USER'S GUIDE

MegaRAID® SATA 300 Storage Adapters

October 2006

Version 1.4

LSI LOGIC®

P/N 80-00153-01 Rev. B

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.

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 MegaRAID SATA storage adapters are 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.

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Document 80-00153-01 Rev. B, Version 1.4 (October 2006)
This document describes the LSI Logic Corporation MegaRAID SATA 300 storage adapters and will remain the official reference source for all revisions/releases of these products until rescinded by an update. This manual applies to the MegaRAID SATA 300-4XLP, MegaRAID SATA 300-4ELP, MegaRAID SATA 300-8X, MegaRAID SATA 300-8XLP, and MegaRAID SATA 300-8ELP storage adapters.

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

Preface

This book is the user's guide for the LSI Logic MegaRAID® Serial ATA (SATA) 300 family of storage adapters. It contains complete physical installation instructions, as well as physical and electrical specifications for the SATA 300 PCI-X and PCI Express storage adapters.

The MegaRAID SATA 300 storage adapter family consists of the following products:

- The MegaRAID SATA 300-4XLP PCI-X (low profile) storage adapter
- The MegaRAID SATA 300-4ELP PCI Express (low profile) storage adapter
- The MegaRAID SATA 300-8X PCI-X storage adapter
- The MegaRAID SATA 300-8XLP PCI-X (low profile) storage adapter
- The MegaRAID SATA 300-8ELP PCI Express (low profile) storage adapter

For details on how to configure the storage adapters, and for an overview of the software drivers, see the *MegaRAID Configuration Software User's Guide*.

Audience

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

- Anyone installing a SATA 300 PCI-X or PCI Express storage adapter into a system
- Engineers who are designing a SATA 300 PCI-X or PCI Express storage adapter into a system

- Engineers and managers who are evaluating the SATA 300 PCI-X or PCI Express storage adapter storage for possible use in a system

Organization

Use this manual to install and configure your SATA 300 storage adapter in the host system. The information in this document is independent of the back-end bus that the system uses, and applies to both MegaRAID SCSI storage adapters and Serial ATA storage adapters.

This document has the following chapters and appendixes:

- Chapter 1, **Introduction**, describes the SATA 300 PCI-X and PCI Express storage adapters.
- Chapter 2, **Hardware Installation**, describes how to install a SATA 300 PCI-X or PCI Express storage adapter in a system.
- Chapter 3, **SATA 300 Storage Adapter Specifications**, provides the environmental and electrical specifications for the SATA 300 PCI-X and PCI Express storage adapters. This chapter also provides the board graphic, jumper definitions, and connector locations for the SATA 300 storage adapters.
- Appendix A, **Glossary of Terms**, lists and explains terms and abbreviations that are used in this manual.
- Appendix B, **MegaRAID Problem Report Form**, provides forms to send or fax to LSI Logic if you encounter difficulty with a SATA 300 PCI-X or PCI Express storage adapter.

Related Publications

MegaRAID Device Driver Installation User's Guide
Document Number: DB11-000018-02

This document explains how to install the MegaRAID device driver for your operating system. The information in this document is independent of the back-end bus and applies to both MegaRAID SCSI storage adapters and Serial ATA storage adapters.

MegaRAID Configuration Software User's Guide
Document Number: DB15-000269-01

This document explains the various RAID system configuration, monitoring, and management tools that the MegaRAID configuration software provides. This document provides step-by-step instructions for using the MegaRAID CU and WebBIOS CU BIOS-based utilities, as well as the MegaRAID Manager and Power Console Plus™ OS-based tools.

The information in this document is independent of the back-end bus and applies to both MegaRAID SCSI storage adapters and Serial ATA storage adapters.

MegaRAID Battery Backup Unit User's Guide
Document Number: DB15-000323-01

This document explains how to install and use the LSI Logic battery backup units for MegaRAID storage adapters. The SATA 300-8X board uses the LSIBBU03 battery backup unit and the LSIiBBU01 battery backup unit. The SATA 300-4ELP and SATA 300-8ELP boards use the LSIiBBU01 intelligent battery backup unit.

Conventional PCI 2.3 Specification
For information on this document, see

www.pcisig.com

PCI-X Local Bus Specification, Revision 1.0a
For information on this document, see

www.pcisig.com

PCI Express Base Specification, Revision 1.0a
For information on this document, see

www.pcisig.com

PCI Express Card Electromechanical Specification, Revision 1.0a
For information on this document, see

www.pcisig.com

Revision History

Document Number	Date/Version	Remarks
80-00153-01 Rev. B	October 2006 Version 1.4	Removed all references to port multipliers, which are not supported.
80-00153-01 Rev. A	July 2006, Version 1.3	Corrected jumper information and a graphic for the SATA 300-8XLP RAID controller. Added the SATA 300-4ELP and SATA 300-4XLP RAID controllers.
DB15-000311-02	January 2006, Version 1.2	Added the SATA 300-8ELP RAID controller to the guide.
DB15-000311-01	October 2005, Version 1.1	Added the SATA 300-8XLP RAID controller to the guide.
DB15-000311-00	December 2004, Version 1.0	Initial release of this document.

Safety Instructions

Use the following safety guidelines to help protect your computer system from potential damage and to ensure your own personal safety.

Note: Use the MegaRAID SATA 300 RAID Controllers with UL listed ITE products only.

When Using Your Computer System

As you use your computer system, observe the following safety guidelines:

Caution: Do not operate your computer system with any cover(s) (such as computer covers, bezels, filler brackets, and front panel inserts) removed:

- Be sure the voltage selection switch on the power supply is set to match the alternating current (AC) power available at your location:
  - 115 volts (V)/60 hertz (Hz) in most of North and South America and some Far Eastern countries such as Japan, South Korea, and Taiwan

  - 230 volts (V)/60 hertz (Hz) in most of Europe, the Middle East, and the Far East. Also be sure your monitor and attached peripherals are electrically rated to operate with the AC power available in your location.

- Wait 5 seconds after turning off the system before removing a component from the system board or disconnecting a peripheral device from the computer.
- Plug the computer and peripheral power cables into properly grounded power sources. These cables are equipped with 3-prong plugs to ensure proper grounding. Do not use adapter plugs or remove the grounding prong from a cable. If you must use an extension cable, use a 3-wire cable with properly grounded plugs.
- Use a surge suppressor, line conditioner, or uninterruptible power supply to help protect your computer system from sudden, transient increases and decreases in electrical power.
- Be sure nothing rests on your computer system's cables and that the cables are not located where they can be stepped on or tripped over.
- Do not spill food or liquids on your computer. If the computer gets wet, consult the documentation that came with it.
- Do not push any objects into the openings of your computer. Doing so can cause fire or electric shock by shorting out interior components.
- Keep your computer away from radiators and heat sources.
- Do not block cooling vents.
- Avoid placing loose papers underneath your computer.
- Do not place your computer in a closed-in wall unit or on a rug.

When Working Inside Your Computer

Notice: Do not attempt to service the computer system yourself, except as explained in this guide and elsewhere in LSI Logic documentation. Always follow installation and service instructions closely.

1. Turn off your computer and any peripherals.
2. Disconnect your computer and peripherals from their power sources. Also disconnect any telephone or telecommunications lines from the computer.

Doing so reduces the potential for personal injury or shock.

Also note these safety guidelines:

- When you disconnect a cable, pull on its connector or on its strain-relief loop, not on the cable itself. Some cables have a connector with locking tabs. If you are disconnecting this type of cable, press in on the locking tabs before disconnecting the cable. As you pull connectors apart, keep them evenly aligned to avoid bending any connector pins.
- Before you connect a cable, make sure both connectors are correctly oriented and aligned.
- Handle components and cards with care. Don't touch the components or contacts on a card. Hold a card by its edges or by its metal mounting bracket. Hold a component such as a microprocessor chip by its edges, not by its pins.

