



4 Channel, 2 mSATA + 2 SATA 6Gb/s RAID Card with HyperDuo

User Manual

Model: UGT-MST644R

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Chapter 1: Introduction

1.1 Features

- Two 7Pin SATA connectors and two mSATA (mini PCIe) socket on board
- Mounts two mSATA SSDs onboard and two SATA HDDs connectors
- 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
- HyperDuo technology to maximum SSD performance
- Support TRIM to extend SSD durability
- Hot plug and Hot Swap on SATA connection
- Supports Port Multiplier FIS/CBS and Native Command Queuing (NCQ)
- Support ATA and ATAPI commands

- Compatible with SATA III/II/I Hard Drives
- Support RAID function: RAID 0, RAID 1, RAID 10 and HyperDuo

1.2 System Requirements

- PCI Express x4, x8 or x16 slot
- Windows® XP/Vista/7/8/8.1

1.3 Package Contents

- 1 x 4 Channel, 2 mSATA + 2 SATA 6Gb/s RAID Card with HyperDuo
- 1 x Driver CD
- 1 x Installation Guide
- 2 x SATA Cables
- 1 x Low Profile Bracket

Chapter 2: Getting Started

2.1 Hardware Layout

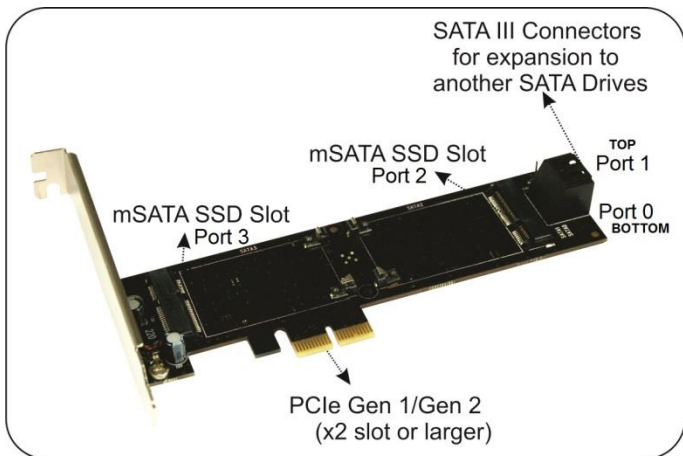


Figure 1

2.2 Hardware Installation

1. Verify the package contents to make sure you have everything that you need to install this mSATA + SATA PCIe RAID Card.

2. This mSATA + SATA PCIe RAID card comes standard with the full height bracket installed, if you are using a low profile system (Slim Line system), please replace the bracket with the provided low profile bracket by first removing the two screws holding the full height bracket, replace the bracket with the low profile bracket and secure the screws back on the card.
3. Turn off the power to your computer, unplug the power cord and remove the cover of the computer system.
4. Remove the slot bracket from an available PCI-Express x4 (x8, x16) slot.
5. Attach your SATA devices to the mSATA + SATA PCIe RAID Card.
6. To install the card, carefully align the card's bus connector with the selected PCIe slot on the motherboard. Push the board down firmly.
7. Replace the slot bracket's holding screw to secure the card.
8. Secure the computer cover; reconnect the power cord and power ON the system.
9. Once the computer is powered ON, proceed with the setup of the configuration and installation of the drivers.

10. If you are setting up RAID configuration, continue with section “**2.3 Creating and Managing Virtual Disk**” and “**2.4 Driver Installation**”. If you are not setting up any RAID function, you can proceed to section “**2.4 Driver Installation**”.

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**.

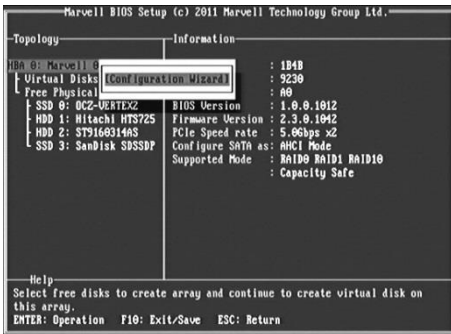
During the initial boot, before the windows logo is displayed,

Press <Ctrl>+<M> to configure the Marvell BIOS Setup

To create a virtual disk

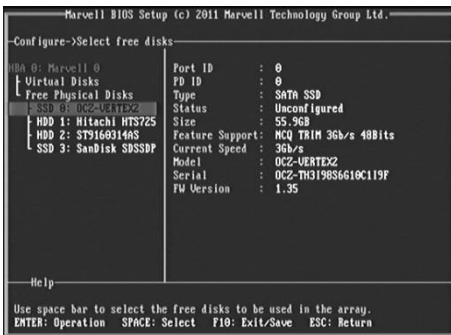
1. In the **Topology** pane, scroll to **HBA0: Marvell 0** and press Enter to select. A menu pops-up, as shown in Figure 2.
Select **Configuration Wizard** and press **Enter** to begin creating the virtual disk.

Figure 2 Configuration Wizard



2. Press **Space** to select/unselect a disk a disk, as shown in Figure 3. Use the arrow keys to scroll the list of free disks.

