

RocketStor 6414AS User Manual



January 15th, 2016
Revision 1.4
HighPoint Technologies, Inc.

Copyright

Copyright © 2016 HighPoint Technologies, Inc. This document contains materials protected by International Copyright Laws. All rights reserved. No part of this manual may be reproduced, transmitted or transcribed in any form and for any purpose without the express written permission of HighPoint Technologies, Inc.

Trademarks

Companies and products mentioned in this manual are for identification purpose only. Product names or brand names appearing in this manual may or may not be registered trademarks or copyrights of their respective owners. Backup your important data before using HighPoint's products and use at your own risk. In no event shall HighPoint be liable for any loss of profits, or for direct, indirect, special, incidental or consequential damages arising from any defect or error in HighPoint's products or manuals. Information in this manual is subject to change without notice and does not represent a commitment on the part of HighPoint.

Notice

Reasonable effort has been made to ensure that the information in this manual is accurate. HighPoint assumes no liability for technical inaccuracies, typographical, or other errors contained herein.

FCC Part 15 Class B Radio Frequency Interference statement

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- 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.

Modifications not expressly approved by the manufacturer could void the user's authority to operate the equipment under FCC rules.

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.

European Union Compliance Statement

This Information Technologies Equipment has been tested and found to comply with the following European directives:

- European Standard EN55022 (1998) Class B
- European Standard EN55024 (1998)

Table of Contents

Product Overview	5
Kit Contents	5
RocketStor 6414S Enclosure Overview	7
RocketRAID 4522 Overview	9
Getting Started	9
Step 1: Setting Up the Hardware	9
Step 2: Install/Update Drivers	12
Step 3: Install HighPoint RAID Management (WebGUI).....	17
Step 4: Create RAID Arrays using WebGUI	20
Step 5: Initialize and format the RAID Array	24
Manage your RAID array	29
RAID Spare Pool	29
Email Notifications	29
WebGUI Remote Login	30
Storage Health Inspection (SHI).....	32
Utilizing the Health Inspector Scheduler	34
RAID Expansion (OCE/ORLM)	35
Updating RocketRAID HBA BIOS/Firmware	36
Updating BIOS/Firmware using WebGUI	36
Troubleshooting - Hardware	37
Enclosure Mute Button	37
LED Activity.....	37
Troubleshooting - Software	39
WebGUI - Connection cannot be established.....	40
Troubleshooting - RAID	40
Critical Arrays.....	40
Disabled Arrays.....	42
Frequently Asked Questions	43
Recovering your Password.....	43
Battery Backup Unit (BBU, sold separately)	43
WebGUI Installer Stuck.....	44
Online Array Roaming	44
Appendix A: Navigating the HighPoint WebGUI	44
How to Login HighPoint WebGUI.....	45

Appendix A-1: Global Tab.....	46
Appendix A-2: Physical Tab.....	47
Appendix A-3: Logical Tab.....	50
Appendix A-4: Setting Tab.....	58
Appendix A-5: Recover Tab.....	60
Appendix A-6: Event Tab	61
Appendix A-7: SHI (Storage Health Inspector)	62
Appendix B: WebGUI Icon Guide	64
Appendix C: RAID Level Reference Guide	66
Help.....	67
HighPoint List of Recommended Hard Drives	67
Contacting Technical Support	67

Product Overview

The RocketStor 6414AS bundle package includes an enclosure for housing your physical drives and a RAID Controller to manage and create RAID arrays of different levels.

