

USER'S GUIDE

LSIU80ALVD PCI to Ultra2 SCSI Host Adapter

August 2004

Version 2.0



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2. This device must accept any interference received, including interference that may cause undesired operation.

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 a residential installation. 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 harmful interference to radio or television 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:

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Document DB15-000320-00, August 2004

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Preface

This book is the primary reference and user's guide for the LSIU80ALVD PCI to Ultra2 SCSI Host Adapter. It contains a complete functional description for the LSIU80ALVD and includes complete physical and electrical specifications for the LSIU80ALVD.

Audience

This document assumes that you have some familiarity with microprocessors and related support devices. The people who benefit from this book are:

- Engineers and managers who are evaluating the processor for possible use in a system
 - Engineers who are designing the processor into a system
-

Organization

This document has the following chapters and appendixes:

- [Chapter 1, Using the LSIU80ALVD](#), defines the interfaces and characteristics of the LSIU80ALVD.
- [Chapter 2, Installing the LSIU80ALVD](#), provides both quick and detailed installation instructions.
- [Chapter 3, Configuring the LSIU80ALVD](#), describes the SCSI BIOS Configuration Utility to configure adapter and device settings.
- [Appendix A, Technical Specifications](#), describes the physical and operational environments of the LSIU80ALVD.
- [Appendix B, Glossary of Terms and Abbreviations](#), provides definitions of various terminology that is referenced throughout this user's guide.

Related Publications

PCI Storage Device Management System SDMS™ 4.0 User's Guide,
Document DB15-000099-01

Revision Record

Revision	Date	Remarks
2.0	8/04	Final version. First printing.

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Chapter 1

Using the LSIU80ALVD

This chapter describes the LSIU80ALVD PCI to Ultra2 SCSI Host Adapter board interface to PCI computer systems and includes these topics:

- [Section 1.1, “General Description,” page 1-1](#)
- [Section 1.2, “Features,” page 1-2](#)
- [Section 1.3, “Interface Descriptions,” page 1-3](#)

1.1 General Description

The LSIU80ALVD provides an Ultra2 SCSI interface to PCI computer systems. It will be referred to as the LSIU80ALVD throughout this manual. Installing this adapter in your PCI system allows connection of up to 15 SCSI devices.

The LSIU80ALVD is a 16-bit, Low Voltage Differential (LVD)/Single-Ended (SE) SCSI solution for your computer. This board can support legacy Fast SCSI and Ultra SCSI devices, and the newest LVD Ultra2 SCSI devices. It is also backwards compatible with existing wide SCSI applications for the LSI8251S and LSI8751SP/E host adapters.

The Storage Device Management System (SDMS™) software operates the board. Other SCSI software that works with the LSI53C895A PCI to Ultra2 Controller with LVDlink™ Universal Transceivers chip could also be used. BIOS support for this adapter is incorporated on the board in a Flash memory device. The LSIU80ALVD has a serial EEPROM device for storing the user's SCSI bus configuration.

This guide, along with the *PCI Storage Device Management System SDMS 4.0 User's Guide*, contains product information and installation instructions to help you gain the full benefits of the LSIU80ALVD.

1.2 Features

This section provides a high level overview of the PCI Interface, the SCSI Interface, and Board Characteristics for the LSIU80ALVD.

1.2.1 PCI Interface

- Full 32-bit DMA bus master
- Zero wait-state bus master data bursts up to 133 Mbytes/s (@ 33 MHz)
- Universal 3.3 V and 5 V PCI bus voltage support
- Supports 32-bit 33 MHz data bursts with variable burst lengths
- Bursts 2 to 128 dwords across the PCI bus
- Prefetches up to 8 Dwords of SCRIPTs instructions
- Supports PCI Write and Invalidate, Read Line, and Read Multiple commands

1.2.2 SCSI Interface

- Supports 16-bit LVD and SE signaling
- Includes 4 Kbytes RAM for SCRIPTs instruction storage
- Automatically enables LVD or SE termination
- Contains external 68-pin high density (HD) and internal 68-pin HD latching connectors
- Performs wide Ultra2 SCSI LVD synchronous transfers up to 80 Mbytes/s
- SCSI synchronous offset up to 31
- Provides SCSI termination power (TERMPWR) source with autoresetting circuit protection device
- SCSI Configured AutoMatically (SCAM) Level 1 Capability (Set "OFF" by default)
- Flash ROM for BIOS storage for up to 256 Kbytes
- Supports variable block size and scatter/gather data transfers

- Performs complex SCSI bus sequences without interrupts, including restore data pointers
- Serial EEPROM for user configuration utility
- SCSI bus activity LED connector and on-board LED

1.2.3 Board Characteristics

- PCI board dimensions, 152.4 x 88.90 mm (6.00 x 3.5 inches)
- PCI Universal 32-bit card edge connector
- HD 68-pin external connector
- HD 68-pin internal connector

A mechanical drawing showing board dimensions and component layout is located in [Appendix A, “Technical Specifications.”](#)

1.3 Interface Descriptions

This section provides a more detailed explanation about the PCI Interface, the SCSI Interface, Ultra2 SCSI Technology, and LVDlink Technology.

1.3.1 The PCI Interface

PCI is a high-speed standard local bus for interfacing a number of I/O components to the processor and memory subsystems in equipment ranging from PCs to servers. The PCI functionality for the LSIU80ALVD is contained within the LSI53C895A. The LSI53C895A connects directly to the PCI bus and generates signal timing and bus protocol in compliance with the PCI Specification Revision 2.1.

The PCI interface operates as a 32-bit DMA bus master. The connection is made through edge connector J1 (see [Figure 2.1](#)). The signal definitions and pin numbers conform to the PCI Local Bus Specification Revision 2.1 standard. The LSIU80ALVD conforms to the PCI universal signaling environment for a 5 V or 3.3 V PCI bus.

1.3.2 The SCSI Interface

The SCSI functionality for the LSIU80ALVD is contained within the LSI53C895A. The LSI53C895A connects directly to the SCSI bus and generates signal timing and bus protocol in compliance with the SCSI standard.

The SCSI interface on the LSIU80ALVD operates as an 8-bit or 16-bit interface. It supports 8-bit or 16-bit, synchronous and asynchronous, LVD or SE, Fast, Ultra and Ultra2 SCSI protocols in various combinations. The interface is made through connectors J2 and J3 (see [Figure 2.1](#)). Internal connector J2 is a 68-pin HD right angle latching connector. External connector J3 is a shielded 68-pin HD right angle connector that protrudes through the back panel bracket.

An on-board LED (labeled Activity) indicates SCSI bus activity.

LVD/SE dual mode, active termination is provided on the LSIU80ALVD. Termination is automatically disabled when both SCSI connectors are used.

The LSIU80ALVD supplies SCSI bus TERMPWR through a blocking diode and a self-resetting 1.5 A short circuit protection device.

A 40 MHz oscillator is installed on the LSIU80ALVD to provide the clock frequency to the LSI53C895A that is necessary to support Ultra2 SCSI transfers of up to 80 Mbytes/s.

1.3.3 Ultra2 SCSI Technology

The LSIU80ALVD fully supports Ultra2 SCSI. Ultra2 SCSI is an extension of the SCSI Parallel Interface 2 and 3 (SPI-2 and SPI-3) family of standards that expands the bandwidth of the SCSI bus, allowing faster synchronous data transfers.

For the internal bus, special impedance SCSI ribbon cables are specified for operation with Ultra and Ultra2 SCSI devices. You must consider the total length of the bus cables and the number of devices on the SCSI bus when setting up your system.

Use SCSI cables that have been rated for standard SCSI (Fast, Ultra, and Ultra2) environments.

See [Chapter 2, “Installing the LSIU80ALVD,”](#) for a detailed explanation of SCSI bus connections.

1.3.4 LVDlink Technology

To support greater device connectivity and a longer SCSI cable, the LSIU80ALVD features LVDlink technology, the LSI Logic implementation of Universal LVD SCSI. LVDlink transceivers provide the inherent reliability of differential SCSI, and a long-term migration path to faster SCSI transfer rates.

The LVDlink transceivers reduce the power needed to drive the SCSI bus, so that the I/O drivers can be integrated directly into the chip. LVDlink technology lowers the amplitude of noise reflections and allows higher transmission frequencies.

The LVDlink transceivers operate in LVD and SE modes. They also allow the chip to detect a High Voltage Differential (HVD) signal when the chip is mistakenly connected to external HVD transceivers. The LSI53C895A automatically detects which type of signal is connected, based on the voltage detected, and automatically switches as needed to the SE or LVD mode. All bus devices must be LVD or SE. If a HVD device is detected, the board puts the SCSI bus in the high impedance state and shuts down.

1.3.4.1 Benefits of LVDlink

The LSI53C895A supports LVD for SCSI, which is a signaling technology that increases the reliability of SCSI data transfers over longer distances than supported by SE SCSI. The low current output of LVD allows the I/O transceivers to be integrated directly into the chip. LVD provides the reliability of HVD SCSI without the added cost of external differential transceivers. Ultra2 SCSI with LVD allows a longer SCSI cable and more devices on the bus, using the same cables defined in the SCSI-3 parallel Interface (SPI-2) standard for Ultra SCSI.

Important: To utilize Ultra2 SCSI performance, the user must only have LVD devices on the bus. Do not mix any SE devices with LVD devices as the entire bus will drop to SE with maximum Ultra SCSI performance.

1.3.5 On-Board LED

On-board LEDs are used to indicate the status of the SCSI bus.

The SCSI Activity LED lights when the SCSI bus is transferring information.

Chapter 2

Installing the LSIU80ALVD

This chapter provides instructions on how to install the LSIU80ALVD and includes these topics:

- [Section 2.1, “Quick Installation Procedure,” page 2-1](#)
 - [Section 2.2, “Detailed Installation Procedure,” page 2-3](#)
 - [Section 2.3, “Completing the Installation,” page 2-24](#)
-

2.1 Quick Installation Procedure

This section is provided for the experienced computer user with prior host adapter installation and SCSI bus setup experience. If you prefer a more detailed guidance for installing the LSIU80ALVD, follow the instructions in the [Section 2.2, “Detailed Installation Procedure.”](#)

For safe and proper installation, check the user's manual supplied with your computer and perform the following steps.

- Step 1. *Ground yourself* before removing this host adapter board. Remove the LSIU80ALVD from the packing and check that it is not damaged. An example of this host adapter board is shown in [Figure 2.1](#).
- Step 2. Switch off and unplug the system.
- Step 3. Remove the cabinet cover on your computer to access the PCI slots.

Caution: *Ground yourself* by touching a metal surface before handling boards. Static charges on your body can damage electronic components. Handle plug-in boards by the edge; do not touch board components or gold connector contacts. The use of a static ground strap is recommended.

- Step 4. Locate the slots for installing a PCI plug-in board. The LSIU80ALVD requires a PCI slot that allows bus master operation. See [Table 2.2](#).
- Step 5. Remove the blank bracket panel on the back of the computer aligned with the PCI slot you intend to use. Save the bracket screw.
- Step 6. Carefully insert the edge connector J1 of the host adapter into the PCI slot. Make sure the edge connector is properly aligned before pressing the board into place. See [Figure 2.2](#).

Note: You may notice that the components on a PCI host adapter face the opposite way from non-PCI adapter boards you have in your system. This is correct, and the board is keyed to go in only one way.

- Step 7. The bracket around connector J3 (see [Figure 2.1](#)) should fit where the blank bracket panel was removed. Secure the bracket with the bracket screw before making the internal and external SCSI bus connections.
- Step 8. If you are connecting any internal SCSI devices, plug a 68-pin connector on the *end* of the internal SCSI ribbon cable into connector J2 (see [Figure 2.1](#)). Make certain to match pin 1 on both connectors.
- Step 9. Connect the LED cable if desired. This is designed to drive an off-board system LED and indicates activity on the SCSI bus. The off-board LED will operate at the same time as the on-board SCSI Activity LED.
- Step 10. Replace the cabinet cover as described in the user's manual for your computer.
- Step 11. Make all external SCSI bus connections. Finally, refer to the *PCI Storage Device Management System SDMS 4.0 User's Guide* (or the guide for the software you will use) to load the driver software for your particular operating system.

