PCIe SATA 6G Raid Card

User Manual

Ver. 1.00

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Contents:

***Chapter 1: Introduction*.....3**

1.1 Product Introduction.....3

1.2 Features.....4

1.3 System Requirements.....5

1.4 Package Contents.....5

***Chapter 2: Getting Started*.....5**

2.1 Hardware Description.....5

2.2 Hardware Installation.....7

2.3 Creating and Managing Virtual Disk.....8

2.3.1 Creating Virtual Disks.....8

2.3.2 Managing Virtual Disks.....19

2.4 Driver and MSU Installation.....28

2.4.1 For Windows OS.....28

2.4.2 For Linux OS.....29

2.5 To Verify Driver Installation (Windows).....29

2.6 Windows RAID Management Utility.....29

2.7 Note For RAID Support Under Linux.....32

Chapter 1: Introduction

1.1 Product Introduction

This board is a single-chip, PCI Express to four SATA Gen III 6Gb/s channels host controller that brings server-class features to the desktop.

This board enables the use of the industry's newest and fastest hard drives at 6Gb/s while providing backward compatibility to legacy SATA 1.5Gb/s or 3Gb/s drives. It uses the same cable and connectors as previous SATA generations to ease integration. Besides, PCI Express 2.0 double the bandwidth of the existing PCI Express bus for faster data throughput. It will enhance system performance for every type of computer user. Each PCI-Express 2.0 lane provides up to 500MB/s of throughput. It also backward compatible with previous generation of PCI Express 1.0 technology.

Using the onboard RAID firmware, the SATA drives attached to this controller can be easily configured as 4 individual ports with no RAID or with RAID 0, RAID 1, RAID 10, HyperDuo.

1.2 Features

- Compliant with PCI-Experss Specification v2.0 and backward compatible with PCI-Express 1.x
- Compliant with Serial ATA Specification 3.0
- PCI Express x2 interface, and compatible with PCI Express x4, x8 and x16 slots
- Supports communication speeds of 6.0Gbps, 3.0Gbps, and 1.5Gbps
- Hot plug and Hot Swap
- Supports Native Command Queuing (NCQ)
- Supports Port Multiplier FIS based switching or command based switching
- Compatible with SATA 6G, 3G and 1.5G Hard Drives
- Support RAID function: RAID 0, RAID 1, RAID 10 and HyperDuo

  Note: Not Supported RAID on PM
- Supports Windows® XP/Vista/7/Server 2008 R2/8, Linux 2.6.x and above

1.3 System Requirements

- PCI Express x4, x8 or x16 slot
- Windows® XP/Vista/7/Server 2008 R2/8, Linux 2.6.x and above

1.4 Package Contents

- 1 x PCIe SATA 6G Raid Card
- 1 x Driver CD
- 1 x User Manual

Chapter 2: Getting Started

2.1 Hardware Description

Note: There are six SATA ports in PCIe SATA 6G Raid Card. We name these ports character A through F. Ports A to D are internal SATA ports and E & F are external eSATA ports. By changing the jumper setting on PCIe SATA 6G Raid Card that allows you to select between external and internal ports to use. By default, port A, B, C and D are working.

Jumper Settings

JP	Description	Active Port
J1-J4	1-2 close	Enable SATA Port A
	2-3 close	Enable eSATA Port E
J5-J8	1-2 close	Enable SATA Port B
	2-3 close	Enable eSATA Port F

Port C and D are always active. With different jumper setting you can active port A, B, E and F by referencing the above table.

2.2 Hardware Installation

1. Turn off the power to your computer.
2. Unplug the power cord and remove your computer's cover.
3. Locate to an empty PCI Express x4, x8, or x16 slot on the motherboard.
4. To install the board, carefully align the card's bus connector with the selected PCIe slot on the motherboard. Push the board down firmly.
5. Attach your internal devices to the PCIe SATA 6G Raid Card.
6. Replace the slot bracket's holding screw to secure the card.
7. Replace the computer cover and reconnect the power cord.

Optional: If connecting external LED indicator to the card, please connect the 2-pin header on the card to the LED.

2.3 Creating and Managing Virtual Disk

2.3.1 Creating Virtual Disks

This section describes the produce for creating virtual disks using the BIOS **Configuration Wizard**.

To create a virtual disk

1. In the **Topology** pane, scroll to **HBA0: Marvell 0** and press Enter to select. A menu pops-up, as shown in Figure 1.

   Select **Configuration Wizard** and press **Enter** to begin creating the virtual disk.

   Figure 1 Configuration Wizard

2. Press **Space** to select/unselect a disk a disk, as shown in Figure 2. Use the arrow keys to scroll the list of free disks.

