SAS Host Bus Adapter

USER'S GUIDE

Revision: B

Document Number: 90-000003

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 A 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. Astek 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 Astek. The correction of interferences caused by such unauthorized modification, substitution, or attachment will be the responsibility of the user.

Astek 3.0 Gbit/s Host Adapters are tested to comply with FCC standards for Class A devices.

This is a Class A 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.

Note: The A3803-PMC-55 and A3803-AMC-01 products are not UL, CE, or FCC qualified at this time.

Astek Corporation

5055 Corporate Plaza Drive

Colorado Springs, CO 80919

Tel: 719-260-1625

FAX: 719-260-1668

Document 90-000003, Revision B (06/23/2008)

This document describes Astek's 3.0 Gbit/s SAS/SATA host adapters and will remain the official reference source for all revisions/releases of these products until rescinded by an update.

Astek products are not intended for use in life-support appliances, devices, or systems. Use of any Astek product in such applications without written consent of the appropriate Astek officer is prohibited.

Astek Corporation reserves the right to make changes to any products herein at any time without notice. Astek does not assume any responsibility or liability arising out of the application or use of any product described herein, except as expressly agreed to in writing by Astek; nor does the purchase or use of a product from Astek convey a license under any patent rights, copyrights, trademark rights, or any other of the intellectual property rights of Astek or third parties.

TRADEMARK ACKNOWLEDGMENT

The Astek logo design is the trademark or registered trademark of Astek Corporation. LSI, LSI Corporation, and MPT are the trademarks or registered trademarks of LSI Corporation. PCI-X is a registered trademark of PCI-SIG. All other brand and product names may be trademarks of their respective companies.

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

Preface

This book is the user's guide for Astek 3.0 Gbit/s Serial-Attached SCSI (SAS) Host Adapter boards. It contains a complete functional description of these boards as well as complete physical and electrical specifications. It also contains instructions for installing the host adapters and for connecting SAS devices.

Audience

This document assumes that you have some familiarity with Serial-Attached SCSI (SAS) protocol and PCI/PCI-X devices. This document benefits people installing and using these boards.

Organization

This document is organized into the following sections:

- Section 1, "Introduction", provides both quick and detailed installation instructions.
- Section 2, "Installation Procedures", describes the physical and operational environments of the host adapter.
- Section 3, "Host Adapter Characteristics", describes the installation procedures for the SAS BIOS and Configuration Utility.
- Section 4, "Customer Feedback", provides a form for submitting feedback regarding this document to Astek.

Related Publications

LSISAS1064 PCI-X to 4-Port Serial Attached SCSI/SATA Controller Technical Manual, Document No. DB14-000274-xx

LSISAS1068 PCI-X to 8-Port Serial Attached SCSI/SATA Controller Technical Manual, Document No. DB14-000287-xx

LSISAS1068E PCI Express to 8-Port Serial Attached SCSI/SATA Controller Technical Manual, Document No. DB14-000330-xx

Fusion-MPT™ Device Management User's Guide, Document No. DB15-000186-xx

IIEEE Standard Physical and Environmental Layers for PCI Mezzanine Cards (PMC), IEEE 1386.1-2001.

Integrated RAID User's Guide, Document No. DB15-000292-xx

Revision Record

Revision	Date	Remarks
1.0	8/23/2006	Initial Document
2.0	6/23/2008	Update to include A8303-PMC -04 -05 -55 versions and A3803-AMC-01

Table of Contents

1 Introduction

This chapter describes the Astek Serial Attached SCSI (SAS) host adapters and consists of the following sections:

- Section 1.1, "Overview"
- Section 1.2, "Features"
- Section 1.3, "PCI Performance"
- Section 1.4, "Software"

1.1 Overview

The Astek host adapters provide eight serial ports for connection to SAS/SATA (Serial ATA) devices. Each port is capable of 3.0 Gbit/s SAS link rates and 3.0 Gbit/s SATA link rates. There are two different host adapter interfaces. These interfaces are PMC and AMC. The PMC interface is PCI-X compliant and operates as a zero wait state bus master with data bursts up to 1064 Mbytes/s on a 64-bit PCI-X 133 MHz bus. The AMC interface is PCIe compliant.

The Astek host adapters contain Flash ROM for storing the BIOS and firmware, and NVSRAM for storing nonvolatile RAID information. Fusion-MPT™ firmware operates the host adapter.

The Astek PMC interface is compliant with the *PCI-X Specification,* revision 2.0, and backwards compliant with previous versions of the PCI/PCI-X specifications. The A3803-PMC -01 -04 -05 boards are keyed for 3.3 V PCI/PCI-X add-in PMC locations only. These versions of the host adapter cannot be used in a 5.0V PCI/PCI-X environment. The A8303-PMC -55 is keyed for both 3.3 V PCI/PCIX and 5.0V PCI/PCI-X environment. The Astek PMC host adapter SAS interface is compatible with the *ANSI Serial Attached SCSI Specification,* revision 1.0 and the *Serial ATA Specification,* revision 1.0a.

