USER'S GUIDE

LSIU40SE Dual Channel PCI to Ultra SCSI Host Adapter

August 2002

Version 2.2

LSI LOGIC ®

FCC   CE

Electromagnetic Compatibility Notices

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference, and
2. This device must accept any interference received, including interference that may cause undesired operation.

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:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and the receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Shielded cables for SCSI connection external to the cabinet are used in the compliance testing of this Product. LSI Logic is not responsible for any radio or television interference caused by unauthorized modification of this equipment or the substitution or attachment of connecting cables and equipment other than those specified by LSI Logic. The correction of interferences caused by such unauthorized modification, substitution, or attachment will be the responsibility of the user.

The LSI Logic LSIU40SE is tested to comply with FCC standards for home or office use.

This Class B digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numérique de la classe B respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.


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This is a Class B product based on the standard of the Voluntary Control Council for Interference from Information Technology Equipment (VCCI). If this is used near a radio or television receiver in a domestic environment, it may cause radio interference. Install and use the equipment according to the instruction manual.

To receive product literature, visit us at http://www.lsilogic.com.

For a current list of our distributors, sales offices, and design resource centers, view our web page located at

http://www.lsilogic.com/contacts/na_salesoffices.html

Preface

This book is the primary reference and user's guide for the LSI Logic LSIU40SE Dual Channel PCI to Ultra SCSI Host Adapter. It contains a complete functional description for the LSIU40SE and includes complete physical and electrical specifications for the LSIU40SE.

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 LSIU40SE**, defines the interfaces and characteristics of the LSIU40SE.

- Chapter 2, **Installing the LSIU40SE**, provides both quick and detailed installation instructions.

- Chapter 3, **Configuring the LSIU40SE**, describes the SCSI BIOS Configuration Utility to configure adapter and device settings.

- Appendix A, **Technical Specifications**, describes the physical and operational environments of the LSIU40SE.

- 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 Systems SDMS™ 4.0 User's Guide, Order Number S14007.A

Revision Record

Revision	Date	Remarks
1.0	1/97	First release.
2.0	9/98	Updated Chapter 3 to reflect 4.11 BIOS; new figure for channel switches.
2.1	12/00	All product names changed from SYM to LSI.
2.2	8/02	Product name changed from LSI22801 to LSIU40SE.

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Chapter 1
Using the LSIU40SE

This chapter describes the LSIU40SE Dual Channel PCI to Ultra SCSI Host Adapter interface to PCI computer systems and includes these topics:

1.1   General Description

The LSI Logic LSIU40SE provides a SCSI-3, Ultra SCSI interface to PCI computer systems. Installing this adapter in your PCI system allows connection of SCSI devices over a SCSI bus.

The dual channel LSIU40SE is a 16-bit, Single-Ended (SE), SCSI solution for your computer, using only one PCI slot. This board can support legacy Fast SCSI devices, and the newest Ultra SCSI devices. It is also backwards compatible with the existing LSI8751SP host adapter but with a different external connector.

The Storage Device Management System (SDMS™) software operates the board. The design of the board does not prevent other software from being written and used with it. BIOS support for this host adapter is incorporated on the board in an 8 X 64K Flash BIOS.

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 LSIU40SE.

1.2 Features

This section provides a high level overview of the PCI Interface, the SCSI Interface, and Board Characteristics for the LSIU40SE.

1.2.1 PCI Interface

- Full 32-bit DMA bus master
- Zero wait-state bus master data bursts
- Universal PCI bus voltage support

1.2.2 SCSI Interface

- Two independent SCSI channels
- 16-bit SE
- Automatically enabled active termination
- Three connectors per channel:
  68-pin VHDCI external
  68-pin right-angle high density internal with jack blocks
  50-pin vertical low density internal
- Fast and Ultra SCSI data transfer capability
- SCSI termination power (TERMPWR) source with autoresetting circuit breaker and TERMPWR shorted LED
- SCSI Configured AutoMatically (SCAM) off in BIOS Version 4.09 and later
- Flash Electronically Erasable Programmable Read Only Memory (EEPROM) for BIOS storage
- Serial NonVolatile Random Access Memory (NVRAM) on each channel for user configuration utility and SCAM information storage
- SCSI activity LED connector for each channel

1.2.3 Board Characteristics

- PCI board dimensions,
  190 x 96.52 mm (7.50 x 3.80 inches)
- Universal 32-bit card edge connector

1.3 Interface Descriptions

This section provides a more detailed explanation about the PCI
Interface, the SCSI Interface, and Ultra SCSI.

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 a high end PC.
The PCI functionality for the LSIU40SE is contained within the
LSI53C876 PCI to Ultra SCSI I/O Processor chip. The LSI53C876
connects directly to the PCI bus and generates timing protocol in
compliance with the PCI Local Bus Specification Revision 2.1 standard.

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 LSIU40SE 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 LSIU40SE is contained within the
LSI53C876. The LSI53C876 connects directly to the two SCSI buses and
generates timing and protocol in compliance with the SCSI standard.

The SCSI interfaces on the LSIU40SE operate as 16-bit, synchronous or
asynchronous, SE bus, and support Ultra SCSI protocols and 16-bit
arbitration. Each interface is made through two of the connectors J2, J3,
and J4 (for Channel A), or J6, J7, and J8 (for Channel B). Connectors
J2 and J6 are 68-pin high density right-angle receptacles. Connectors J3
and J7 are shielded 68-pin VHDCI 0.8 mm right-angle receptacles that
protrude through the back panel bracket. Connectors J4 and J8 are
50-pin low density vertical shrouded pin headers. See Figure 2.1 for the
location of these connectors.

SE SCSI active termination is provided on the LSIU40SE. Termination is
automatically enabled when only one of the connectors J2, J3, and, J4
(or J6, J7, and, J8) is used, or when an 8-bit device is connected to the
16-bit J3 or J7 connectors. In the latter case, only the upper 8 data bits
are automatically terminated. The LSIU40SE supplies SCSI bus

TERMPWR through a blocking diode and a self-resetting 1.5 A short circuit protection device. The on-board LED lights when TERMPWR is shorted. Separate switches for each channel allow user override of termination.

A 40 MHz oscillator is installed on the LSIU40SE to provide the clock frequency to the LSI53C876 that is necessary to support Wide Ultra SCSI transfers of up to 40 Mbytes/s.

1.3.3 Ultra SCSI

The LSIU40SE fully supports Ultra SCSI as well as Fast SCSI simultaneously. Ultra SCSI is an extension of the SCSI-3 family of standards that expands the bandwidth of the SCSI bus, allowing faster synchronous data transfers.

Special SCSI cables are specified for operation with Ultra SCSI devices. You must consider the total number of devices and the length of the SCSI bus when setting up your system. See Chapter 2, "Installing the LSIU40SE," for a more detailed explanation of SCSI bus connections.

Chapter 2
Installing the LSIU40SE

This chapter provides instructions on how to install the LSIU40SE and includes these topics:

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 in installing the LSIU40SE, please follow the instructions in 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 LSIU40SE 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. Refer to the user's manual for your computer.

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 PCI plug-in board installation. The LSIU40SE 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.

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.

> 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 the connectors J3 and J7 (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 or J6 for Wide SCSI, or a 50-pin connector into connector J4 or J8 for normal SCSI (see Figure 2.1). Make certain to match pin 1 on both connectors.

Step 9. Connect your computer's LED cable if desired. This is designed to drive the front panel LED found on most PC cabinets to indicate activity on the SCSI bus.

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 that 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 LSIU40SE, 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 that 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
- 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 access up to 15 peripheral devices per channel.

2.2.2 Inserting the Host Adapter

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

Step 1. *Ground yourself* before removing this host adapter board. Remove the LSIU40SE 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 on your computer to access the PCI slots.