Remember: The SCSI bus requires proper termination, and no duplicate SCSI IDs.

2.2 Detailed Installation Procedure

This section provides step-by-step instructions for installing the LSIU80ALVD, and connecting it to your SCSI peripherals. If you are experienced in these tasks, you may prefer to use the preceding [Section 2.1, “Quick Installation Procedure.”](#) If you are not confident you can perform the tasks as described here, LSI Logic suggests getting assistance.

2.2.1 Before You Start

Before starting, look through the following task list to get an overall idea of the steps to perform.

- Open your PC cabinet and select an open PCI slot
- Insert the host adapter board
- Connect the internal and external SCSI peripherals
- Terminate the SCSI bus
- Set the peripheral SCSI IDs
- Make any configuration changes
- Close your PC cabinet
- Install the software

The SCSI host adapter acts on your computer's behalf as the host to your suite of SCSI peripherals. Each chain of SCSI peripheral devices and their host adapter work together, and are referred to as a SCSI bus.

Each SCSI host adapter that you install can act as host for up to 15 peripheral devices, not including the adapter itself.

2.2.2 Inserting the Host Adapter

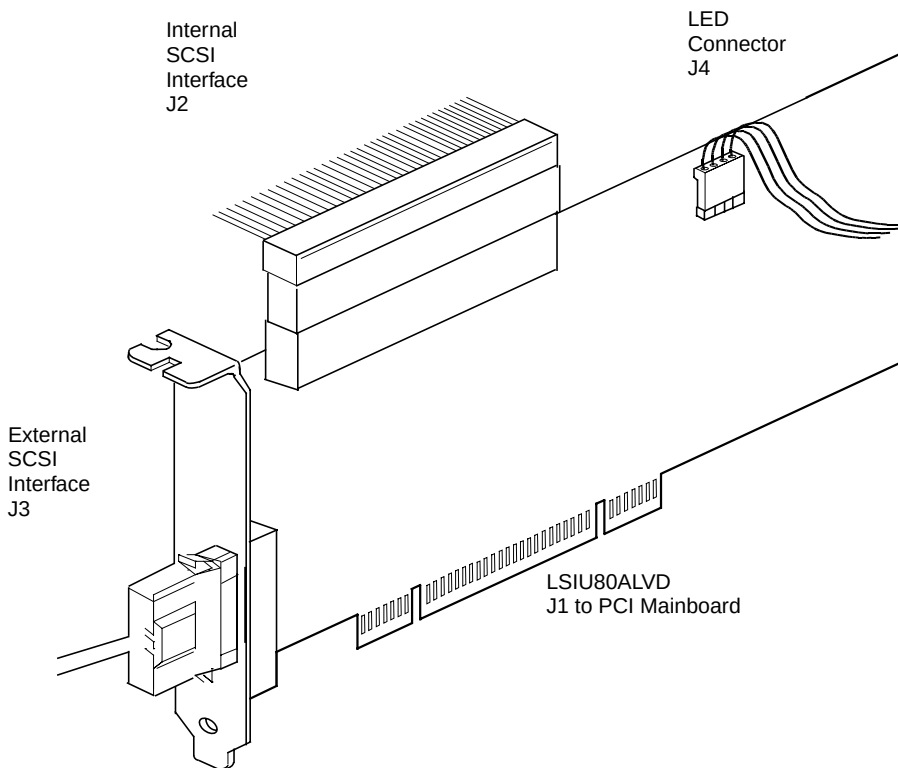
For safe and proper installation, check the user's manual supplied with your computer and perform the following steps.

- Step 1. *Ground yourself* before removing this host adapter board. Remove the LSIU80ALVD from the packing and check that it is not damaged. An example of this host adapter board is shown in [Figure 2.1](#).
- Step 2. Switch off and unplug power cords for all components in your system.
- Step 3. Remove the cabinet cover from your computer to access the PCI slots.

Caution: *Ground yourself* by touching a metal surface before removing the cabinet top. Static charges on your body can damage electronic components. Handle plug-in boards by the edge; do not touch board components or gold connector contacts. The use of a static ground strap is recommended.

- Step 4. Locate the slots for PCI plug-in board installation. Refer to the user's manual for your computer to confirm the location of the PCI slots. The LSIU80ALVD requires a PCI slot that allows bus master operation.
- Step 5. Remove the blank bracket panel on the back of the computer aligned with the PCI slot you intend to use. Save the bracket screw.

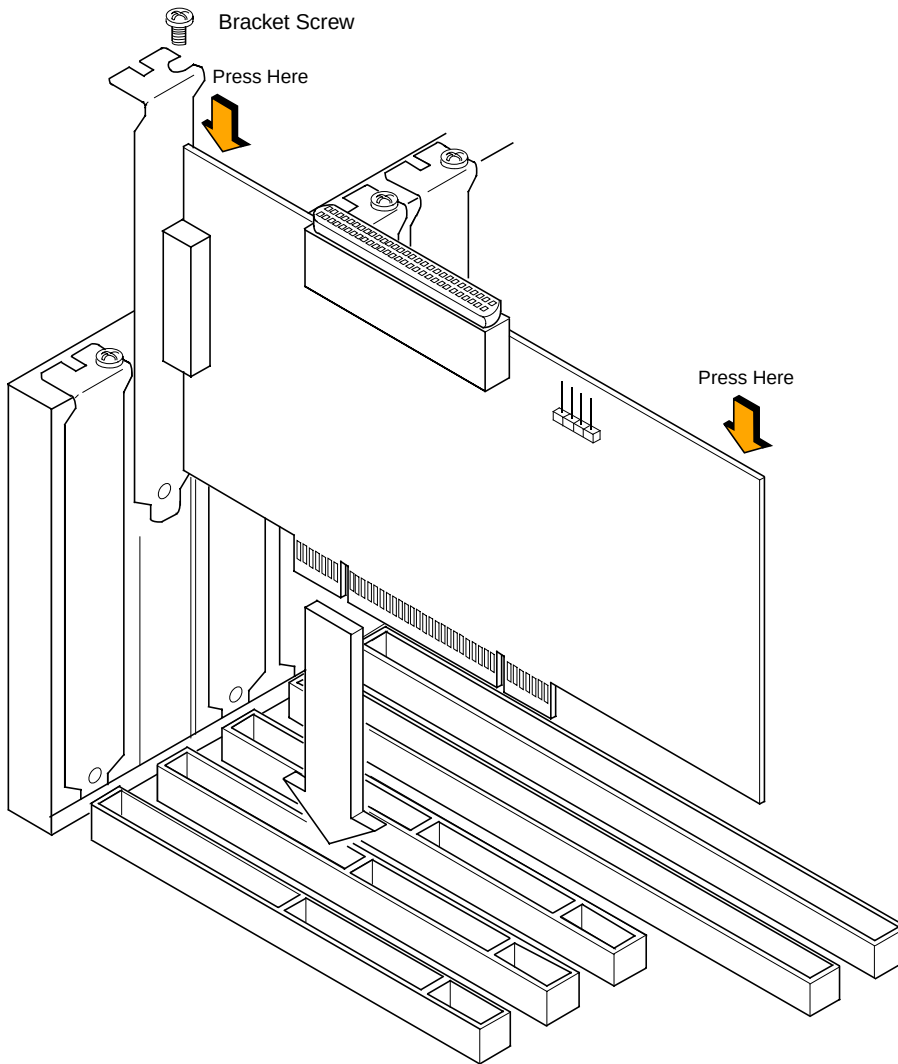
Figure 2.1 Hardware Connections for the LSIU80ALVD



Step 6. Carefully insert edge connector J1 (see [Figure 2.1](#)) of the host adapter into the PCI slot. Make sure the edge connector is properly aligned before pressing the board into place as shown in [Figure 2.2](#).

Note: You may notice that the components on the PCI host adapter face the opposite way from non-PCI adapter boards you have in your system. This is correct, and the board is keyed to go in only one way.

Figure 2.2 Inserting the Host Adapter



Step 7. The bracket around connector J3 (see [Figure 2.1](#)) should fit where you removed the blank panel. Secure it with the bracket screw (see [Figure 2.2](#)) before making the internal and external SCSI bus connections.

2.2.3 Connecting the SCSI Peripherals

SCSI bus connections to the LSIU80ALVD inside your computer can be made with an unshielded 68-conductor Ultra SCSI PVC ribbon cable (see [Figure 2.3](#)). One side of this cable is marked with a colored stripe to indicate pin 1. Sometimes the connectors on this cable are keyed to ensure proper pin-1 connection.

All external SCSI bus connections to the LSIU80ALVD are made with high quality shielded 68-conductor cables (see [Figure 2.3](#)). The connectors on this cable are always keyed to ensure proper pin-1 connection.

Note: All the cables shown in [Figure 2.3](#) are included in the LSI Logic Adapter Board Kit for the LSIU80ALVD.

Table 2.1 SCSI Bus Widths and Speeds

STA Terms	SCSI Bus Width, Bits	SCSI Bus Speed Maximum Data Rate, Mbytes/s
SCSI-1	8	5
Fast SCSI	8	10
Fast Wide SCSI	16	20
Ultra SCSI	8	20
Wide Ultra SCSI	16	40
Ultra2 SCSI	8	40
Wide Ultra2 SCSI	16	80
Note: Absence of the word "Wide" means an 8-bit bus width. It is acceptable to use the word "Narrow" to avoid ambiguity.		

You can connect up to eight SCSI, Fast SCSI, and Ultra SCSI devices on a SE Ultra SCSI bus only if they are evenly spaced on a 1.5-meter Ultra SCSI cable (0.19 m between devices).

You can connect up to four devices if they are evenly spaced on a 3-meter Ultra SCSI cable (0.75 m between devices). Your SE SCSI bus should not exceed 3 meters (total internal and external cable lengths), even with fewer than four devices.

For LVD applications, you can connect up to 16 devices including the host adapter if they are evenly spaced on a 12-meter Ultra SCSI cable (0.19 m minimum between devices).

Table 2.2 SCSI Bus Lengths

	Maximum Bus Length, Meters ¹			Maximum # of Devices
	SE	Differential	LVD	
SCSI-1	6	25	12	8
Fast SCSI	3	25	12	8
Fast Wide SCSI	3	25	12	16
Ultra SCSI	1.5 ²	25	12	8
Ultra SCSI	3 ²	–	–	4
Wide Ultra SCSI	–	25	12	16
Wide Ultra SCSI	1.5	–	–	8
Wide Ultra SCSI	3	–	–	4
Ultra2 SCSI	Note ³	Note ³	12	8
Wide Ultra2 SCSI	Note ³	Note ³	12	16

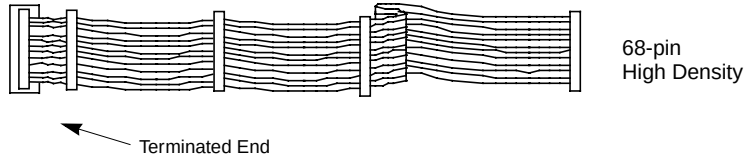
1. This parameter may be exceeded in point-to-point and engineered applications.

2. Additional spacing rules apply.

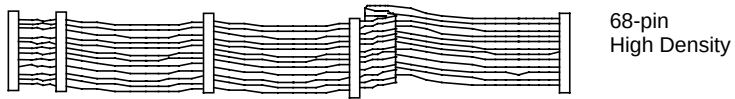
3. SE and high power differential are not defined at Ultra2 speeds.