The Astek AMC interface is compliant with the PCIMG AMC.0 R1.0 ECR-002 specification. The Astek AMC host adapter SAS interface is compatible with the *ANSI Serial Attached SCSI Specification,* revision 1.0 and the *Serial ATA Specification,* revision 1.0a.

The functionality of Astek host adapters comes from the LSI Corp. LSISAS1068 and LSISAS1068E controller chips. The LSISAS1068

integrates eight high-performance SAS/SATA phys and a 64-bit, 133 MHz PCI-X bus master DMA core. The LSISAS1068E integrates eight high-performance SAS/SATA phys and a PCIe core. The design of Astek host adapters makes it easy to add SAS interfaces to any computer, workstation, or server with a PCI/PCI-X/PCIe bus.

Table 1 shows the LSI SAS controllers and their associated Astek host adapters that support SAS/SATA devices.

Table 1: Astek Host Adapters and Controllers

Controller	Host Adapter
LSI SAS1068	A3803-PMC-01
LSI SAS1068	A3803-PMC-04
LSI SAS1068	A3803-PMC-05
LSI SAS1068	A3803-PMC-55
LSI SAS 1068E	A3803-AMC-01

1.2 Features

This section lists features of the Astek 3.0 Gbit/s SAS host adapters:

- Supports narrow port and wide port as shown in Table 2

Table 2: SAS Bandwidths

Half Duplex	Full Duplex
Narrow Port (1 Lane)—300 Mbytes/s	Narrow Port (1 Lane)—600 Mbytes/s
Wide Port (2 Lanes)—600 Mbytes/s	Wide Port (2 Lanes)—1200 Mbytes/s
Wide Port (4 Lanes)—1200 Mbytes/s	Wide Port (4 Lanes)—2400 Mbytes/s

- Supports SSP, STP, and SMP as defined in the *Serial Attached SCSI (SAS) Specification,* version 1.0.
- Supports SATA as defined in the *Serial ATA Specification,* version 1.0
- Provides configurable drive spin-up sequencing on a per-phy basis.
- Simplifies cabling with a point-to-point, serial architecture.
- Provides smaller and thinner cables that do not restrict airflow.

- Provides a serial, point-to-point, enterprise-level storage interface.
- Transfers data using SCSI information units.
- Provides compatibility with SATA target devices.

1.3 PCI Performance

1.3.1 PCI Features of the Astek 3.0 Gbit/s PMC to SAS Host Adapters

- Supports a 133 MHz, 64-bit PCI/PCI-X interface that does the following:
  - Operates up to 133MHz PCI-X
  - Operates at 33 MHz or 66MHz PCI
  - Supports 32-bit or 64-bit data transfers
  - Supports 32-bit or 64-bit addressing through Dual Address Cycles (DAC)
  - Provides a theoretical 1064 Mbytes/s PCI bandwidth
  - Complies with the *PCI Local Bus Specification,* revision 3.0
  - Complies with the PCI-X Addendum to the PCI Local Bus *Specification*, revision 2.0
  - Complies with the PCI Bus Power Management Interface *Specification*, revision 1.2
  - Complies with the PC2001 Specification
  - Complies with the IEEE 1386.1-2001 PCI Mezzanine Card Specification.
- Provides unequalled performance through the Fusion-MPT architecture
- Provides high throughput and low CPU utilization to offload the host processor
- Presents a single electrical load to the PCI Bus

- Reduces Interrupt Service Routine (ISR) overhead with interrupt coalescing
- Supports 32-bit or 64-bit data bursts with variable burst lengths
- Supports the PCI Cache Line Size register
- Supports the PCI Memory Write and Invalidate, Memory Read Line, and Memory Read Multiple commands
- Supports the PCI-X Memory Read Dword, Split Completion, Memory Read Block, and Memory Write Block commands
- Supports 16 PC I-X Split Transaction cycles
- Supports backwards compatibility with previous revisions of the PCI specification
- Provides a full 32-bit or 64-bit PCI-X DMA bus master
- Reduces time-to-market with the Fusion-MPT architecture that provides:
  - Single driver binary for SAS/SATA, SCSI, and Fibre Channel products
  - One firmware build that supports all Integrated RAID™ capabilities
  - Thin and easy to develop drivers
  - Reduced integration and certification effort

