

## Thunderbolt 2™ 4-Bay 3.5" SATA Hard Drive Enclosure with RAID

S354SMTB2R



\*actual product may vary from photos

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- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help

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 operation.

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## Industry Canada Statement

This Class B digital apparatus complies with Canadian ICES-003.

Cet appareil numérique de la classe [B] est conforme à la norme NMB-003 du Canada.

CAN ICES-3 (B)/NMB-3(B)

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# Table of Contents

<b>Introduction</b> .....	<b>1</b>
Packaging Contents .....	1
Recommended System Requirements.....	1
<b>Product Diagram</b> .....	<b>2</b>
Front View .....	2
Rear View.....	2
<b>Getting Started</b> .....	<b>3</b>
Step 1. Installing your hard drives.....	3
Step 2. Connect the Thunderbolt Enclosure to your computer system.....	6
Step 3. Your Thunderbolt Enclosure is now ready to use!.....	7
Step 4 Install the RAID management software for hardware RAID configuration .....	8
<b>Software Installation</b> .....	<b>9</b>
Mac OSX .....	9
Windows 8/8.1, 7, Vista (32/64 bit).....	10
<b>Software Operation</b> .....	<b>12</b>
Create a RAID Array .....	12
Create a HyperDuo Array .....	15
Managing Your Array .....	17
<b>Technical Support</b> .....	<b>22</b>
<b>Warranty Information</b> .....	<b>22</b>

# Introduction

## Packaging Contents

- 1 x Thunderbolt 4-bay 3.5 in. hard drive RAID enclosure
- 1 x 2m Thunderbolt cable
- 3 x Allen keys
- 1 x universal power adapter (NA/JP, EU, UK, ANZ)
- 1 x instruction manual

## Recommended System Requirements

- 1X Computer system with:
  - Available Thunderbolt port
  - Apple® Mac® OSX
  - Microsoft® Windows 8/8.1, Server 2008 R2 (32/64-bit)
- 4X 3.5" SATA Hard Drives

**Note:** 2.5" hard drives or solid state drives are supported when installed using a 2.5in to 3.5in drive adapter (sold separately)

# Product Diagram

## Front View

1. Drive Door
2. Drive LEDs
3. Faceplate screws



## Rear View

1. Built-in drive fan
2. Power switch
3. Power adapter port
4. Thunderbolt ports



# Getting Started

## Step 1. Installing your hard drives.

### **WARNING:**

Hard drives and storage enclosures require careful handling, especially when being transported. If you are not careful with your hard disk, lost data may result. Always handle your hard drive and storage device with caution. Be sure that you are properly grounded by wearing an anti-static strap when handling computer components or discharge yourself of any static electricity build-up by touching a large grounded metal surface (such as the computer case) for several seconds.

1. Using the included Allen key, remove the four screws from the front faceplate of the Hard Drive Enclosure.



2. Grasp the drive door and gently pull it outward to reveal the drive bays.



3. On each of your four 3.5in hard drives, place HDD mounting brackets from each of your HDD mounting kits on either side of the drives, aligning the pegs with the hard drive mounting holes. Then with your hard drive labels facing upward, slide each of your four 3.5in hard drives into an available drive bay with the SATA connector facing inward, using the HDD bracket to align the slot.



4. Place the drive door back over the drive bays so that the four screw holes are lined up.



5. Using the included Allen key, drive each of the four screws back into the enclosure through the front place plate.



## Step 2. Connect the Thunderbolt Enclosure to your computer system.

1. Connect the included Thunderbolt cable from one of the Thunderbolt ports on the back of the enclosure, to an available Thunderbolt port on your computer system.



### Notes:

- **Either Thunderbolt port may be used to connect the enclosure to the host computer system. The remaining Thunderbolt port may be used to daisy chain to an additional device such as another enclosure, or Display.**
  - **If daisy chaining Thunderbolt 1 devices, please ensure the Thunderbolt Hard Drive Enclosure is the first down stream device, as Thunderbolt 2 performance will be throttled by a Thunderbolt 1 device.**
2. Connect your power adapter from the power adapter port on the back of the enclosure into an available power outlet.
  3. Turn on the enclosure, by placing the power switch in the "ON" position .



### Step 3. Your Thunderbolt Enclosure is now ready to use!

The hard drives installed in your Thunderbolt Enclosure will now appear in your computer systems just as if they were installed internally.