Caution: *Ground yourself* by touching a metal surface before removing the cabinet cover. 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 LSIU40SE 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 LSIU40SE
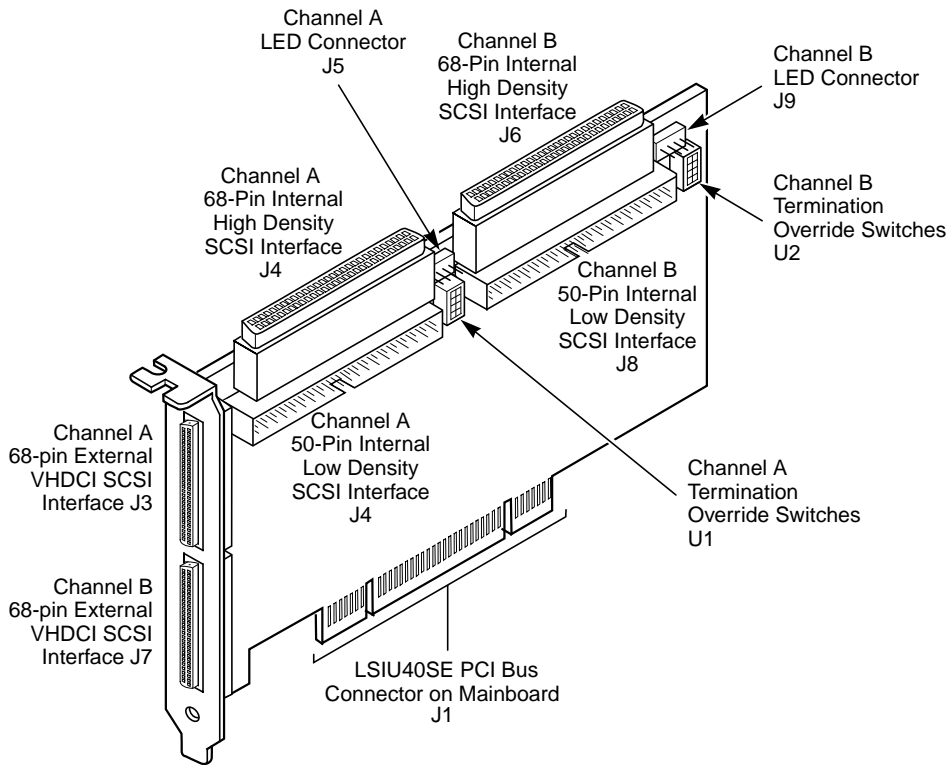
Channel A
LED Connector
J5

Channel B
68-Pin Internal
High Density
SCSI Interface
J6

Channel B
LED Connector
J9

Channel A
68-Pin Internal
High Density
SCSI Interface
J4

Channel B
Termination
Override Switches
U2

Channel B
50-Pin Internal
Low Density
SCSI Interface
J8

Channel A
68-pin External
VHDCI SCSI
Interface J3

Channel A
50-Pin Internal
Low Density
SCSI Interface
J4

Channel A
Termination
Override Switches
U1

Channel B
68-pin External
VHDCI SCSI
Interface J7

LSIU40SE PCI Bus
Connector on Mainboard
J1

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.

Step 7.   To plan on hooking up another host adapter on the same bus as this host adapter, or an 8-bit device on 68-pin connector, see Section 2.2.10.1, "Channel Switches," discussed later in this chapter.

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.

Figure 2.2   Inserting the Host Adapter
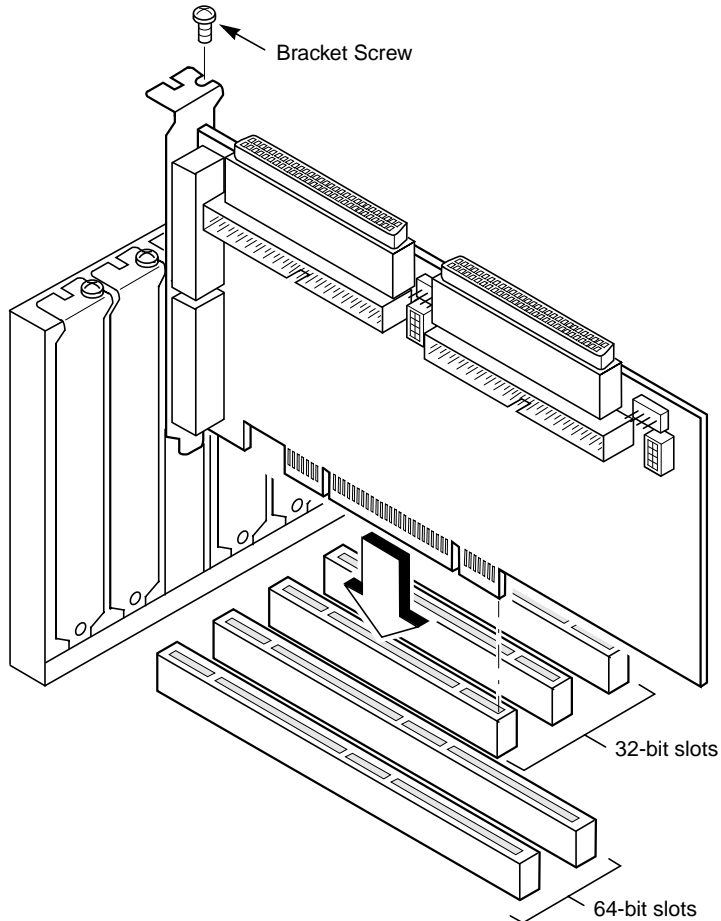
Step 8.   The bracket around the connectors J3 and J7 (see Figure 2.1) should fit where you removed the blank panel. Secure it with the bracket screw (see Figure 2.2) before making the internal and external SCSI bus connections.

2.2.3   Connecting the SCSI Peripherals

SCSI bus connections to the LSIU40SE are made with an unshielded, 68 or 50-conductor ribbon cable (see Figure 2.3). One side of this cable is marked with a color to indicate the pin-1 side. Sometimes the connectors on this cable are keyed to ensure proper pin-1 connection.

All external SCSI bus connections to the LSIU40SE are made with shielded, 68-conductor cables (see Figure 2.3). The connectors on this cable are always keyed to ensure proper pin-1 connection.

Figure 2.3   SCSI Cables

**SCSI Cables for Internal Connections
50-pin High Density**

**SCSI Cable for Internal Connections
50-pin Low Density**

**SCSI Cable for External Connections
68-pin VHDCI**
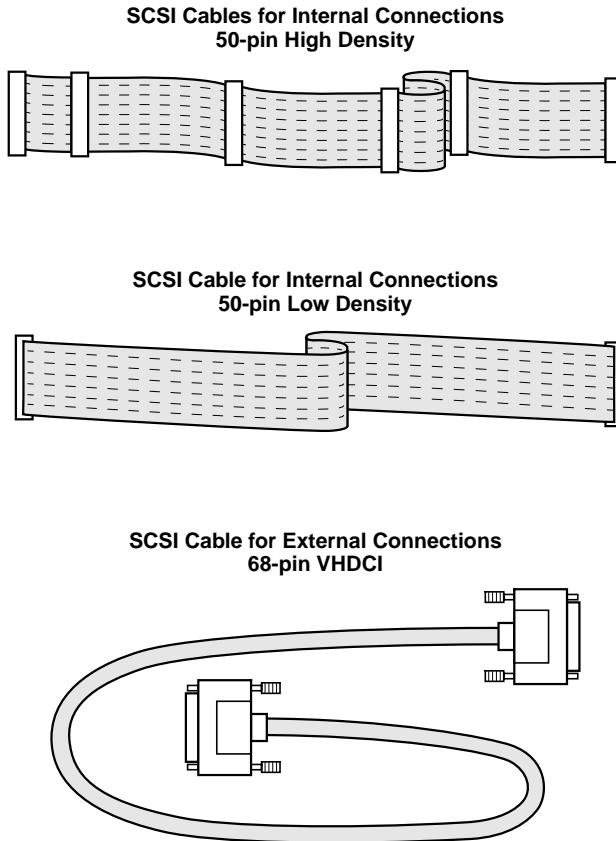
Important: You can connect up to 16 SCSI and Fast SCSI devices, including the host adapter board, on a SE SCSI bus only if they are at least .3 m apart on a 6-meter cable. For Ultra SCSI, you can connect up to eight devices, including the host adapter board, on a SE Ultra SCSI bus only if they are evenly 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. The LSIU40SE autotermination scheme is designed to operate properly when plugging the end connector of the SCSI cables into the LSIU40SE SCSI connectors.

If you connect the LSIU40SE in the middle of the bus, you will incur improper termination since the switches are not assigned on that bus correctly. Refer to Section 2.2.10.1, "Channel Switches," for more information.

2.2.4 Making Internal SCSI Bus Connections

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

Step 1. If you are connecting an internal Wide SCSI device, plug the 68-pin connector on one end of a wide internal SCSI ribbon cable into the connector J2 or J6 (see Figure 2.4).

Figure 2.4   Internal Wide SCSI Ribbon Cable to Host Adapter Connection
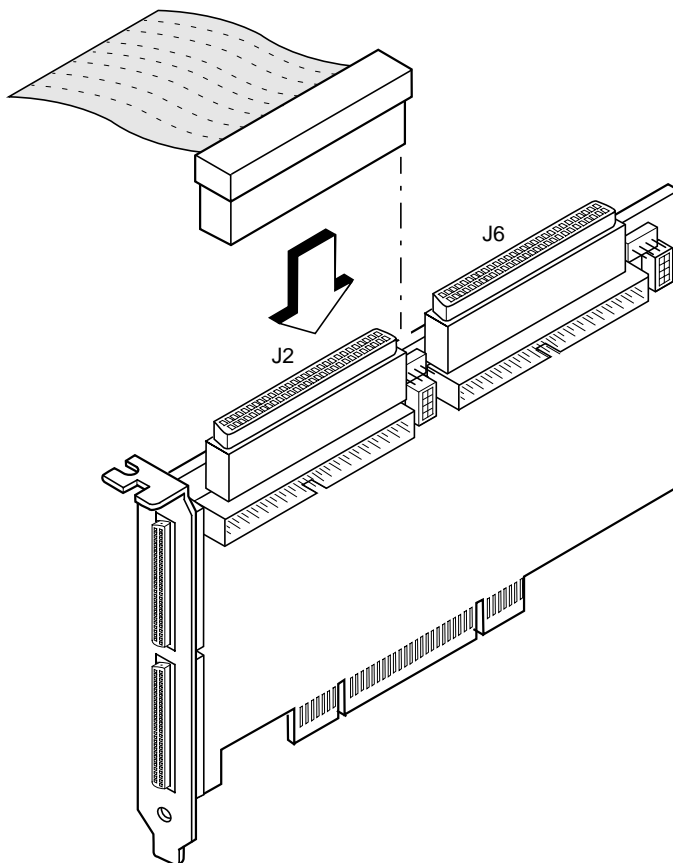
Step 2.   To connect an 8-bit internal SCSI device, plug the 50-pin connector on one end of an 8-conductor internal SCSI ribbon cable into the connector J4 or J8 (see Figure 2.5). Make certain to match pin 1 on both connectors.