1.3.2 PCI Features of the Astek 3.0 Gbit/s AMC to SAS Host Adapters

- Supports AMC.1 PCI Express connectivity for PCIe x1 through PCIe x8 fabric links:
  - Operates up to 2.5Gb/s per lane PCI Express
  - Complies PCIMG AMC.0 R1.0 ECR-002 specification
  - Complies with PCI Express Base Specification, Revision 1.0a
- Provides unequalled performance through the Fusion-MPT architecture

- The AMC to SAS host adapter supports AMC.1 PCI Express connectivity for PCIe x1 through PCIe x8 fabric links.
- Reduces time-to-market with the Fusion-MPT architecture that provides:
  - Single driver binary for SAS/SATA, SCSI, and Fibre Channel products
  - One firmware build that supports all Integrated RAID™ capabilities
  - Thin and easy to develop drivers
  - Reduced integration and certification effort

1.4 Software

Astek 3.0 Gbit/s SAS host adapters support all major operating systems, as shown in Table 3.

Table 3: Software Support

OS Support	Versions
Windows	XP, 2000, Server 2003 32-bit and 64-bit (x86 and AMD64)
Red Hat Linux	RHEL 4
SuSE Linux	9
VxWorks	5.5.1
Sun Sparc Solaris	Solaris 8

Astek SAS host adapters use the Fusion-MPT architecture for all major operating systems, which allows for thinner drivers for better performance. To obtain a device driver that supports your operating system, contact the Astek Corporation Technical Support team at 719-260-1625 or visit our web site at http://www.astekcorp.com.

2 Installation Procedures

This section provides both quick instructions and detailed instructions on how to install the Astek 3.0 Gbit/s SAS host adapters: This chapter consists of the following sections:

- Section 2.1, “PMC Host Adapter PMC Host Adapter Quick Installation Procedure”
- Section 2.2, “PMC Host Adapter PMC Host Adapter Detailed Installation Procedure”
- Section 2.3, “AMC Host Adapter PMC Host Adapter Quick Installation Procedure”
- Section 2.4, “AMC Host Adapter PMC Host Adapter Detailed Installation Procedure”

2.1 PMC Host Adapter Quick Installation Procedure

This section provides an overview of the installation procedure. If you are an experienced computer user with prior host adapter installation and SAS setup experience, this section may sufficiently describe the procedure for you. If you prefer more detailed guidance for installing the host adapter, proceed to Section 2.2, “PMC Host Adapter Detailed Installation Procedure.”

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

Step 1. Ground yourself before removing the host adapter board.

Step 2. Remove the host adapter from the packing and check that it is not damaged.

Figure 1 illustrates an example of a host adapter board. Also refer to Chapter 2 to see more detailed drawings of the 3 Gbit/s SAS host adapter boards.

Step 3. Remove the carrier card from your system following the appropriate procedures for your system.

Step 4. Insert and secure the host adapter board onto the carrier card.

Step 5. Make any configuration changes to the carrier card and/or system.

Step 6. Insert the carrier card back into the system.

Step 7. Connect the serial cable(s) between the host adapter and the serial hard disk drive(s).

2.2 PMC Host Adapter Detailed Installation Procedure

This section provides step-by-step instructions for installing the host adapter. If you are experienced in these tasks, you may prefer to use Section 2.1, "PMC Host Adapter Quick Installation Procedure."

2.2.1 Before You Start

Before starting, look through the following task list to get an overall idea of the steps you will be performing. If you are not confident you can perform the tasks as described here, Astek recommends getting assistance.

2.2.2 Inserting the Host Adapter

For safe and proper installation, use the user's manual supplied with your computer or system. Perform the following steps to install the host adapter.

Step 1. Ground yourself before removing the host adapter board.

Step 2. Remove the host adapter from the packing and check that it is not damaged.

Figure 1 illustrates an example of a host adapter board. Also refer to Section 3 to see more detailed drawings of the 3.0 Gbit/s PMC to SAS host adapter boards.