Figure 2 Select Free Disks

Note: The PCIe SATA 6G Raid Card supports the creation of RAID 0 and RAID 1 virtual disks comprising of exactly two SATA physical disks.

3. After selecting the required disks, press **Enter** to continue, as shown in Figure 3.

Figure 3 Confirm Disk Selection

4. **Create Virtual Disk** by configuring its setting in the **Information** pane, as shown in Figure 4.

   The controls for making selection are listed in the **Help** pane when an available setting is highlighted.

Figure 4 Configure Virtual Disk

Note: Max size (MB) and Disk ID are properties of the virtual disk that cannot be edited. Max size (MB) in the size of the RAID virtual disk as determined by the selected RAID Level. Disk ID lists the IDs of the physical disks comprising the virtual disk.

5. **RAID Level**, as shown in Figure 4, is highlighted when the **Create Virtual Disk** screen is presented. Press **Enter** to select a **RAID Level**. A menu pops-up, as shown in Figure 5, and list lists available RAID levels.
6. Scroll the list, as shown in Figure 5, and press **Enter** to select a **RAID Level** (RAID 0, RAID 1).

Figure 5 RAID Level

Note: The default Level is RAID 0.

7. Scroll to **Stripe Size** and press **Enter** to select.

   A menu pops-up, as shown in Figure 6, and lists available stripe sizes for the selected RAID level.

8. Scroll the list, as shown in Figure 6, and press **Enter** to select **Stripe Size** (32K, 64K)

   Figure 6 Stripe Size

Note: The default size is 64 KB.

9. Scroll to **Gigabyte Rounding** and press **Enter** to select.

   A menu pops-up, as shown in Figure 7, and lists available stripe sizes for the selected RAID level.

10. Scroll the list, as shown in Figure 7, and press **Enter** to select **Gigabyte Rounding** (None, 1G, 10G)

    Figure 7 Gigabyte Rounding

Note: The default setting for Gigabyte Rounding is 1G.

11. Scroll to **Quick Init** and press **Enter** to enable to disable quick initialization of the virtual disk.

    A menu pops-up, as shown in Figure 8, and lists available options for quick initialization of the virtual disk.

12. Scroll the list, as shown in Figure 8, and press **Enter** to select **Quick Init** (Yes, No).

    Figure 8 Quick Init

Note: The default setting for Quick Init is Yes.

13. Scroll to **VD Name** and the Default name is cleared for a new name, as shown in Figure 9.

    Type a new name and press **Enter** to confirm the selection.

    Figure 9 VD Name

14. After configuring the virtual disk, scroll to **Next**, as shown in Figure 10.

    Press **Enter** to create the virtual disk.

    Figure 10 Create Virtual Disk

15. Please **Y** to select **Yes**, as shown in Figure 11, to confirm the creation of the virtual disk. The virtual disk is now listed in the **Topology** pane, as shown in Figure 12.

Figure 11 Create Virtual Disk Confirmation

Figure 12 Virtual Disk in Topology Pane

2.3.2 Managing Virtual Disks

This section contains the following topics:

- Viewing Properties of Virtual Disk
- Erasing RAID Configuration Data
- Rebuilding Virtual Disk
- Deleting Virtual Disk

Viewing Properties of Virtual Disk

To view the properties of a virtual disk, scroll to the **Virtual Disk (VD 0: Default** in Figure 13) in the **Topology** pane. The properties of the virtual disk are displayed in the **Information** pane when **VD 0: Default** is highlighted, as shown in Figure 13.

Figure 13 Virtual Disk Properties: Functional VD

Erasing RAID Configuration Data

Note: The RAID controller stores RAID configuration data on all physical disks that are part of a virtual disk. RAID configuration data must be erased on the physical disk before it can be used with another virtual disk.

1. In the **Topology** pane, select **Physical Disk (VD 0: Default > PD 0: ST3750330MS** in Figure 14) and press **Enter**.

   A menu pops-up, as shown Figure 14.
2. Select **Delete** to delete the virtual disk, as shown in Figure 14.
3. Select **Yes** when prompted to confirm the erase operation.

Figure 14 Erase RAID Configuration Data

Rebuilding Virtual Disk

Note: The PCIe SATA 6G Raid Card BIOS supports manual rebuilding of RAID 1 virtual disks. The rebuild process is both initiated and complete in the BIOS. The Marvell Storage Utility (MSU), which runs in an OS environment, cannot be used to either initiate, resume, or complete the rebuild process. Spare physical disks are not supported.

To manually rebuild a RAID 1 virtual disk

1. When a virtual disk is degraded, the **Status** of a virtual disk is changed from **Functional** to **Degrade**, as shown in Figure 15.

