Serial ATA II RAID Controller

4 Port SATA II RAID Controller with RAID 0, RAID 1, and RAID 0+1 Support

PCISATA2P4

Instruction Manual

Actual product may vary from photo

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• Reorient or relocate the receiving antenna.

• Increase the separation between the equipment and 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.

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Introduction

Thank you for purchasing a StarTech.com Serial ATA II RAID controller card. This product allows you to safeguard your data using multiple SATA or SATA II hard drives. With support for RAID levels 0, 1, and 0+1, you can enjoy a great deal of flexibility to configure a solution that meets your needs and your budget. If you are looking to add the speed of SATA devices to your computer but aren't ready to implement your array yet, you can use the PCISATA2P4 as a typical four port SATA II controller without using the RAID function.

Features

- Supports SATA II data transfer rates of up to 300 MBytes/sec., and is backwards-compatible with first generation SATA drives at a data transfer rate of 150 MBytes/sec.
- Offers the ability to implement RAID levels 0, 1, and 0+1
- You can install a "spare" drive (RAID 1+S) alongside a mirrored array (RAID 1) that will allow the system to function seamlessly, even if the boot drive fails
- Functions as a regular SATA controller when a RAID is not configured

Before You Begin

WARNING! PCI cards, like all computer equipment, can be severely damaged by static electricity. Be sure that you are properly grounded before opening your computer case or touching your PCI card. StarTech.com recommends that you wear an anti-static strap when installing any computer component. If an anti-static strap is unavailable, discharge yourself of any static electricity build-up by touching a large grounded metal surface (such as the computer case) for several seconds. Also be careful to handle the PCI card by its edges and not the gold connectors.

System Requirements

- An IBM-compatible computer with an available PCI or PCI-X slot (standard or low-profile)
- OS Support: Windows NT4/2000/XP/2003 Server

Contents

This package should contain:

- 1 x PCI SATA II RAID controller card
- 1 x Low profile replacement bracket (used in small form factor case designs only)
- 1 x Installation CD
- 1 x Instruction Manual

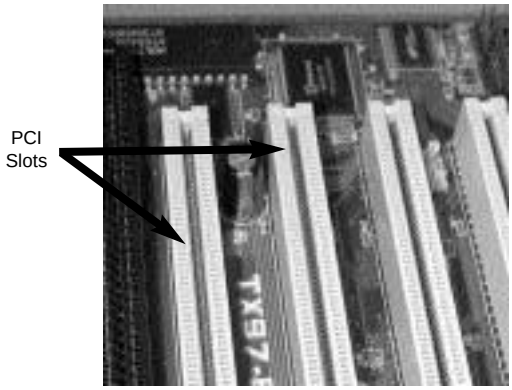
Installation

This section will guide you through the installation of your RAID card. Please read through the instructions carefully and complete each step in the order listed. **If you are installing the card in a low profile slot, remove the standard size bracket and replace it with the included low profile replacement bracket before completing these instructions.**

Installing the Card

1. Make sure that your system is unplugged and you are grounded.

2. Remove the cover of your system (see your computer's user manual for details, if necessary) and gently turn your computer onto its side.



3. Locate an empty PCI or PCI-X slot (usually white in color) and remove the metal plate that covers the rear bracket. (PCI-X slots are slightly longer than a standard PCI slot.) You may need a Phillips screwdriver to perform this step. **Retain this screw!** You will need it to secure the card later.

4. Gently insert the PCI card into the empty slot, making sure it is firmly seated.

5. Secure the card in place using the screw you removed in Step 3.

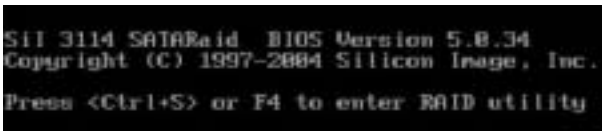
6. Install your SATA drive(s) according to their installation instructions.

7. Put the computer case back on.

Accessing the RAID Utility

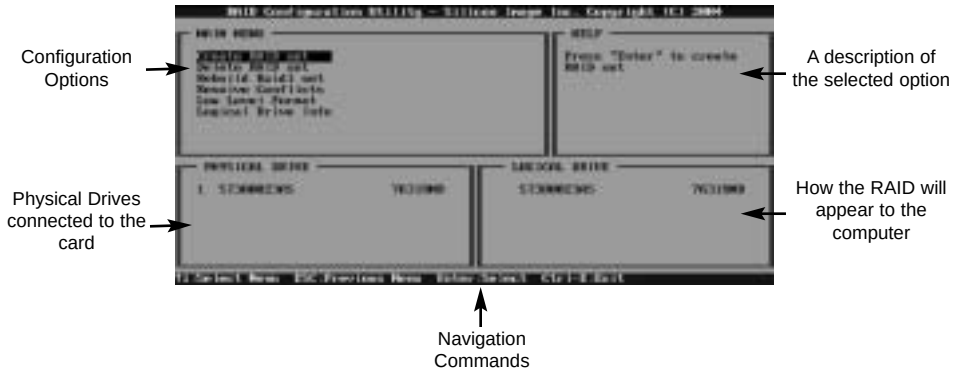
The PCISATA2P4 comes with an integrated BIOS-level configuration utility that allows you to configure the RAID setup, rebuild your array in the event of failure, and resolve conflicts with the arrays you have setup. Once you have installed the card according to the instructions and attached the SATA drives you wish to use with the card, you can then configure the type of array you would like to use. **If you are using the the card as a SATA controller without a RAID, proceed directly to the "Installing the Drivers" section on page 5 now.**