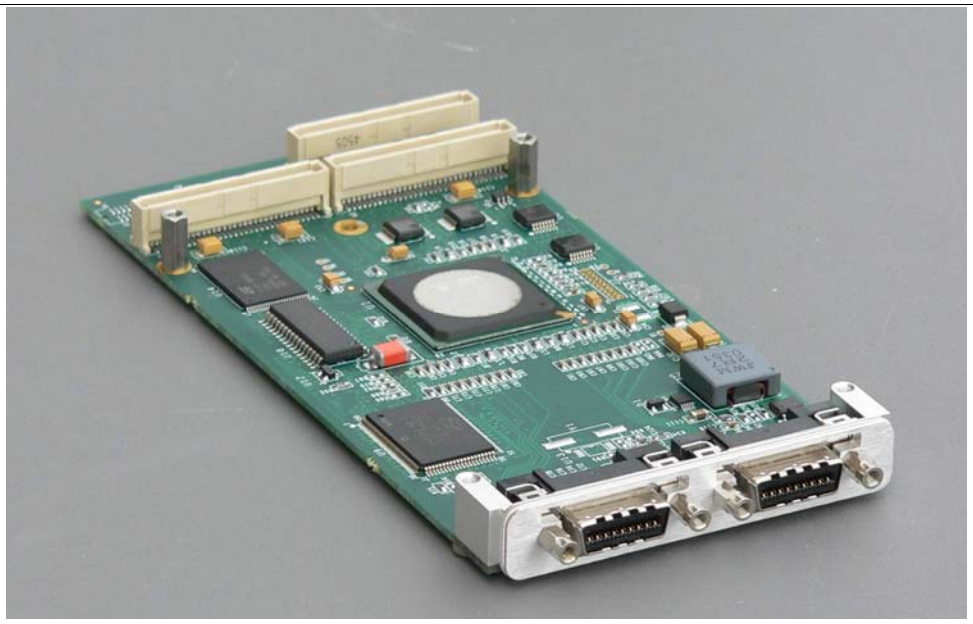

Figure 1: 3.0Gb/s SAS Host Adapter

Step 3. If installed, remove the carrier card from the system using the recommended procedures for your system.

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

Step 4. Locate the location for PMC plug-in board installation.

Refer to the computer's user's manual to confirm the location of the PMC slots.

This host adapter requires a 32-bit or 64-bit PCI/PCI-X PMC bus connector that allows bus master operation. If a 32-bit PCI/PCI-X PMC connection is used, P3 may remain uninserted.

Note: For this host adapter to function as a 64-bit device, it must be inserted in a 64-bit PCI/PCI-X PMC connection. If the host adapter is inserted in a 32-bit PCI/PCI-X PMC connection, it will function as a 32-bit device.

Step 5. Remove the blank PMC bezel that exists on the front panel of the carrier card.

Step 6. Insert the PMC bezel of the adapter card into the PMC bezel opening on the carrier card. The SAS connectors should fit outside the carrier card where you removed the blank panel (see Figure 2).

Make sure EMI gasket remains inside the groove of the PMC bezel when inserting the adapter card. Failure to do so may result in EMI emissions from your system.

Step 7. Align the PMC connectors on the adapter card with the mating connectors on the carrier card. Firmly press the host adapter into place by applying pressure above the PMC connectors (see Figure 2).

Step 8. Secure the board with the 4 mounting screws (see Figure 2).

Step 9. Install the carrier card into the system using the recommended procedures for your system.

Step 10. Make the external serial connections by inserting the serial cables into one or both ports on the adapter card and connecting to serial hard disk drive(s).

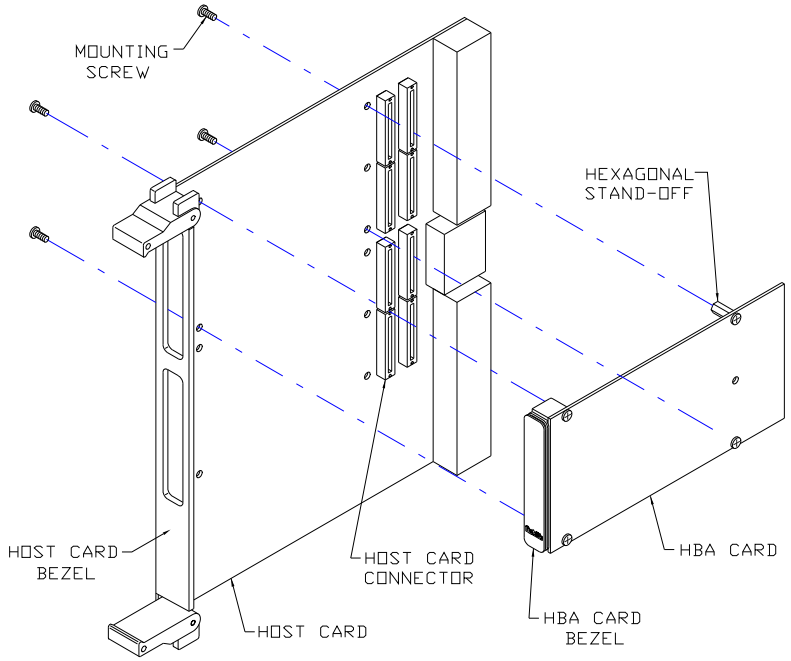

Figure 2: Inserting the Astek Host Adapter on a carrier card

2.3 AMC Host Adapter Quick Installation Procedure

This section provides an overview of the installation procedure. If you are an experienced computer user with prior host adapter installation and SAS setup experience, this section may sufficiently describe the procedure for you. If you prefer more detailed guidance for installing the host adapter, proceed to Section 2.2, “AMC Host Adapter PMC Host Adapter Detailed Installation Procedure.”