Figure 15 Virtual Disk Properties: Degrade VD

2. Replace the faulty physical disk with an identical physical disk.

   Note: If an identical disk is unavailable, use a replacement physical disk or larger size or one with a slightly smaller size as determined the Gigabyte Rounding setting for the virtual disk.

   The PCIe SATA 6G Raid Card detects the new physical disk and lists the device under Free Physical Disks in the Topology pane, as shown in Figure 16.

   Figure 16 Replace Physical Disk

3. In the **Topology pane**, scroll to **Virtual Disks (VD 0: New_VD** in Figure 17), and press **Enter** to select.

   A menu pops-up, as shown in Figure 17

   Scroll to **Rebuild** and press **Enter** to configure the rebuild process.

   Figure 17 Rebuild Virtual Disk

4. Scroll through the list of free disk, as shown Figure 18, and press **Space** to select or unselect a replacement physical disk.

   Press **Enter** to continue.

   Figure 18 Select Replacement Disk

5. Press **Y** to select **Yes**, as shown in Figure 19, when prompted to confirm the rebuild process.

Figure 19 Confirm Rebuild Virtual Disk

6. The status of the Rebuild process is reflected in the properties of the virtual disk, as shown in Figure 20.

Figure 20 Rebuild Status

To pause the rebuild process

1. In the **Topology** pane, scroll to the partially rebuild **Virtual Disk**.
2. Press **Enter** to view available operation on **Virtual Disk**.
3. Scroll to **Pause** and press **Enter** to pause the rebuild process.

   Note: Incomplete rebuild procedures are paused upon exiting the BIOS. The rebuild procedure(s) can be resumed manually upon re-entering the BIOS.

To pause the rebuild process

1. In the **Topology** pane, scroll to the partially rebuild **Virtual Disk**.
2. Press **Enter** to view available operation on **Virtual Disk**.
3. Scroll to **Resume** and press **Enter** to resume the rebuild process.

   Note: The rebuild process is both initiated and completed in the BIOS. The Marvell Storage Utility (MSU), which runs in an OS environment, cannot be used to either initiate, pause, resume, or complete the rebuild process.

Deleting Virtual Disk

To delete a virtual disk

1. In the **Topology** pane, select **Virtual Disk (VD 0: Default** in Figure 21) and press **Enter**.

   A menu pops-up, as shown Figure 21.
2. Select **Delete** to delete the virtual disk, as shown in Figure 21.
3. Press **Y** to select **Yes** when prompted **Do you want to delete this virtual disk?**
4. Press **Y** to select **Yes** when prompted **Do you want to delete MBR from this virtual disk?**

   Figure 21 Delete Virtual Disk

2.4 Driver and MSU Installation

2.4.1 For Windows OS

1 Insert the provided CD into your CD-ROM drive.

2 At the Windows desktop click Start, then Run.

3 Type D:\PCIe\mv91xx\Setup.exe, then click OK. (Change D: to match your CD-ROM drive letter)

4 Follow the instructions on screen to install the driver. After driver installation is complete, you must restart your computer.

2.4.2 For Linux OS

Linux distributions contain Inbox drivers for AHCI devices. The drivers are installed automatically during the Linux OS installation.

2.5 To Verify Driver Installation (Windows)

1. Right click **My Computer** and click **Manage**.
2. Select **Device Manager**.
3. Look for the following:

   Windows® XP: Double click **SCSI and RAID Controller:**

   -Marvell 92xx SATA 6G Controller should be displayed

   Windows® Vista/7/Server 2008 R2: Double click **Storage controllers:**

   - Marvell 92xx SATA 6G Controller should be displayed

2.6 Windows RAID Management Utility

The Marvell Storage Utility (MSU) is a browse-based RAID management utility for Marvell RAID controllers. It can create and manage RAID virtual disks and arrays, using storage and enclosure

devices connected to the RAID controller. This chapter provides an introduction to MSU and an overview of its user interface.

1. The MSU System Tray application is available on Windows OS and appears as an icon in the system tray. Clicking this icon launches the MSU in your default browser.

2. When opening MSU in some versions Windows, Internet Explorer may detect a problem with the security certificate for the MSU web page. Select **Continue to this website (not recommended)** to continue opening MSU.

3. When MSU opens, it prompts for the user's operating system (or network) credentials. Users with administrator privileges are granted full read/modify permission in MSU. Users without administrator privileges are granted view-only permission in MSU.

4. User can manage or create a virtual disk over this utility.

2.7 Note For RAID Support Under Linux

As an add-in card for an existing Operating System installation with hard drives used for the purpose of additional storage. RAID can be configured from the drives connected to this controller using Linux software RAID utilities such as MDADM, or LVM/LVM2. We will NOT provide technical support on how to configure the hard drive and also how to create RAID sets in Linux.