Figure 2.5   Internal SCSI Ribbon Cable to Host Adapter Connection

Channel B

Channel A
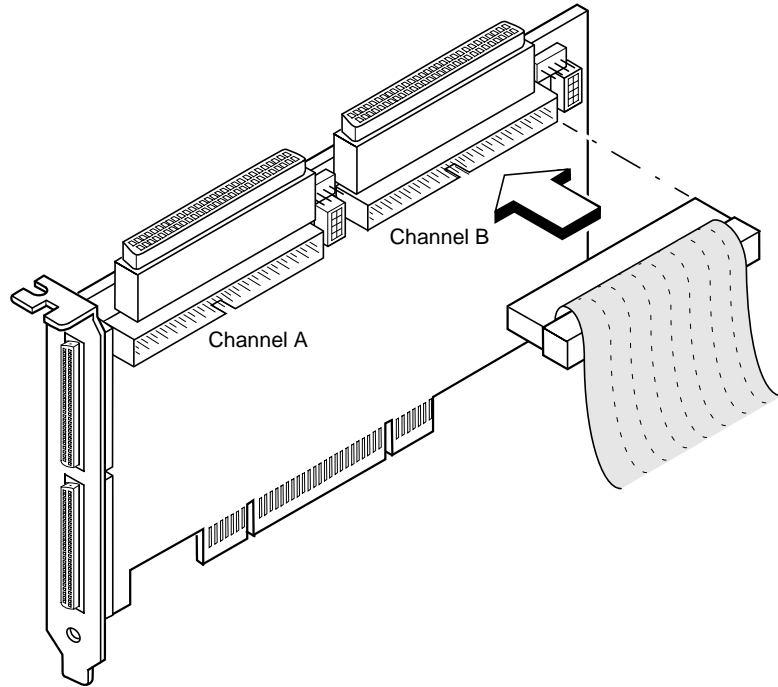
Step 3. Plug the 68-pin or 50-pin connector on the other end of the internal SCSI ribbon cable into the SCSI connector on the internal SCSI device. An example of this connection is shown in Figure 2.6. You must match pin 1 on all connections.

Figure 2.6   Internal SCSI Ribbon Cable to Internal SCSI Device Connection
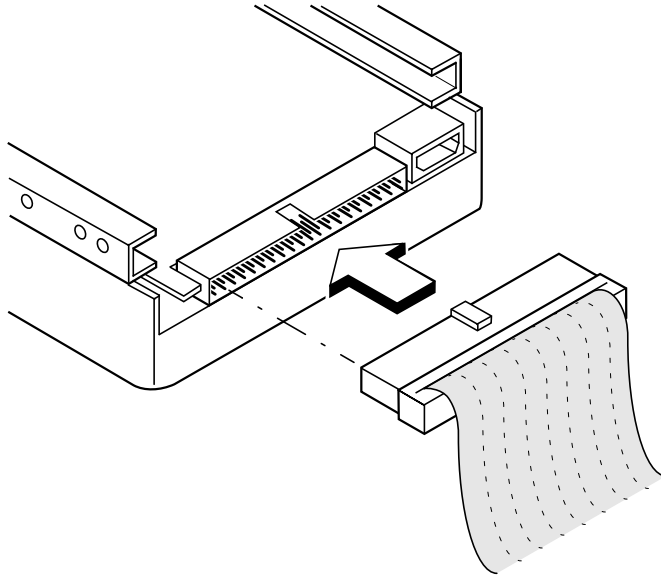
Step 4. Additional internal SCSI devices are plugged in by using an internal SCSI ribbon cable with the required number of connectors attached along its length as shown in Figure 2.7.

An example of this type of chained connection is shown in Figure 2.8. Make sure to match pin 1 on all connections.

Figure 2.7   Connecting Additional Internal SCSI Devices
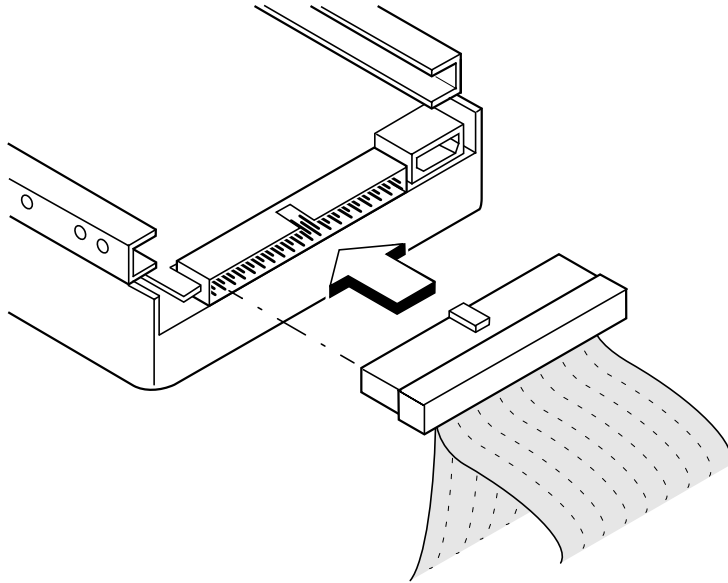
Figure 2.8   Multiple Internal SCSI Devices Chained Together
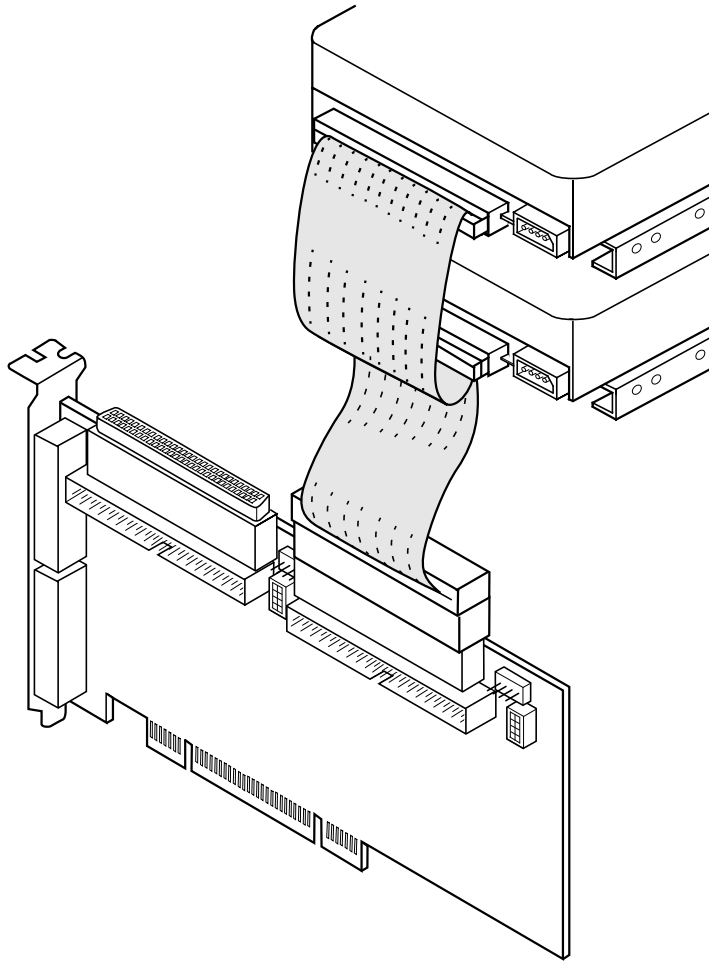
Step 5. It is also possible to use both internal connectors on a channel if you do not attach any external devices to that channel. An example of this configuration is shown in Figure 2.9.

