

LINDY®

COMPUTER CONNECTION TECHNOLOGY

RAID Native SATA-150 4 Ports PCI Host

User Manual
English



LINDY No. 70541 (Internal 4 Port)
LINDY No. 70542 (External 2 Port + Internal 2 Port)



www.LINDY.com



1. Introduction

This RAID Native SATA-150 4Ports PCI Host Adapter is a PCI to 4Ports Serial ATA host controller board. It provides a 32bit, 33/66 MHz PCI interface on the host side and dual, fully compliant Serial ATA 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 0, RAID 1 and RAID 0+1 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 transfer rate of 1.5 Gb/s (150 MB/s). It comes completely with drivers for Windows 98, Windows Millennium, Windows NT 4.0, Windows 2000 and XP.

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.
- 32 bit, 33/66MHz fully compliant PCI host interface.

1.1.2. High Speed Serial ATA Interface

- Four high speed Serial ATA interface ports, each supporting 1st generation Serial ATA data rates (1.5Gb/s).
- 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 1.0 specifications.
- Supports Spread Spectrum in receiver.
- Independent 256-byte FIFOs (32 bit * 64 deep) per Serial ATA channel for host reads and writes.

1.1.3. The Individual features for different HBA Models

1.1.3.1. Model A: Serial ATA Internal 4 Ports

- Supports Independent four Internal Ports

1.1.3.2. Model B: SATA External 2 Port + Internal 2 Port

- Supports two External Ports and two Internal Ports
- Special Shell SATA connectors on External Port to support Mobile HDD, Mobile CD-ROM, Mobile DVD and Mobile CD-RW
- One USB-like Connector on board to provide 2A / 5V DC power output for External Devices using

1.2. Package Contents

- RAID Native SATA-150 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. This card provides two RAID Set types, Striped (RAID 0) and Mirrored (RAID 1).

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.

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 **Stripe** 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.

3.2. 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 **Mirrored** 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

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 **Mirrored-Striped set** then press **F3**.
4. Select **Auto config**. Press **A**.
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. 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.

3.5. Rebuilding Mirrored Sets

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

3.5. 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

This section provides the information on how to install the drivers of RAID Native SATA-150 4Ports PCI Host Adapter for the operating systems:

New & Existing Windows 98/98 SE

New & Existing Windows ME

New & Existing Windows NT 4.0

New & Existing Windows 2000

New & Existing Windows XP

4.1. Windows 98/98SE Driver Installation

For New Windows 98/98 SE Systems (Fresh Installation)

1. After the *SATA RAID PCI Host Adapter* and attached drives are configured, follow Microsoft procedures to install Windows accordingly.
2. Once Windows has been installed, double click **My Computer/Control Panel/System**, then click **Device Manager**.
3. Double click **Other Devices** then **PCI RAID Controller**.
4. Click **Driver** tab, then **Update Driver**.
5. Insert the Driver CD and click **Next**.
6. Select **Search for a better driver than the one ...**option and click **Next**.
7. Check **Specify a location**, uncheck the other boxes, type in **E:** (If your

CD-ROM/DVD is E:\) and click **Browse**.

8. Points specify a location, example E:\SATA Raid_4Port\Sil3114\Win98_me_2000_xp_nt4.0, click **OK** and then **Next**.
9. Click **Next** and then **Finish**.
10. Remove the Driver CD and click **Yes** to restart Windows to complete driver installation.

For Existing Windows 98/98 SE Systems

1. After the *SATA RAID PCI Host Adapter* and attached drives are configured, boot up Windows.
2. At the **Add New Hardware Wizard**, click **Next**.
3. Select **Search for the best driver for your device** option and then click **Next**.
4. Insert the Driver CD, check **Specify a location**, uncheck the other boxes, and click **Browse**.
5. Points specify a location, example E:\SATA Raid_4Port\Sil3114\Win98_me_2000_xp_nt4.0, click **OK** and then **Next**. (If your CD-ROM/DVD is E:\)
6. Click **Next** and then **Finish** respectively.

4.2. Windows ME Driver Installation

For New Windows ME Systems (Fresh Installation)

1. After the *SATA RAID PCI Host Adapter* and attached drives are configured, follow Microsoft procedures to install Windows accordingly.
2. Once Windows has been installed, right click **My Computer**, then click **Properties**. Click **Device Manager** tab.
3. Double click **Other Devices** then **PCI RAID Controller**.
4. Click **Driver** tab, then **Update Driver**.
5. Insert the Driver CD, check **Specify the location of the driver (Advanced)** and click **Next**.
6. Select **Search for the better driver** option, check **Specify a location**, uncheck **Removable Media**, type in E:\ (If your CD-ROM/DVD is E:\), and click **Browse**.
7. Points specify a location, example E:\SATA Raid_4Port\Sil3114\Win98_me_2000_xp_nt4.0, click **OK** and then **Next**.
8. Click **Next** and then **Finish**.
9. Remove the Driver diskette and click **Yes** to restart Windows to complete driver installation.

For Existing Windows ME Systems

1. After the *SATA RAID PCI Host Adapter* and attached drives are configured, boot up Windows.

2. At the **Add New Hardware Wizard**, check **Specify the location of the driver (Advanced)**, and click **Next**.
3. Insert the Driver CD, check **Specify a location**, uncheck the other boxes, and click **Browse**.
4. Points specify a location, example **E:\SATA Raid_4Port\Sil3114\Win98_me_2000_xp_nt4.0**, click **OK** and then **Next**. (If your CD-ROM/DVD is **E:**)
5. Click **Next** and then **Finish**.