Figure 2.3 SCSI Cables

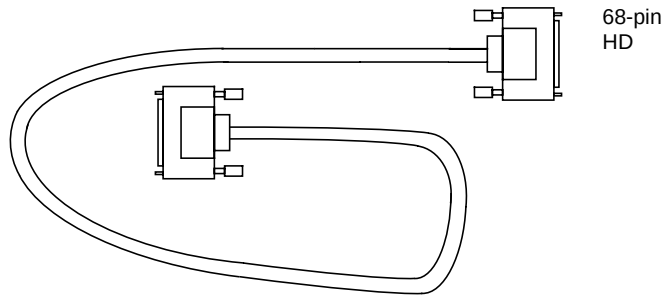
Terminated SCSI Cable for Internal Connections
(for use with nonterminated internal devices)



SCSI Cable for Internal Connections



SCSI Cable for External Connections

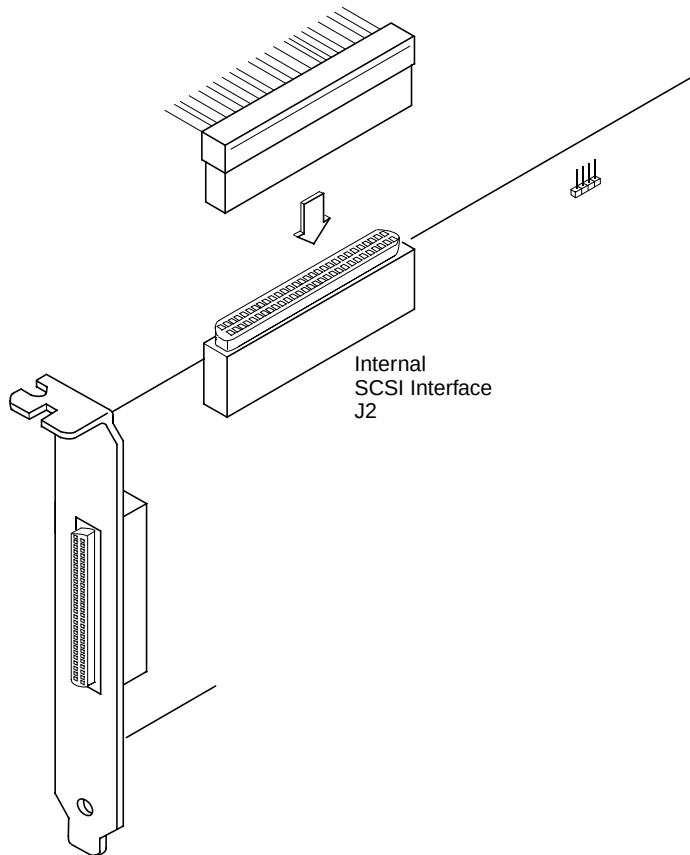


2.2.4 Making Internal SCSI Bus Connections

This section provides step-by-step instructions about making internal SCSI bus connections.

- Step 1. To connect an internal SCSI device, plug the 68-pin connector on one *end* of the internal SCSI ribbon cable into connector J2 (see [Figure 2.4](#)).

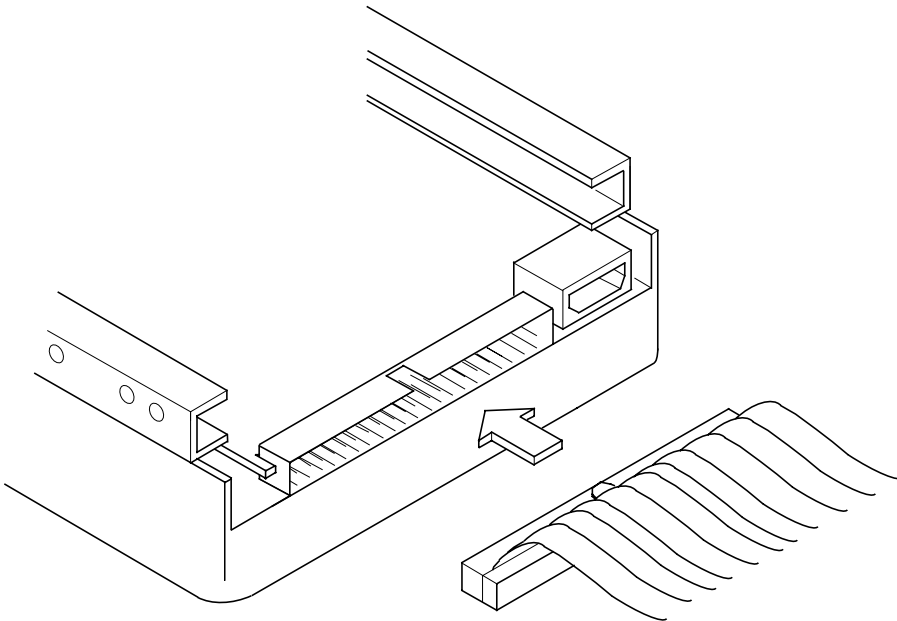
Figure 2.4 Internal SCSI Ribbon Cable to Host Adapter Connection



Step 2. Plug the 68-pin connector on the other end of the internal SCSI ribbon cable into the SCSI connector on your internal SCSI device. An example of this connection is shown in [Figure 2.5](#). You must match pin 1 on all connections.

Note: For nonterminated internal SCSI devices, a terminated cable will be required. This connector must be on the *end* of the SCSI cable.

Figure 2.5 Internal SCSI Ribbon Cable to Internal SCSI Device Connection



Step 3. To plug in additional internal SCSI devices, use an internal SCSI ribbon cable with the required number of 68-pin connectors attached along its length as shown in [Figure 2.6](#).

An example of this type of chained connection is shown in [Figure 2.7](#). Make sure to match pin 1 on all connections.

Figure 2.6 Connecting Additional Internal SCSI Devices

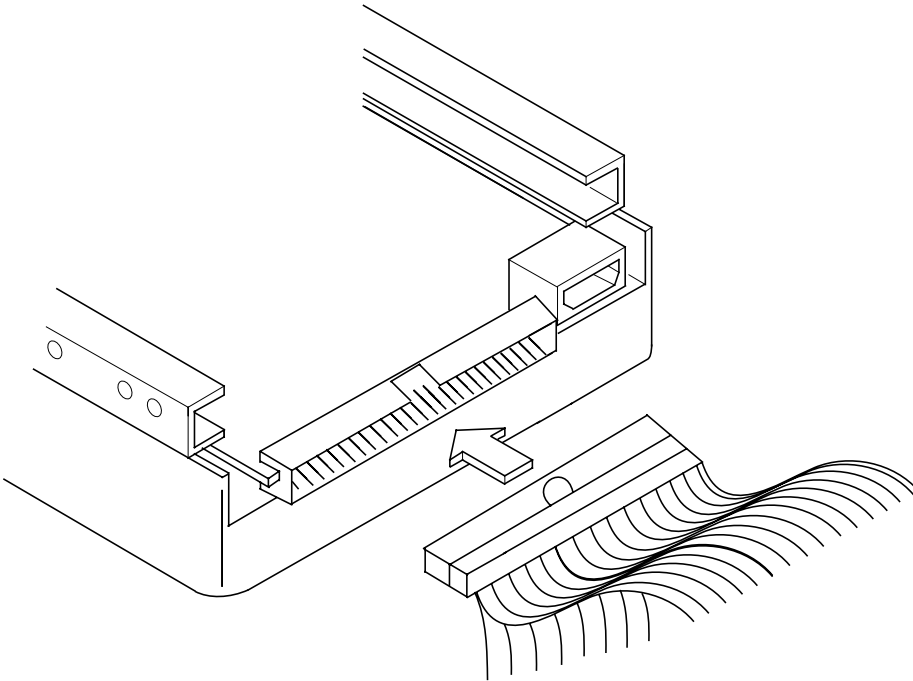
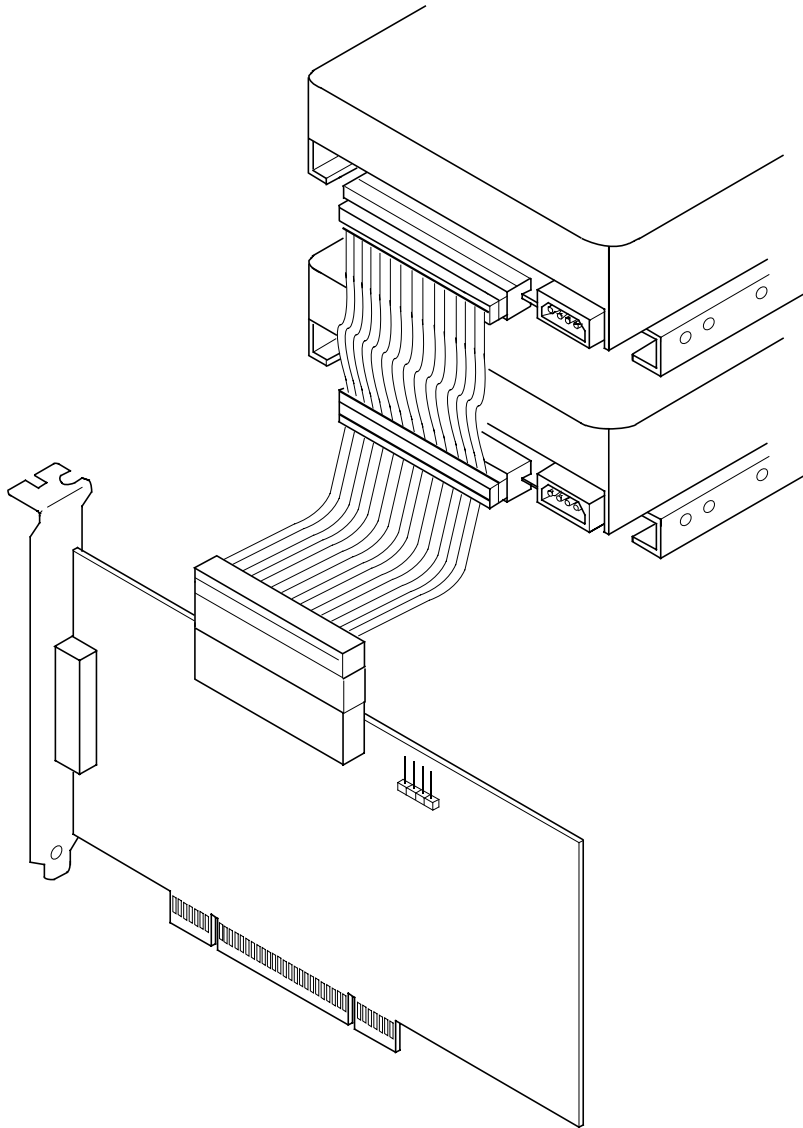


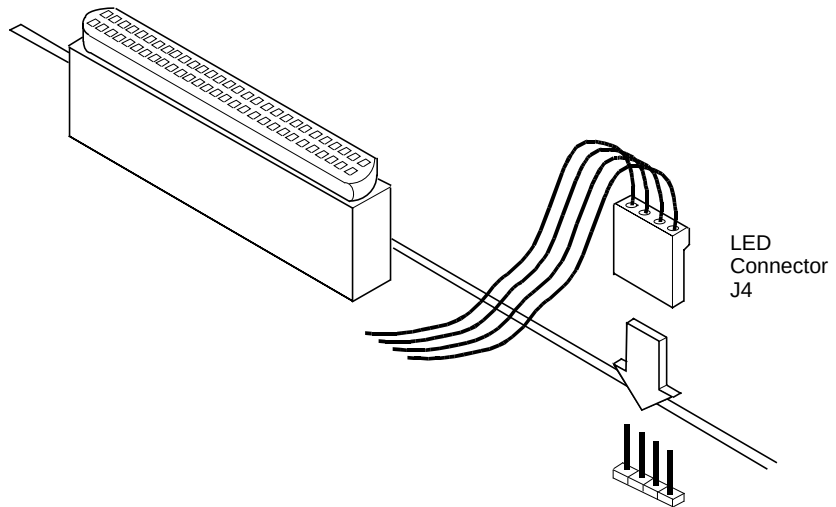
Figure 2.7 Multiple Internal SCSI Devices Chained Together



Most PC cabinets are designed with a front panel LED. You may connect the LED cable to connector J4 on the host adapter, as shown in [Figure 2.8](#). This causes the front panel LED to light when there is activity on the SCSI bus.

Connector J4 is not keyed. The orientation of the LED cable does not matter as long as all four pins are connected.

Figure 2.8 SCSI LED Connector



Some LED cables have only two wires. In this case, place the connector on one end or the other of J4. If the LED does not light during SCSI bus activity from this host adapter, you may have to rotate the LED cable connector 180° on J4.