To enter the configuration utility, press and hold [CTRL] and [S] at the same time (or press [F4]) when you see the following prompt:



NOTE: At least one SATA drive must be installed for you to access the RAID utility.

Once you access the utility, you will be presented with the following menu:



The **Main Menu** option allows you to carry out various tasking related to configuring and maintaining your RAID. You can navigate the menu using the arrow keys on the keyboard and select an item by pressing [Enter]. The **Main Menu** options are described below:

Create RAID set: Create a RAID for the first time, or change the configuration of an array after deleting a previous setup. See below for more details and an explanation of the RAID levels available with the card.

Delete RAID set: Delete an existing RAID. Depending on your configuration, this may cause data loss or cause the computer to become unbootable. It is highly recommended that you have a complete, good backup prior to using this option.

Rebuild Raid1 set: If a drive has failed in a RAID1 configuration (mirroring), this option allows you to synchronize the data between the new replacement drive and the remaining good hard drive that contains a copy of the data.

Resolve Conflicts: If you have installed a drive that was previously used in another array, this option will resolve any metadata conflicts that could cause your array not to function or produce erratic behavior.

Low Level Format: This feature completely overwrites the data on the selected drive(s) with zeros; this is essentially a comprehensive deletion tool. This will destroy all data on the drive, including partition information. Ensure you have a complete, good backup before using this option.

Logical Drive Info: This displays information how the logical drive will appear to the computer and the operating system. In all RAID configurations, the drives in your array will appear to be a single physical drive. If you wish, you can partition the logical drive space into multiple partitions using your operating system.

IMPORTANT: If you want your computer to boot from your RAID, you must configure your computer's BIOS to use the drives connected to the PCISATA2P4 in your boot sequence. Depending on the options available, you must set your boot sequence to include **RAID** or **SCSI** to use the RAID as the boot drive, particularly if you have ATA hard drives connected to the motherboard's IDE controller. Depending on the configuration of the computer, you may not need to make any changes to the BIOS if you do not have any ATA hard drives installed on the onboard IDE controller. Consult your computer or motherboard documentation for more details on including the RAID card in your boot sequence.

Configuring an Array
When you choose **Create a RAID set** from the **Main Menu** of the RAID utility, you will be presented with the following menu:

The requirements for each option/RAID level are described here:

RAID0: Also called "disk striping," where multiple physical drives are merged to create a single logical volume.

Minimum number of drives: 2
Maximum number of drives: 4
Fault tolerance: None
Performance: Excellent; improves both read and write performance
Other considerations: None

RAID1: Also called "drive mirroring," where a drive has an exact duplicate copy of data maintained on another disk.

Minimum number of drives: 2 (per array)
Maximum number of drives: 2 (per array)
Fault tolerance: Excellent; complete redundancy
Performance: Good; some reduction in write performance
Other considerations: 50% reduction in useable space as the drive containing the mirror is not available to the user; drives must be identical

RAID10: Also called RAID 0+1, this is a combination of disk striping (RAID 0) and mirroring (RAID 1). Two disks are striped together in a single volume, with a mirrored striped set for redundancy.

Minimum number of drives: 4

Maximum number of drives: 4
Fault tolerance: Excellent; complete redundancy
Performance: Good; some reduction in write performance
Other considerations: 50% reduction in useable space as the drives containing the mirror is not available to the user; drives must be identical

SPARE DRIVE: This is used in conjunction with RAID 1 (mirroring) and allows the computer to keep running in the event of a drive failure without user intervention, even if it is the boot drive that has failed. Also referred to as RAID 1+S.

Minimum number of drives: 1 (requires an associated RAID 1 array)
Maximum number of drives: 1 (requires an associated RAID 1 array)
Fault tolerance: Adds seamless disaster recovery to a RAID 1 configuration
Performance: Not applicable
Other considerations: Drive is not available to the user; drive must be identical to the models used in the associated RAID 1 array

After you select which RAID level you wish to use, you will have to select drives to include in the array. Follow the on-screen prompts to complete the configuration. If you wish to use the RAID 1+S ("spare drive") option, you must configure a RAID 1 array first.

Deciding which RAID solution to implement has some important implications for the performance of your system and the safety of your data. This is intended as a guide only, so you should investigate the wealth of information available on the Internet or consult with a computer system professional for further assistance in deciding which solution will best meet your needs.

