



# **4 Channel 6-Port SATA 6Gb/s PCIe RAID Host Card**

## **User Manual**

**Model: UGT-ST644R**

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# 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 is also backward compatible with previous generation of PCI Express 1.0 technology.

Using the onboard RAID firmware, the 4 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, and HyperDuo.

## ***1.2 Features***

- Compliant with PCI-Express 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
- Supports Windows® XP/Vista/7/8 and Server 2008 R2

## ***1.3 System Requirements***

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

## ***1.4 Package Contents***

- 1 x 4 Channel 6-Port SATA 6Gb/s PCIe RAID Host Card
- 1 x Driver CD
- 1 x User Manual
- 1 x Low Profile Bracket
- 2 x SATA Cables

# Chapter 2: Getting Started

## 2.1 Hardware Layout

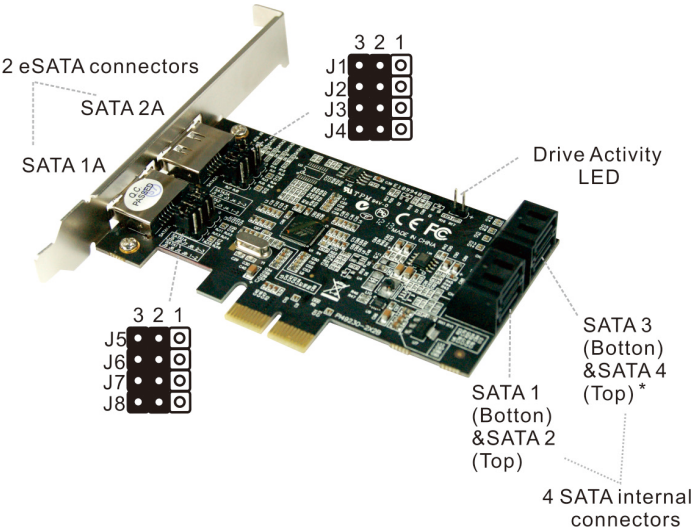


Figure 1: Layout

**\*Note:** The internal SATA 3 and SATA 4 connectors are dedicated channels, they can not be disabled.

## Jumper Settings

Refer to **Figure 1** for the positions of each connectors. **SATA 1, 2** and **SATA 1A, 2A** are interchangeable. Follow the instructions in **Table 1** to configure the jumper.

<i><b>Output Type</b></i>	<i><b>Output connectors</b></i>	<i><b>Description</b></i>	
4 internal output	SATA 1, SATA 2, SATA 3, SATA 4	J1-J8 1-2 short	
2 internal + 2 external output	SATA 3, SATA 4, SATA 1A, SATA 2A	J1-J8 2-3 short	
3 internal + 1 external output	SATA 2, SATA 3, SATA 4, SATA 1A	J1-J4 1-2 short J5-J8 2-3 short	
	SATA 1, SATA 3, SATA 4, SATA 2A	J1-J4 2-3 short J5-J8 1-2 short	

**Table 1: Jumper Settings**

## *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 4 Channel 6-Port SATA 6Gb/s PCIe RAID Host Card.
6. Replace the slot bracket's holding screw to secure the card.
7. Secure the computer cover and reconnect the power cord.

## *2.3 Creating and Managing Virtual Disk*

### *2.3.1 Creating Virtual Disks*

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

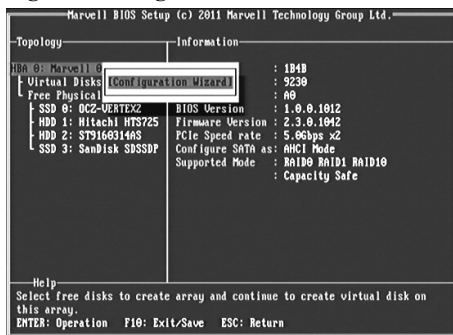
**Press <Ctrl>+<M> to enter Marvell BIOS Setup**

## 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.

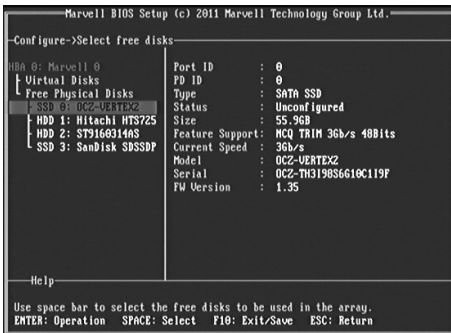
**Figure 1 Configuration Wizard**



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.