Figure 2.9   Using Both Internal Connectors on a Channel
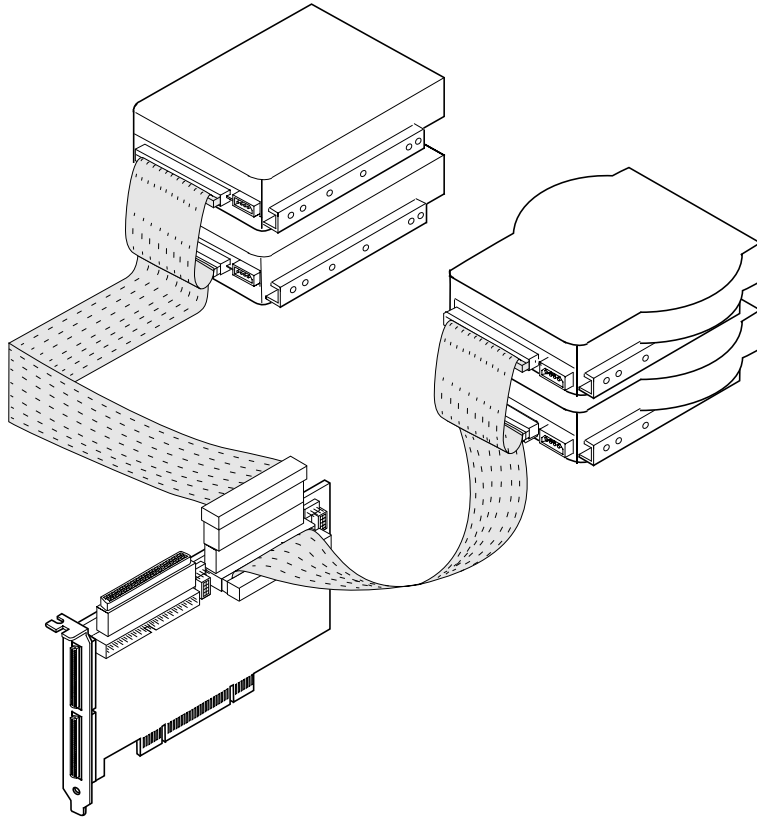
Note: When two connectors are already used on a channel, the third connector cannot be used.

Step 6.   Most PC cabinets are designed with a front panel LED (sometimes already connected to an existing IDE drive). You may connect this LED cable to the host adapter, as shown in Figure 2.10. This causes the front panel LED to indicate activity on the SCSI bus.

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

Figure 2.10   SCSI LED Connectors
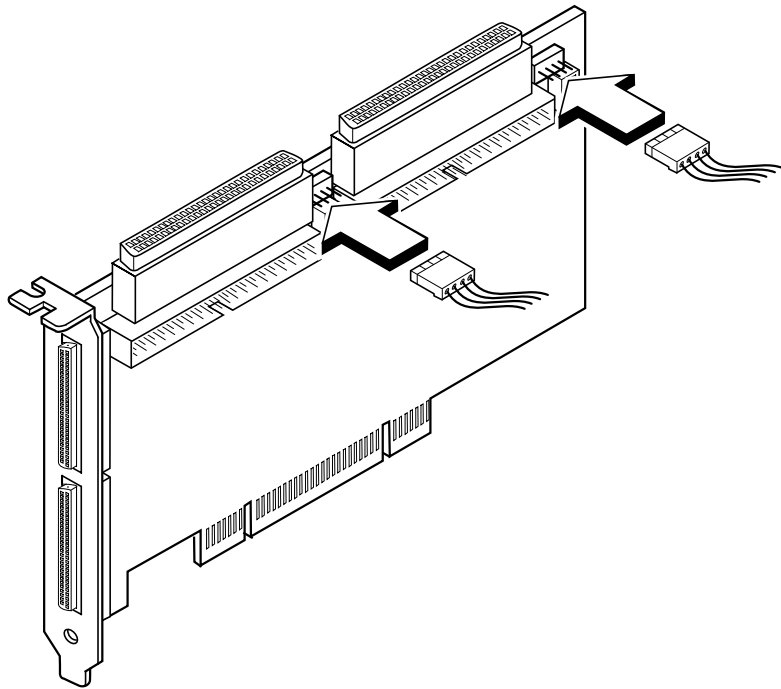
Some LED cables have only two wires. In this case, place the connector on one end or the other of J5 or J9. If the LED does not light during SCSI bus activity from this host adapter, you may have to rotate the LED cable 180° on J5 or J9.

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 LSIU40SE, plug the 68-pin connector on one end of a shielded external SCSI VHDCI cable (see Figure 2.3) into the host adapter connector J3 or J7 (see Figure 2.1).

This connector is now bracketed to the back panel of your computer. Figure 2.11 shows how this connection is made.

Figure 2.11 External Cable to Host Adapter
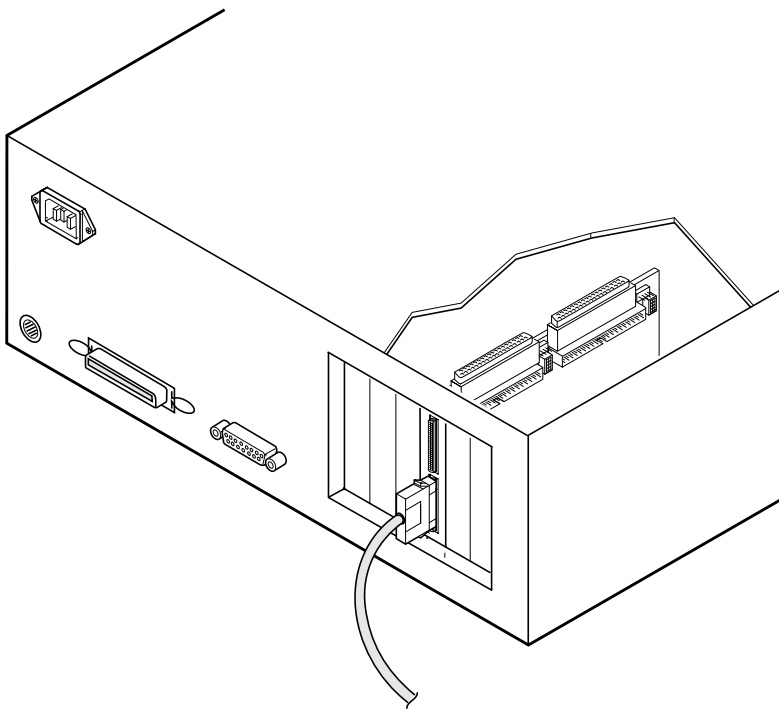
Step 2.   Plug the 68-pin connector on the other end of the shielded external SCSI cable into the SCSI connector on the external SCSI device. An example of this connection is shown in Figure 2.12.

Figure 2.12 External Cable to External SCSI Device
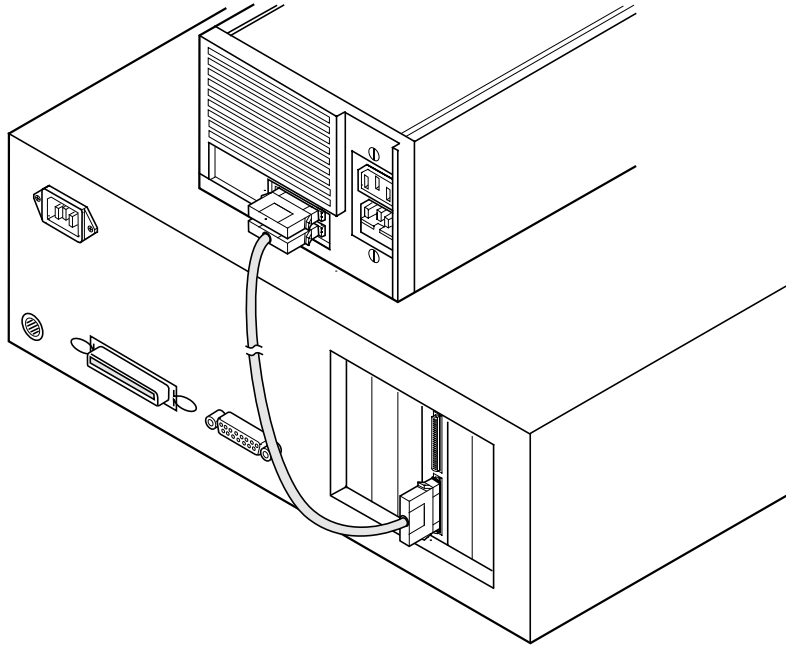
Step 3. To connect more than one external SCSI device to the host adapter, you must chain them together with shielded external SCSI cables. An example of these chained connections is shown in Figure 2.13.

Figure 2.13 Multiple External SCSI Devices Chained Together
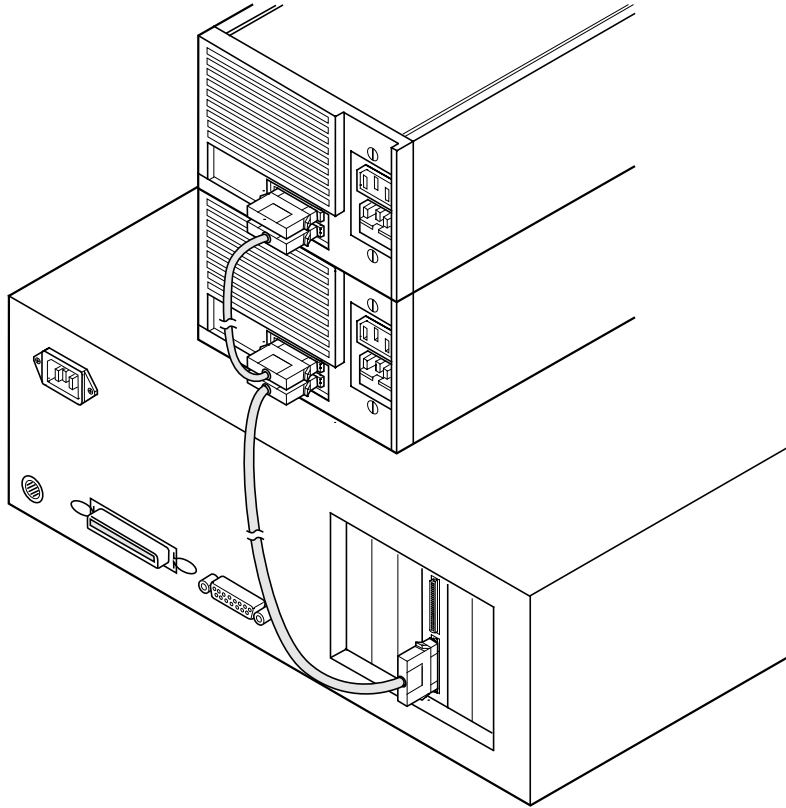
2.2.6   SCSI Bus Termination

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 LSIU40SE is also on the SCSI bus—its termination is automatically enabled when it is connected to the end of the bus.