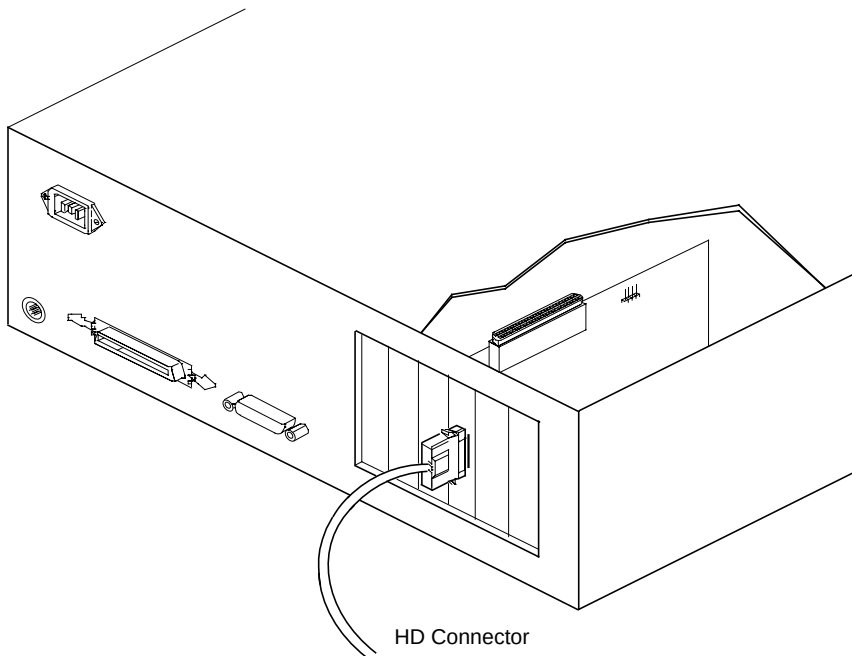
2.2.5 Making External SCSI Bus Connections

This section provides step-by-step instructions about making external SCSI bus connections.

- Step 1. To connect external SCSI devices to the LSIU80ALVD, plug the 68-pin HD connector on one end of a shielded external SCSI cable (see [Figure 2.3](#)) into the host adapter connector J3 (see [Figure 2.1](#)).

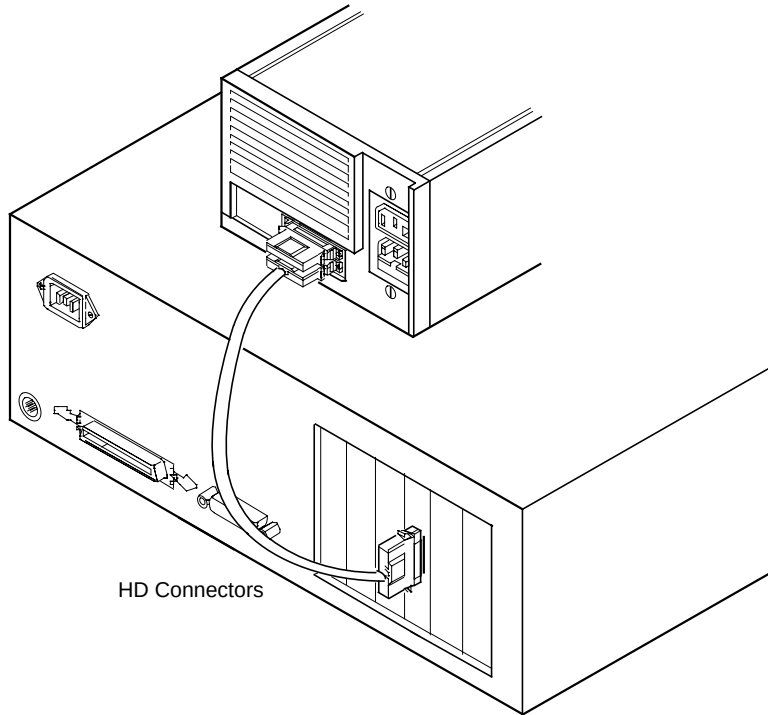
This connector is in the bracket attached to the back panel of your computer. [Figure 2.9](#) shows how this connection is made.

Figure 2.9 External Cable to Host Adapter



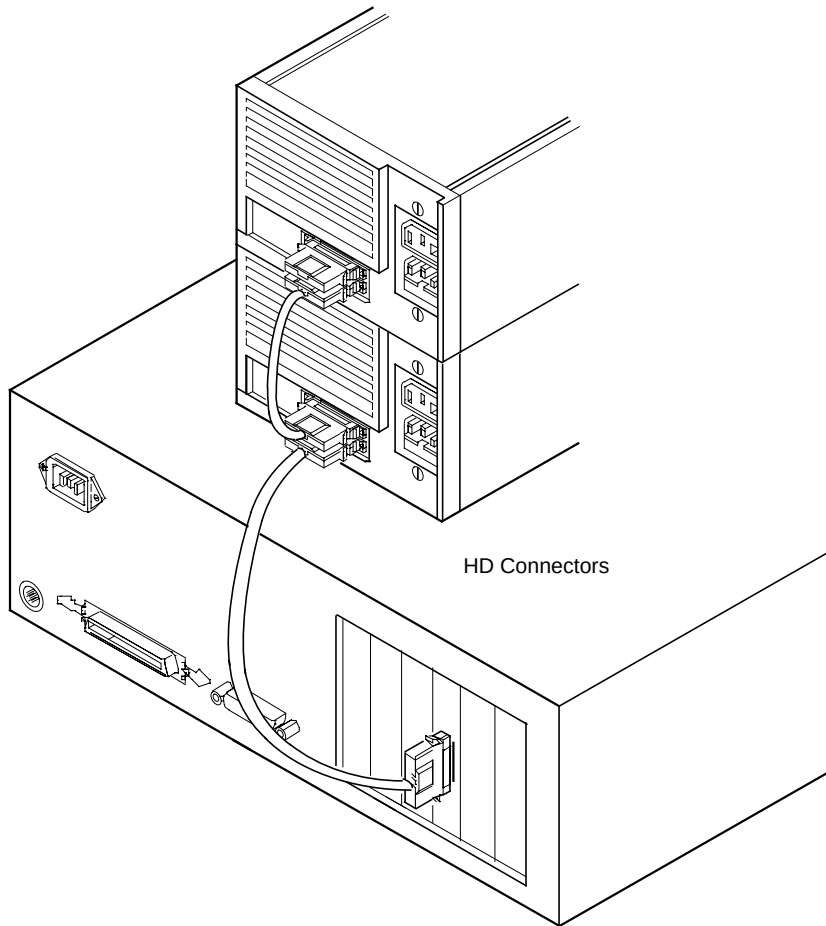
Step 2. Plug the 68-pin connector on the other end of the shielded external SCSI cable into the SCSI connector on your external SCSI device. An example of this connection is shown in [Figure 2.10](#).

Figure 2.10 External SCSI Device Cable



Step 3. To connect more than one external SCSI device to the host adapter, you must chain them together with shielded external SCSI cables. An example of these chained connections is shown in [Figure 2.11](#).

Figure 2.11 Multiple External SCSI Devices Chained Together



2.2.6 SCSI Bus Termination

The devices making up the SCSI bus are connected serially (chained together) with SCSI cables. The first and last physical SCSI devices connected on the ends of the SCSI bus must have their terminators active. All other SCSI devices on the bus must have their terminators removed or disabled. Remember that the LSIU80ALVD is also on the SCSI bus—its termination is automatically enabled when it is connected to the end of the bus.

Important: To utilize Ultra2 SCSI performance, the user must only have LVD devices on the bus. Do not mix any SE devices with LVD devices as the entire bus will drop to SE with maximum Ultra SCSI performance.

The peripheral device terminators are usually set with jumpers, resistor modules, or with a switch on the peripheral. Refer to the peripheral manufacturer's instructions and to the user's manual for your computer for information on how to identify the terminator setting of each device and how to change it.

Caution: The autoenable/disable sensing feature on the LSIU80ALVD may enable termination erroneously if it is directly cabled to another SCSI device or host adapter using the same sensing method. The LSIU80ALVD senses the presence of SCSI devices by detecting the ground signal on conductor 50 of the SCSI cable.

The LSIU80ALVD automatically controls SCSI bus termination for three different bus configurations, depending on the use of connectors (see [Figure 2.1](#)). The three bus configurations are:

- Only for internal SCSI connections,
- Only for an external SCSI connection, and
- Connections to both internal and external SCSI connectors.

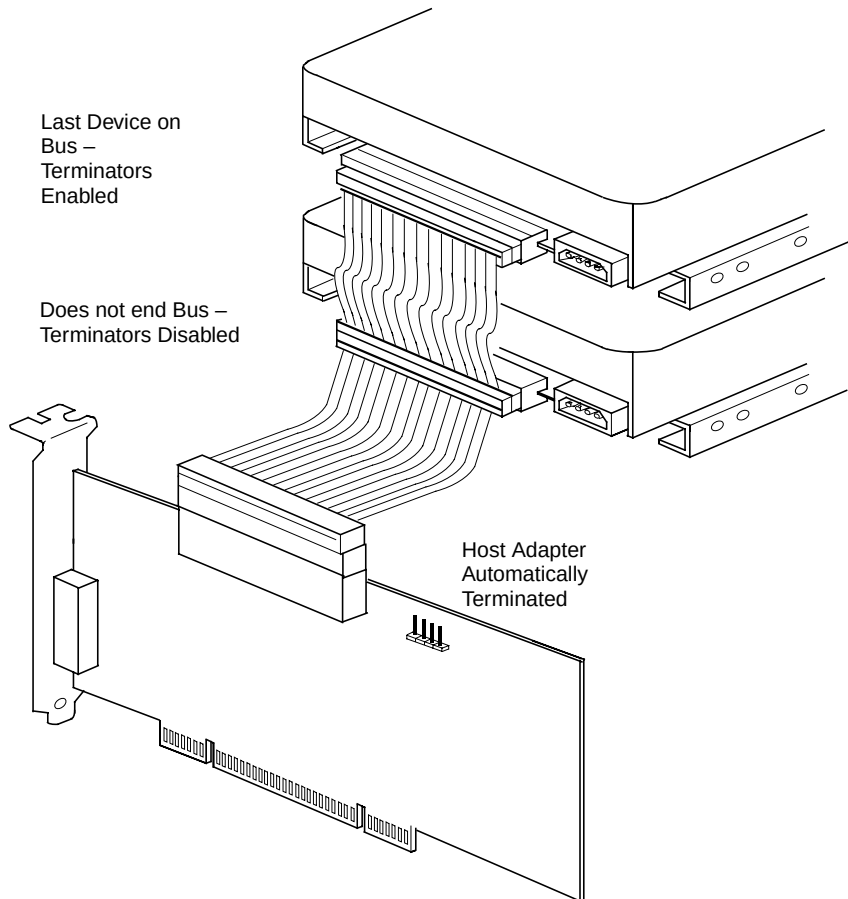
Termination on the LSIU80ALVD for these three different bus configurations is discussed below.

2.2.7 Internal Bus Connections

If you have only internal SCSI device connections to your host adapter, you must terminate the last internal device on the SCSI bus. You must disable the terminators on all other devices. Termination on your host adapter is automatically enabled in this case.

[Figure 2.12](#) shows an example of how termination is determined for this SCSI bus configuration.