Verification of the Proper Installation for Windows 98/98SE/ME

1. Double click **My Computer/Control Panel/System**. Click **Device Manager** tab.
2. Double click **SCSI Controllers**, **Silicon Image Sil 3114 SATA RAID Controller** should be listed.
3. Highlight **Silicon Image Sil 3114 SATA RAID Controller** and click **Properties**. A message **This device is working properly** is displayed in the dialog box, the driver has been correctly installed. If any error message is displayed, remove **Silicon Image Sil 3114 SATA RAID Controller** and restart your system.

4.3. Windows NT 4.0 Driver Installation

For New Windows NT 4.0 System (Fresh Installation)

1. Before installation, copy all the files under directory **E:\SATA Raid_4Port\Sil3114\Win98_me_2000_xp_nt4.0\driver*.*** to a blank floppy disk
2. After the SATA RAID PCI Host Adapter and attached drives are configured, follow Microsoft procedures to install Windows accordingly.
3. At the **Windows Set-up** screen, press **F6** to specify and add the driver.
4. Press **S**, select **Other**, then press **Enter**.
5. Insert the Driver diskette and press **Enter**.
6. Select **Silicon Image Sil 3114 SATA RAID Controller for Windows NT 4.0 and 2000** and press **Enter**.
7. Press **Enter** to continue and follow on-screen instructions to complete Windows NT 4.0 installation.

Add Windows NT 4.0 Driver on Original Booting Device

1. After the **SATA RAID PCI Host Adapter** and attached drives are configured, boot up Windows. Double click **My Computer/Control Panel/SCSI Adapters**, then click the **Drivers** tab.
2. Click **Add...** then **Have Disk...**
3. Insert the Driver CD in your CD-ROM/DVD drive and type in **E:** (If your CD-ROM/DVD is **E:**), then click **Browse**.
4. Points specify a location, example **E:\SATA Raid_4Port\Sil3114\Win98_me**

- `_2000_xp_nt4.0\SI3114r.inf`, click **Open** then **OK**.
5. Highlight **Silicon Image Sil 3114 SATAraid Controller** and click **OK**.
 6. If the **Insert Disk** dialog appears, click **OK** then **Browse**.
 7. Highlight **SI3114r.sys** and click **Open** then **OK**.

Verification of the Proper Installation for Windows NT 4.0

1. Double click **My Computer/Control Panel/SCSI Adapters**.
2. Highlight **Silicon Image Sil 3114 SATAraid Controller** and click **Properties**.
This device is working properly is displayed in the dialog box, the driver has been correctly installed.

4.4. Windows 2000 Driver Installation

For New Windows 2000 Systems (Fresh Installation)

1. Before installation, copy all the files under directory `E:\SATA Raid_4Port\ Sil3114\ Win98_me _2000_xp_nt4.0\driver\ *.*` to a blank floppy disk.
2. After the *SATA RAID PCI Host Adapter* and attached drives are configured, follow Microsoft procedures to install Windows accordingly.
3. At the **Windows Set-up** screen, press **F6** to specify and add the driver.
4. Insert the Driver diskette. Press **S**, then press **Enter**.
5. Select **Silicon Image Sil 3114 SATAraid Controller for Windows NT 4.0 and 2000** and press **Enter**.
6. Press **Enter** to continue and follow on-screen instructions to complete installation.

Add Windows 2000 Driver on Original Booting Device

1. After the *SATA RAID PCI Host Adapter* and attached drives are configured, boot up Windows.
2. At 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:\SATA Raid_4Port\Sil3114\Win98_me _2000_xp_nt4.0\SI3114r.inf`, click **Open** then **OK**.
6. Click **Next** if the **Digital Signature Not Found** message appears, click **Yes**. (**Note** If prompted for Windows 2000 CD-ROM, insert the CD and click **OK**. Type in `E:\I386`, click **OK** and **Finish**. (assuming `E:` is your CD-ROM drive))
7. Click **Finish**.

4.5. Windows XP Driver Installation

For New Windows XP Systems (Fresh Installation)

1. Before installation, copy all the files under directory E:\SATA Raid_4Port\ Sil3114\ Win98_me _2000_xp_nt4.0\driver\ *.* to a blank floppy disk
2. After the *SATA RAID PCI Host Adapter* and attached drives are configured, follow Microsoft procedures to install Windows accordingly.
3. At the **Windows Set-up** screen, press **F6** in order to specify and add the driver.
4. Insert the Driver diskette. Press **S** then press **Enter**.
5. Select **Silicon Image Sil 3114 SATAraid Controller for Windows XP** and press **Enter**.
6. Press **Enter** to continue and follow on-screen instructions to complete Windows XP installation. **Note:** When the **Software Installation** warning pops up, click **Yes**. And when the **Hardware Installation** warning pops up, click **Yes** again.

Add Windows XP Driver on Original Booting Device

1. After the *SATA RAID PCI Host Adapter* and attached drives are configured, boot up Windows.
2. At the **Found New Hardware Wizard**, check **Install from a list or specific location (Advanced)**, then click **Next**.
3. Insert the Driver CD. Check **Include this location in the search**, uncheck the other box, type in **E:**, and click **Browse**.
4. Points specify a location, example **E:\SATA Raid_4Port\Sil3114\Win98_me _2000_xp_nt4.0**, click **OK** then **Next**.
5. When a warning message pops up, click **Continue Anyway**, then click **Finish**.

Verification of the Proper Installation for Windows 2000/XP

1. Double click **My Computer/Control Panel/System**.
2. Click **Hardware** then click **Device Manager**.
3. Double click **SCSI and RAID Controllers**, then double click **Silicon Image Sil 3114 SATAraid Controller** to display driver properties.
4. A message ***This device is working properly*** is displayed in the dialog box, the driver has been correctly installed.



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.