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 LSIU40SE may enable termination erroneously if it is directly cabled to another SCSI device or host adapter using the same sensing method. This is dealt with by properly setting the termination override switches U1 or U2 (see Figure 2.1). The LSIU40SE senses SCSI devices by detecting the ground signal on pin-22 of a 50-conductor internal SCSI ribbon cable, or pin-50 of an internal or external 68-conductor SCSI cable. If you use an adapter to connect 8-bit devices externally with a 50-conductor SCSI cable, the ground signal is detected on pin-34.

The LSIU40SE automatically covers SCSI bus termination for five different bus configurations, depending on the use of the connectors on the LSIU40SE (see Figure 2.1). The five bus configurations are:

*   Only for internal SCSI connections,

*   Only for external SCSI connections,

*   For both internal and external SCSI connections,

*   For connections to both internal connectors, and

*   For an internal connection to another LSIU40SE, or any connection to a device using the same sensing method for automatic termination as your LSIU40SE.

2.2.7 Internal SCSI Connections

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

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

Figure 2.14 Internal SCSI Device Termination
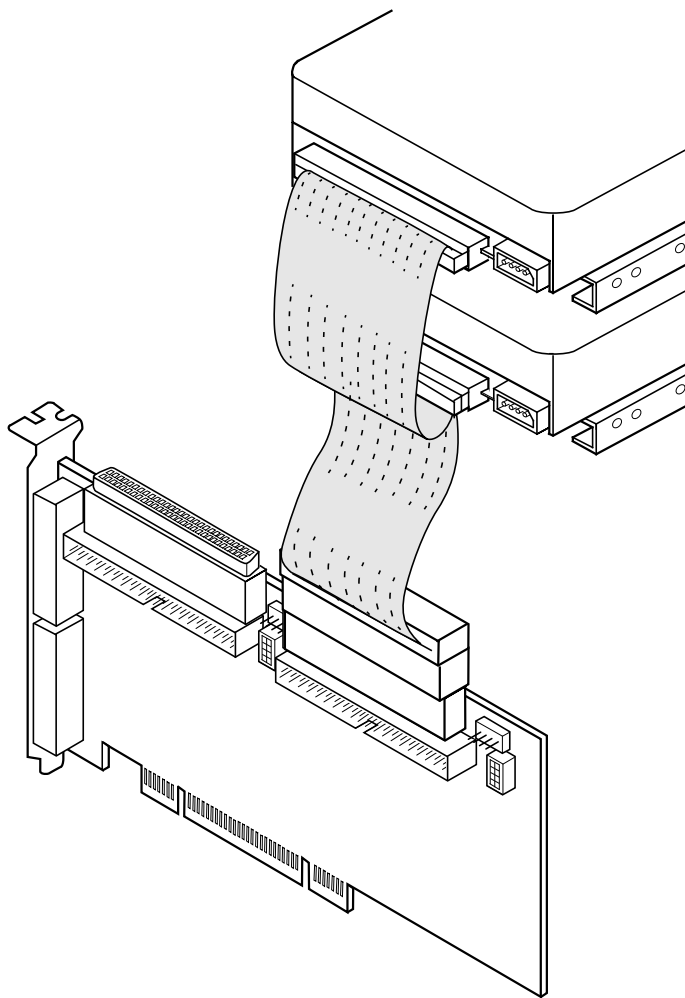
2.2.8 External SCSI Connections

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

Figure 2.15 shows an example of how termination is determined for this SCSI bus configuration.

Figure 2.15 External SCSI Device Termination
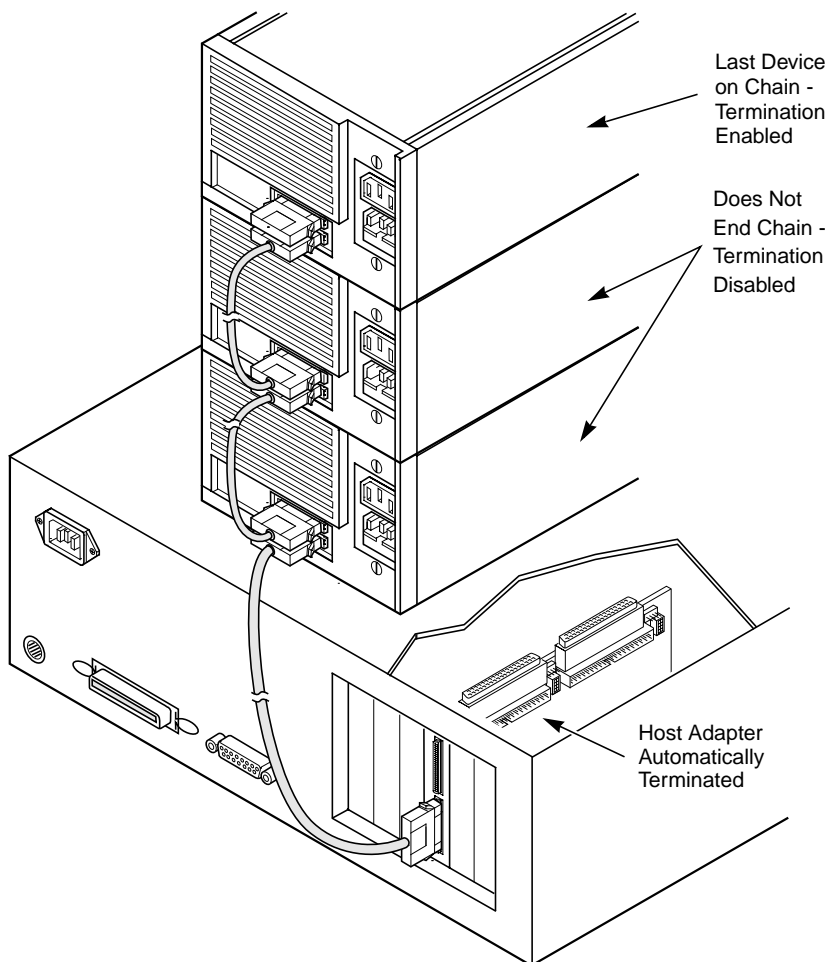
2.2.9   Internal and External SCSI Connections

If internal and external SCSI device connections to the host adapter have been made, then terminate the last internal and 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 2.16 shows an example of how termination is determined for this SCSI bus configuration.

Figure 2.16   Internal and External SCSI Device Termination
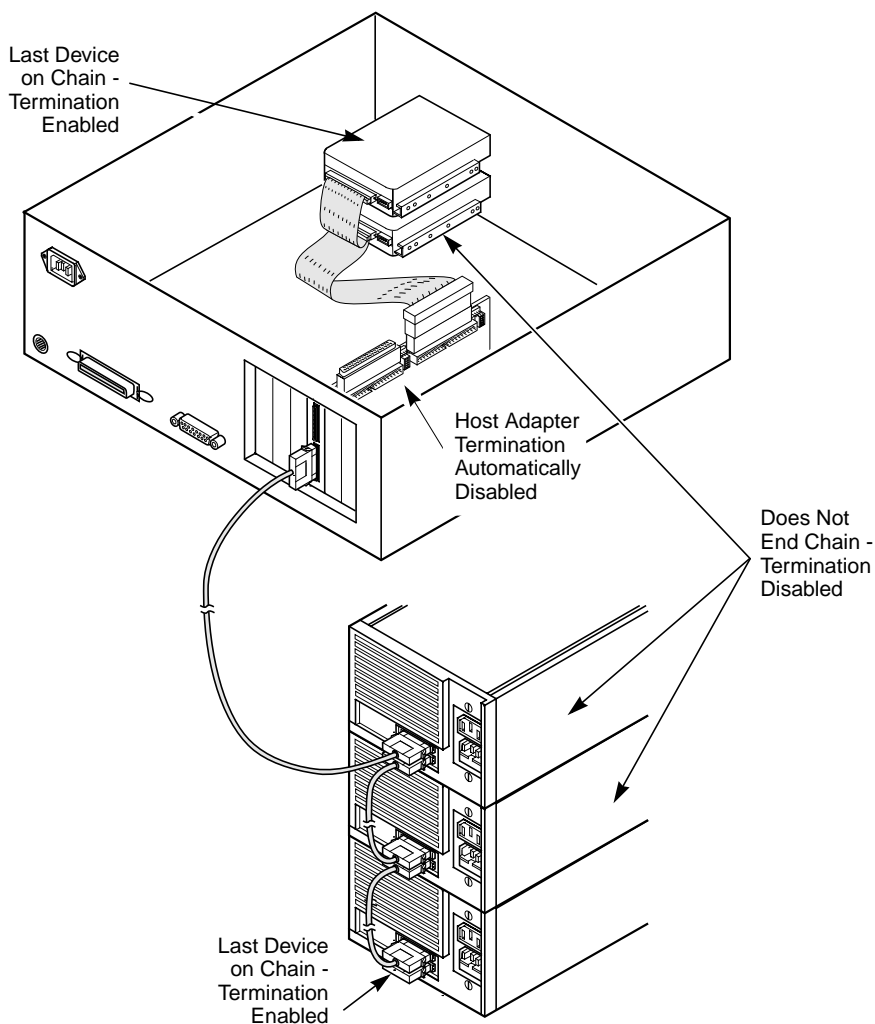
2.2.10 Internal SCSI Connections for Both Internal Connectors