#### Notes:

- **The Thunderbolt Enclosure supports Hardware RAID. By default the Thunderbolt enclosure is configured for JBOD RAID operation.**

## Step 4 (Optional). Install the RAID management software (Marvell Storage Utility or MSU) on your computer to configure Your Thunderbolt Enclosure for Hardware RAID operation.

**Note:** The Thunderbolt enclosure also supports software RAID configured within the Windows and Mac OSX operating systems.

### Supported Hardware RAID modes:

#### **JBOD**

In JBOD, no RAID configuration is set and all drives appear as individual disks.

#### **RAID1**

In RAID1 two drives appear as an individual disk and data is written identically to both. This level protects your data from individual drive failure as a backup of all data is written instantly.

#### **RAID0**

In RAID0 two drives appear together as a larger individual disk the size of both drives combined. This level can improve your performance as read and write operations are performed in parallel on separate disks.

#### **RAID 1+0**

In RAID 1+0 two drives appear together as a larger individual disk the size of both drives combined, with the added benefit of improved performance. However, the data is then backed up to the remaining two drives for added security.

#### **Hyper Duo**

The HyperDuo can quickly access data from a Solid-State Drive (SSD), while safely storing all remaining data on SATA Hard Drives (HDD) with larger capacities, allowing for SSD performances at HDD capacity levels.

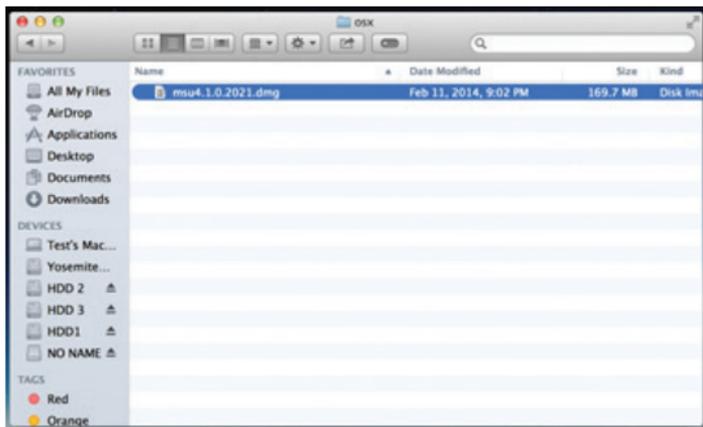
# Software Installation

## Mac OSX

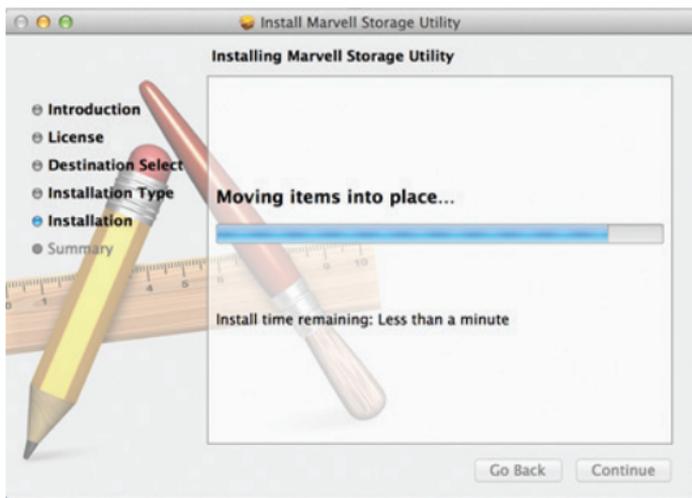
1. Download the RAID Management Tool (MSU) from: [StarTech.com/Support](http://StarTech.com/Support)

The screenshot shows the StarTech.com website's Support page. At the top, there is a navigation bar with the StarTech.com logo, phone number (1 800 265 1844), and a search bar. Below the navigation bar, there are links for Home, Reseller Area, Drivers & Downloads, Sales & Support, Tools & Guides, Blog, University, About, Contact, and Where To Buy. A 'Click to CHAT LIVE with an Advisor' button is visible on the left. The main content area is titled 'Sales & Technical Support' and includes sections for Sales Support and Technical Support. The Sales Support section provides information about pre-sales support and contact options. The Technical Support section provides information about technical resources and links to a Technical Support Inquiry Form, Product Manual and Driver Downloads, and Return Merchandise Authorization (RMA).

