

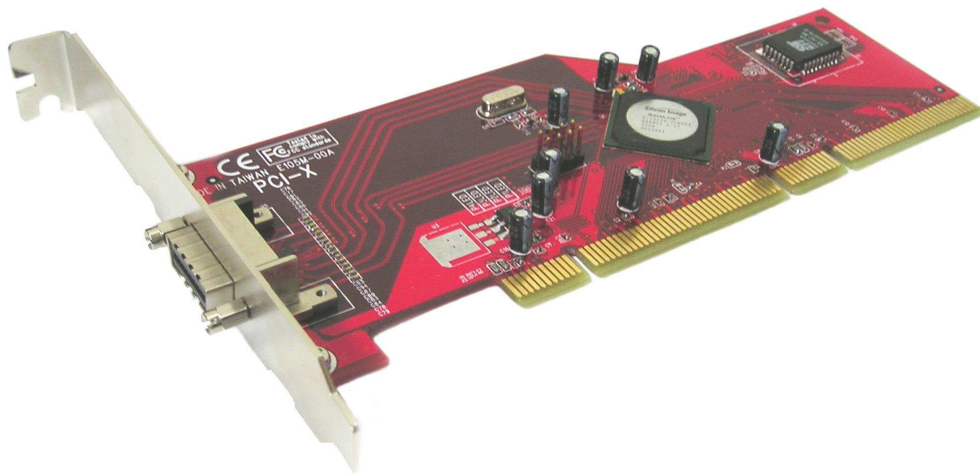
# LINDY®

## COMPUTER CONNECTION TECHNOLOGY

### 4Port Raid5 SATAII-3Gbps Multilane PCI-X Card

User Manual

*English*



LINDY No. 51127

[www.LINDY.com](http://www.LINDY.com)



## **Important Message:**

- 1. Before controller card installation, we recommend to study the PDF file of SATA Raid5 manual at enclosed CD folder \ Raid5 SATA2\_4Port \ Sil3124 \ Windows \ Gui first. This Raid manual has more information on Raid architecture, Raid features, Raid installation, Raid setting and Management software for Raid5 GUI (Graphical User Interface).**
- 2. After driver installation, if you like, you can install SATARaid5 GUI for Raid management. Before SATARaid5 GUI installation, you must remove all the existing SATARaid GUI (or Java SATARaid GUI) to ensure your new SATARaid5 GUI can work properly.  
i.e. : (\ Start \ Control Panel \ Add or Remove Programs \ Select all SATARaid \ Remove)**
- 3. Raid sets can be created and managed by either the BIOS utility setting or the SATARAID5 GUI setting under Windows.**
- 4. For RAID creating, BIOS utility allow the random creating but GUI just supports the building by sequential SATA Port1, Port2, Port3 .....**

## **1. Introduction**

This RAID SATA II –3Gbps 4Ports PCI-X Host Adapter is a PCI to 4Ports Serial ATA host controller board. It provides a 64bit, 133 MHz PCI interface on the host side and four, fully compliant Serial ATA II – 3Gbps ports on the device side to access SATA Hard disk drive.

The board can be used to upgrade your desktop computer to have 4Ports Serial ATA Channels and support RAID 5, RAID 0+1, RAID 0, RAID 1 and JBOD features. It accepts host commands through the PCI bus, processes them and transfers data between the host and Serial ATA devices. The board should be connected to SATA target device and will take the data, serialize it and output it for transmission over the SATA interface. The board can control four independent Serial ATA channels. Each channel has its own Serial ATA bus and will support one Serial ATA device.

The board supports Serial ATA Generation 1 & Generation 2 transfer rate of 1.5 Gbps /

3Gbps. It comes completely with drivers for Windows 2000, Windows XP, Windows 2003.