Figure 2.12 Internal SCSI Device Termination

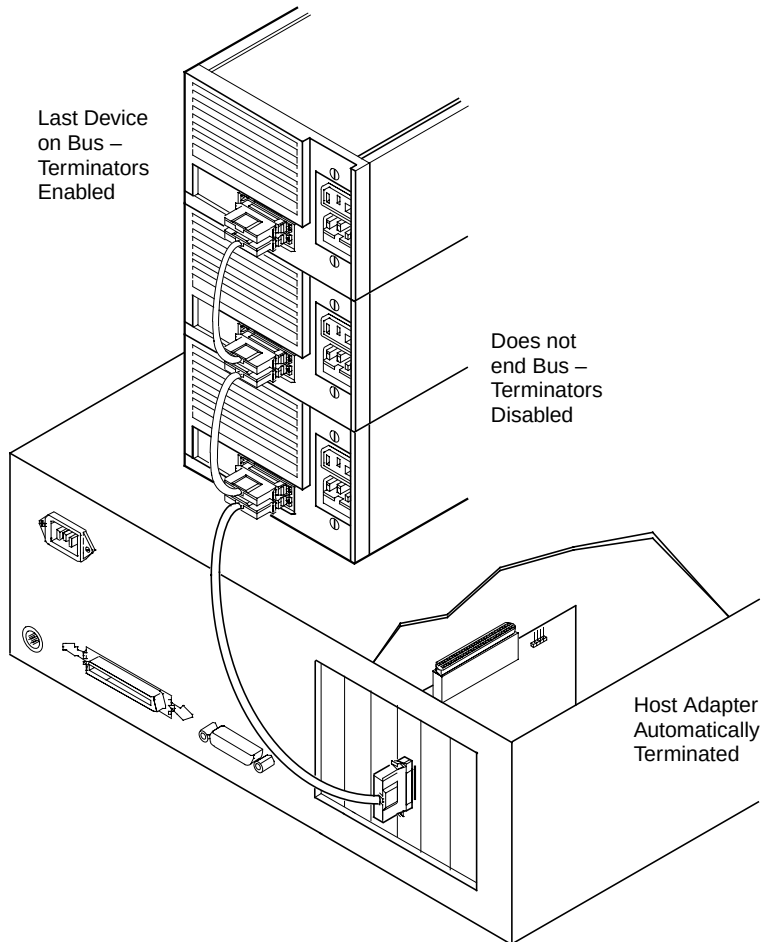


2.2.8 External Bus Connections

If you have only external SCSI device connections to your host adapter, you must terminate the last external device on the SCSI bus. You must disable the terminators on all other devices. Termination on the host adapter is automatically enabled in this case.

[Figure 2.13](#) shows an example of how termination is determined for this SCSI bus configuration.

Figure 2.13 External SCSI Device Termination

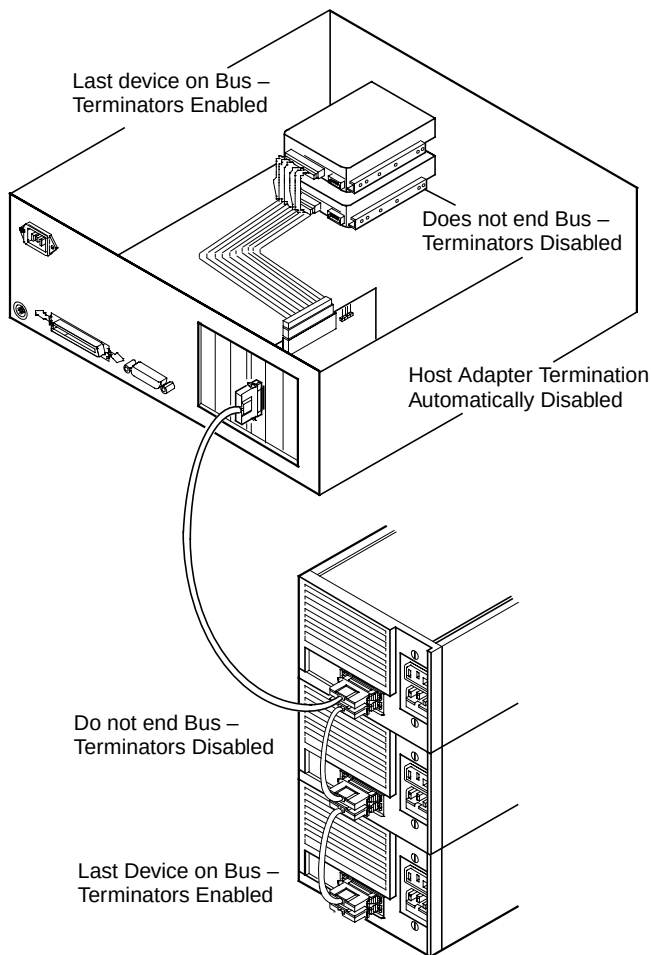


2.2.9 Internal and External Bus Connections

If internal and external SCSI device connections to your host adapter have been made, then terminate the last internal and last external devices on the SCSI bus. You must disable the termination on all other devices. Termination on the host adapter is automatically disabled in this case.

Figure 2.14 shows an example of how termination is determined for this SCSI bus configuration.

Figure 2.14 Internal and External SCSI Device Termination



2.2.10 Setting SCSI IDs

You must set each SCSI device and the host adapter to a separate SCSI ID 0 through 15. SCSI ID 7 is the preset host adapter setting, giving it the highest priority on the SCSI bus. If you plan to boot your computer from a SCSI hard disk drive on the SCSI bus, that drive should have the lowest SCSI ID on the bus. Typically, SCSI ID 0 is used; however, for system performance optimization, an ID other than 0 (zero) can be used. [Chapter 3, “Configuring the LSIU80ALVD,”](#) explains how to set the host adapter ID using the LSI Logic SCSI BIOS Configuration Utility.

The peripheral device SCSI IDs are usually set with jumpers or with a switch on the peripheral. Refer to the peripheral manufacturer's instructions and to the user's manual for your computer to determine the ID of each device and how to change it. You must have no duplication of SCSI IDs on a SCSI bus.

- Step 1. Determine the SCSI ID of each device on the SCSI bus. Note any duplications.
- Step 2. Make any necessary changes to the SCSI IDs to eliminate duplicates and record the IDs for future reference. [Table 2.3](#) is provided as a place to keep this record.

Table 2.3 SCSI ID Record

SCSI ID	SCSI Device
15	
14	
13	
12	
11	
10	
9	
8	
7	LSIU80ALVD (default)
6	
5	
4	
3	
2	
1	
0	

2.3 Completing the Installation

Before replacing the cover on your computer, review this installation procedure check list. This can save you effort later.

Verify Installation Procedures	Done
Host adapter connection in PCI bus slot secure	
Internal SCSI bus connections secure (pin-1 continuity)	
External SCSI bus connections secure	
Proper SCSI bus termination established	
Unique SCSI IDs set and recorded for each device	

- Step 1. Replace the cabinet cover on your computer.
- Step 2. Plug in all power cords, and switch on power to all devices and your computer.
- Step 3. Wait for your computer to boot up.
- Step 4. To change the configuration of the host adapter, see [Chapter 3, “Configuring the LSIU80ALVD.”](#) Finally, refer to the *PCI Storage Device Management System SDMS 4.0 User's Guide* (or the guide for the software you plan to use) to load the driver software for your particular operating system.

Chapter 3

Configuring the LSIU80ALVD

This chapter describes configuring the LSIU80ALVD and includes these topics:

- [Section 3.1, “When to Configure the LSIU80ALVD,” page 3-1](#)
- [Section 3.2, “Starting the SCSI BIOS Configuration Utility,” page 3-2](#)
- [Section 3.3, “Exiting the SCSI BIOS Configuration Utility,” page 3-14](#)

3.1 When to Configure the LSIU80ALVD

In most cases you should not need to change the default configuration of the host adapter. You may decide to alter these default values if there is a conflict between device settings, or if you need to optimize system performance.

[Table 3.1](#) and [Table 3.2](#) list the configuration settings you can change. The global settings affect the host adapter and all SCSI devices that are connected to it. The device settings affect only individual SCSI devices.

Table 3.1 Global Default Settings

Settings for the Host Adapter and All Devices	Default Settings
SCAM Support	Off ¹
Parity Checking	Enabled
Host Adapter SCSI ID	7
Scan Order	Low to High (0–Maximum)

1. Applies to BIOS version 4.09 and later.

Table 3.2 Device Default Settings

Settings for Individual SCSI Devices	Default Settings
Synchronous Transfer Rate (Mbytes/s)	80
Data Width	16
Disconnect	On
Read Write I/O Time-out (seconds)	10
Scan for Devices at Boot Time	Yes
Scan for SCSI LUNs ¹	Yes
Queue Tags	On

1. Logical Unit Number.

3.2 Starting the SCSI BIOS Configuration Utility

If you have LSI Logic SCSI BIOS Version 4.XX, and it includes the LSI Logic SCSI BIOS Configuration Utility, you can change the default configuration of the SCSI host adapters. You may decide to alter these default values if there is a conflict between device settings or if you need to optimize system performance.

You can see the version number of your LSI Logic SCSI BIOS in a banner displayed on your computer monitor during boot. If the utility is available, the following message also appears on your monitor:

Press Ctrl-C to start LSI Logic Configuration Utility...

This message remains on your screen for about five seconds, giving you time to start the utility. If you decide to press "Ctrl-C," the message changes to:

Please wait, invoking LSI Logic Configuration Utility...

After a brief pause, your computer monitor displays the Main Menu of the LSI Logic SCSI BIOS Configuration Utility.

NonVolatile Random Access Memory (NVRAM) is available on the LSIU80ALVD. Changes can be made and stored using this menu driven utility.

Important: This utility is a powerful tool. If, while using it, you somehow disable all of your controllers, pressing Ctrl-A (or Ctrl-E on version 4.04 or later) after memory initialization during reboot allows you to re-enable and reconfigure.

Note: Not all devices detected by the Configuration Utility can be controlled by the BIOS. Devices such as tape drives and scanners require that a device driver specific to that peripheral be loaded. This device driver is provided by the device manufacturer.

3.2.1 Configuration Utility Main Menu

When you start the LSI Logic SCSI BIOS Configuration Utility, the Main Menu appears. This menu displays a list of up to four LSI Logic PCI to SCSI host adapters and information about each of them. To select an adapter, use only the arrow keys and enter key. Then, you can view and/or change the current settings for that adapter and the SCSI devices attached to it.

You can select an adapter only if Current Status is “On”. Changes are possible since NVRAM is present on this host adapter.

[Figure 3.1](#) is an example of the Main Menu:

Figure 3.1 Main Menu

Main Menu					
	Port Num	Irq----- Level	Status----- Current	Next-Boot	NVRAM Found
LSI53C895A	FC00	9	On	On	Yes
LSI53C896	F800	9	On	Off	Yes
LSI53C896	F801	9	On	Off	Yes
Change Adapter Status					
Adapter Boot Order					
Additional Adapter Configuration					
Display Mode = Verbose					
Mono/Color					
Language					
Help					
Quit					

Below the list of host adapters on the Main Menu display, you see eight options. They are described in detail below. If these settings are altered, the system reboots upon exit from the Configuration Utility by using the Quit option.

3.2.1.1 Change Adapter Status

Change Adapter Status allows the user to activate or deactivate a host adapter and all SCSI devices attached to it. When this option is used to make a change, the change takes place after a reboot upon exit from the utility. [Figure 3.2](#) is an example of the Change Status on Next Boot menu:

Figure 3.2 Change Status on Next Boot Menu

Main Menu					
Change Status on Next Boot:					
	Port Num	Irq----- Level	Status----- Current	-----NVRAM Next-Boot	Found
LSI53C895A	FC00	9	On	On	Yes
LSI53C896	F800	9	On	Off	Yes
LSI53C896	F801	9	On	Off	Yes

To change an adapter's status, select it and press Enter. Then press the Escape (Esc) key to exit from this menu.

3.2.1.2 Adapter Boot Order

Adapter Boot Order allows the user to set the order in which host adapters will boot when you have more than one LSI Logic host adapter in your system. When this option is selected, the Boot Order menu appears. [Figure 3.3](#) is an example of the Boot Order menu:

Figure 3.3 Boot Order Menu

Main Menu						
BootSeq		Bus	DevFunc	BootSeq		Bus DevFunc
0	LSI53C895A	00	A0	1	LSI53C896	00 98
2	LSI53C896	00	90			

To change an adapter's boot order, select it and press Enter. You are then prompted to enter the new boot sequence number. To remove an adapter's boot order, press Enter again rather than entering a new sequence number. While the maximum capacity is 32 adapters, only 0 through 3 can be assigned a boot order. If an invalid number is entered, an error message appears. When the adapters are ordered as desired, press the Escape (Esc) key to exit from this menu.