2. Open the **“osx”** folder from the main directory and launch the **smu4.1.0.2021** installer file. Then double click the msu installer package.



3. The windows installation wizard will walk you through the remaining installation steps. To complete the installation, click the **Next** button on each window, and accept the License Agreement when displayed.

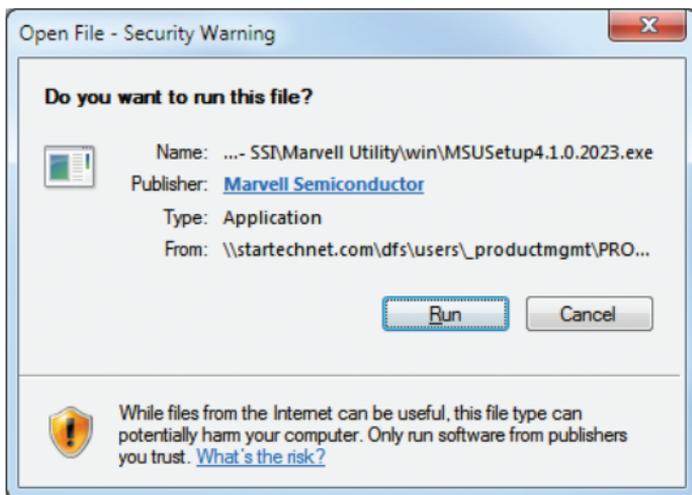


- Once installation is complete, click the **Finish** button. The Marvell Storage Utility has now been installed.

## Windows 8/8.1, 7, Vista (32/64 bit)

- Download the RAID Management Tool from: [StarTech.com/Support](http://StarTech.com/Support)

- Open the **“Win”** folder from the main directory and launch the **MSUSetupX.X.XXXX(.exe)** setup file. You may receive a Windows Security Warning alerting you that the application has been launched. Click **Run**.



3. The windows installation wizard will walk you through the remaining installation steps. To complete the installation, click the **Next** button on each window, and accept the License Agreement when displayed.



4. Once installation is complete, click the **Finish** button. The Marvell Storage Utility has now been installed.



## Software Operation

The Marvell Storage Utility (MSU) is a browser-based management utility that can create and manage RAID and HyperDuo virtual disks using your Thunderbolt hard drive enclosure.

**Note: Active Scripting or JavaScript must be enabled in your default web browser.**

### Create a RAID Array

#### **WARNING!**

**In order to prepare your drives for RAID operation, this enclosure will configure newly installed drives into your desired RAID configuration. Please be aware that any data currently on the drives may be lost during this process. It is recommended that you back up all data prior to setting your RAID configuration.**

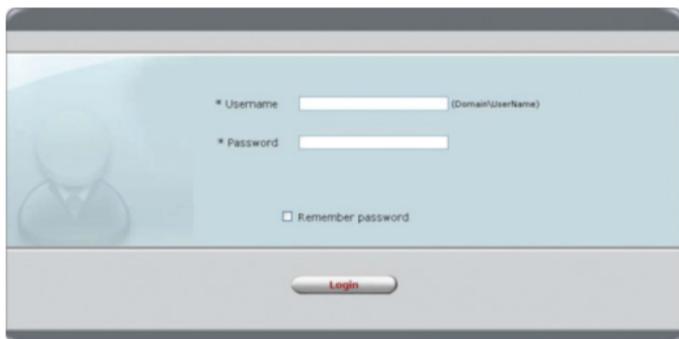
1. Launch the MSU software using the icon on your desktop.



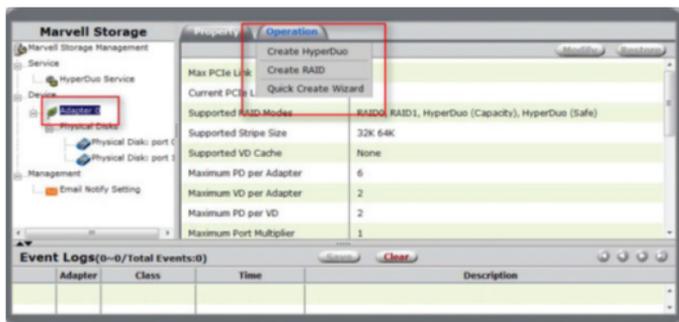
2. Once the application window is opened you will need to login.
  - a) Windows users require their Windows account user name and password to login.

b) Mac OSX users require their User name and password to login.