RAID, Redundant Array of Independent Disks, greatly enhances two main areas of data storage: performance and data integrity. By using RAID 0, also known as Striping, performance of sustained data transfer rates is greatly enhanced by simultaneously writing data to 2, 3 or 4 drives. The second benefit of RAID is data redundancy. RAID 1, Mirroring, writes identical data on two drives or sets of drives, thus protecting the data from a disk failure. If, for any reason, one drive were to fail, your data is secure and available from the mirrored second drive.

## **1.1. Features**

### **1.1.1. PCI Interface**

- Compliant with PCI Specification, revision 2.2.
- Integrated PCI DMA engines.
- 64 bit, 133MHz fully compliant PCI host interface.

### **1.1.2. High Speed Serial ATA Interface**

- Four high speed Serial ATA interface ports, each supporting 1st generation & 2<sup>nd</sup> generation Serial ATA data rates 1.5Gbps/ 3Gbps.
- Provides RAID 0 (Striping) to greatly increase the performance of data transfer by simultaneously writing data to 2 drives.
- Provides RAID 1 (Mirroring) to protect the data from a disk failure by writing identical data on 2 drives.
- RAID 0+1 (Mirrored-Striping) combine both Striping and Mirroring technologies to provide both the performance enhancements that come from Striping and the data availability and integrity that comes from Mirroring.
- Fully compliant with Serial ATA specifications.
- Supports Spread Spectrum in receiver.

## **1.2. Package Contents**

- RAID5 SATA II – 3Gbps 4Ports PCI Host Adapter

- This Users Manual
- Driver CD

## 2. What Is RAID

### RAID - Redundant Array of Independent Disks

RAID technology manages multiple disk drives to enhance I/O performance and provide redundancy in order to withstand the failure of any individual member, without loss of data.

#### **Disk Striping (RAID 0)**

Striping is a performance-oriented, non-redundant data mapping technique. While Striping is discussed as a RAID Set type, it actually does not provide fault tolerance. With modern SATA bus mastering technology, multiple I/O operations can be done in parallel, enhancing performance. Striping arrays use multiple disks to form a larger virtual disk.

#### **Disk Mirroring (RAID 1)**

Disk mirroring creates an identical twin for a selected disk by having the data simultaneously written to two disks. This redundancy provides instantaneous protection from a single disk failure. If a read failure occurs on one drive, the system reads the data from the other drive.

#### **Mirrored-Striping (RAID 0+1 also known as RAID 10)**

A Mirrored-Striping Set does just what it says, combining both Striping and Mirroring technologies to provide both the performance enhancements that come from Striping and the data availability and integrity that comes from Mirroring. When data is written to a Mirrored-Striped Set, instead of creating just one virtual disk as Striping would do, a second, Mirrored virtual disk is created as well.

#### **Parity RAID (RAID 5)**

Parity or RAID 5 adds fault tolerance to Disk Striping by including parity information with the data. Parity RAID dedicates the equivalent of one disk for storing parity stripes. The data and parity information is arranged on the disk array so that parity is written to different disks. There are at least 3 members to a Parity RAID set. The following example

illustrates how the parity is rotated from disk to disk.

Parity RAID uses less capacity for protection and is the preferred method to reduce the cost per megabyte for larger installations. Mirroring requires 100% increase in capacity to protect the data whereas the above example only requires a 50% increase. The required capacity decreases as the number of disks in the group increases.

### **Just Bunch of Disks (JBOD)**

The JBOD is a virtual disk that can either be an entire disk drive or a segment of a single disk drive. For this card, JBOD function only supports one disk.

## **3. BIOS Installation ( RAID Setting )**

Creating and deleting RAID sets is a function found in the BIOS. During boot up, the RAID setting message will appear and pause for a few moments to allow the user to choose what to do. This board will act as normal NON-RAID card when BIOS not configured for RAID. Just proceed to Software Installation section directly. If you use traditional parallel ATA HDD, make sure your hard drives be set up as master mode before the RAID setting.