3.2.1.3 Additional Adapter Configuration

Additional Adapter Configuration allows the user to configure an adapter that is not assigned a boot order. When this option is selected, the Adapter Configuration menu (as shown in [Figure 3.4](#)) appears:

Figure 3.4 Adapter Configuration Menu

Main Menu							
BootSeq		Bus	DevFunc	BootSeq		Bus	DevFunc
1	LSI53C895A	00	A0	0	LSI53C896	00	98
LSI53C896							

Highlight the adapter to be configured and press Enter. The message *Resetting Adapter, Please wait* appears, and then the system scans for devices. Finally, the Utilities Menu appears and lists the available options, which are described below.

3.2.1.4 Display Mode

Display Mode determines how much information about the host adapters and SCSI devices appear on your computer monitor during boot. For more complete information, choose the verbose setting. For a faster boot, choose the terse setting.

3.2.1.5 Mono/Color

Mono/Color allows the user to choose between a monochrome or color display for the SCSI BIOS Configuration Utility. If needed, choose the mono setting to get a more readable screen on a monochrome monitor.

3.2.1.6 Language

If enabled, the Language option allows the user to select from five languages for the Configuration Utility: English, German, French, Italian, and Spanish. Call for support if you have any additional questions.

3.2.1.7 Help

The Help option displays a help screen with information about the Main Menu.

3.2.1.8 Quit

The Quit option allows exiting from the SCSI BIOS Configuration Utility when the Main Menu is displayed.

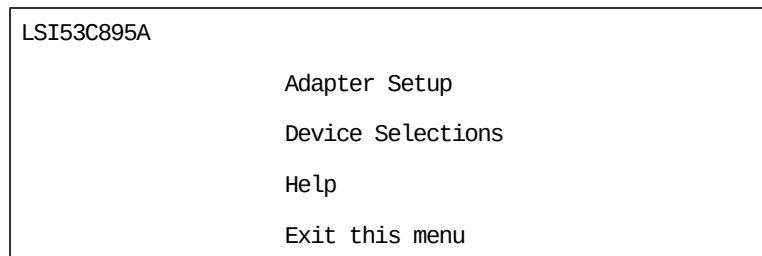
3.2.1.9 Esc

Pressing the Esc key allows exiting from all the screens except the Main Menu.

3.2.2 Utilities Menu

When you select a host adapter on the Main menu, the Utilities menu appears. [Figure 3.5](#) is an example of the Utilities menu:

Figure 3.5 Utilities Menu



Choose Adapter Setup to view and change the selected adapter settings. Choose Device Selections to view and change settings for the devices attached to the selected adapter.

You are returned to this menu after making changes to the configuration of any host adapter or connected SCSI device. Before you exit this menu, you are prompted to save or cancel any changes.

3.2.2.1 Adapter Setup Menu

When you select Adapter Setup, the corresponding menu appears. [Figure 3.6](#) is an example of the Adapter Setup menu:

Figure 3.6 Adapter Setup Menu

Adapter Setup	
SCAM Support	Off
Parity	Enabled
Host SCSI ID	7
Scan Order	Low to High <0..Max>
Removable Media Support	None
CHS Mapping	SCSI Plug & Play Mapping
Spinup Delay	2
Secondary Cluster Server	No
Termination	
Help	
Restore Default Setup	
Exit this menu	

The settings in this menu are global settings that affect the selected host adapter and all SCSI devices attached to it.

SCAM Support – The LSI Logic BIOS Version 4.0 and above supports the SCSI Plug and Play protocol called SCAM. SCAM support by default is off in versions 4.09.00 and later for the LSI53C895A device. You may choose to turn this on. Note that if this BIOS is flashed onto a board with existing settings, then these settings will not be changed to reflect the new BIOS defaults. Go into the Configuration Utility to change settings.

Parity – The LSI Logic PCI to SCSI host adapters always generate parity, but some older SCSI devices do not. Therefore, you are offered the option of disabling parity checking.

Note: When disabling parity checking, it is also necessary to disable disconnects for all devices, as parity checking for the reselection phase is not disabled. If a device does not generate parity, and it disconnects, the I/O never completes because the reselection never completes.

Host SCSI ID – This option refers to the host adapter's SCSI ID, which is a unique number used to identify the device on the SCSI bus.

Note: In general, it is suggested that you do not change your host adapter ID from the default value of 7, as this gives it the highest priority on the SCSI bus.

Scan Order – This option allows the user to tell the SCSI BIOS and device drivers to scan the SCSI bus from low to high (0 to max) SCSI ID, or from high to low (max to 0) SCSI ID. If you have more than one device on the SCSI bus, changing the scan order changes the order in which drive letters are assigned by the system. Drive order may be reassigned differently in systems supporting the BIOS Boot Specification (BBS).

See the *PCI Storage Device Management System SDMS 4.0 User's Guide*, Chapter 2 "SCSI BIOS" for additional information regarding BBS.

Note: The scan order option may conflict with operating systems that automatically assign a drive order.

Removable Media Support – This option defines the removable media support for a specific drive. When this option is selected, a window appears with three choices:

- None
- Boot Drive Only
- With Media Installed

None indicates there is no removable media support whether the drive is selected in BBS as being first, or first in scan order in non-BBS.

Boot Drive Only provides removable media support for a removable hard drive if it is first in the scan order.

With Media Installed provides removable media support wherever the drive(s) actually resides.

One of these choices can be selected by highlighting it and pressing Enter.

CHS Mapping – This option defines the cylinder head sector (CHS) values that will be mapped onto a disk without pre-existing partitioning information. SCSI Plug and Play Mapping is the default value.

To support interchange with non-compatible systems, there is another option that can be selected by choosing CHS Mapping and then moving the cursor to Alternate CHS Mapping.

Note: Neither of these options will have any affect after the disk has been partitioned with the FDISK command.

To remove partitioning, two options are available:

- Reformat the disk using the Format Device option. See [Section 3.2.3, “Device Selections Menu,”](#) below.
- Use the FDISK/MBR command at the C:\ prompt, where MBR represents master boot record.

Important: Reformatting the disk or using FDISK/MBR erases all partitioning and data that exists. Be careful when using either the Format utility or the FDISK/MBR command that you target the correct disk.

After clearing the partitions and data, it is necessary to reboot and clear memory or the old partitioning data will be reused.

Spinup Delay (seconds) – This option allows the user to stagger spinups for a longer period of time to balance the total current load. The default value is 2 seconds, with choices between 1 and 10 seconds.

This is a power management feature designed to accommodate disk devices that may have heavy current load during power up. If multiple drives are being powered up simultaneously and drawing heavy current loads, then this option staggers the spinups to limit startup current.

Secondary Cluster Server – This option allows the user to enable an adapter to join a cluster of adapters without doing any SCSI bus resets. This is a requirement for Microsoft Cluster Server. The default value is No with an alternate option of Yes.

Termination – This option allows the user to have termination control providing an adapter has controllable termination. The default value is Autotermination. The alternate value is Off.

3.2.3 Device Selections Menu

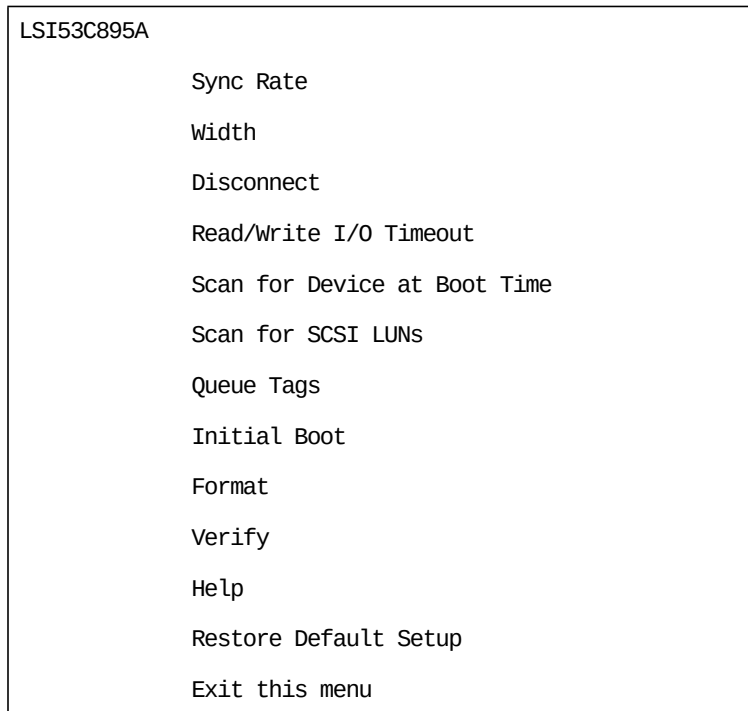
When you select the Device Selections option, the corresponding menu appears. [Figure 3.7](#) is an example of the Device Selections menu:

Figure 3.7 Device Selections Menu

Device Selections 0-7									
		Sync	Data	Disc	Time	Scan		Queue	Initial
		Rate	Width		Out	Bus	LUNS	Tags	Boot
0-Dev0	N/A	80	16	On	10	Yes	Yes	On	No
1-Dev1	N/A	80	16	On	10	Yes	Yes	On	No
2-Dev2	N/A	80	16	On	10	Yes	Yes	On	No
3-Dev3	N/A	80	16	On	10	Yes	Yes	On	No
4-Dev4	N/A	80	16	On	10	Yes	Yes	On	No
5-Dev5	N/A	80	16	On	10	Yes	Yes	On	No
6-Dev6	N/A	80	16	On	10	Yes	Yes	On	No
LSI53C895A		80	16	On	10	Yes	Yes	On	No
Device Selections 8-15									
Help									
Exit this menu									

The settings in this menu affect individual SCSI devices attached to the selected host adapter. Changes made from this menu do not cause the system to reboot upon exit from the SCSI BIOS Configuration Utility. To change a value, select the required device by using the arrow keys and press Enter. A new menu (as shown in [Figure 3.7](#)) appears providing the options and utilities available. For example, you could cursor to Sync Rate to change the Sync Rate value of the chose device.

Figure 3.7 Device Selections Menu (Cont.)



Sync Rate (Mbytes/s) – This option defines the maximum data transfer rate the host adapter will attempt to negotiate. The host adapter and a SCSI device must agree to a rate they can both handle.

Width (bits) – This option defines the maximum SCSI data width the host adapter will attempt to negotiate. The host adapter and a SCSI device must agree to a width they can both handle. Only host adapters that can do 16-bit data transfers have this option enabled.

Disconnect – SCSI devices have the ability to disconnect from the initiator during an I/O transfer. The disconnect option frees the SCSI bus to allow other I/O processes. This option tells the host adapter whether or not to allow a device to disconnect. Some devices run faster with disconnects enabled (typically newer devices), while some run faster with disconnects disabled (typically older devices).

Read/Write I/O Time-Out (seconds) – This option sets the amount of time the host adapter waits for a read, write, or seek command to complete before trying the I/O transfer again. Since this provides a safeguard allowing the system to recover if an I/O operation fails, it is recommended that you always set the time-out to a value greater than zero.

Note: If the time-out is set to zero, then the I/O will never time-out.

Scan for Device at Boot Time – Set this option to No when there is a device you do not want to be available to the system. Also, on a bus with only a few devices attached, you can speed up boot time by changing this setting to No for all unused SCSI IDs.

Scan for SCSI Logical Units (LUNs) – Set this option to No if you have problems with a device that responds to all LUNs whether they are occupied or not. For example, if there is a SCSI device with multiple LUNs but you do not want all of those LUNs to be available to the system, then set this option to No. This will limit the scan to LUN 0 only.

Queue Tags – This option allows the user to enable or disable the issuing of queue tags during I/O requests when your device driver can do this.

Initial Boot – This option allows any device attached to the first adapter to become the boot device. It provides the users of non-BBS personal computers some of the flexibility of a BBS machine.

Format – If enabled, this option allows you to low-level format a magnetic disk drive. Low-level formatting will completely and irreversibly erase all data on the drive. Note that this utility will only format 512 byte sectors. For other sector sizes, do not use this utility.

Verify – This option allows you to read all the sectors on a disk looking for errors. When selected, this option displays the following message:

```
Verify all sectors on the device
Press ESC to abort
Else press any key to continue
```

Help – This option displays a help screen with information about the current menu.