For safe and proper installation, check the user’s manual supplied with your computer system and perform the following steps:

Step 1. Ground yourself before removing the host adapter board.

Step 2. Remove the host adapter from the packing and check that it is not damaged.

Figure 3 illustrates an example of an AMC host adapter board. Also refer to Chapter 2 to see more detailed drawings of the 3 Gbit/s AMC to SAS host adapter boards.

Step 3. Insert and secure the host adapter board onto the carrier card.

Step 4. Connect the serial cable(s) between the host adapter and the serial hard disk drive(s).

2.4 AMC Host Adapter Detailed Installation Procedure

This section provides step-by-step instructions for installing the host adapter. If you are experienced in these tasks, you may prefer to use Section 2.2, “AMC Host Adapter PMC Host Adapter Quick Installation Procedure.”

2.4.1 Before You Start

Before starting, look through the following task list to get an overall idea of the steps you will be performing. If you are not confident you can perform the tasks as described here, Astek recommends getting assistance.

2.4.2 Inserting the Host Adapter

For safe and proper installation, use the user's manual supplied with your computer or system. Perform the following steps to install the host adapter.

Step 1. Ground yourself before removing the host adapter board.

Step 2. Remove the host adapter from the packing and check that it is not damaged.

Figure 3 illustrates an example of an AMC host adapter board. Also refer to Section 3 to see more detailed drawings of the 3.0 Gbit/s AMC to SAS host adapter boards.

Figure 3: 3.0Gb/s SAS Host Adapter

Step 3. If installed, remove the carrier card from the system using the recommended procedures for your system.

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

Step 4. Locate the location for AMC board installation.

Refer to the computer's user's manual to confirm the location of the AMC slots.

Step 5. Remove the blank AMC bezel that exists on the front panel of the carrier card.

Step 6. Align the AMC connector on the adapter card with the mating connector on the carrier card using the provided rails. Firmly press the host adapter into place by applying pressure.

Step 7. Install the carrier card into the system using the recommended procedures for your system.

Step 8. Make the external serial connections by inserting the serial cables into the port on the adapter card and connecting to serial hard disk drive(s).

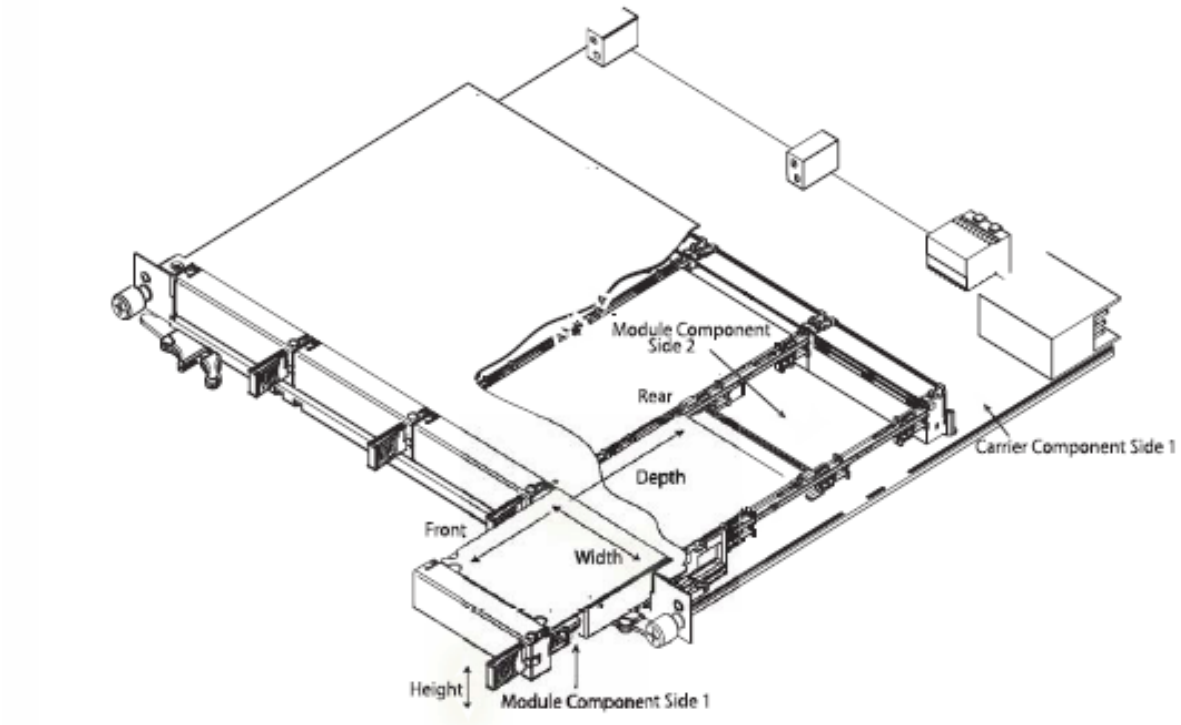

Figure 4: Inserting the AMC Astek Host Adapter on a carrier card

3 Host Adapter Characteristics

This chapter describes the characteristics of the Astek 3.0Gbit/s PMC to SAS host adapters. The chapter includes these topics:

- Section 3.1, "Characteristics of Astek SAS Host Adapters"
- Section 3.2, "Electrical and Environmental Specifications"

3.1 Characteristics of Astek SAS Host Adapters

The 3.0 Gbit/s PMC to SAS host adapters use the LSISAS1068 controller. The LSI Corp. LSISAS1068 controller connects up to eight SAS/SATA devices to a computer system through the PCI/PCI-X interface. The LSISAS1068 supports a 133 MHz, 64-bit PCI-X PMC bus and is backwards compatible with revisions of the PCI/PCI-X PMC bus.

The LSISAS1068 controller chip contains the PCI/PCI-X functionality for Astek SAS host adapters. The controller chip connects directly to the PCI/PCI-X PMC bus and generates timing and protocol in compliance with the PCI and PCI-X specifications.

The LSISAS1068 controller chip contains the SAS/SATA functionality for the Astek SAS host adapters. The controller chips connect channels directly to the SAS/SATA devices.

The Astek SAS host adapters provide up to 1 M x 8-bit Flash ROM for storing the BIOS and firmware. The Astk SAS host adapters provide up to 32 K x 8-bit of a NVSRAM device for storing the nonvolatile RAID information when a system failure happens.

3.1.1 A3803-PMC-01 Host Adapter Characteristics

3.1.1.1 LEDs

There are no externally visible LEDs on the A3803-PMC-01 host adapter board.

3.1.1.2 Connectors

This section provides a description of the different connectors on the A3803-PMC-01 host adapter. See Figure 5 for connector locations.

PMC Connectors (P1, P2, P3) - The PCI/PCI-X interface operates as a 32-bit or 64-bit DMA bus master. The connection is made through the PMC connectors P1, P2, and P3. The signal definitions and pin numbers conform to the PCI/PCI-X and PMC specifications.

SAS/SATA Connectors (J5 and J6) - The A3803-PMC-01 supports SAS connections through connectors J5 and J6. The J5 andJ6 connectors are SFF-8470 SAS external right-angle connectors.

Figure 5: A3803-PMC-01 Host Adapter Configuration

3.1.1.3 A3803-PMC-01 PMC Bezel

The A3803-PMC-01 I/O bezel is configured as shown in Figure 6. Two external SFF-8470 connectors are available on the front bezel.

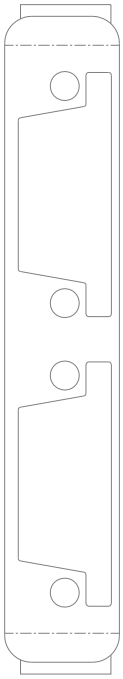

Figure 6: A3803-PMC-01 PMC Panel

3.1.1.4 Physical Characteristics

The A3803-PMC-01 is 75mm x 150mm. PCI/PCI-X connection is made through the PMC connectors P1, P2, and P3. SAS/SATA connections are made through the SAS connectors J5 and J6. The component height on the top and bottom of the A3803-PMC-01 board follows the PMC specifications.

3.1.2 A3803-PMC-04 Host Adapter Characteristics

3.1.2.1 LEDs

There are no externally visible LEDs on the A3803-PMC-04 host adapter board.

3.1.2.2 Connectors

This section provides a description of the different connectors on the A3803-PMC-04 host adapter. See Figure 7 for connector locations.

PMC Connectors (P1, P2, P3) - The PCI/PCI-X interface operates as a 32-bit or 64-bit DMA bus master. The connection is made through the PMC connectors P1, P2, and P3. The signal definitions and pin numbers conform to the PCI/PCI-X and PMC specifications.

SAS/SATA Connectors (J5 and J6) - The A3803-PMC-04 supports SAS connections through connectors J5 and J6. The J5 andJ6 connectors are SFF-8470 SAS external right-angle connectors.

Figure 7: A3803-PMC-04 Host Adapter Configuration

3.1.2.3 A3803-PMC-01 PMC Bezel

The A3803-PMC-04 I/O bezel is configured as shown in Figure 8. Two external SFF-8470 connectors are available on the front bezel.

