. If using a monochrome or gray-scale monitor, type "ADL -M" to improve viewing contrast.

List of Adapters

When the utility is first loaded, a list of installed host adapter(s) is displayed at the upper left corner of the screen. Along with each installed host adapter is its configured mode. (Note that the user must run the System Configuration Utility in order to change the mode in which the host adapter is selcted to operate). If more than one host adapter is installed, use the up and down arrow key to choose the host adapter. When the host adapter to be selected is highlighted, press <ENTER> to select.

The <ESC> key can be used to exit the utility. When using other parts of the utility, return to this screen to exit. If either the Download Firmware or Low-level Format utility has been used, the system will reboot automatically to allow correct configuration.

Main Menu

After selecting the host adapter, a main menu will appear. Three operations are provided. They are:

- Download Firmware
- Firmware Information
- Low-level Format

Use the up and down arrow key to choose the operation. Press <ENTER> to start an operation. Each operation is described below.

Download Firmware

Have the new firmware ready on a floppy diskette or copy it onto the internal hard disk drive. The new firmware will come with its checksum value on the floppy diskette label.

First, an edit form will pop up when this operation is chosen. Use the arrow keys to move from field to field, or within the field. Type in the firmware file name (example : A:\phase1.hex) that is going to load into the host memory, and choose the mode (Standard or Enhanced) that is going to download by toggling with the <+/–> key. Press <ESC> to exit the form and continue.

After exiting from this screen the new firmware file will be automatically loaded into the host memory. The checksum will be calculated and displayed if the firmware file is loaded successfully. At this point, verify the displayed checksum with the checksum on the floppy label. Press <ESC> to cancel the operation. Press <Y> to continue. This will issue the DOWNLOAD FIRMWARE command to the host adapter. The whole process may take up to 45 seconds. A message will indicate the success or failure of downloading the new firmware.

Subsequently, a confirm message window will be displayed to allow verification of the download operation. If the displayed information is valid, press <ESC> to continue and return to the main menu.

Firmware Information

This operation queries the board for the release, revision, and checksum information of microcode currently on the host adapter. If the command is successfully completed, all information that is retrieved from the host adapter will be displayed. Otherwise, an error message will be displayed. After reading the host adapter information, press <ESC> to continue.

If multiple host adapters are installed, the <ESC> key can be used to select another host adapter from the List of Host Adapters menu.

5.0 LOW-LEVEL FORMAT UTILITY

The Low-Level Format Utility is used to reformat a hard disk and erase all previous information stored on the disk. This may be necessary with disks formatted to operate with a different system or SCSI controller.

For format utility is entered as a part of the Down Utility described above. Run the ADL and select "Low-Level Format" from the menu displayed.

Choosing the option will display a "List of Device(s)," which contains the list of all attached SCSI device(s) on the previously selected host adapter. Press <ESC> to return to the main menu or <ENTER> to select the SCSI drive to be formatted. Note that the only device type that is currently supported is Direct Access Device.

After choosing a SCSI device, a menu will be displayed to allow the user to choose either the format and verify option, or the wipe boot sector option. Press <ENTER> to select. A warning message will be displayed to alert the user that this particular operation will result in losing the data content that is stored on the drive. The user can either press <Y> to continue the operation or <ESC> to abort the operation.

Appropriate messages for successful or unsuccessful completion of the operation are displayed. Simply press <ESC> to continue and return to the main menu.