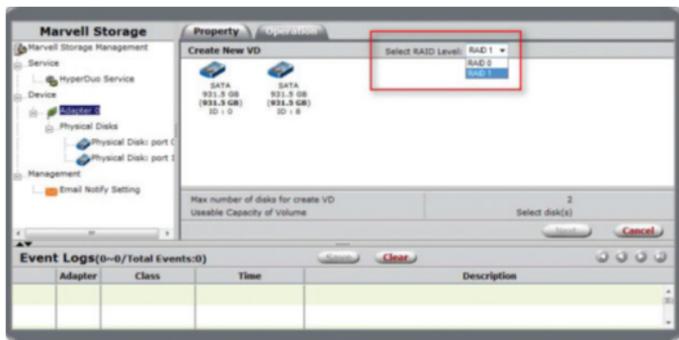
**Note: In Mac OSX there are two user names: a friendly username, and an actual user name. Please note that the actual user name is required to login.**



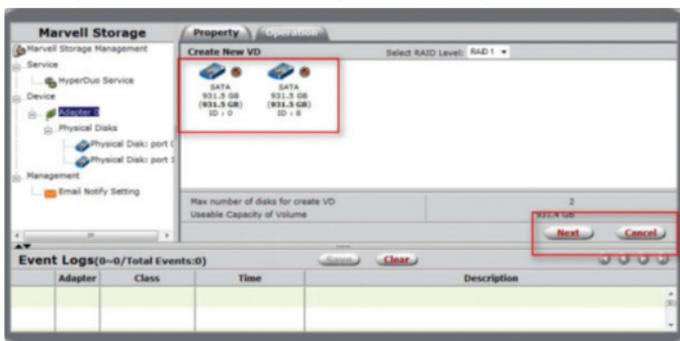
3. Select Adapter from the Marvell Storage menu, then hover-over the operation tab, and select Create RAID.



4. The Create New VD window is now displayed, using the Select RAID Level drop down menu choose your desired RAID mode.

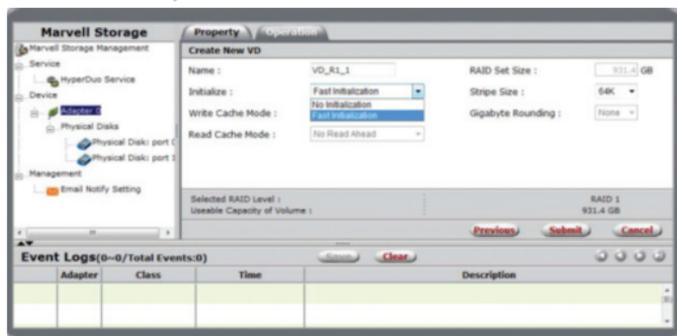


5. Your physically installed hard drives will be represented on the Create New VD Window. Select each drive you would like included in your RAID array. Then click the Next Button.

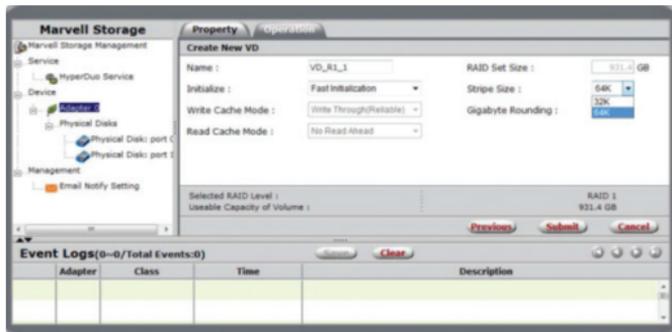


**Note: The Next button will not be selectable, until the correct number of physical hard drives have been selected to build your desired array.**

6. A default name will now be assigned to your RAID array. If you would like to rename the array, click the Name field and type your desired name. Then Select the Initialization method for your choice.