Figure 3 Select Free Disks



3. After selecting the required disks, press **Enter** to continue, as shown in Figure 4.

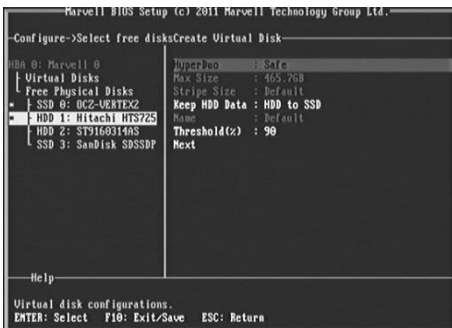
Figure 4 Confirm Disk Selection



4. **Create Virtual Disk** by configuring its setting in the **Information** pane, as shown in Figure 5.

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

Figure 5 Configure Virtual Disk

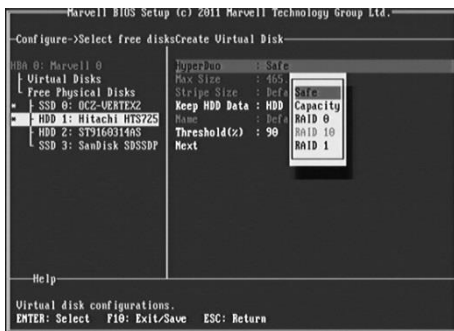


Note: Max size (MB) and Disk ID are properties of the virtual disk

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

Figure 6 RAID Level



Note: The default Level is HyperDuo Safe.

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

Figure 7 Create Virtual Disk

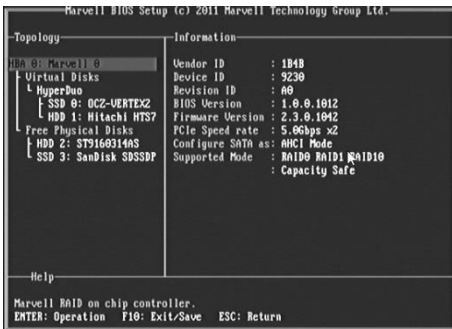


8. Please **Y** to select **Yes**, as shown in Figure 8, to confirm the creation of the virtual disk. The virtual disk is now listed in the **Topology** pane, as shown in Figure 9.

Figure 8 Create Virtual Disk Confirmation



Figure 9 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 10) in the **Topology** pane. The properties of the

virtual disk are displayed in the **Information** pane when **HyperDuo** is highlighted, as shown in Figure 10.

Figure 10 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 11) and press **Enter**.

A menu pops-up, as shown Figure 11.

2. Select **Erase RAID Config Data** to delete the virtual disk, as shown in Figure 11.

3. Select **Yes** when prompted to confirm the erase operation.

Figure 11 Erase RAID Configuration Data



Rebuilding Virtual Disk

Note: The mSATA + SATA PCIe Card BIOS support 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 12.

Figure 12 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 mSATA + SATA PCIe RAID Card detects the new physical disk and lists the device under Free Physical Disks in the Topology pane, as shown in Figure 13.

Figure 13 Replace Physical Disks



- In the **Topology** pane, scroll to **Virtual Disks (VD 0: New_VD** in Figure 14), and press **Enter** to select.

A menu pops-up, as shown in Figure 14

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

Figure 14 Rebuild Virtual Disk

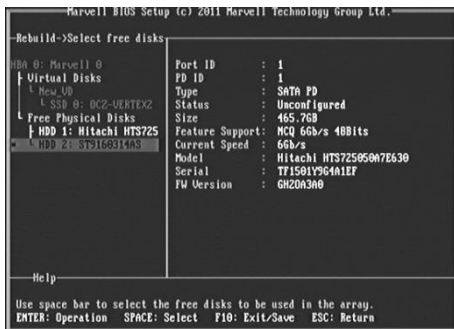


- Scroll through the list of free disk, as shown Figure 15, and press

Space to select or unselect a replacement physical disk.

Press **Enter** to continue.

Figure 15 Select Replacement Disk



5. Press **Y** to select **Yes**, as shown in Figure 16, when prompted to confirm the rebuild process.

Figure 16 Confirm Rebuild Virtual Disk



- The status of the Rebuild process is reflected in the properties of the virtual disk, as shown in Figure 17.

Figure 17 Rebuild Status



Deleting Virtual Disk

To delete a virtual disk

- In the **Topology** pane, select **Virtual Disk (New_VD** in Figure 18) and press **Enter**.
A menu pops-up, as shown Figure 18.
- Select **Delete** to delete the virtual disk, as shown in Figure 18.
- Press **Y** to select **Yes** when prompted **Do you want to delete this virtual disk?**
- Press **Y** to select **Yes** when prompted **Do you want to delete MBR from this virtual disk?**

Figure 18 Delete Virtual Disk



2.4 Driver Installation

1. Please insert the CD driver bundle with this mSATA RAID Card into your CD-ROM drive.
2. At the Windows desktop, click **Start**, then click **Run**.
3. Type **D:\UGT-MST644R\Setup.exe**, click **OK**. (Change **D:** to match your CD-ROM drive letter)
4. Follow the on-screen instructions to complete the installation. 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/7/8/8.1: Double click **Storage controller:**

- **Marvell 92xx SATA 6G Controller** should be displayed

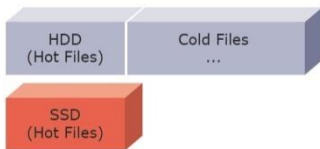
2.6 What is HyperDuo?

HyperDuo is a technology created by Marvell Semiconductor, Inc. to optimize the performance of storage technology. This technology is built in to the UGT-MST644R 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