If you have internal SCSI device connections to both internal connectors of a channel, you must terminate the internal devices on each end of the SCSI bus. You must disable the termination on all other devices. Termination on the host adapter is automatically disabled in this case. Remember, you must not use the external connector for a channel if you use both internal connectors for that channel.

Figure 2.17 shows an example of how termination is determined for this SCSI bus configuration. If you connect the LSIU40SE in the middle of the bus, you will incur improper termination since the switches are not assigned on that bus correctly.

Figure 2.17 Internal and Internal SCSI Device Termination
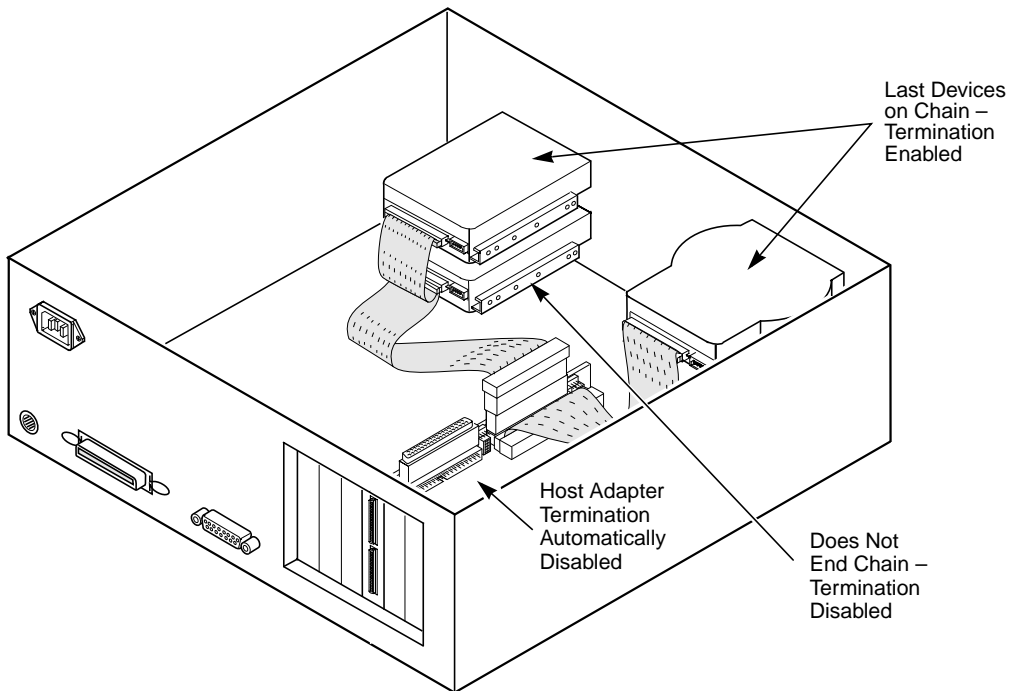
If you have an internal connection to another LSIU40SE, or any connection to a device that uses the same sensing method for automatic termination as your LSIU40SE, you must properly set the termination override switches U1 or U2 (see Figure 2.1).

2.2.10.1   Channel Switches

When connecting another LSIU40SE, you must turn on the switch for the connector used on one or both of the boards. Please refer to Figure 2.18, and the next two paragraphs, to determine the correct switch setting.

Four switches for each channel provide cable detection simulation and forced upper line termination. Switch one simulates a device on the internal 50-pin connector, switch two simulates a device on the internal 68-pin connector, switch three forces the upper SCSI line terminator to stay on, and switch four simulates a device on the external 68-pin connector.

When LSIU40SE is in the middle of a bus using only one connector, then switch Int68 and Ext68 (switches 2 and 4) for that bus are on. This forces the terminators for that bus to be disabled.

Figure 2.18 Termination Override Switch Settings for U1 and U2

1	ON	Default setting. Autotermination will work as designed.
2		
3		
4		

1-INT50

1	ON	Simulates a device on the Internal 50 pin connector. Use this switch only when a device is connected to the internal 50 pin connector that does not ground pin-22, like another LSI Logic host adapter.
2		
3		
4		

2-INT68

1	ON	Simulates a device on the Internal 68 pin connector. Use this switch only when a device is connected to the internal 68 pin connector that does not ground pin-50, like another LSI Logic host adapter.
2		
3		
4		

3-UPPER TERM

1	ON	Forces termination ON the upper data lines. Use this switch when a narrow 8-bit device is connected to one of the 68 pin connectors.
2		
3		
4		

1	ON	Simulates a device on the External 68 pin connector. Use this switch only when a device is connected to the external 68 pin connector that does not ground pin-50, like another LSI Logic host adapter.
2		
3		
4		

4-EXT68

2.2.11 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 SCSI ID 0, or the lowest SCSI ID on the bus. Chapter 3, "Configuring the LSIU40SE," explains how to set your 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 and if 8-bit SCSI devices are to be used, the host adapter ID must not be set above 7.

Step 2. Make any necessary changes to the SCSI IDs and record the IDs for future reference. Table 2.1 is provided as a place to keep this record.

Table 2.1   SCSI ID Record

SCSI ID	SCSI Device
15	
14	
13	
12	
11	
10	
9	
8	
7	LSIU40SE (default)
6	
5	
4	
3	
2	
1	
0	

2.2.12 Setting Interrupts

You should not normally have to change the default interrupt routing for the LSIU40SE, since performance is usually increased by having two separate interrupts. However, if your system does not support two separate interrupts, jumper TP9 (see Figure A.1 on page A-2) is provided to change the interrupt routing. Table 2.2 explains the jumper settings:

Table 2.2   Setting Interrupts

Jumper Setting	Condition
Jumper Out (default)	INTB/ is routed to INTB/ on the PCI bus
Jumper In	INTB/ is rerouted at power up to INTA/ on the PCI bus

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 your host adapter, see Chapter 3, "Configuring the LSIU40SE." 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
LSIU40SE

This chapter describes configuring the LSIU40SE and includes these topics:

3.1   When to Configure the LSIU40SE

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–Max)

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)	40
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 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.

NVRAM is available on the LSIU40SE. Changes can be made and stored to NVRAM 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.

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. The 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. The LSIU40SE appears on the menu as two LSI53C875 entries; one for each channel. 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 the host adapter.

is an example of the Main Menu.

Figure 3.1   Main Menu

```
Main Menu

              Port   Irq---------Status--------NVRAM
              Num
                     Level  Current   Next-Boot  Found

LSI53C875   FC00  9      On        On         Yes
LSI53C875   F800  9      On        Off        Yes
LSI53C895   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 will reboot upon exit from the Configuration Utility using the Quit option.

3.2.1.1 Change Adapter Status

Change Adapter Status allows you 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   Irq---------Status--------NVRAM
            Num
                   Level  Current   Next-Boot   Found

LSI53C875   FC00   9      On        On          Yes
LSI53C875   F800   9      On        Off         Yes
LSI53C895   F801   9      On        Off         Yes
```

To change an adapter's status, select it and press Enter. 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  LSI53C875  00   A0       1      LSI53C875  00   98

 2  LSI53C895  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 four

adapters can be assigned a boot order starting with boot sequence number zero (0). 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  LSI53C875  00   A0       0        LSI53C875 00   98

   LSI53C895
```

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 you 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.
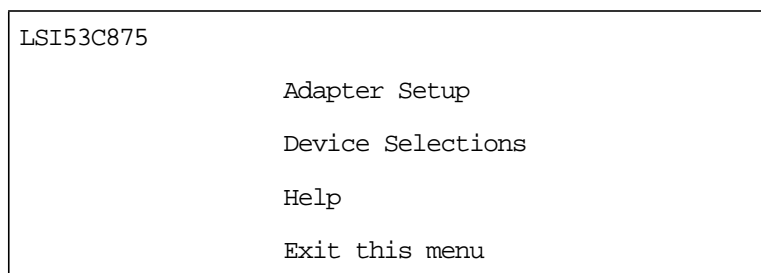
3.2.1.9   Esc

Pressing the Esc key allows exit 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