Protecting Against Electrostatic Discharge

Static electricity can harm delicate components inside your computer. To prevent static damage, discharge static electricity from your body before you touch any of your computer's electronic components, such as the microprocessor. You can do so by touching an unpainted metal surface, such as the metal around the card-slot openings at the back of the computer.

As you continue to work inside the computer, periodically touch an unpainted metal surface to remove any static charge your body may have accumulated. In addition to the preceding precautions, you can also take the following steps to prevent damage from electrostatic discharge (ESD):

- When unpacking a static-sensitive component from its shipping carton, do not remove the component from the antistatic packing material until you are ready to install the component in your computer. Just before unwrapping the antistatic packaging, be sure to discharge static electricity from your body.
- When transporting a sensitive component, first place it in an antistatic container or packaging.
- Handle all sensitive components in a static-safe area. If possible, use antistatic floor pads and workbench pads.

Contents

Figures

Tables

Chapter 1
Introduction

This chapter describes the MegaRAID® SATA 300 PCI-X and PCI Express storage adapters and consists of the following sections:

- Section 1.1, “Overview”
- Section 1.2, “Features”
- Section 1.3, “Storage Adapter Characteristics”

1.1 Overview

The SATA 300 PCI-X and PCI Express storage adapters provide a high-performance intelligent PCI-X (Peripheral Component Interconnect-X) to SATA (High Speed Serial AT Attachment) and a PCI Express to SATA interface with RAID (Redundant Array of Independent Disks) control capabilities.

You can install the SATA board on a PCI-X or PCI Express bus and use it to connect Serial ATA drives to the host computer over a Serial ATA cable.

SATA 300 PCI-X and PCI Express storage adapters are an ideal RAID solution for the internal storage of workgroup, departmental, and entry-level enterprise systems. They offer a cost-effective way to implement RAID in a server.

1.1.1 MegaRAID System Installation Main Steps

The following steps outline the main tasks required to install and configure a SATA system. Each main task consists of a series of steps and operations that the noted reference manual explains. LSI Logic recommends performing the tasks in the order listed when you install and configure your SATA system.

1. Understand RAID system theory and operation.
2. Install the SATA 300 storage adapter and the related hardware. These steps are provided in this current guide.
3. Configure the physical arrays and logical devices using either the MegaRAID Configuration Utility (CU) or the WebBIOS CU. For detailed instructions, see the *MegaRAID Configuration Software User's Guide*.
4. Install the MegaRAID device drivers. For detailed instructions, see the *MegaRAID Device Driver Installation User's Guide.*
5. Manage, monitor, and reconfigure the RAID arrays and logical drives using either the MegaRAID Manager tool or the Power Console Plus™ tool. Each tool runs under an operating system and can manage the RAID array while the system is operating. For detailed instructions, see the *MegaRAID Configuration Software User's Guide*.

1.1.2 Storage Adapter Description

The MegaRAID SATA 300 family of adapters consists of the following:

- The MegaRAID Serial ATA 300-4XLP, which is a low-profile (7.1" x 2.536") PCI-X storage adapter that supports four Serial ATA ports. It supports a remote intelligent Battery Backup Unit (LSIiBBU01) only.
- The MegaRAID Serial ATA 300-4ELP, which is a low-profile version (7.71" x 2.536") of the Serial ATA 300-8ELP PCI Express storage adapter that supports four Serial ATA ports. It supports a remote intelligent Battery Backup Unit (LSIiBBU01) only.
- The MegaRAID SATA 300-8X, which is a half-size PCI-X storage adapter (6.6" x 4.2") that supports eight Serial ATA ports. You can attach a daughtercard to provide battery backup support using the LSIiBBU01 (intelligent Battery Backup Unit).
- The MegaRAID Serial ATA 300-8XLP, which is a low-profile version (7.1" x 2.536") of the Serial ATA 300-8X PCI-X storage adapter that supports eight Serial ATA ports. It supports a remote intelligent Battery Backup Unit (LSIiBBU01) only.
- The MegaRAID Serial ATA 300-8ELP, which is a low-profile version (7.71" x 2.536") of the Serial ATA 300-8 PCI Express storage adapter

that supports eight Serial ATA ports. It supports a remote intelligent Battery Backup Unit (LSIiBBU01) only.

The MegaRAID SATA 300 PCI-X boards use an Intel 80331 chip, while the MegaRAID SATA 300 PCI Express boards use an Intel 80333 chip. The Intel processors provides the intelligent RAID management capabilities. The 4-port SATA 300 adapters support RAID levels 0, 1, 5, and 10. The 8-port SATA 300 adapters support RAID levels 0, 1, 5, 10, and 50.

1.1.3 Enclosure Management

MegaRAID SATA 300 RAID controllers offer enclosure management using the same protocols as SCSI Accessed Fault-Tolerant Enclosures (SAF-TE). These protocols use an I^2C interface to communicate with the SEP. This feature allows you to use RAID capabilities provided by the SATA 300 storage adapters in an enclosure containing your physical drives.

The SATA 300 controllers use the SAF-TE command protocol to communicate control and status with the SEP. The SAF-TE protocol defined in the SATA II specification communicates or performs SAF-TE operations, such as setting the drive state and turning the LED on or off with the SEP device. SEP is a microcontroller that resides on SATA backplane. It senses the drive inserted status, drive activity LED, and status LED near each physical drive slot. The drive status is reported and LED control performed according to commands through I^2C bus. LEDs are located on the backplane near each physical drive slot.

1.1.4 Operating System Support

The MegaRAID Serial ATA storage adapters support several major operating systems. LSI Logic provides device drivers and RAID management tools for operating systems on the *MegaRAID Universal Software Suite* CD, which accompanies the SATA boards.

You can view the supported operating systems and download the latest drivers for RAID storage adapters on the LSI Logic web site at http://www.lsilogic.com/cm/DownloadSearch.do.

Refer to the *MegaRAID Device Driver Installation User's Guide* on the *MegaRAID Universal Software Suite* CD for instructions on installing the

device drivers. Be sure to use the latest service packs provided by the operating system manufacturer and review the `readme` file that accompanies the driver.

1.1.5 RAID Configuration Utilities

The SATA 300 adapters provide several RAID configuration utilities for configuring arrays and logical drives. The utilities are listed in Section 1.2, "Features."

Note: The maximum size logical drive you can configure is 2 Tbytes.

For information on configuring RAID arrays and using the MegaRAID configuration and management tools, refer to the *MegaRAID Configuration Software User's Guide*.