Installing the Drivers

Windows 2000/XP

1. Windows will launch the **Add New Hardware Wizard**. Click **Next**.

2. Choose the **Search for a suitable driver...** option and click **Next**.

3. Check only the **CD-ROM drives** option. Ensure the installation CD is inserted in the CD-ROM or other optical drive. Click **Next**..

4. Windows will display a message stating that "Windows has found a driver for this device". Click **Next**. Choose **Yes** or **Continue Anyway** if you are warned that the driver file has not been digitally signed.

5. WIndows will display a message that states "Windows has finished installing software for this device". Click **Finish**.

6. Windows will continue to detect and install any remaining new devices. If the Add New Hardware Wizard is launched again, repeat steps 1 through 5 from above.

Windows NT 4.0
Consult the **readme.txt** file in the **\SATAII3Gbps_ Raid_4Port\Sil3124\WinXP_2000_2003_NT\drivers** folder on the installation CD for instructions on how to configure the card for use in Windows NT 4.0.

Verifying Your Installation

Windows 2000/XP/2003 Server

1. Go to **Start** > **Settings** > **Control Panel**.
2. Double click **System**.
3. Click the **Hardware** tab and choose **Device Manager**.
4. If the card does not appear with a red **x** or yellow exclamation point (**!**) next to it, Windows has not detected a problem with the installation and the card should function normally.

Glossary

array
Two or more disk drives working in tandem as a single device. Sometimes used as a synonym for RAID (see below).

BIOS
Abbreviation for Basic Input/Output System. The BIOS is the device that manages the devices that are installed in the computer and can be used to control the computer's configuration, including startup options and any integrated peripherals.

logical drive
When a RAID is created, it collects information about the drives actually connected to the controller and reports them as a single drive to the computer: the result of this process is the logical drive. The size of the logical drive compared to the total capacity of the disks actually installed (the "physical" drives) may vary considerably based on the RAID level implemented for the solution. Note that this is not the same as a "logical drive" in the sense of an operating system (software-based) partitioning of a hard drive, since this translation is handled on a hardware level and is transparent to the end user. Since a RAID appears to the computer and the operating system as a single drive, it can be formatted and partitioned as though it were a single disk.

metadata
Literally interpreted to mean "data about data." Since RAID configurations present the hard disks contained within them (array) to the computer as a single drive, the records of how the array is bound together between the drives (where the data is stored, the order of the drives in the array, and the information needed to rebuild a failed drive) are all considered metadata.

mirroring; mirrored set [of disks]
A process where one drive automatically keeps an exact copy of another disk (RAID 1).

physical drive
A drive that is physically installed in the computer and connected to the RAID controller.

RAID
Abbreviation for Redundant Array of Inexpensive Disks. This technology allows users to

pool their hard drives in order to improve speed, fault tolerance, or both. RAID is available in several different versions, commonly referred to as “levels.” The phrase “level” suggests that there is a hierarchy between levels, which is not strictly the case. The many implementations of RAID each have their own advantages, disadvantages, and technical requirements. RAID can be implemented through software or hardware. Hardware solutions are generally preferred for a higher degree of performance and reliability.

Serial Advanced Technology Attachment (Serial ATA or SATA)
Serial ATA is a relatively new method of connecting hard drives and other devices to a computer (particularly hard drives), and is designed to replace the older IDE standard (sometimes referred to as ATA or PATA, for Parallel Advanced Technology Attachment).

striping; striped set [of disks]
Striping is a process where two or more disks are combined and presented to the computer as a single device (a “logical” drive): this is the process used in RAID 0.

Specifications

Form Factor/Interface	PCI (32-bit, 33/66 MHz) or PCI-X (64-bit, 133 MHz) Full-sized or low profile slot
Maximum Data Transfer Rate	300 MBytes/sec. (SATA II)
SATA Ports:	4 x 7-pin male (internal)
RAID Levels Supported	0, 1, 0+1, 1+S, also configurable as a typical SATA controller
OS Support	Windows NT4/2000/XP/2003 Server
Regulatory and Other Certifications	FCC Class B, CE, UL, Microsoft WHQL

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SATA18

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SATA24

36 inch Serial ATA Drive Connection Cable
SATA36

18 inch Serial ATA Data Cable with LP4 Adapter
SATA18POW

18 inch Right Angle Serial ATA Cable (1 end)
SATA18RA1

24 inch Right Angle Serial ATA Cable (1 end)
SATA24RA1

36 inch Right Angle Serial ATA Cable (1 end)
SATA36RA1

24 inch RIght Angle Serial ATA Cable (both ends)
SATARA24

36 inch Right Angle Serial ATA Cable (both ends)
SATARA36

Mutant Mods 24 inch Blue EL Wire Illuminated Serial ATA Drive Connection Cable
SATA24BLEL

Mutant Mods 24 inch Blue UV Reactive Serial ATA Drive Connection Cable
SATA24BLUV

Mutant Mods 24 inch Green EL Wire Illuminated Serial ATA Drive Connection Cable
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Mutant Mods 24 inch Red UV Reactive Serial ATA Drive Connection Cable
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