```
LSI53C875

                    Adapter Setup

                    Device Selections

                    Help

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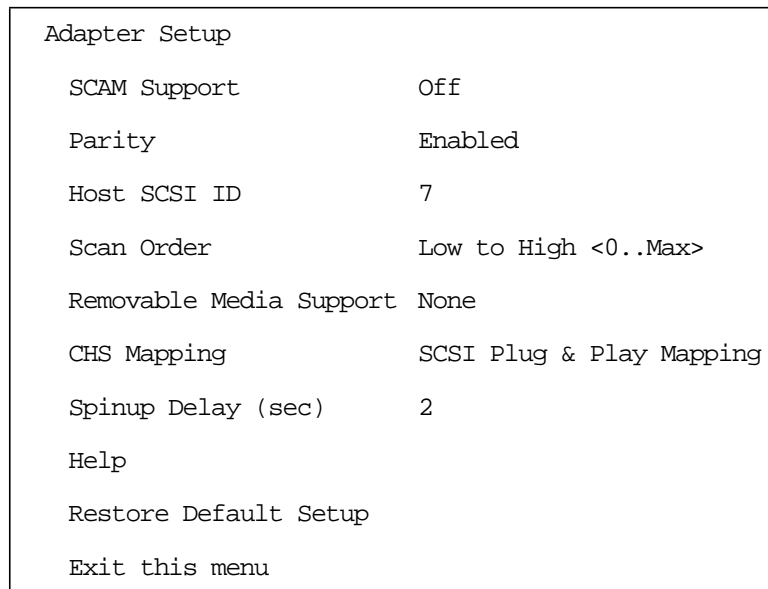
Choose Adapter Setup to view and change the selected adapter settings. Choose Device Selections to view and change settings for the devices attached to the selected adapter.

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 Adapter Setup 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 (sec)      2

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

SCAM Support – The LSI Logic BIOS Version 4.xx and above supports the SCSI Plug and Play protocol called SCAM (SCSI Configured AutoMatically). SCAM support by default is off in adapter BIOS versions 4.09 and later for the LSI53C876 device. The user may choose to turn this on only if the system drivers do not require SCAM off. Note that if this BIOS is flashed onto a board with existing settings, then these settings are not changed to reflect the new BIOS defaults. Go into the Configuration Utility to change these 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 the user not change the host adapter ID from the default value of 7, as this gives it the highest priority on the SCSI bus. Please also note that if you have 8-bit SCSI devices (narrow), they cannot see host IDs greater than 7.

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 there is 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 partition information. SCSI Plug and Play Mapping is the default value.

To support interchange with noncompatible 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 effect 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, thus nullifying the previous operation.

Spinup Delay (seconds) – This option allows you 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 device 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.
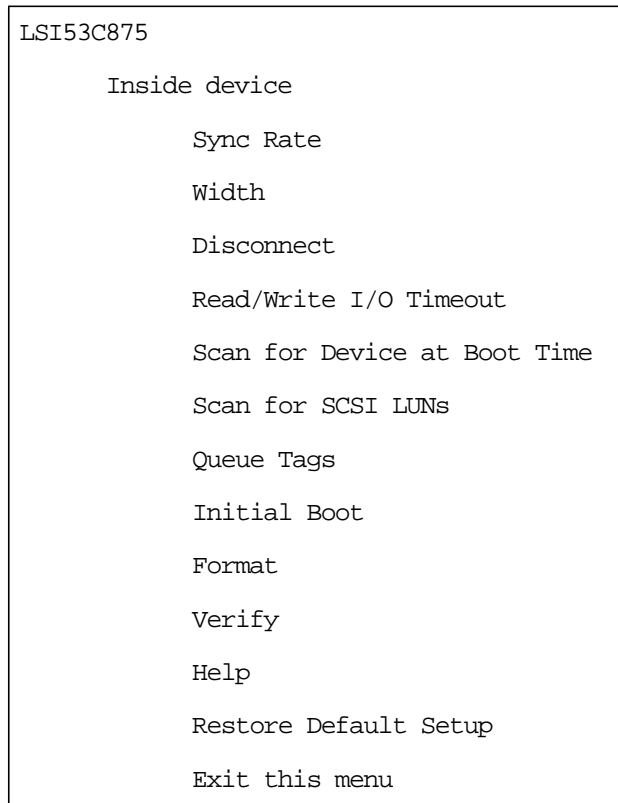
3.2.3 Device Selections Menu

When you select the Device Selections option, the corresponding menu (as shown in Figure 3.7) appears.

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 40    16    On    10    Yes   Yes   On     No

1-Dev1 N/A 40    16    On    10    Yes   Yes   On     No

2-Dev2 N/A 40    16    On    10    Yes   Yes   On     No

3-Dev3 N/A 40    16    On    10    Yes   Yes   On     No

4-Dev4 N/A 40    16    On    10    Yes   Yes   On     No

5-Dev5 N/A 40    16    On    10    Yes   Yes   On     No

6-Dev6 N/A 40    16    On    10    Yes   Yes   On     No

LSI53C875  40    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 3.8) appears providing the options and utilities available. For example, you could select the Sync Rate option to change the Sync Rate value of the chosen device.

Figure 3.8   Device Selections Menu (Cont.)

```
LSI53C875

      Inside device

              Sync Rate

              Width

              Disconnect

              Read/Write I/O Timeout

              Scan for Device at Boot Time

              Scan for SCSI LUNs

              Queue Tags

              Initial Boot

              Format

              Verify

              Help

              Restore Default Setup

              Exit this menu
```

Please review the descriptions of each option below before changing any values.

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. This 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 if there is a device that 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 problems arise 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 with some of the flexibility of a BBS machine.

Format Device – If enabled, this option allows the user to low-level format a magnetic disk drive. Low-level formatting will completely and irreversibly erase all data on the drive. Formatting will default the drive to a 512-byte sector size even if the drive had previously been formatted to another sector size.

Verify – This option allows the user 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 brings up a help screen with information about the current menu.

Restore Default Setup – This option resets all device selections back to their default 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 you to leave the current menu 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 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

This section discusses the physical environment associated with the LSIU40SE. It includes a mechanical drawing of this board, which is shown in Figure A.1. It also includes these topics:

A.1   Physical Environment

This section discusses the physical, electrical, thermal, and safety characteristics of the LSIU40SE. Additionally, this board is compliant with electromagnetic standards set by the FCC.

A.1.1   Physical Characteristics

The dimensions of the LSIU40SE are 190 x 96.52 mm (7.50 x 3.80 inches). PCI connection is made through edge connector J1.

Internal 16-bit SCSI connection is made through the 68-pin high density connectors J2 or J6. Internal 8-bit SCSI connection is made through the 50-pin low density connectors J4 or J8. External SCSI connection is made through the 68-pin VHDCI connectors J3 or J7. The J3 and J7 connectors extend through the ISA/EISA bracket, which is attached to the face of the connector outside the cabinet where the LSIU40SE is installed.

The bracket is a standard ISA type with a cutout to accommodate the connectors. The J5 and J9 connectors are for connecting the computer's Busy LED. It is a 4-pin one row right-angle header wired in parallel with the on-board LED. The component height on the top and bottom of the board follows the PCI Local Bus Specification Revision 2.1 standard.

Figure A.1 LSIU40SE Mechanical Drawing
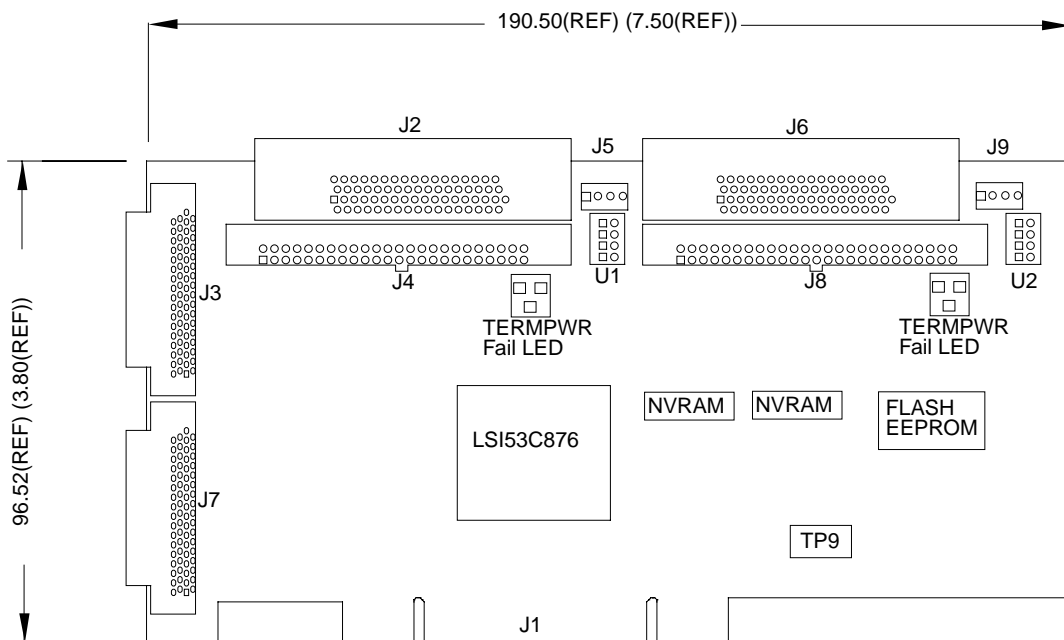
All dimensions are given in mm and inches.