1.1.6 Technical Support

For assistance installing, configuring, or running your SATA 300 RAID Controller, contact LSI Logic Technical Support:

Email:

support@lsil.com

eurosupport@lsil.com (Europe)

Phone Support:

1-800-633-4545 (North America)

+44 1344 413 441 (Europe)

Web Site:

http://www.lsilogic.com/support/support_form.html

http://www.lsilogic.com/support/phone.html

1.2 Features

This section highlights the features of the SATA 300 storage adapters. The SATA 300 adapters are intelligent storage adapters that do the following:

- Provide four or eight internal SATA ports
- Support the *Serial ATA 1.0* and *Serial ATA II: Extensions to Serial ATA 1.0* specifications:
  - Provide a 150 Mbytes/s and 300 Mbytes/s data transfer rate
  - Use a low-cost, small 7-pin connector with thin, flexible cables (SATA 300-8X)
  - Use a 26-circuit, high-speed iPASS connector (SATA 300-4XLP and SATA 300-8XLP)
  - Use a 36-circuit, high-speed iPASS connector (SATA 300-4ELP and SATA 300-8ELP)
  - Use low-voltage signaling levels to reduce current draw, electromagnetic emission, and signal switching time
  - Support enclosure management, using an I^2C interface to communicate with an SEP
- Support the *PCI-X Specification, Revision 1.0a*: (SATA 300-4XLP, SATA 300-8X, and SATA 300-8XLP)
  - Provide up to 64-bit, 133-MHz data transfers from the host system to the SATA 300 controller
  - Provide backward compatibility with previous implementations of the PCI specification
  - Conform to the half-size PCI form factor (SATA 300-8X)
  - Conform to the low-profile PCI with extended length form factor (SATA 300-4XLP and SATA 300-8XLP)
- Comply with the *PCI Express Specification*, *Revision 1.0a*: (SATA 300-4ELP and SATA 300-8ELP)
  - Provide PCI Express x 4 lane configuration
  - Support transfers rates of up to 2.5 Gbits/s per PCI Express lane
  - Support a dedicated PCI Express bus

- Provide 128 Mbytes of 333 MHz error-correction code (ECC) DDR SDRAM
- Support RAID levels 0, 1, 5, and 10 (SATA 300-4XLP, and SATA 300-4ELP) or RAID levels 0, 1, 5, 10, and 50 (SATA 300-8X, SATA 300-8XLP, and SATA 300-8ELP)
  - Use an Intel 80331 processor to provide intelligent RAID management (SATA 300-4XLP, SATA 300-8X, and SATA 300-8XLP)
  - Use an Intel 80333 processor to provide intelligent RAID management (SATA 300-4ELP and SATA 300-8ELP)
  - Provide hardware-based, exclusive-OR generation and checking
- Provide two BIOS-based RAID management tools:
  - MegaRAID BIOS Configuration Utility (CU), started by pressing CTRL+M during system boot
  - WebBIOS CU, started by pressing CTRL+H during system boot
- Support the MegaRAID Manager utility for local RAID system management while the system is running
- Support the Power Console Plus tool for both local and networked RAID management while the system is running
- Support RAID management tools, which enable you to
  - Configure logical disks and physical arrays
  - Initialize logical drives after configuration
  - Verify the redundancy data in logical drives that use RAID levels 1, 5, 10, or 50
  - Rebuild data from failed drives while the system is still operational
  - Reconstruct a drive when you change the RAID level of an array or add a physical drive to an existing array
- Provide an optional battery backup unit (BBU) through a daughtercard with battery and power circuitry (SATA 300-8X).
- Support a remote battery backup unit mounted in the system (SATA 300-4XLP, SATA 300-4ELP, SATA 300-8XLP and SATA 300-8ELP).

1.3 Storage Adapter Characteristics

Table 1.1 summarizes the characteristics of the SATA 300 storage adapters.

Table 1.1 MegaRAID SATA 300 Storage Adapter Characteristics

Feature	MegaRAID 300-4XLP, and MegaRAID SATA 300-4ELP, MegaRAID SATA 300-8X, MegaRAID 300-8XLP, and MegaRAID SATA 300-8ELP Storage Adapters
Part Number	• SATA 300-4XLP: 01039 • SATA 300-4ELP: 01091 • SATA 300-8X: 01038 • SATA 300-8XLP: 01039 • SATA 300-8ELP: 01091
Number of Ports	4 or 8 internal
Serial ATA Bus Speed	• SATA 300-4XLP: 1.5 Gbits/s, 3.0 Gbits/s • SATA 300-4ELP: 3.0 Gbits/s • SATA 300-8X and SATA 300-8XLP: 1.5 Gbits/s, 3.0 Gbits/s • SATA 300-8ELP: 3.0 Gbits/s
Serial ATA Data Transfer Rate[1]	150 Mbytes/s, 300 Mbytes/s
Intelligent RAID Management	• SATA 300-4XLP: Yes, using the Intel 80331 processor • SATA 300-4ELP: Yes, using the Intel 80333 processor • SATA 300-8X and SATA 300-8XLP: Yes, using the Intel 80331 processor • SATA 300-8ELP: Yes, using the Intel 80333 processor
PCI Bus Width and Speed	• SATA 300-4XLP: 64-bit, 133 MHz • SATA 300-4ELP: 2.5 Gbits/s per PCI Express lane • SATA 300-8X and SATA 300-8XLP: 64-bit, 133 MHz • SATA 300-8ELP: 2.5 Gbits/s per PCI Express lane
PCI Data Transfer Rate[1]	• SATA 300-4XLP: 1064 Mbytes/s • SATA 300-4ELP: 2 Gbytes/s full duplex or 1 Gbyte/s half duplex • SATA 300-8X and SATA 300-8XLP: 1064 Mbytes/s • SATA 300-8ELP: 2 Gbytes/s full duplex or 1 Gbyte/s half duplex
RAID Levels	• 0, 1, 5, and 10 (SATA 300-4XLP, SATA 300-4ELP) • 0, 1, 5, 10, and 50 (SATA 300-8X, SATA 300-8XLP, SATA 300-8ELP)
SDRAM Support	128 Mbytes ECC DDR 333 SDRAM
Cache Function	Write-back, write-through, adaptive read ahead, non-read ahead, read ahead, cache I/O, direct I/O

Table 1.1 MegaRAID SATA 300 Storage Adapter Characteristics (Cont.)

Feature	MegaRAID 300-4XLP, and MegaRAID SATA 300-4ELP, MegaRAID SATA 300-8X, MegaRAID 300-8XLP, and MegaRAID SATA 300-8ELP Storage Adapters
Online Expansion	Yes
Hot Spare Pool	Yes
Hot Swap	Yes
Hardware Exclusive-OR	Yes
Enclosure Management Support	Yes
BIOS RAID Management Tools	MegaRAID CU, WebBIOS CU
Software RAID Management Tools	MegaRAID Manager, Power Console Plus
BBU (sold separately)	Yes

1. Theoretical transfer rate.

Chapter 2
Hardware Installation

This chapter describes the hardware installation of all the SATA 300 storage adapters. This chapter consists of the following sections:

2.1 Installation Overview

The following steps provide an overview of the operations to install the MegaRAID SATA 300-4XLP, MegaRAID SATA 300-4ELP, MegaRAID SATA 300-8X, MegaRAID SATA 300-8XLP, and MegaRAID SATA 300-8ELP storage adapters and configure them for RAID operations.

Step 1. Install the hardware. For hardware installation instructions, refer to Section 2.3, “Detailed Installation Instructions,” on page 2-2.

Step 2. Configure the system BIOS. Refer to the system documentation for details.

Step 3. Run the MegaRAID configuration utility to configure the Serial ATA drives into a RAID array. Refer to the *MegaRAID Configuration Software User’s Guide* for details.

Step 4. Install the operating system driver. Refer to the *MegaRAID Device Driver Installation User’s Guide* for details.

Step 5. Install and run the MegaRAID Manager CU or the Power Console CU to manage the RAID system configuration and performance. Refer to the *MegaRAID Configuration Software User’s Guide* for details.

2.2 Installation Requirements

You must have the following items to install and use a MegaRAID SATA 300 storage adapter:

- A MegaRAID SATA 300-4XLP, SATA 300-4ELP, SATA 300-8X, SATA 300-8XLP, or SATA 300-8ELP storage adapter and device driver
- A host computer with an available PCI-X or PCI Express expansion slot
- Serial ATA disk drives and cables

2.3 Detailed Installation Instructions

The following steps provide detailed instructions.

Step 1. Unpack the MegaRAID storage adapter and inspect it for damage.