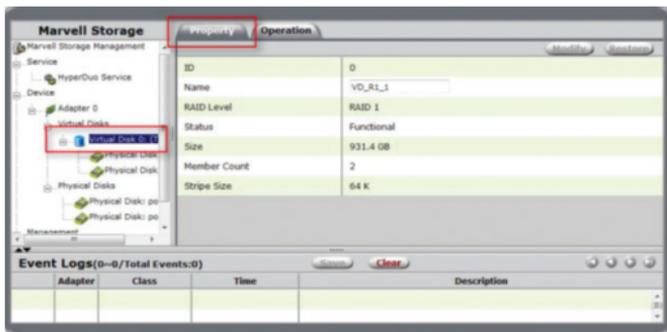


7. Next, select your desired stripe size using the Stripe size drop down menu. Then click the submit button.



**Note: a number of advanced customizable options can also be changed such as Name, Initialize setting, Cache Modes, RAID Set Size, Stripe Size, and Gigabyte Rounding (It is recommended that they are left as their defaults).**

8. Your RAID array has now been created. The Property tab will now be displayed for your newly created RAID array.



## Create a HyperDuo Array

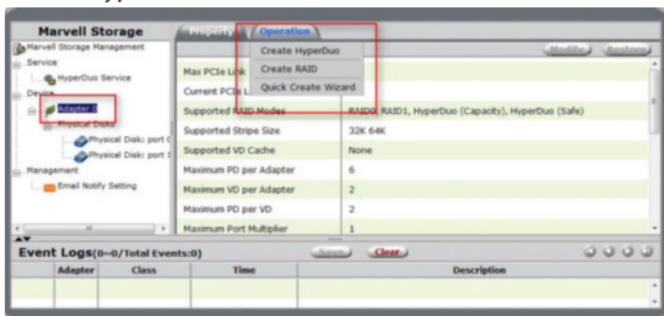
### WARNING!

**In order to prepare your drives for HyperDuo operation, this enclosure will configure newly installed drives into HyperDuo configuration. Please be aware that any data currently on the drives may be lost during this process. It is recommended that you back up all data prior to setting your HyperDuo configuration.**

1. Launch the MSU software using the icon on your desktop, and login.

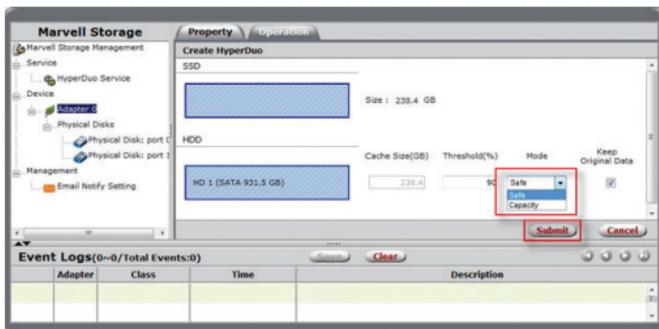


2. Select Adapter from the Marvell Storage menu, then hover-over the operation tab, and select Create HyperDuo.



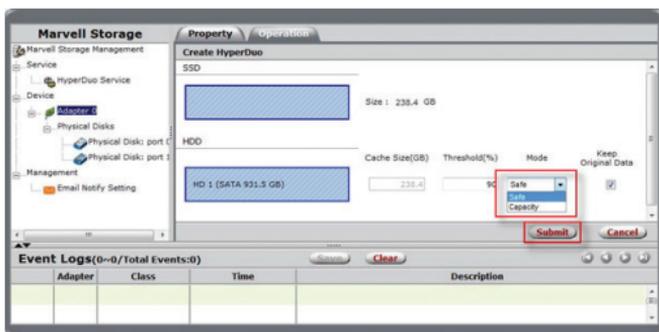
3. The Create HyperDuo Screen is now displayed. Using the Mode drop down menu, select Safe or Capacity depending on your desired mode (a description for both modes is listed below) then click the submit button.

Mode	Description
Safe	Creates an array for optimal fault tolerance.
Capacity	Creates an array for optimal performance. (Capacity Mode will delete all content currently saved on your drives)



**Note: (Safe only)** If you would like to keep the data on your hard drive ensure the **Keep Original Data** box is checked.

4. Click the Submit button.



5. Your HyperDuo array will now be created. The Property tab will now be displayed for your newly created HyperDuo array.