A.1.2 Electrical Characteristics

The LSIU40SE maximum power requirements, including SCSI TERMPWR, under normal operation are as follows:

+5 V DC	5%	1.5 A	Over the operating range 0–55 ˚C
+12 V	0.6 V	50 mA	Over the operating range 0–55 ˚C
+3.3 V	0.3 V	130 mA	Over the operating range 0–55 ˚C when operating in a 3.3 V PCI slot

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 opens.

The PCI PRSNT1/ and PRSNT2/ pins are set to indicate a 15 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: 0% to 90% noncondensing
- Maximum dew point temperature: 32 ˚C

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 and CISPR Class B limits and is marked with the FCC Self Certification logo. 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 LSIU40SE is designed for use in PCI computer systems with an ISA/EISA bracket type. The LSI Logic SDMS software 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.1 and Table A.2 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 PCI portion of the LSI53C876 chip is powered from the 3 V/5 V pins.

Table A.1 PCI Connector J1 (Front)[1]

Signal Name	Pin	Signal Name	Pin	Signal Name	Pin
−12 V	1	GND	22	+3.3 V	43
TCK	2	AD27	23	C_BE1/	44
GND	3	AD25	24	AD14	45
TDO	4	+3.3 V	25	GND	46
+5 V	5	C_BE3/	26	AD12	47
+5 V	6	AD23	27	AD10	48
INTB/	7	GND	28	GND	49
INTD/	8	AD21	29	KEYWAY	50
GND (PRSNT1/)	9	AD19	30	KEYWAY	51
RESERVED	10	+3.3 V	31	AD08	52
GND (PRSNT2/)	11	AD17	32	AD07	53
KEYWAY	12	C_BE2/	33	+3.3 V	54
KEYWAY	13	GND	34	AD05	55
RESERVED	14	IRDY/	35	AD03	56
GND	15	+3.3 V	36	GND	57
CLK	16	DEVSEL/	37	AD01	58
GND	17	GND	38	3 V/5 V	59
REQ/	18	LOCK/	39	ACK64/	60
3 V/5 V	19	PERR/	40	+5 V	61
AD31	20	+3.3 V	41	+5 V	62
AD29	21	SERR/	42		

1. Shaded signals are not connected.

Table A.2   PCI Connector J1 (Back)[1]

Signal Name	Pin	Signal Name	Pin	Signal Name	Pin
TRST/	1	AD28	22	PAR	43
+12 V	2	AD26	23	AD15	44
TMS	3	GND	24	+3.3 V	45
TDI	4	AD24	25	AD13	46
+5 V	5	IDSEL	26	AD11	47
INTA/	6	+3.3 V	27	GND	48
INTC/	7	AD22	28	AD09	49
+5 V	8	AD20	29	KEYWAY	50
RESERVED	9	GND	30	KEYWAY	51
3 V/5 V	10	AD18	31	C_BE0/	52
RESERVED	11	AD16	32	+3.3 V	53
KEYWAY	12	+3.3 V	33	AD06	54
KEYWAY	13	FRAME/	34	AD04	55
RESERVED	14	GND	35	GND	56
RST/	15	TRDY/	36	AD02	57
3 V/5 V	16	GND	37	AD00	58
GNT/	17	STOP/	38	3 V/5 V	59
GND	18	+3.3 V	39	REQ64/	60
RESERVED	19	SDONE	40	+5 V	61
AD30	20	SBO/	41	+5 V	62
+3.3 V	21	GND	42		

1.   Shaded signals are not connected.

A.2.2 The SCSI Interface

The SCSI interface operates as 8-bit or 16-bit, synchronous or asynchronous, SE bus, and supports SCSI-2 protocols and 16-bit arbitration. The interface is made through connectors J2, J3 and J4 for channel A. Channel B connectors are J6, J7, and J8. Connectors J2 and J6 are 68-pin high density right-angle receptacles for internal connections. Connectors J3 and J7 are 68-pin VHDCI right-angle receptacles that protrude through the back panel bracket. Connectors J4 and J8 are 50-pin low density vertical shrouded headers used for internal SCSI connections.

> Note: Up to two (and only two) connections are allowed on each channel. Connecting to all three connectors on a channel will result in an unreliable configuration.

Active SE SCSI termination is provided automatically. SCSI termination power is also supplied by the board. Table A.3 and Table A.4 show the signal assignments for J2/J6, J3/J7, and J4/J8.

Table A.3   SCSI Connectors J2/J6 and J3/J7

Signal Name	Pin	Signal Name	Pin	Signal Name	Pin
GND	1	GND	24	SD7/	47
GND	2	GND	25	SDP/	48
GND	3	GND	26	GND	49
GND	4	GND	27	CPRSNT_A-B/[1]	50
GND	5	GND	28	TERMPWR	51
GND	6	GND	29	TERMPWR	52
GND	7	GND	30	N/C	53
GND	8	GND	31	GND	54
GND	9	GND	32	SATN/	55
GND	10	GND	33	GND	56
GND	11	GND (J2/J6) GND/16CBLSNS (J3/J7)	34	SBSY/	57
GND	12	SD12/	35	SACK/	58
GND	13	SD13/	36	SRST/	59
GND	14	SD14/	37	SMSG/	60
GND	15	SD15/	38	SSEL/	61
GND	16	SDP1/	39	SC_D/	62
TERMPWR	17	SD0/	40	SREQ/	63
TERMPWR	18	SD1/	41	SI_O/	64
N/C	19	SD2/	42	SD8/	65
GND	20	SD3/	43	SD9/	66
GND	21	SD4/	44	SD10/	67
GND	22	SD5/	45	SD11/	68
GND	23	SD6/	46		

1. CPRSNT_A/ (J2/J6) and CPRSNT_B/ (J3/J7) are used to sense the connection of a standard SCSI device by sensing SCSI standard GND on this pin.

Table A.4   SCSI Connectors J4/J8

Signal Name	Pin	Signal Name	Pin
GND	1	SD0/	2
GND	3	SD1/	4
GND	5	SD2/	6
GND	7	SD3/	8
GND	9	SD4/	10
GND	11	SD5/	12
GND	13	SD6/	14
GND	15	SD7/	16
GND	17	SDP/	18
GND	19	GND	20
GND	21	CPRSNT_C/[1]	22
N/C	23	N/C	24
N/C	25	TERMPWR	26
N/C	27	N/C	28
GND	29	GND	30
GND	31	SATN/	32
GND	33	GND	34
GND	35	SBSY/	36
GND	37	SACK/	38
GND	39	SRST/	40
GND	41	SMSG/	42
GND	43	SSEL/	44
GND	45	SC_D/	46
GND	47	SREQ/	48
GND	49	SI_O/	50

1. CPRSNT_C/ is used to sense the connection of a standard
    SCSI device by sensing SCSI standard GND on this pin.

A.2.3 The LED Interface

The LED interface on the LSIU40SE is a four-wire arrangement that allows the user to connect an LED harness to the board. The 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 connectors on the LSIU40SE are J5 and J9.

Table A.5   LED Connectors J5/J9

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

Appendix B
Glossary of Terms and Abbreviations

Address	A specific location in memory, designated either numerically or by a symbolic name.
Asynchronous Data Transfer	A method of transmission which does not require a common clock, but separates fields of data by stop and start bits. 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 bothering 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.
Chain	A topology in which every processor is connected to two others, except for two end processors that are connected to only one other.
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. A method of moving data from a storage device directly to RAM, without using the CPU's resources.

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 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 Electronically 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 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.

Mbyte   Megabyte. A measure of computer storage equal to 1024 kilobytes.

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).

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 (Electronically Erasable Programmable 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. One 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, an error message appears.

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 ensure proper alignment, but internal SCSI ribbon cables are sometimes 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 allows 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.

Scatter/Gather   A device driver feature that lets the host adapter modify a transfer data pointer so that a single host adapter transfer can access many segments of memory. This minimizes interrupts and transfer overhead.

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 next SCSI specification, which adds features to the SCSI-2 standard. Although this version is still in development, parts of the SCSI-3 standard are already in use.

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 ID 7 giving it priority to control the bus.
SDMS	Storage Device Management System. An LSI Logic software product that manages SCSI system I/O.
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.
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).
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.
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.
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 term "Fast-20".
VCCI	Voluntary Control Council for Interference.
Virtual Memory	Space on a hard disk that can be used as if it were RAM.
VHDCI	Very High Density Cable Interconnect. A trapezoidal shielded connector that has a 0.8 mm pitch.
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.
Word	A two byte (or 16-bit) unit of information.

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