Unpack the storage adapter in a static-free environment. Remove the storage adapter from the antistatic bag and inspect it for damage. Contact LSI Logic or your MegaRAID OEM support representative if the storage adapter appears damaged.

Step 2. Power-down the system.

Power-down the computer and physically remove the power cord from the back of the power supply. Remove the cover from the computer chassis. Disconnect the system from any networks.

Step 3. Review the connectors and jumpers on the SATA 300 storage adapter.

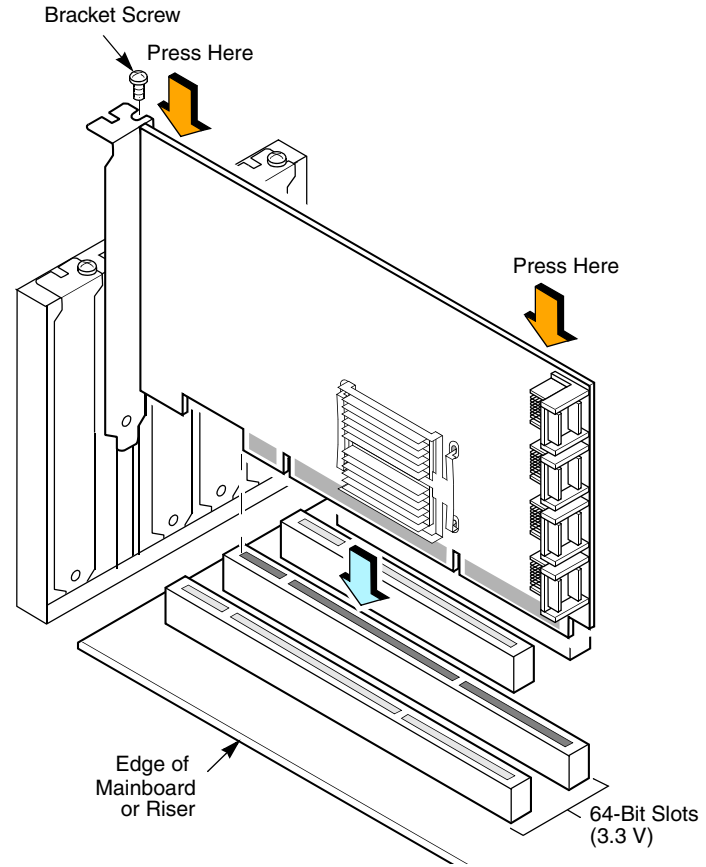
Review the connector and jumper settings on the SATA 300 storage adapter, using the definitions and locations provided in Chapter 3, “SATA 300 Storage Adapter Specifications.” The jumpers are set at the factory and you usually do not need to change them.

Step 4. Carefully insert the SATA 300 storage adapter.

Align the SATA 300 PCI-X storage adapter to a PCI-X slot. Press down gently (but firmly) to properly seat the storage adapter in the slot. Figure 2.1 shows how to insert the SATA 300 PCI-X storage adapter into a slot.

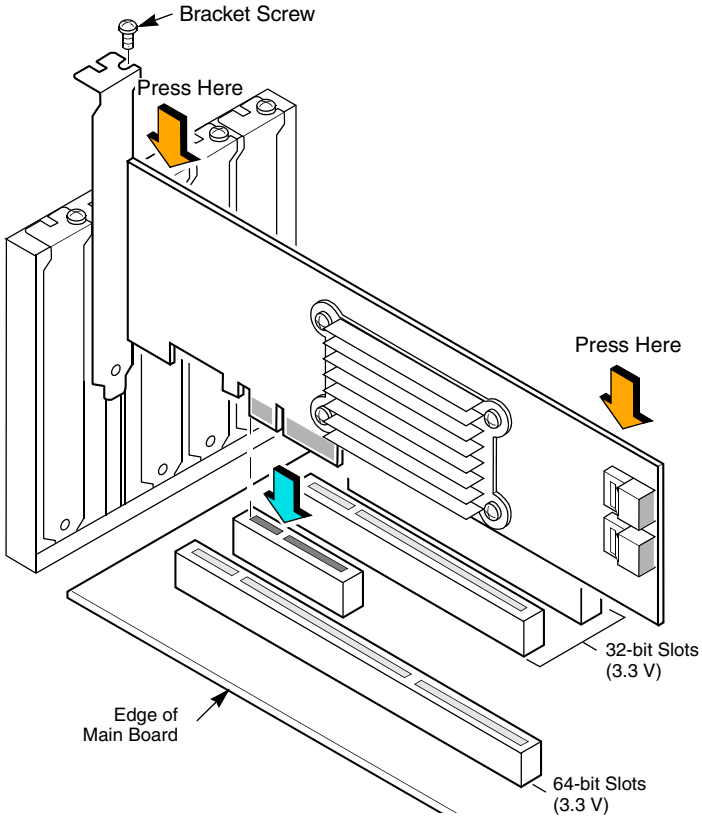
Caution: If your board has a memory module or BBU module, *never* apply pressure to the module when inserting the board.

Figure 2.1 Inserting a MegaRAID SATA 300 Storage Adapter into a PCI-X Slot



Align the SATA 300 PCI Express storage adapter to a PCI Express slot. Press down gently (but firmly) to properly seat the storage adapter in the slot. Figure 2.2 shows how to insert the SATA 300 PCI Express storage adapter into a slot.

Figure 2.2 Inserting a MegaRAID SATA 300 Storage Adapter into a PCI Express Slot



Step 5. Screw the bracket to the computer frame.

Step 6. Configure the Serial ATA devices and install them in the host system computer case.

Refer to the documentation for the Serial ATA device for any pre-installation configuration requirements.

Step 7. Connect the Serial ATA cables between the SATA 300 storage adapter and the Serial ATA devices. Chapter 3,

"SATA 300 Storage Adapter Specifications," shows the connector locations on the SATA 300 storage adapters.

Step 8. Replace the computer cover and power-up the system.

Replace the computer cover and reconnect the power cords. Power-up the computer.

During boot, the MegaRAID BIOS message appears:

```
MegaRAID BIOS Version x.xx date
(c) Copyright 2005, LSI Logic Corporation, USA
MegaRAID SATA Adapter Card found at PCI Bus No:xx
Dev No:xx
```

The firmware takes several seconds to initialize. During this time the adapter scans the Serial ATA ports.

2.4 Post-Installation Steps

After you install the storage adapter, you must install the device driver and define the logical drives and physical disk arrays. Refer to the *MegaRAID Device Driver Installation User's Guide* for detailed device driver installation steps. Refer to the *MegaRAID Configuration Software User's Guide* for detailed steps on configuring physical arrays and logical drives.

Chapter 3
SATA 300 Storage Adapter Specifications

This chapter describes the specifications of the MegaRAID SATA 300 PCI-X and SATA 300 PCI Express to Serial ATA storage adapters. This chapter consists of the following sections:

3.1 MegaRAID SATA 300 Storage Adapter Specifications

The SATA 300 PCI-X storage adapters conform to the *PCI-X Local Bus Specification, Revision 1.0a*, and the SATA 300 PCI Express storage adapters conform to the *PCI Express Specification*, *Revision 1.0a*. They are backward compatible with previous revisions of the PCI specification. All the SATA 300 storage adapters support the *Serial ATA 1.0 Specification* and *Serial ATA II Extensions to Serial ATA 1.0, Revision 1.0*.

Table 3.1 lists the SATA 300 storage adapters and summarizes the board specifications.