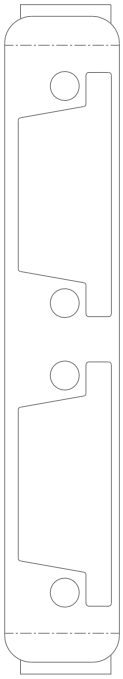

Figure 8: A3803-PMC-04 PMC Panel

3.1.2.4 Physical Characteristics

The A3803-PMC-04 is 75mm x 150mm. PCI/PCI-X connection is made through the PMC connectors P1, P2, and P3. SAS/SATA connections are made through the SAS connectors J5 and J6. The component height on the top and bottom of the A3803-PMC-01 board follows the PMC specifications.

3.1.3 A3803-PMC-05 Host Adapter Characteristics

3.1.3.1 LEDs

There are no externally visible LEDs on the A3803-PMC-05 host adapter board.

3.1.3.2 Connectors

This section provides a description of the different connectors on the A3803-PMC-05 host adapter. See Figure 9 for connector locations.

PMC Connectors (P1, P2, P3) - The PCI/PCI-X interface operates as a 32-bit or 64-bit DMA bus master. The connection is made through the PMC connectors P1, P2, and P3. The signal definitions and pin numbers conform to the PCI/PCI-X and PMC specifications.

SAS/SATA Connectors (J5 and J6) - The A3803-PMC-01 supports SAS connections through connectors J5 and J6. The J5 andJ6 connectors are SFF-8470 SAS external right-angle connectors.

Figure 9: A3803-PMC-05 Host Adapter Configuration

3.1.3.3 A3803-PMC-05 PMC Bezel

The A3803-PMC-05 I/O bezel is configured as shown in Figure 10. Two external SFF-8470 connectors are available on the front bezel.

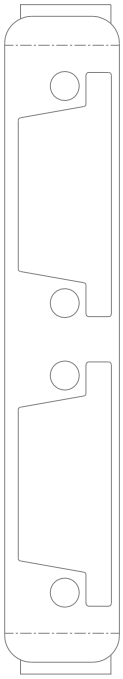

Figure 10: A3803-PMC-05 PMC Panel

3.1.3.4 Physical Characteristics

The A3803-PMC-05 is 75mm x 150mm. PCI/PCI-X connection is made through the PMC connectors P1, P2, and P3. SAS/SATA connections are made through the SAS connectors J5 and J6. The component height on the top and bottom of the A3803-PMC-05 board follows the PMC specifications.

3.1.4 A3803-PMC-55 Host Adapter Characteristics

3.1.4.1 LEDs

There are no externally visible LEDs on the A3803-PMC-55 host adapter board.

3.1.4.2 Connectors

This section provides a description of the different connectors on the A3803-PMC-55 host adapter. See Figure 11 for connector locations.

PMC Connectors (P1, P2, P3) - The PCI/PCI-X interface operates as a 32-bit or 64-bit DMA bus master. The connection is made through the PMC connectors P1, P2, and P3. The signal definitions and pin numbers conform to the PCI/PCI-X and PMC specifications.

SAS/SATA Connectors (J5 and J6) - The A3803-PMC-55 supports SAS connections through connectors J5 and J6. The J5 andJ6 connectors are SFF-8470 SAS external right-angle connectors.

Figure 11: A3803-PMC-55 Host Adapter Configuration

3.1.4.3 A3803-PMC-55 PMC Bezel

The A3803-PMC-01 I/O bezel is configured as shown in Figure 1210. Two external SFF-8470 connectors are available on the front bezel.

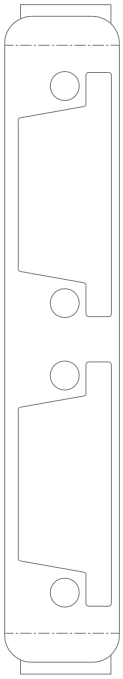

Figure 12: A3803-PMC-55 PMC Panel

3.1.4.4 Physical Characteristics

The A3803-PMC-55 is 75mm x 150mm. PCI/PCI-X connection is made through the PMC connectors P1, P2, and P3. SAS/SATA connections are made through the SAS connectors J5 and J6. The component height on the top and bottom of the A3803-PMC-5 board follows the PMC specifications.

3.1.5 A3803-AMC-01 Host Adapter Characteristics

3.1.5.1 LEDs

There are eleven LEDs that can be viewed on the A3803-AMC-01 front panel. These LEDs are described below in Table 4.