**Note: It can take up to 30 minutes for the HyperDuo array to be created.**

# Managing Your Array

## View Properties of your RAID/HyperDuo Array

1. Launch the MSU software using the icon on your desktop, and login.

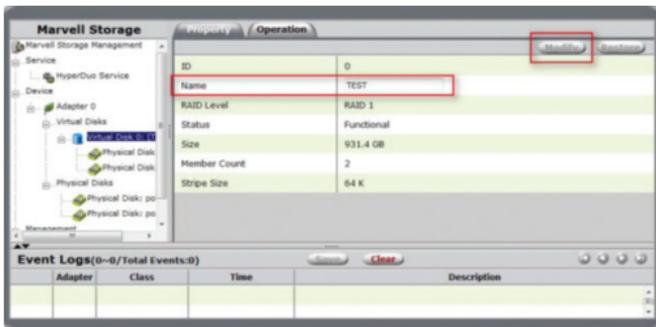


2. Select your desired array from list of Virtual Disks in the Marvell Storage Menu. The Property tab is now displayed, listing the Properties for your array.



## Rename Your Array

1. To rename your Array select the Name field on the Property tab and type your desired Name in the field. Then click the Modify button.



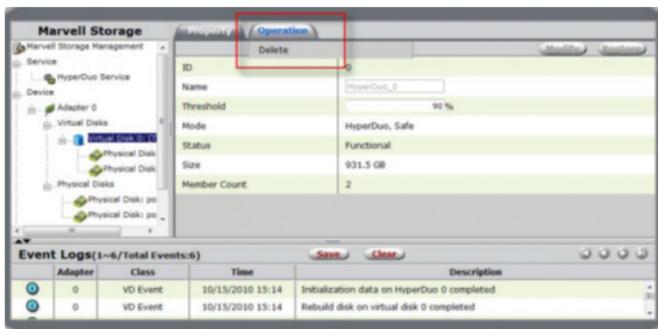
2. Your Array has now been renamed.

## Delete Your Array

### WARNING!

Deleting your RAID array permanently erases any data on your virtual disk. However, you can choose to keep partition information on the virtual disk.

1. Hover-over the Operation tab at the top of the Property page and select Delete.



2. A warning will be displayed alerting you that all data on the virtual disk will be erased. Select OK to acknowledge the warning.
3. An additional pop-up message warning you that drive data will be lost is displayed. Click Ok continue.
4. A message will now be displayed asking: Do you want to delete the partition information if this has one? Click OK to delete the partition information or Cancel to keep the partition information stored on the drive

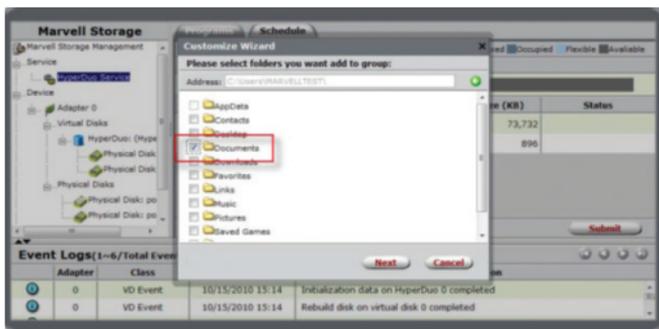
## Customize Your HyperDuo Array

### Add Folders for HyperDuo Optimization

1. Launch the MSU software using the icon on your desktop, and login.



2. Select HyperDuo Service from the Marvell Storage menu, then select Advanced. The customize Wizard will be displayed.



3. Navigate through the folders and place a check next to the folders you would like to add.

**Note:** You can navigate into each folder by clicking the folder name. Or return to the parent directory by clicking the green button with white arrow.

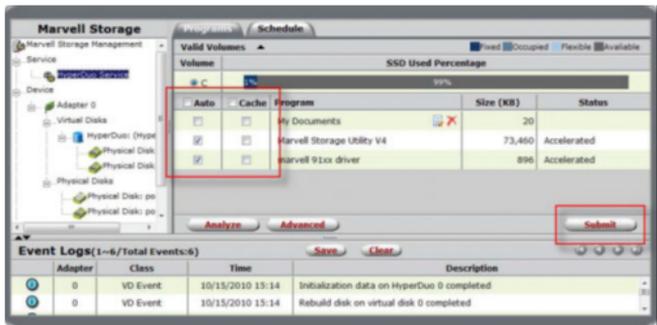
4. Click Next to add selected folders.
5. Review the folders and click the red X beside a folder or file to remove it.
6. Click the submit button to save changes.