Table 3.1 MegaRAID SATA 300 Storage Adapter Specifications

Storage Adapter	Ports	RAID Levels	PCI Bus Mode	Board Dimensions
SATA 300-4XLP (low-profile)	4	0, 1, 5, and 10	64 bits, 133 MHz PCI-X	7.1 x 2.536 inches (180.34 x 64.41 mm)
SATA 300-4ELP (low-profile)	4	0, 1, 5, and 10	x4 PCI Express (2.5 Gbits/s per PCI Express lane)	7.71 x 2.536 inches (195.83 x 64.41 mm)

Table 3.1 MegaRAID SATA 300 Storage Adapter Specifications

Storage Adapter	Ports	RAID Levels	PCI Bus Mode	Board Dimensions
SATA 300-8X	8	0, 1, 5, 10, and 50	64 bits, 133 MHz PCI-X	6.6 x 4.2 inches (167.64 x 106.68 mm)
SATA 300-8XLP (low-profile)	8	0, 1, 5, 10, and 50	64 bits, 133 MHz PCI-X	7.1 x 2.536 inches (180.34 x 64.41 mm)
SATA 300-8ELP (low-profile)	8	0, 1, 5, 10, and 50	x4 PCI Express (2.5 Gbits/s per PCI Express lane)	7.71 x 2.536 inches (195.83 x 64.41 mm)

The following subsections provide detailed descriptions of the SATA 300 PCI-X and SATA 300 PCI Express storage adapters and RAID configuration utilities.

3.1.1 MegaRAID SATA 300-4XLP, MegaRAID SATA 300-8X, and SATA 300-8XLP Storage Adapters

The MegaRAID SATA 300 PCI-X storage adapters are intelligent RAID controllers that provide four or eight Serial ATA ports. The SATA 300-4XLP is a low-profile PCI-X storage adapter. The SATA 300-4XLP storage adapter has four ports and supports RAID levels 0, 1, 5, and 10.

The SATA 300-8XLP is a low-profile version of the SATA 300-8X, though they have a few differences in their jumpers and connectors. The SATA 300-8X and SATA 300-8XLP controllers have eight ports and support RAID levels 0, 1, 5, 10, and 50.

The SATA 300 PCI-X storage adapters do the following:

- Support four or eight Serial ATA ports:
  - Use differential signaling
  - Transfer data in frames
  - Support Serial ATA power management
  - Comply with the PCI-X and PCI 2.3 specifications; are backward-compatible with previous versions of the PCI 2.3 specification
- Support up to a 64-bit/133 MHz PCI/PCI-X interface:
  - Function in a 64-bit PCI/PCI-X slot

  - Function at 133 MHz, 100 MHz, or 66 MHz
  - Support 3.3 V PCI signaling
- Support native command queuing, which allows the physical drives to prioritize data requests by multiple processors, in order to maximize throughput

3.1.2 MegaRAID SATA 300-4ELP and SATA 300-8ELP Storage Adapters

The MegaRAID SATA 300 PCI Express storage adapters are intelligent RAID controllers that provide four or eight Serial ATA ports. The SATA 300-4ELP and SATA 300-8ELP are low-profile cards. The SATA 300-4ELP RAID controller has four ports and supports RAID levels 0, 1, 5, and 10. The SATA 300-8ELP RAID controller has eight ports and supports RAID levels 0, 1, 5, 10, and 50.

The SATA 300-4ELP and SATA 300-8ELP storage adapters do the following:

- Supports four or eight Serial ATA ports:
  - Uses differential signaling
  - Transfers data in frames
  - Supports Serial ATA power management
  - Complies with the *PCI Express Specification*, *Revision 1.0a*; is backward-compatible with previous versions of the PCI Express specification

  Note: The board length for the SATA 300-8ELP storage adapter does not meet the specification; it is slightly longer than the specification.
- Supports a PCI Express interface:
  - Supports a dedicated PCI Express bus
  - Functions in a x4 or greater PCI Express slot
  - Supports transfer rates of up to 2.5 Gbits/s per lane
  - Complies with the *PCI Express Specification*, *Revision 1.0a*
- Supports native command queuing, which allows the physical drives to prioritize data requests by multiple processors, in order to maximize throughput

3.1.3 RAID Configuration Utilities

The MegaRAID BIOS Configuration Utility and the WebBIOS Configuration Utility provide RAID management and configuration support before the operating system boots. The MegaRAID Manager utility and the Power Console Plus utility provide RAID management and configuration support after the operating system boots. The Power Console Plus tool enables you to manage RAID arrays over a network.

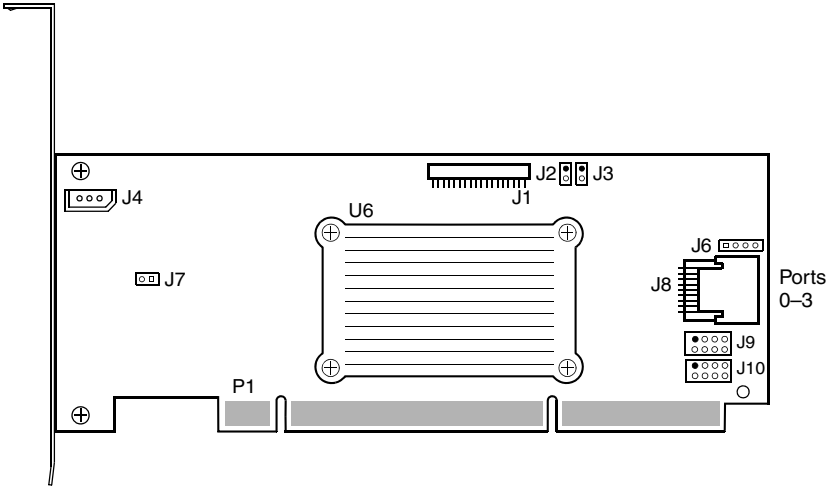
3.2 Storage Adapter Board Specifications

The following information illustrates the SATA 300 board layouts and describes the connectors and jumpers.

3.2.1 SATA 300-4XLP Board Layout

Figure 3.1 provides the layout of the SATA 300-4XLP board.

Figure 3.1 SATA 300-4XLP Board Layout



3.2.2 SATA 300-4XLP Connectors and Jumpers

Table 3.2 describes the connectors and jumpers on the SATA 300-4XLP board.

Table 3.2 SATA 300-4XLP Connectors and Jumpers

Jumper	Type	Description
J1	Battery Pack Connector	20-pin connector. Provides interface to the remote battery pack.
J2	LED SATA Activity Connector	2-pin connector. When lit, it indicates SATA activity on one or more SATA drives.
J3	Firmware Initialization Mode Select	2-pin connector. If the firmware flashed onto the board is corrupted, you need to install a jumper on J3 (this holds the CPU core in reset), so you can flash the firmware. Remove the jumper after you flash the new firmware. No jumper: This is the setting during normal operation (Mode 3). This is the default. Jumper: This holds the CPU core in reset (Mode 0). 1. Note: The card does not function as a RAID controller if this jumper is mounted.
J4	I^2C Interface	3-pin connector. The I^2C interface is for communication with storage enclosure processor (SEP) devices.
J6	Serial Port RS232 Debugger	4-pin jumper. Used for diagnostic purposes.
J7	BIOS Disable jumper	2-pin jumper. The BIOS function is enabled or disabled in the software depending on the status of this jumper. No jumper: BIOS is enabled. This is the default. Jumper: BIOS is disabled. 1. Note: The card does not function as a RAID controller if this jumper is mounted.