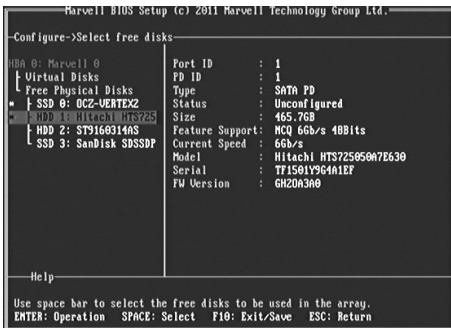
**Figure 2 Select Free Disks**





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

**Figure 3 Confirm Disk Selection**

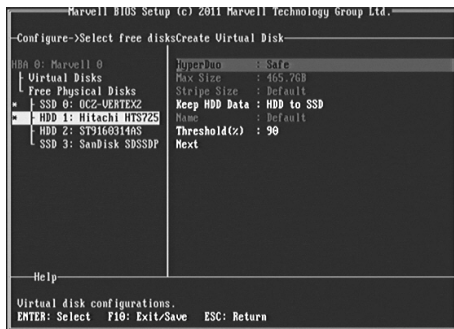


4. **Create Virtual Disk** by configuring its setting in the **Information**

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**

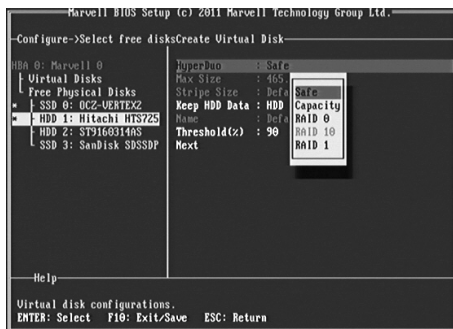


**Note:** Max size (MB) and Disk ID are properties of the virtual disk that cannot be edited. Max size (MB) is the size of the RAID virtual disk as determined by the selected RAID Level. Disk ID lists the IDs of the physical disks comprising the virtual disk.

5. **RAID Level**, as shown in Figure 5, 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 showing a list of available RAID levels.

6. Scroll the list, as shown in Figure 5, and press **Enter** to select a **RAID Level** (HyperDuo Safe, HyperDuo Capacity, RAID 0, RAID 10, RAID 1).

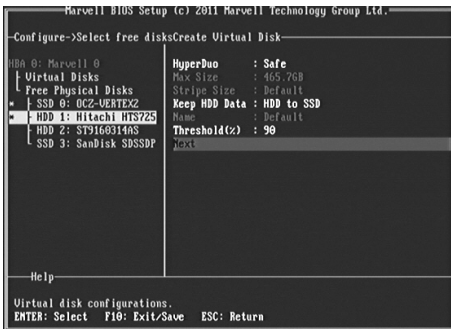
**Figure 5 RAID Level**



**Note:** The default Level is HyperDuo Safe.

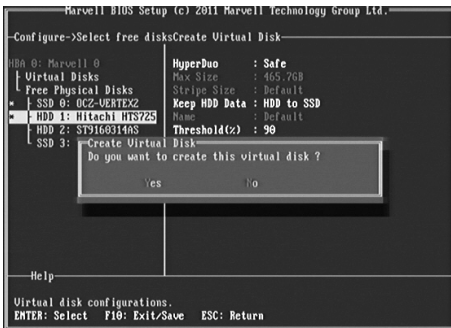
7. After selecting the raid level, scroll to **Next**, as shown in Figure 6. Press **Enter** to create the virtual disk.

**Figure 6 Create Virtual Disk**

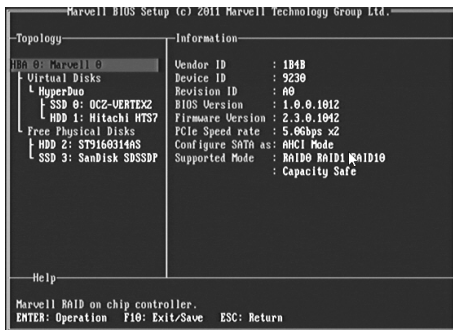


8. Please **Y** to select **Yes**, as shown in Figure 7, to confirm the creation of the virtual disk. The virtual disk is now listed in the **Topology** pane, as shown in Figure 7.

### Figure 7 Create Virtual Disk Confirmation



**Figure 8 Virtual Disks in Topology Pane**



### ***2.3.2 Managing Virtual Disks***

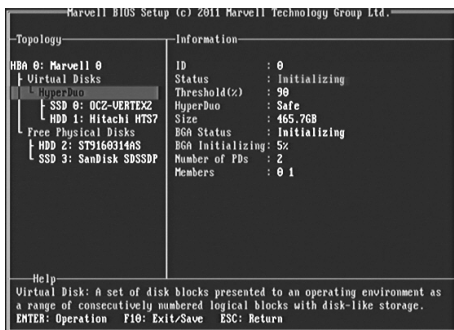
This section contains the following topics:

- 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 (HyperDuo** in Figure 9) in the **Topology** pane. The properties of the virtual disk are displayed in the **Information** pane when **HyperDuo** is highlighted, as shown in Figure 9.