### Change Method of Optimization

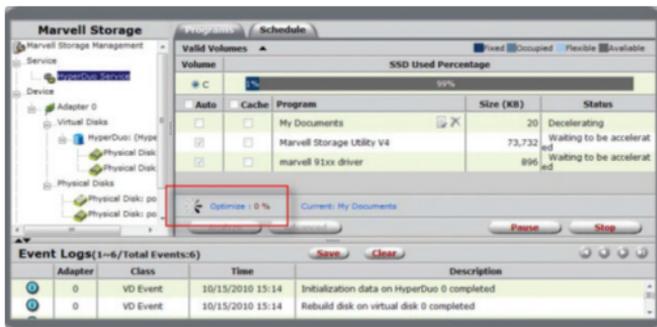
1. Launch the MSU software using the icon on your desktop, and login.
2. Select HyderDuo Service from the Marvell Storage menu.
3. Place a check in your desired method for optimization. A description of each optimization method is listed below.

Mode	Description
Auto	Select Auto to have the Software manage the optimization of a folder or program.
Cache	Select Cache to manually select a folder or program for optimization.
Neither	Select neither to specify that a folder or program should never be optimized.

- Click Submit to save your changes.



- An alert window will be displayed, click OK to begin the optimization process.

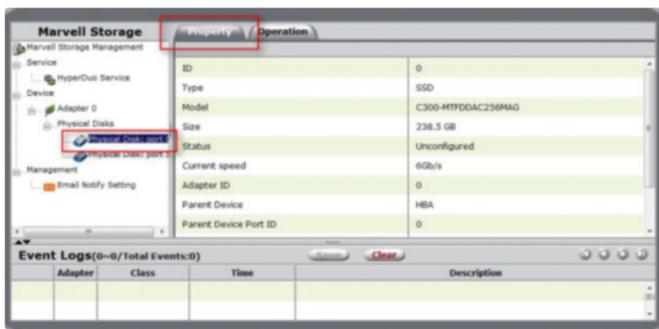


## View Properties of your Physical Hard Drives

- Launch the MSU software using the icon on your desktop, and login.



- Select your desired physical disk from list of Physical Disks in the Marvell Storage Menu. The Property tab is now displayed, listing the Properties for your disk.



**Note:** Your physical disk properties cannot be edited.

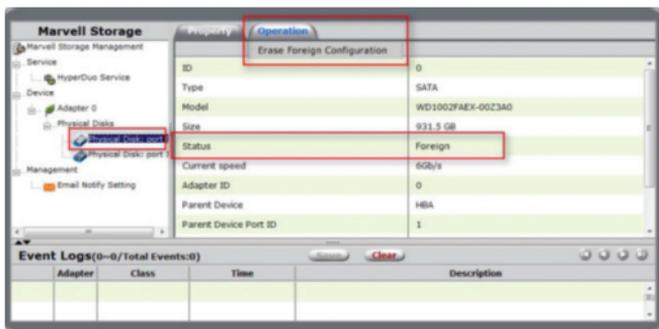
## Erase Foreign RAID Configuration

### WARNING!

When erasing previously configured RAID Data, this enclosure will erase all drive data. Please be aware that any data currently on the drives will be lost during this process. It is recommended that you back up all data prior to erasing previously configured RAID data.

RAID controllers store data on any drive within a RAID array. If your drives have been previously configured in a different RAID array, this data must be deleted before a new array can be built. Please follow the below steps to erase previously configured RAID data.

1. Select your desired physical disk from list of Physical Disks in the Marvell Storage Menu. Hover-over the Operation tab and select Erase Foreign Configuration.



2. Your previously installed RAID data will now be deleted.

# Technical Support

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For the latest drivers/software, please visit [www.startech.com/downloads](http://www.startech.com/downloads)

## Warranty Information

This product is backed by a two year warranty.

In addition, StarTech.com warrants its products against defects in materials and workmanship for the periods noted, following the initial date of purchase. During this period, the products may be returned for repair, or replacement with equivalent products at our discretion. The warranty covers parts and labor costs only. StarTech.com does not warrant its products from defects or damages arising from misuse, abuse, alteration, or normal wear and tear.

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