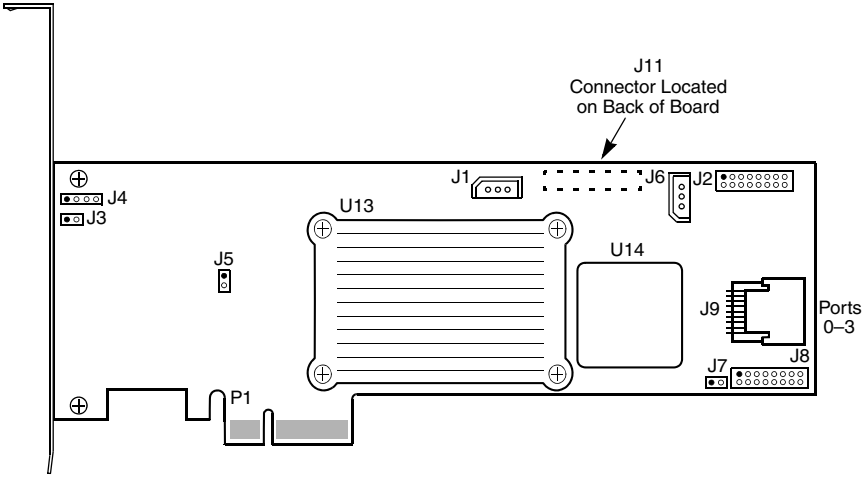
Table 3.2 SATA 300-4XLP Connectors and Jumpers (Cont.)

Jumper	Type	Description
J8	SATA 300-4XLP Ports	Ports 0–3. These ports connect the cables from the adapter to the SATA physical drives.
J9	LED SATA Activity Interface Connector	8-pin (4x2) jumper. Provides LED interface individually to eight SATA ports. The LED indicates SATA activity on specific ports.
J10	LED Drive Fault Interface Connector	8-pin (4x2) jumper. Provides LED interface individually to eight SATA ports. The LED indicates a drive fault on specific ports.

3.2.3 SATA 300-4ELP Board Layout

Figure 3.2 provides the layout of the SATA 300-4ELP board.

Figure 3.2 SATA 300-4ELP Board Layout



3.2.4 SATA 300-4ELP Connectors and Jumpers

Table 3.3 describes the connectors and jumpers on the SATA 300-4ELP board.

Table 3.3 SATA 300-4ELP Connectors and Jumpers

Jumper	Type	Description
J1	IPMI-style I^2C Debug header	3-pin connector. Used for diagnostic purposes.
J2	Individual Activity LED header for all 8 ports	16-pin (8x2) jumper. Provides LED interface individually to eight SATA II ports. The LED indicates activity on particular ports.
J3	Debugger	2-pin jumper. Used for diagnostic purposes.
J4	Serial header for debug use	4-pin jumper. Used for diagnostic purposes. 1. Note: The serial port is not RS232 voltage level compliant.
J5	Firmware Initialization Mode Select	2-pin connector. If the firmware flashed onto the board is corrupted, you need to install a jumper on J5 (this holds the CPU core in reset), so you can flash the firmware. Remove the jumper after you flash the new firmware. No jumper: This is the setting during normal operation (Mode 3). This is the default. Jumper: This holds the CPU core in reset (Mode 0). 1. Note: The card does not function as a RAID controller if this jumper is mounted.
J6	IPMI-style SMBus (System Management) /I^2C header	3-pin connector. Provides enclosure management support.
J7	Cache Write Pending LED	2-pin connector. Connector for enclosure LED. Provides a signal that indicates when the on-board cache contains data and a write from the cache to the hard drives is pending. Optional.

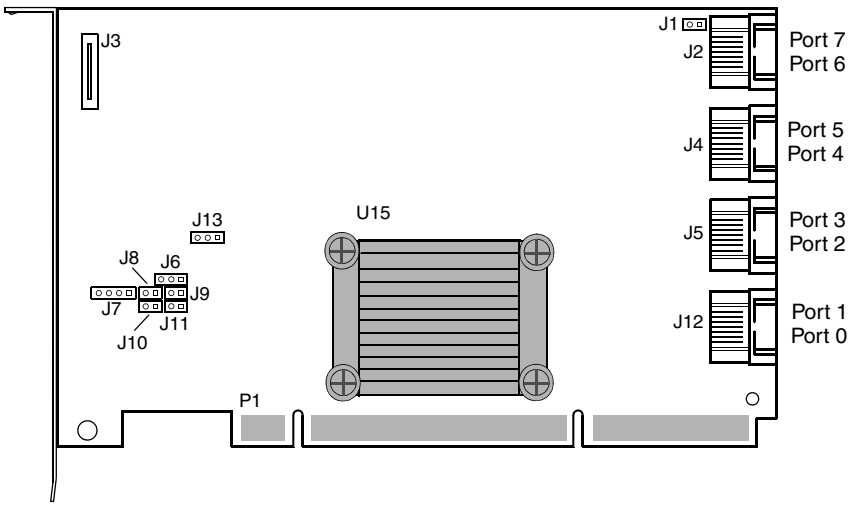
Table 3.3 SATA 300-4ELP Connectors and Jumpers (Cont.)

Jumper	Type	Description
J8	LED Drive Fault Connector Interface	16-pin (8x2) jumper. Provides LED interface individually to eight SATA II ports. The LED indicates a drive fault on particular ports.
J9	SATA 300-4ELP Ports	Ports 0-3. These ports connect the cables from the adapter to the SATA physical drives.
J11	Battery Backup Connector (located on the back side of the RAID controller)	20-pin connector. Provides interface to the remote battery pack.

3.2.5 SATA 300-8X Board Layout

Figure 3.3 provides the layout of the SATA 300-8X board.

Figure 3.3 SATA 300-8X Board Layout



3.2.6 SATA 300-8X Connectors and Jumpers

Table 3.4 describes the connectors and jumpers on the SATA 300-8X board.

Table 3.4 SATA 300-8X Connectors and Jumpers

Jumper	Type	Description
J1	LED SATA Activity Connector	2-pin connector. When lit, it indicates SATA activity on one or more SATA drives.
J2, J4, J5, J12	SATA 300-8X Ports	Ports 0–7. These ports connect the cables from the adapter to the SATA physical drives.
J3	BBU Daughtercard	40-pin connector. Connector for an optional backup battery pack.
J6	Serial Port RS232 Interface	3-pin connector. Used for diagnostic purposes.
J7	I^2C Interface	4-pin connector. The I^2C interface is for communication with storage enclosure processor (SEP) devices.
J8	Write Pending Activity (Dirty Cache) LED	2-pin connector. When lit, it indicates that the on-board cache memory contains data and that a write from cache to the physical drives is pending.
J9	Serial EEPROM Interface	2-pin connector. When equipped with a connector from a serial programming device, it provides the interface for programming the on-board, manufacturing-tracking serial EEPROM.
J10	BIOS Disable	2-pin connector. Jumpered: BIOS disabled. Unjumpered: BIOS enabled. This is the default.

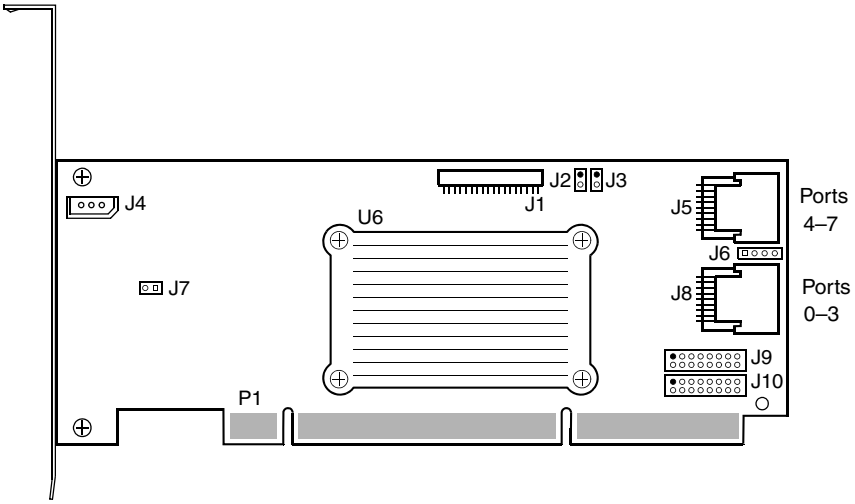
Table 3.4 SATA 300-8X Connectors and Jumpers (Cont.)