Restore Default Setup – This option resets all device selections back to their optimal settings. Select this option to restore all manufacturing defaults for the specified adapter. Note that all user customized options will be lost upon saving after restoring default setup.

Exit this menu – This option allows the user to leave the current menu screen and return to the previous screen.

3.3 Exiting the SCSI BIOS Configuration Utility

Since some changes only take effect after the system reboots, it is important that you exit from this Configuration Utility properly. Return to the Main Menu and exit by using the Quit option.

Important: Rebooting the system without properly exiting from this utility may cause some changes to not take effect.

Appendix A

Technical Specifications

The section discusses the physical environment associated with the LSIU80ALVD. It includes a mechanical drawing of this board, which is shown in [Figure A.1](#). It also includes these topics:

- [Section A.1, “Physical Environment,” page A-1](#)
 - [Section A.2, “Operational Environment,” page A-4](#)
-

A.1 Physical Environment

This section discusses the physical, electrical, thermal, and safety characteristics of the LSIU80ALVD. Additionally, this board is compliant with electromagnetic standards set by the FCC.

A.1.1 Physical Characteristics

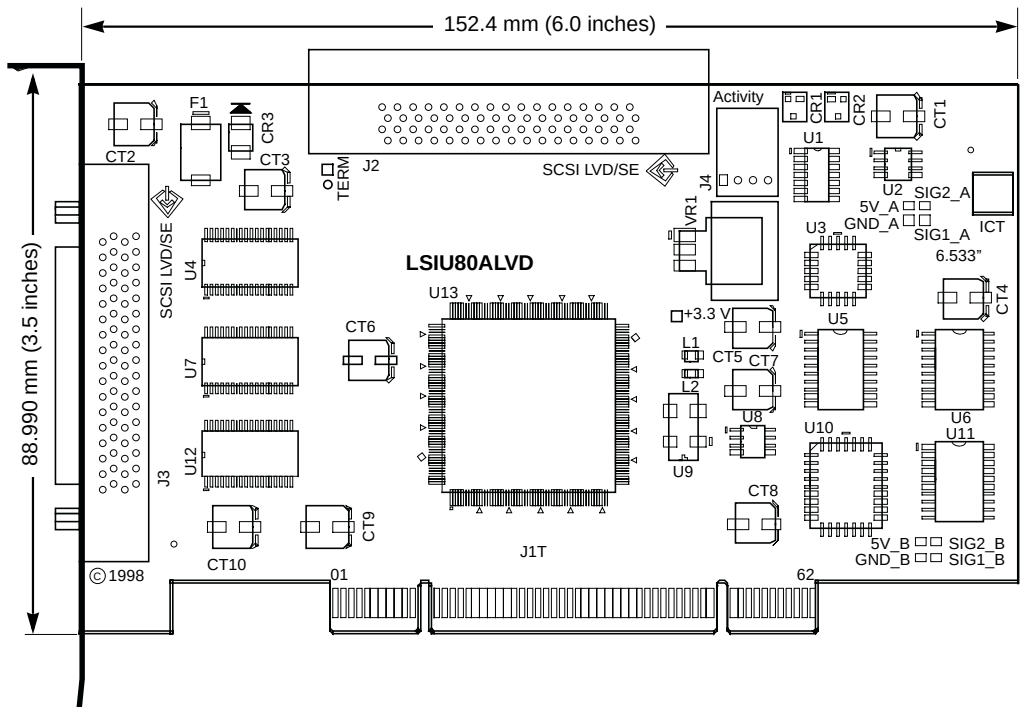
The dimensions of the LSIU80ALVD board are 154.4 x 88.90 mm (6.00 x 3.50 inches). PCI connection is made through edge connector J1.

Internal SCSI connection is made through the 68-pin HD connector J2. External SCSI connection is made through the 68-pin HD connector J3. The J3 connector extends external to the cabinet through a bracket attached to the board and the face of the connector. The bracket is a standard ISA type with a cutout to accommodate connector J3.

The J4 connector is for connecting to the computer's drive activity LED. It is a 4-pin one row right angle header wired in parallel with the on-board SCSI Activity LED.

The component height on the top and bottom of the board conforms to the PCI Specification Revision 2.1.

Figure A.1 LSIU80ALVD Mechanical Drawing



- Note:
- J1: PCI 32-bit, universal board connector.
 - J2: 68-pin high density connector.
 - J3: 68-pin high density connector.
 - J4: 4-pin low density connector.

A.1.2 Electrical Characteristics

The LSIU80ALVD maximum power requirement, including SCSI TERMPWR, under normal operation is as follows:

Table A.1 Maximum Power Requirements

+5 V DC	±5%	1.5 A	Over the operating range 0 °C to 55 °C
---------	-----	-------	--

Under abnormal conditions such as a short on SCSI TERMPWR, + 5 V current may be higher. At temperatures of at least 25 °C a current of 4 A is sustained no longer than 30 seconds before the self-resetting TERMPWR short circuit protection device (F1) opens.

The PCI PRSNT1/ and PRSNT2/ pins are set to indicate a 7.5 W maximum configuration.

A.1.3 Thermal, Atmospheric Characteristics

The board is designed to operate in an environment defined by the following parameters:

- Temperature range: 0 °C to 55 °C (dry bulb)
- Relative humidity range: 5% to 90% noncondensing
- Maximum dew point temperature: 32 °C
- Storage Temperature: – 45 °C to + 105 °C (dry bulb)

A.1.4 Electromagnetic Compliance

The board is designed and implemented to minimize electromagnetic emissions, susceptibility, and the effects of electromagnetic discharge. The board meets the requirements of FCC Class B and CISPR 22 limits and is marked with the FCC Class B Declaration of Conformity Symbol. It also carries the CE mark.

A.1.5 Safety Characteristics

The bare board meets or exceeds the requirements of UL flammability rating 94 V0. The bare board is also marked with the supplier's name or trademark, type, and UL flammability rating. Since this board is installed in a PCI bus slot, all voltages are below the SELV 42.4 V limit.

A.2 Operational Environment

The LSIU80ALVD is designed for use in PCI computer systems. The SDMS operates the board, but the design of the board does not prevent the use of other software.

A.2.1 The PCI Interface

The PCI interface operates as a 32-bit DMA bus master. The connection is made through edge connector J1, which provides connections on both the front and back of the board. The signal definitions and pin numbers conform to the PCI Local Bus Specification Revision 2.1 standard.

[Table A.2](#) and [Table A.3](#) show the signal assignments.

Note: The + 3.3 V pins are tied together and decoupled with high frequency bypass capacitors to ground. No current from these 3.3 V pins is used on the board. The board derives power from the + 5 V pins, directly and through a 3.3 V voltage regulator. The PCI $V_{I/O}$ pins are used to differentiate between a 5 V or a 3.3 V PCI environment.

Table A.2 PCI Connector J1 (Front)

Signal Name	Pin	Signal Name	Pin	Signal Name	Pin
–12 V	1	GND	22	SERR/	42
TCK	2	AD27	23	+3.3 V	43
GND	3	AD25	24	C_BE1/	44
TDO	4	+3.3 V	25	AD14	45
+5 V	5	C_BE3/	26	GND	46
+5 V	6	AD23	27	AD12	47
INTB/	7	GND	28	AD10	48
INTD/	8	AD21	29	GND	49
GND (PRSNT1/)	9	AD19	30	KEYWAY	50
RESERVED	10	+3.3 V	31	KEYWAY	51
GND (PRSNT2/)	11	AD17	32	AD08	52
KEYWAY	12	C_BE2/	33	AD07	53
KEYWAY	13	GND	34	+3.3 V	54
RESERVED	14	IRDY/	35	AD05	55
GND	15	+3.3 V	36	AD03	56
CLK	16	DEVSEL/	37	GND	57
GND	17	GND	38	AD01	58
REQ/	18	LOCK/	39	VI/O	59
VI/O	19	PERR/	40	ACK64/	60
AD31	20	+3.3 V	41	+5 V	61
AD29	21			+5 V	62
1. Highlighted signals are not connected.					

Table A.3 PCI Connector J1 (Back)

Signal Name	Pin	Signal Name	Pin	Signal Name	Pin
TRST/	1	AD28	22	GND	42
+12 V	2	AD26	23	PAR	43
TMS	3	GND	24	AD15	44
TDI	4	AD24	25	+3.3 V	45
+5 V	5	IDSEL	26	AD13	46
INTA/	6	+3.3 V	27	AD11	47
INTC/	7	AD22	28	GND	48
+5 V	8	AD20	29	AD09	49
RESERVED	9	GND	30	KEYWAY	50
+5 V	10	AD18	31	KEYWAY	51
RESERVED	11	AD16	32	C_BE0/	52
KEYWAY	12	+3.3 V	33	+3.3 V	53
KEYWAY	13	FRAME/	34	AD06	54
RESERVED	14	GND	35	AD04	55
RST/	15	TRDY/	36	GND	56
VI/O	16	GND	37	AD02	57
GNT/	17	STOP/	38	AD00	58
GND	18	+3.3 V	39	VI/O	59
RESERVED	19	SDONE	40	REQ64/	60
AD30	20	SBO/	41	+5 V	61
+3.3 V	21			+5 V	62
Note: Highlighted signals are not connected.					

A.2.2 The SCSI Interface

The SCSI interface conforms to ANSI X 3T10.11/1142.

The SCSI interface operates as 16-bit, synchronous or asynchronous, SE or LVD, and supports SCSI-3 protocols and 8-bit and 16-bit arbitration. The interface is made through connectors J2 and J3.

Active SE or LVD SCSI termination is provided automatically. SCSI TERMPWR is supplied by the board.

Connector J2 is a 68-pin HD right angle header used for internal connections.

Connector J3 is a 68-pin HD right angle connector that protrudes through the back panel bracket and is used for external connections.

[Table A.4](#) and [Table A.5](#) show the signal assignments for J2 and J3 respectively.

Table A.4 Internal SCSI Connector J2

Signal Name	Pin	Signal Name	Pin
SD12+	1	SD12–	35
SD13+	2	SD13–	36
SD14+	3	SD14–	37
SD15+	4	SD15–	38
SDP1+	5	SDP1–	39
SD00+	6	SD00–	40
SD01+	7	SD01–	41
SD02+	8	SD02–	42
SD03+	9	SD03–	43
SD04+	10	SD04–	44
SD05+	11	SD05–	45
SD06+	12	SD06–	46
SD07+	13	SD07–	47
SDP0+	14	SDP0–	48
GND	15	GND	49
DIFFSENS	16	J2_SENS	50
TERMPWR	17	TERMPWR	51
TERMPWR	18	TERMPWR	52
N/C	19	N/C	53
GND	20	GND	54
SATN+	21	SATN–	55
GND	22	GND	56
SBSY+	23	SBSY–	57
SACK+	24	SACK–	58
SRST+	25	SRST–	59
SMSG+	26	SMSG–	60
SSEL+	27	SSEL–	61
SCD+	28	SCD–	62
SREQ+	29	SREQ–	63
SIO+	30	SIO–	64
SD08+	31	SD08–	65
SD09+	32	SD09–	66
SD10+	33	SD10–	67
SD11+	34	SD11–	68

Table A.5 External SCSI Connector J3

Signal Name	Pin	Signal Name	Pin
SD12+	1	SMSG+	26
SD13+	2	SSEL+	27
SD14+	3	SCD+	28
SD15+	4	SREQ+	29
SDP1+	5	SIO+	30
SD00+	6	SD08+	31
SD01+	7	SD09+	32
SD02+	8	SD10+	33
SD03+	9	SD11+	34
SD04+	10	SD12–	35
SD05+	11	SD13–	36
SD06+	12	SD14–	37
SD07+	13	SD15–	38
SDP0+	14	SDP1–	39
GND	15	SD00–	40
DIFFSENS	16	SD01–	41
TERMPWR	17	SD02–	42
TERMPWR	18	SD03–	43
N/C	19	SD04–	44
GND	20	SD05–	45
SATN+	21	SD06–	46
GND	22	SD07–	47
SBSY+	23	SDP0–	48
SACK+	24	GND	49
SRST+	25	J3_SENS	50
TERMPWR	51	SMSG–	60
TERMPWR	52	SSEL–	61
N/C	53	SCD–	62
GND	54	SREQ–	63
SATN–	55	SIO–	64
GND	56	SD08–	65
SBSY–	57	SD09–	66
SACK–	58	SD10–	67
SRST–	59	SD11–	68
Note: When operated in the SE mode, all signals with the + suffix are clamped to ground.			