Table 4: LED Descriptions

LED	Description
LED 1	Indicates an “Out of Service” condition when Red
LED 2	Indicates an “In Service” status when Green

HS	Indicates Hot Swap status of the module
0	Lane 0 activity. Green indicates activity; Yellow indicates fault
1	Lane 1 activity. Green indicates activity; Yellow indicates fault
2	Lane 2 activity. Green indicates activity; Yellow indicates fault
3	Lane 3 activity. Green indicates activity; Yellow indicates fault
4	Lane 4 activity. Green indicates activity; Yellow indicates fault
5	Lane 5 activity. Green indicates activity; Yellow indicates fault
6	Lane 6 activity. Green indicates activity; Yellow indicates fault
7	Lane 7 activity. Green indicates activity; Yellow indicates fault

3.1.5.2 Connectors

This section provides a description of the different connectors on the A3803-AMC-01 host adapter. See Figure 13 for connector locations.

AMC Edge Connector- SAS and PCIe connections are made through the AMC Edge connector. The signal definitions and pin numbers conform to the AMC specification.

SAS/SATA Connector (J102) - The A3803-AMC-01 supports SAS connections through connector J102. Connector J102 is an external connection made using an x4 SFF-8088 I-Pass style right-angle connector.

Figure 13: A3803-AMC-01 Host Adapter Configuration

3.1.5.3 A3803-AMC-01 PMC Bezel

The A3803-AMC-01 I/O bezel is configured as shown in Figure 14. Two external SFF-8470 connectors are available on the front bezel.

Figure 14: A3803-AMC-01 AMC Panel

3.1.5.4 Physical Characteristics

The A3803-AMC-01 is 75mm x 150mm. The PCIe connection is made through the AMC edge connector J5. SAS/SATA connections are made through the SAS connector J102 and the AMC edge connector. The component height on the top and bottom of the A3803-AMC-01 board follows AMC specifications.

3.2 Electrical and Environmental Specifications

The design and implementation of Astek host adapters minimize electromagnetic emissions, susceptibility to radio frequency energy, and the effects of electrostatic discharge. The board carries the CE mark, FCC Class A and is marked with the FCC Self-Certification logo.

3.2.1 Electrical Characteristics

Table 5 lists the maximum power requirements for the Astek host adapters under normal operation.

Table 5: Maximum Power Requirements

PMC Host Adapters	PCI/PCI·X +3.30 V	Power	Operating Range
A3803-PMC-01	2.26 A	7.5W	0 °C to 60 °C
A3803-PMC-04	2.26 A	7.5W	0 °C to 60 °C
A3803-PMC-05	2.26 A	7.5W	0 °C to 60 °C

PMC Host Adapters	PCI/PCI·X +3.30 V, +5.0 V	Power	Operating Range
A3803-PMC-55	2.26 A	7.5W	0 °C to 60 °C

Note: The A3803-PMC-55 is the only host adapter that can be used in a 5.0V PCI/PCI-X environment. All other Astek 3.0 Gbit/s PMC to SAS host adapters can only be used in a 3.3V PCI/PCIX environment.

AMC Host Adapters	PCIe +12 V	Power	Operating Range
A3803-AMC-01	TBD	TBD	-5 °C to 45 °C

3.2.2 Thermal and Atmospheric Characteristics

This section describes the thermal and atmospheric characteristics of Astek 3.0Gbit/s SAS host adapters.

3.2.2.1 Atmospheric Characteristics for Astek 3.0 Gbit/s PMC to SAS Host Adapters

- Temperature range: 0 °C to 60°C (dry bulb)
- Relative humidity range: 5% to 90% non-condensing

- Maximum dew point temperature: 32 °C

The following parameters define the storage and transit environment for the Astek 3.0 Gbit/s SAS host adapters:

- Temperature range: -45°C to +105 °C (dry bulb)
- Relative humidity range: 5% to 90% non-condensing

3.2.2.2 Atmospheric Characteristics for Astek 3.0 Gbit/s AMC to SAS Host Adapters

- Temperature range: -5 °C to 45°C (dry bulb)
- Relative humidity range: 5% to 90% non-condensing
- Maximum dew point temperature: 32 °C

The following parameters define the storage and transit environment for the Astek 3.0 Gbit/s SAS host adapters:

- Temperature range: -45°C to +70 °C (dry bulb)
- Relative humidity range: 5% to 90% non-condensing

3.2.3 Safety Characteristics

All Astek 3.0 Gbit/s SAS host adapters meet or exceed the requirements of UL flammability rating 94V-0. Each bare board is marked with the supplier's name or trademark, type, and UL flammability rating. Because these boards are installed in a PMC bus slot, all voltages are below the SELV 42.4 V limit.

4 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.

Fax your reader's comments to:

Astek Corporation
Technical Publications
Fax: 719.260.1668

Please tell us how you rate this document: 3.0 Gbit/s PMC to SAS Host Adapter 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: _____
Title: _____
Company Name: _____
Company Address: _____
_____
_____
Date: _____
Telephone: _____
Fax: _____

For technical or sales assistance, either visit our web site or call us directly:

Astek Corporation
Technical Support: 719.260.1625
Web: www.astekcorp.com