Jumper	Type	Description
J11	Firmware Initialization Mode Select	2-pin connector. If the firmware flashed onto the board is corrupted, you need to install a jumper on J11 (this holds the CPU core in reset), so you can flash the firmware. Remove the jumper after you flash the new firmware. No jumper: This is the setting during normal operation (Mode 3). This is the default. Jumper: This holds the CPU core in reset (Mode 0). 1. Note: The card does not function as a RAID controller if this jumper is mounted.
J13	I^2C Interface	3-pin connector. The I^2C interface is for communication with storage enclosure processor (SEP) devices.

3.2.7 SATA 300-8XLP Board Layout

Figure 3.4 provides the layout of the SATA 300-8XLP board.

Figure 3.4 SATA 300-8XLP Board Layout



3.2.8 SATA 300-8XLP Connectors and Jumpers

Table 3.5 describes the connectors and jumpers on the SATA 300-8XLP board.

Table 3.5 SATA 300-8XLP Connectors and Jumpers

Jumper	Type	Description
J1	Battery Pack Connector	20-pin connector. Provides interface to the remote battery pack.
J2	LED SATA Activity Connector	2-pin connector. Provides LED interface to indicate SATA activity on one or more SATA drives.
J3	Firmware Initialization Mode Select	2-pin connector. If the firmware flashed onto the board is corrupted, you need to install a jumper on J3 (this holds the CPU core in reset), so you can flash the firmware. Remove the jumper after you flash the new firmware. No jumper: This is the setting during normal operation (Mode 3). This is the default. Jumper: This holds the CPU core in reset (Mode 0). 1. Note: The card does not function as a RAID controller if this jumper is mounted.
J4	I^2C Interface	3-pin connector. The I^2C interface is for communication with storage enclosure processor (SEP) devices.
J5, J8	SATA 300-8XLP Ports	Ports 0–7. These ports connect the cables from the adapter to the SATA physical drives.
J6	Serial Port RS232 Debugger	4-pin jumper. Used for diagnostic purposes.

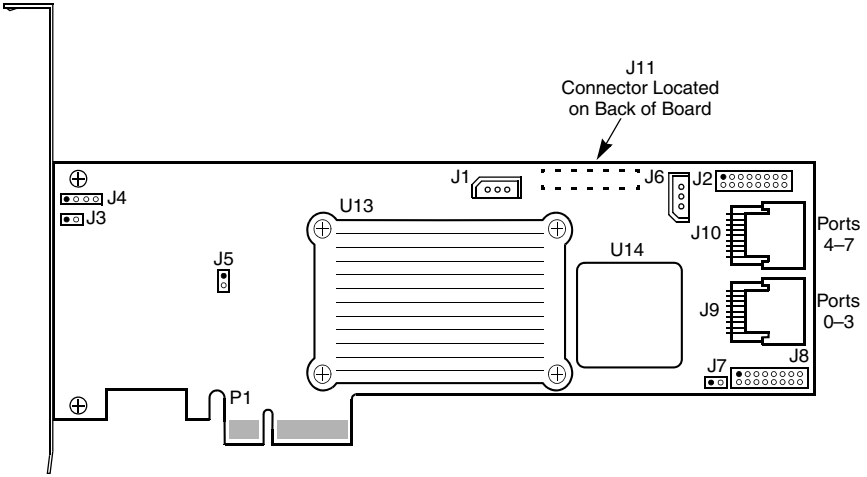
Table 3.5 SATA 300-8XLP Connectors and Jumpers (Cont.)

Jumper	Type	Description
J7	BIOS Disable jumper	2-pin jumper. The BIOS function is enabled or disabled in the software depending on the status of this jumper. No jumper: BIOS is enabled. This is the default. Jumper: BIOS is disabled. 1. Note: The card does not function as a RAID controller if this jumper is mounted.
J9	LED SATA Activity Interface Connector	16-pin (8x2) jumper. Provides LED interface individually to eight SATA ports. The LED indicates SATA activity on specific ports.
J10	LED Drive Fault Interface Connector	16-pin (8x2) jumper. Provides LED interface individually to eight SATA ports. The LED indicates a drive fault on specific ports.

3.2.9 SATA 300-8ELP Board Layout

Figure 3.5 provides the layout of the SATA 300-8ELP board.

Figure 3.5 SATA 300-8ELP Board Layout



3.2.10 SATA 300-8ELP Connectors and Jumpers

Table 3.6 describes the connectors and jumpers on the SATA 300-8ELP board.

Table 3.6 SATA 300-8ELP Connectors and Jumpers

Jumper	Type	Description
J1	IPMI-style I^2C Debug header	3-pin connector. Used for diagnostic purposes.
J2	Individual Activity LED header for all 8 ports	16-pin (8x2) jumper. Provides LED interface individually to eight SATA II ports. The LED indicates activity on particular ports.
J3	Debugger	2-pin jumper. Used for diagnostic purposes.
J4	Serial header for debug use	4-pin jumper. Used for diagnostic purposes. 1. Note: The serial port is not RS232 voltage level compliant.
J5	Firmware Initialization Mode Select	2-pin connector. If the firmware flashed onto the board is corrupted, you need to install a jumper on J5 (this holds the CPU core in reset), so you can flash the firmware. Remove the jumper after you flash the new firmware. No jumper: This is the setting during normal operation (Mode 3). This is the default. Jumper: This holds the CPU core in reset (Mode 0). 1. Note: The card does not function as a RAID controller if this jumper is mounted.
J6	IPMI-style SMBus (System Management) /I^2C header	3-pin connector. Provides enclosure management support.
J7	Cache Write Pending LED	2-pin connector. Connector for enclosure LED. Provides a signal that indicates when the on-board cache contains data and a write from the cache to the hard drives is pending. Optional.

Table 3.6 SATA 300-8ELP Connectors and Jumpers (Cont.)

Jumper	Type	Description
J8	LED Drive Fault Connector Interface	16-pin (8x2) jumper. Provides LED interface individually to eight SATA II ports. The LED indicates a drive fault on particular ports.
J9, J10	SATA 300-8ELP Ports	Ports 0–7. These ports connect the cables from the adapter to the SATA physical drives.
J11	Battery Backup Connector (located on the back side of the RAID controller)	20-pin connector. Provides interface to the remote battery pack.

3.3 Physical and Environmental Specifications

The design and implementation of the Serial ATA storage adapters minimize electromagnetic emissions, susceptibility to radio frequency energy, and the effects of electrostatic discharge. The board carries the CE mark, C-Tick mark, FCC Self-Certification logo, Canadian Compliance Statement, Korean MIC, Taiwan BSMI, Japan VCCI. In addition, the board meets the requirements of CISPR Class B.

MegaRAID SATA 300-4XLP (Model 01039), and MegaRAID SATA 300-4ELP (Model 01091), MegaRAID SATA 300-8X (Model 01038), MegaRAID SATA 300-8XLP (Model 01039), and MegaRAID SATA 300-8ELP (Model 01091) storage adapters are CSA C22.2 No. 60950-1, UL 60950-1 First Edition listed Accessory, UL file number E257743.

3.3.1 Safety Characteristics

All SATA storage adapters meet or exceed the UL flammability rating 94 V0 requirements. Each bare board is marked with the supplier name or trademark, type, and UL flammability rating. Because these boards are installed in a PCI-X bus slot, all voltages are lower than the SELV 42.4 V limit.