A.2.3 On-Board LED

On-board LEDs are used to indicate the status of the SCSI bus.

The SCSI Activity LED lights when the SCSI bus is transferring information.

A.2.4 The SCSI Busy LED

The SCSI Activity LED interface on the LSIU80ALVD is a four-wire arrangement that allows the user to connect an LED harness to the board. The buffered GPIO0_FETCH line (maximum output low voltage 0.4 V and minimum output low current 16 mA) is pulled low to complete the circuit when a harness with an LED is attached. The SCSI Busy LED connector is J4.

Table A.6 LED Connector J4

Signal Name	Pin
LED+	1
LED–	2
LED–	3
LED+	4

Appendix B

Glossary of Terms and Abbreviations

Active Termination	The electrical connection required at each end of the SCSI bus, composed of active voltage regulation and a set of termination resistors. Ultra and Ultra2 SCSI require active termination.
Address	A specific location in memory, designated either numerically or by a symbolic name.
Asynchronous Data Transfer	One of the ways data is transferred over the SCSI bus. It is slower than synchronous data transfer.
BIOS	Basic Input/Output System. Software that provides basic read/write capability. Usually kept as firmware (ROM based). The system BIOS on the mainboard of a computer is used to boot and control the system. The SCSI BIOS on the host adapter acts as an extension of the system BIOS.
Bit	A binary digit. The smallest unit of information a computer uses. The value of a bit (0 or 1) represents a two-way choice, such as on or off, true or false, and so on.
Bus	A collection of unbroken signal lines across which information is transmitted from one part of a computer system to another. Connections to the bus are made using taps on the lines.
Bus Mastering	A high-performance way to transfer data. The host adapter controls the transfer of data directly to and from system memory without interrupting the computer's microprocessor. This is the fastest way for multitasking operating systems to transfer data.
Byte	A unit of information consisting of eight bits.
CISPR	A special international committee on radio interference (Committee, International and Special, for Protection in Radio).
Configuration	Refers to the way a computer is set up; the combined hardware components (computer, monitor, keyboard, and peripheral devices) that

make up a computer system; or the software settings that allow the hardware components to communicate with each other.

CPU	Central Processing Unit. The “brain” of the computer that performs the actual computations. The term Microprocessor Unit (MPU) is also used.
DMA	Direct Memory Access.
DMA Bus Master	A feature that allows a peripheral to control the flow of data to and from system memory by blocks, as opposed to PIO (Programmed I/O) where the processor is in control and the flow is by byte.
Device Driver	A program that allows a microprocessor (through the operating system) to direct the operation of a peripheral device.
Differential SCSI	A hardware configuration for connecting SCSI devices. It uses a pair of lines for each signal transfer (as opposed to Single-Ended SCSI which references each SCSI signal to a common ground.)
Dword	A double word is a group of four consecutive bytes or characters that are stored, addressed, transmitted, and operated on as a unit. The lower two address bits of the least significant byte must equal zero in order to be Dword aligned.
EEPROM	Electrically Erasable Programmable Read Only Memory. A memory chip typically used to store configuration information. See NVRAM.
EISA	Extended Industry Standard Architecture. An extension of the 16-bit ISA bus standard. It allows devices to perform 32-bit data transfers.
External SCSI Device	A SCSI device installed outside the computer cabinet. These devices are connected in a continuous chain using specific types of shielded cables.
Fast-20	The SCSI Trade Association (STA) supports the use of “Ultra SCSI” over the term “Fast-20”. Please see Ultra SCSI.
Fast-40	The SCSI Trade Association (STA) supports the use of “Ultra2 SCSI” over the term “Fast-40”. Please see Ultra2 SCSI.
Fast SCSI	A standard for SCSI data transfers. It allows a transfer rate of up to 10 Mbytes/s over an 8-bit SCSI bus and up to 20 Mbytes/s over a 16-bit SCSI bus.
FCC	Federal Communications Commission.

File	A named collection of information stored on a disk.
Firmware	Software that is permanently stored in ROM. Therefore, it can be accessed during boot time.
Hard Disk	A disk made of metal and permanently sealed into a drive cartridge. A hard disk can store very large amounts of information.
Host	The computer system in which a SCSI host adapter is installed. It uses the SCSI host adapter to transfer information to and from devices attached to the SCSI bus.
Host Adapter	A circuit board or integrated circuit that provides a SCSI bus connection to the computer system.
Internal SCSI Device	A SCSI device installed inside the computer cabinet. These devices are connected in a continuous chain using an unshielded ribbon cable.
IRQ	Interrupt Request Channel. A path through which a device can get the immediate attention of the computer's CPU. The PCI bus assigns an IRQ path for each SCSI host adapter.
ISA	Industry Standard Architecture. A type of computer bus used in most PCs. It allows devices to send and receive data up to 16-bits at a time.
Kbyte	Kilobyte. A measure of computer storage equal to 1024 bytes.
Local Bus	A way to connect peripherals directly to computer memory. It bypasses the slower ISA and EISA buses. PCI is a local bus standard.
Logical Unit	A subdivision, either logical or physical, of a SCSI device (actually the place for the device on the SCSI bus). Most devices have only one logical unit, but up to eight are allowed for each of the eight possible devices on a SCSI bus.
LUN	Logical Unit Number. An identifier, zero to seven, for a logical unit.
LVDlink	Low Voltage Differential Link allows greater Ultra2 SCSI device connectability and longer SCSI cables. LVDlink lowers the amplitude of noise reflections and allows higher transmission frequencies. Detailed information may be found in Section 1.3.4, "LVDlink Technology."
Mainboard	A large circuit board that holds RAM, ROM, the microprocessor, custom integrated circuits, and other components that make a computer work. It also has expansion slots for host adapters and other expansion boards.

Main Memory	The part of a computer's memory which is directly accessible by the CPU (usually synonymous with RAM).
Mbyte	Megabyte. A measure of computer storage equal to 1024 kilobytes.
Motherboard	See Mainboard. In some countries, the term Motherboard is not appropriate.
Multitasking	The executing of more than one command at the same time. This allows programs to operate in parallel.
Multithreading	The simultaneous accessing of data by more than one SCSI device. This increases the data throughput.
NVRAM	NonVolatile Random Access Memory. Actually an EEPROM (Electrically Erasable Read Only Memory chip) used to store configuration information. See EEPROM.
Operating System	A program that organizes the internal activities of the computer and its peripheral devices. An operating system performs basic tasks such as moving data to and from devices, and managing information in memory. It also provides the user interface.
Parity Checking	A way to verify the accuracy of data transmitted over the SCSI bus. The parity bit in the transfer is used to make the sum of all the 1 bits either odd or even (for odd or even parity). If the sum is not correct, the information may be retransmitted or an error message may appear.
Passive Termination	The electrical connection required at each end of the SCSI bus, composed of a set of resistors. It improves the integrity of bus signals.
PCI	Peripheral Component Interconnect. A local bus specification that allows connection of peripherals directly to computer memory. It bypasses the slower ISA and EISA buses.
Peripheral Devices	A piece of hardware (such as a video monitor, disk drive, printer, or CD-ROM) used with a computer and under the computer's control. SCSI peripherals are controlled through a SCSI host adapter.
Pin-1 Orientation	The alignment of pin 1 on a SCSI cable connector and the pin-1 position on the SCSI connector into which it is inserted. External SCSI cables are always keyed to insure proper alignment, but internal SCSI ribbon cables sometimes are not keyed.

PIO	Programmed Input/Output. A way the CPU can transfer data to and from memory using the computer's I/O ports. PIO is usually faster than DMA, but requires CPU time.
Port Address	Also Port Number. The address through which commands are sent to a host adapter board. This address is assigned by the PCI bus.
Port Number	See Port Address.
Queue Tags	A way to keep track of multiple commands that allow for increased throughput on the SCSI bus.
RAM	Random Access Memory. The computer's primary working memory in which program instructions and data are stored and are accessible to the CPU. Information can be written to and read from RAM. The contents of RAM are lost when the computer is turned off.
RISC Core	LSI Logic SCSI chips contain a RISC (Reduced Instruction Set Computer) processor, programmed through microcode scripts.
ROM	Read Only Memory. Memory from which information can be read but not changed. The contents of ROM are not erased when the computer is turned off.
SCAM	SCSI Configured AutoMatically. A method to automatically allocate SCSI IDs using software when SCAM compliant SCSI devices are attached.
SCSI	Small Computer System Interface. A specification for a high-performance peripheral bus and command set. The original standard is referred to as SCSI-1.
SCSI-2	The current SCSI specification which adds features to the original SCSI-1 standard.
SCSI-3	The SCSI specification which adds features to the SCSI-2 standard.

SCSI Bus	A host adapter and one or more SCSI peripherals connected by cables in a linear chain configuration. The host adapter may exist anywhere on the chain, allowing connection of both internal and external SCSI devices. A system may have more than one SCSI bus by using multiple host adapters.
SCSI Device	Any device that conforms to the SCSI standard and is attached to the SCSI bus by a SCSI cable. This includes SCSI host adapters and SCSI peripherals.
SCSI ID	A way to uniquely identify each SCSI device on the SCSI bus. Each SCSI bus has eight available SCSI IDs numbered 0 through 7 (or 0 through 15 for Wide SCSI). The host adapter usually gets the highest ID, (7 or 15) giving it priority to control the bus.
SCSI SCRIPTS	A SCSI programming language that works with the SCRIPTS processor that is embedded on the LSI53C8XX device. These SCRIPTS reside in in host computer system memory.
SCRIPTS Processor	The SCRIPTS processor allows users to fine tune SCSI operations with regard to unique vendor commands or new SCSI specifications. The SCRIPTS processor fetches SCRIPTS instructions from system memory to control operation of the LSI53C8XX device.
SDMS	Storage Device Management System. An LSI Logic software product that manages SCSI system I/O.
Single-Ended SCSI	A hardware specification for connecting SCSI devices. It references each SCSI signal to a common ground. This is the most common method (as opposed to differential SCSI which uses a separate ground for each signal).
STA	SCSI Trade Association. A group of companies that cooperate to promote SCSI parallel interface technology as a viable mainstream I/O interconnect for commercial computing.
Synchronous Data Transfer	One of the ways data is transferred over the SCSI bus. Transfers are clocked with fixed frequency pulses. This is faster than asynchronous data transfer. Synchronous data transfers are negotiated between the SCSI host adapter and each SCSI device.
System BIOS	Controls the low-level POST (Power-On Self-Test), and basic operation of the CPU and computer system.

Ultra SCSI	A standard for SCSI data transfers. It allows a transfer rate of up to 20 Mbytes/s over an 8-bit SCSI bus and up to 40 Mbytes/s over a 16-bit SCSI bus. STA (SCSI Trade Association) supports using the term “Ultra SCSI” over the older term “Fast-20”.
Ultra2 SCSI	A standard for SCSI data transfers. It allows a transfer rate of up to 40 Mbytes/s over an 8-bit SCSI bus, and up to 80 Mbytes/s over a 16-bit SCSI bus. STA (SCSI Trade Association) supports using the term “Ultra2 SCSI” over the term “Fast-40”.
VCCI	Voluntary Control Council for Interference.
VDE	Verband Deutscher Elektroniker (Association of German Electrical Engineers).
Virtual Memory	Space on a hard disk that can be used as if it were RAM.
Wide SCSI	A SCSI-2 feature allowing 16-bit or 32-bit transfers on the SCSI bus. This dramatically increases the transfer rate over the standard 8-bit SCSI bus.
Wide Ultra SCSI	The SCSI Trade Association (STA) term for SCSI bus width 16-bits, SCSI bus speed maximum data rate 40 Mbytes/s.
Wide Ultra2 SCSI	The SCSI Trade Association (STA) term for SCSI bus width 16-bits, SCSI bus speed maximum data rate 80 Mbytes/s.
Word	A two byte (or 16-bit) unit of information.

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