### **3.1. Creating Striped Sets (RAID 0)**

1. As the BIOS boots, Press CTRL+S or F4 to enter the raid bios utility.
2. Select **Create RAID set**. Press **Enter**.
3. Select **RAID 0** then press **Enter**.
4. Select **Number of hard drive**. Press **Enter**.
4. Select **RAID size**. Press **Enter**.
5. Press **Y** to save your settings.
6. Press **CTRL+E** and then press **Y** to exit the setup.
7. Continue with conventional Fdisk and Format steps as if you are installing a conventional hard drive.
8. Your RAID configuration is complete. Please proceed to software installation section.

### **3.2. Creating Mirrored Sets (RAID 1)**

1. As the BIOS boots, Press CTRL+S or F4 to enter the raid bios utility.

2. Select **Create RAID set**. Press **Enter**.
3. Select **RAID 1** then press **Enter**.
4. Select **Auto configuration**. Press **Enter**.
5. Press **Y** to save your settings.
6. Press **CTRL+E** and then press **Y** to exit the setup.
7. Continue with conventional Fdisk and Format steps as if you are installing a conventional hard drive.
8. Your RAID configuration is complete. Please proceed to software installation section.

### **3.3. Creating a Mirrored-Striped Set (RAID 10)**

1. As the BIOS boots, press CTRL+S or F4 to enter the raid bios utility.
2. Select **Create RAID set**. Press **F2**.
3. Select **RAID 10** then press **Enter**.
4. Select **Auto config**. Press **Enter**.
5. Press **Y** and then press ESC to exit the setup.
6. Continue with conventional Fdisk and Format steps as if you are installing a conventional hard drive.
7. Your RAID configuration is complete. Please proceed to software installation section.

### **3.4. Creating Parity RAID (RAID 5)**

1. As the BIOS boots, Press CTRL+S or F4 to enter the raid bios utility.
2. Select **Create RAID set**. Press **Enter**.
3. Select **RAID 5** then press **Enter**.
4. Select **Auto configuration**. Press **Enter**.
5. Press **Y** to save your settings.

### **3.5. Creating JBOD Sets**

1. As the BIOS boots, Press CTRL+S or F4 to enter the raid bios utility.

2. Select **Create RAID set**. Press **Enter**.
3. Select **JBOD (Single)** then press **Enter**.
4. Select **JBOD Drives**. Press **Enter**.
5. Select **RAID size**. Press **Enter**.
6. Press **Y** to save your settings.

### 3.6. Creating Spare Drive

1. As the BIOS boots, Press CTRL+S or F4 to enter the raid bios utility.
2. Select **Create RAID set**. Press **Enter**.
3. Select **Spare Drive** then press **Enter**.
4. Select **Spare Drives**. Press **Enter**.
5. Select **RAID size**. Press **Enter**.
6. Press **Y** to save your settings.

### 3.7. Deleting RAID Sets

1. As the BIOS boots, Press CTRL+S or F4 to enter the raid bios utility.
2. Select **Delete RAID set**. Press **Enter**.
3. Answer **Y** to remove the RAID set. If the RAID set being deleted is a Striped set, then all of the data will be lost. If the set being deleted is a Mirrored set, then the data will remain intact and accessible on both drives.

### 3.8. Rebuilding Mirrored Sets (RAID 1)

1. After replacing the failed hard drives boot the BIOS, Press CTRL+S or F4 to enter the raid bios utility.
2. Select **Rebuild RAID 1 set**. Press **Enter**.
3. Select **Rebuild Hard Drive**. Press **Enter**.
4. Answer **Y** to rebuild the Mirrored set of hard drive.

### 3.9. Resolving Conflict

When a RAID set is created, the metadata written to the disk includes drive connection information (Primary and Secondary). If, after a disk failure, the

replacement disk was previously part of a RAID set (or used in another system), it may have conflicting metadata, specifically in reference to the drive connection information. If so, this will prohibit the RAID set from being either created or rebuilt, In order for the RAID set to function properly, this old metadata must be first overwritten with the new metadata. To resolve this, select **Resolve Conflicts**, and the correct metadata, including the correct drive connection information, will be written to the replacement disk.