3.3.2 Electrical Characteristics

Table 3.7 lists the maximum power requirements for the MegaRAID SATA 300 storage adapters under normal operation.

Table 3.7 Maximum Power Requirements

Feature	SATA 300-8X[1]	SATA 300-4XLP, SATA 300-8XLP[2]	SATA 300-4ELP, SATA 300-8ELP[3]
+12 V	0.25 A if BBU daughtercard is used	0.25 A if a remote BBU is used	1.3 A without battery charging 1.525 A with battery charging
+5.0 V	2.2 A	2.08 A	N/A
+3.3 V	0.6 A	0.96 A	2.0 A
Power from +12 V	3 W	3 W	15.6 W without battery charging 18.3 W with battery charging
Power from +5 V	11 W	10.4 W	N/A
Power from +3.3 V	2 W	3.18 W	6.6 W
Total Power	16 W	16.8 W	24.9 W with battery charging
Operating Range	With BBU: 0 °C to 40 °C Without BBU: 0 °C to 45 °C	With BBU: 0 °C to 40 °C Without BBU: 0 °C to 45 °C	With BBU: 0 °C to 40 °C Without BBU: 0 °C to 45 °C

1. The total power for the SATA 300-8X has taken into consideration the charging of the BBU from the +12 V and the on-board regulator efficiencies.
2. The total power for the SATA 300-4XLP and the SATA 300-8XLP has taken into consideration the charging of the BBU from the +12 V and the on-board regulator efficiencies.
3. The total power for the SATA 300-4ELP and the SATA 300-8ELP has taken into consideration the charging of the BBU from the +12 V and the on-board regulator efficiencies.

3.3.3 Thermal and Atmospheric Characteristics

The operating (thermal and atmospheric) conditions for MegaRAID SATA 300 PCI-X storage adapters are:

- Temperature range: 0 °C to 40 °C with BBU; 0 °C to 45 °C without BBU (dry bulb)
- Relative humidity range: 5% to 90% noncondensing
- Airflow must be at least 200 linear feet per minute (LFPM) to avoid operating the Intel 80331 processor above the maximum ambient temperature
- The heat sink temperature below 80 °C

The parameters for the non-operating (such as storage and transit) environment for the SATA 300 PCI-X storage adapters are:

- Temperature range: -40 °C to 105 °C (dry bulb)
- Relative humidity range: 20% to 80% noncondensing

The operating (thermal and atmospheric) conditions for the MegaRAID SATA 300-8ELP PCI Express storage adapter are:

- Temperature range: 0 °C to 40 °C
- Relative humidity range: 5% to 90% noncondensing
- Airflow must be at least 200 linear feet per minute (LFPM) to avoid operating the Intel 80333 processor above the maximum ambient temperature

The parameters for the non-operating (such as storage and transit) environment for the SATA 300-8ELP PCI Express storage adapter are:

- Temperature range: -30 °C to +80 °C
- Temperature range: 0 °C to +45 °C
- Relative humidity range: 5% to 90% noncondensing

Appendix A
Glossary of Terms

Array — An array of disk drives combines the storage space on the disk drives into a single segment of storage space. A hot spare drive does not actively participate in an array.

BIOS — Acronym for Basic Input/Output System. The BIOS is software that provides basic read/write capability. It is usually stored as firmware. The system BIOS on the computer motherboard boots and controls the system. The BIOS on the storage adapter acts as an extension of the system BIOS.

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.

Device Driver — A program that allows a microprocessor (through the operating system) to direct the operation of a peripheral device, such as a disk drive.

Host — The computer system in which a storage adapter is installed. The host uses the storage adapter to transfer information to and from devices attached to the storage adapter.

PCI, PCI-X — Acronym for Peripheral Component Interconnect. I/O architectures designed to increase data transfers without slowing down the central processing unit (CPU), based on a high performance local bus specification that allows connection of devices directly to computer memory. The PCI Local Bus can be implemented on a 32-bit or 64-bit bus and run at clocks speeds of 33 MHz to 66 MHz. At 32 bits and 33 MHz, the throughput rate is 133 Mbytes/s.

PCI Express — Acronym for Peripheral Component Interconnect Express. A high performance local bus specification that allows the connection of devices directly to computer memory. PCI Express is a two-way, serial connection that transfers data on two pairs of point-to-point data lines. PCI Express

goes beyond the PCI specification in that it is intended as a unifying I/O architecture for various systems: desktops, workstations, mobile, server, communications, and embedded devices.

RAID Acronym for Redundant Array of Independent Disks (originally Redundant Array of Inexpensive Disks) is an array of multiple independent physical drives that yields performance exceeding that of a Single Large Expensive Disk (SLED). A RAID disk subsystem improves I/O performance on a server using only a single drive. The RAID array appears to the host server as a single storage unit. I/O is expedited because several disks can be accessed simultaneously.

Serial ATA Serialized AT Attachment. The Serial ATA bus is a high-speed, internal bus that provides a low pin count, low voltage level bus for device connections between a host adapter and a Serial ATA device.

Storage Adapter A circuit board that provides a device connection between the host and the storage devices attached to the storage adapter.

Appendix B MegaRAID Problem Report Form

Use the following forms in Tables B.1 through B.3 to report problems with your MegaRAID SATA 300 storage adapter.

Table B.1 Customer Information

Customer Information	MegaRAID Serial ATA Information
Name:	Today's Date:
Company:	Date of Purchase:
Address:	Invoice Number:
City, State:	Serial Number:
Country:	Number of Channels:
Email address:	Cache Memory:
Phone:	Firmware Version:
Fax:	BIOS Version:

Table B.2 System and Problem Information

Motherboard:	BIOS Manufacturer:
Operating System:	BIOS Date:
Operating System Version:	Video Adapter:
MegaRAID Driver Version:	CPU Type and Speed:
Network Card:	System Memory:
Other Disk Controllers Installed:	Other Adapter Cards Installed:
Description of problem:	
Steps necessary to recreate problem: 1. 2. 3. 4.	

Table B.3 MegaRAID Array and Logical Device Configuration

Array Number	RAID Mode, Stripe Size
Array #0 Configuration	
Array #1 Configuration	
Array #2 Configuration	
Array #3 Configuration	
Array #4 Configuration	
Array #5 Configuration	
Array #6 Configuration	
Array #7 Configuration	
Array #8 Configuration	
Array #9 Configuration	

Customer Feedback

We would appreciate your feedback on this document. Please copy the following page, add your comments, and fax it to us at the number shown.

If appropriate, please also fax copies of any marked-up pages from this document.

Important: Please include your name, phone number, fax number, and company address so that we may contact you directly for clarification or additional information.

Thank you for your help in improving the quality of our documents.

Reader's Comments

Fax your comments to: LSI Logic Corporation
Technical Publications
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Fax: 408.433.4333

Please tell us how you rate this document: *MegaRAID SATA 300 Storage Adapters User's Guide.* Place a check mark in the appropriate blank for each category.

	Excellent	Good	Average	Fair	Poor
Completeness of information	____	____	____	____	____
Clarity of information	____	____	____	____	____
Ease of finding information	____	____	____	____	____
Technical content	____	____	____	____	____
Usefulness of examples and illustrations	____	____	____	____	____
Overall manual	____	____	____	____	____

What could we do to improve this document?

If you found errors in this document, please specify the error and page number. If appropriate, please fax a marked-up copy of the page(s).

Please complete the information below so that we may contact you directly for clarification or additional information.

Name _____ Date _____
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Title _____
Department _____ Mail Stop _____
Company Name _____
Street _____
City, State, Zip _____