**Figure 9 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.

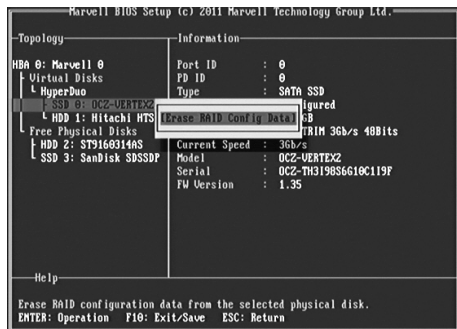
1. In the **Topology** pane, select **HyperDuo (HyperDuo > SSD 0:**

**OCZ-VERTEX2** in Figure 10) and press **Enter**.

A menu pops-up, as shown Figure 10.

2. Select **Erase RAID Config Data** to delete the virtual disk, as shown in Figure 10.
3. Select **Yes** when prompted to confirm the erase operation.

### Figure 10 Erase RAID Configuration Data



## Rebuilding Virtual Disk

**Note:** The 4 Channel 6-Port SATA 6Gb/s PCIe RAID Host Card BIOS supports manual rebuilding of RAID 1 virtual disks. The rebuild process is both initiated and complete in the BIOS. The Marvell RAID Utility (MRU), which runs in an OS environment, CANNOT be used

to 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 11.

**Figure 11 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 4 Channel 6-Port SATA 6Gb/s PCIe RAID Host Card detects the new physical disk and lists the device under Free Physical



Disks in the Topology pane, as shown in Figure 12.

**Figure 12 Replace Physical Disks**

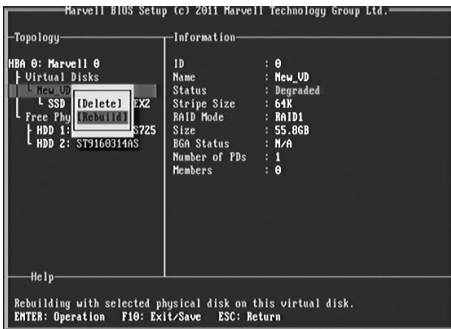


3. In the **Topology** pane, scroll to **Virtual Disks (VD 0: New\_VD** in Figure 13), and press **Enter** to select.

A menu pops-up, as shown in Figure 13

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

**Figure 13 Rebuild Virtual Disk**



4. Scroll through the list of free disk, as shown Figure 14, and press **Space** to select or unselect a replacement physical disk. Press **Enter** to continue.

**Figure 14 Select Replacement Disk**



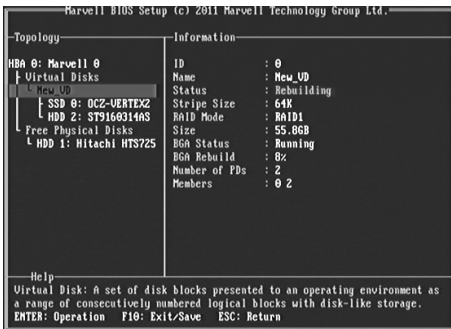
5. Press **Y** to select **Yes**, as shown in Figure 15, when prompted to confirm the rebuild process.

**Figure 15 Confirm Rebuild Virtual Disk**



6. The status of the Rebuild process is reflected in the properties of the virtual disk, as shown in Figure 16.

**Figure 16 Rebuild Status**



## Deleting Virtual Disk

### To delete a virtual disk

1. In the **Topology** pane, select **Virtual Disk (New\_VD** in Figure 17) and press **Enter**.  
A menu pops-up, as shown Figure 17.
2. Select **Delete** to delete the virtual disk, as shown in Figure 17.
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 17 Delete Virtual Disk**



## ***2.4 Driver Installation***

1. Please insert the CD driver bundle with the 4 Channel 6-Port SATA 6Gb/s PCIe RAID Host Card into your CD-ROM drive.
2. At the Windows desktop, click **Start**, then click **Run**.
3. Type **D:\UGT-ST644R\Windows\Setup.exe**, click **OK**. (Change **D:\** to match your CD-ROM drive letter)
4. Follow the on-screen instructions to complete the installation.
5. Restart Windows to complete the installation.

## ***2.5 To Verify Driver Installation***

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/7/8/Server 2008 R2:** Double click **Storage controller:**  
- **Marvell 92xx SATA 6G Controller** should be displayed

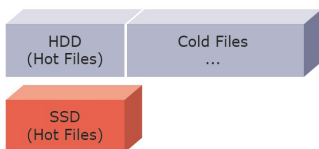
## ***2.6 What is HyperDuo?***

HyperDuo is a technology created by Marvell Semiconductor, Inc. to optimize the performance of storage technology. This technology is built in to the UGT-ST644R card. It involves the combination of SSD as cache storage for the HDD drive to give unparalleled access speed. This tiering of SSD and HDD can give you 80% SSD performance at about the a third of the cost. Using safe mode, you mirror frequently access (hot files) in SSD speed and in Capacity mode, you combination SSD and HDD together with frequently access (hot files) in the SSD. You can easily setup the configuration in the card BIOS to optimize your system.

Minimum Requirement: one SSD and one HDD.

It can be setup in two modes of operation.

- Safe Mode –Mirror SSD DATA to HDD



- Capacity Mode – Add SSD and HDD Capacities together