## **4. Software Installation**

### **4.1. Windows 2000/XP/2003 Fresh Installation**

1. Power off the system. Connect the hard drives to the controller card and insert the controller card into a PCI slot. Power up the system.
2. Put your Windows 2000/XP CD into the CD-ROM/DVD drive, or the 2000/XP boot diskette #1 in the floppy drive if your system cannot boot from the CD.
3. Press F6 for third party SCSI or driver installation at the beginning of text mode installation. Press 's' when setup asks if you want to specify an additional device and insert the Driver CD. Press 'Enter' and select 'E:\Raid5 SATA2\_4Port \SiI3124\Windows\Driver'.
4. Press 'Enter' to continue on with text mode setup.
5. Follow the setup instructions to select your choice for partition and file system.
6. After setup examines your disks, it will copy files to Windows 2000 installation folders and restart the system. The setup program will continue and finish the installation after restart.
7. Waiting until Windows finishes installing devices, regional settings, networking settings, components, and final set of tasks, reboot the system if it is required.
8. See instructions in section 4.3 to verify controller was installed correctly.

### **4.2. Adding the controller card to an existing Windows**

#### **2000/XP/2003 Installation**

1. Power off the system. Connect the hard drives to the controller card and insert the controller card into a PCI slot. Power up the system.
2. During OS boot up, Windows will display the 'Found New Hardware Wizard'. Click 'Next'.



3. Select 'Search for a suitable driver for my device (Recommended)' and Click 'Next'.
4. Insert the Driver CD in your CD-ROM/DVD drive, check **Specify a location**, uncheck the other boxes, click **Next**, type in **E:\** (If your CD-ROM/DVD is **E:\**). Click **Browse**.
5. Points specify a location, example **E:\ Raid5 SATA2\_4Port \ Sil3124 \ Windows \ Driver**, click **Open** then **OK**.
6. When the wizard indicates that it found a driver for the device click 'Next'.
7. If the 'Digital Signature Not Found' dialog appears, click 'Yes' to continue installing the driver.
8. The wizard will now copy the required files to the system and start the driver. After starting the driver the wizard will display a completion dialog, click 'Finish' to exit the wizard.
9. See instructions in section 4.3 to verify controller was installed correctly.

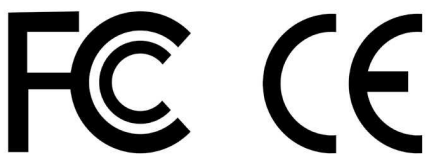
## 4.3. Verifying controller installation under Windows

### 2000/XP/2003

1. Right click on 'My Computer' icon, select 'Properties', left click on 'Hardware' tab and then on 'Device Manager' button.
2. Double click on 'SCSI and RAID Controllers', If there is no yellow '!' or '?' in front of 'Silicon Image Sil 3124 SoftRaid5 Controller', the driver is started correctly.
4. To view information about the devices attached to the controller, use the SilCfg Utility and click on the device from the list.

## 4.4. Update new driver on Windows 2000/XP/2003 with existing driver

1. Right click on 'My Computer' and select 'Properties'. Under the 'System Properties' section, click on 'Hardware' tab and then on 'Device Manager' click 'SCSI and RAID Controller' and right click 'Silicon Image Sil 3124 SoftRaid5 Controller'.
2. Click 'Driver', 'Update Driver' and select 'Search for a suitable driver for my device[Recommended]'. Insert the Driver CD. Press 'Enter' and select 'E:\ Raid5 SATA2\_4Port\Sil3124\Windows \Driver'. Click 'Next' and complete the driver installation.
3. System will go through the enumeration process and install the driver. At the end of the process, click 'Yes' to reboot your system when necessary.
4. See instructions in section 4.3 to verify controller was installed correctly.



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 operations.