- RocketStor 6414S Enclosure
- HighPoint RocketRAID 4522 Controller

Kit Contents

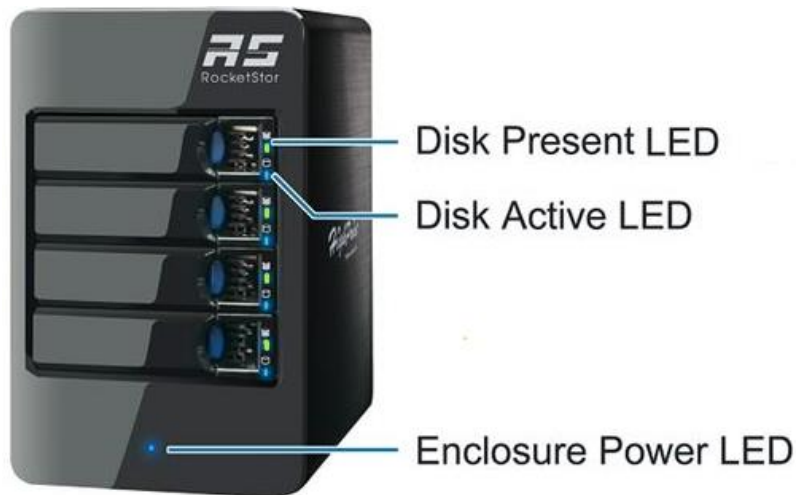
Before getting started, check to see if any items are missing, damaged, or incorrect. For any discrepancy contact your reseller or go to www.highpoint-tech.com for online support.

Item	Count
4-Bay Tower Enclosure	1
8-Port SAS 6Gb/s Hardware RAID PCIe2.0 x8 Host Adapter	1
Low Profile Bracket	1
Disk Trays	4
SFF-8088(Mini-SAS) Cable	1
UL Power Cord	1
3.5" HDD mounting screws	16
2.5" SSD mounting screws	16
Quick Installation Guide	1

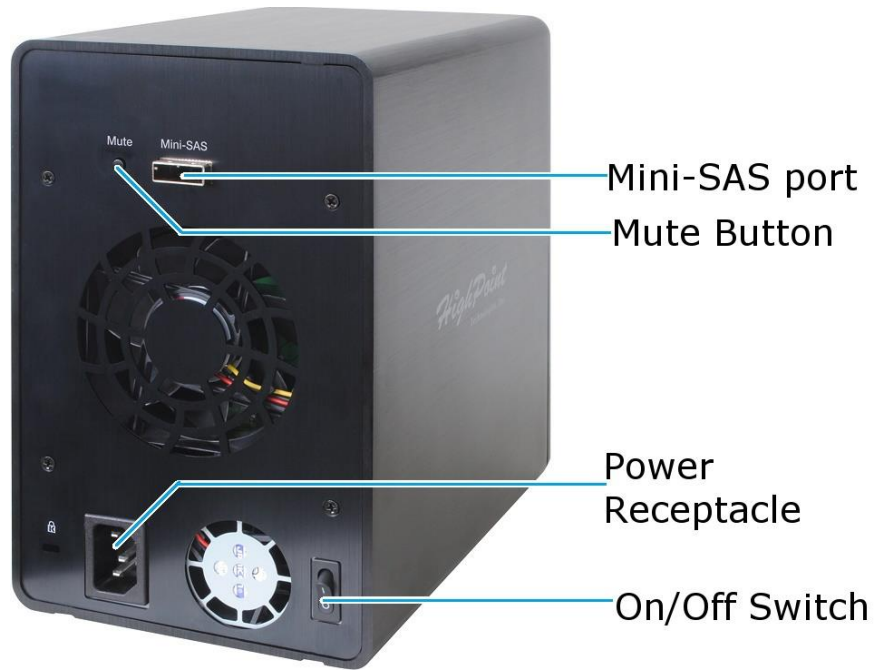
Feature Specifications	RocketStor 6414AS
Form Factor	External Mini-SAS (SFF-8088)
Host Port	1x Mini-SAS (SFF-8088)
RAID Controller /Bus Interface	RocketRAID 4522 / PCIe 2.0 x8
I/O Storage Processor	RAID-On-Chip Onboard
Onboard Cache	512MB DDR 3 Cache Memory with ECC Protection
RAID Level	0, 1, 5, 6, 10, JBOD
Max. Capacity	Up to 32 TB
Number Of drives	Up to 4
Drive Interface	SAS, SATA
Drive Form Factor	3.5" & 2.5"
Chassis Material	Brushed Aluminum Housing
Dimension	8.66"(H)x5.31"(W)x8.67"(D)
Weight	9.46 lbs
Warranty	1 Year
Advanced RAID Features	Flash ROM for Upgradeable Firmware
	Storage Health Inspector
	Redundant RAID Configurations
	NVRAM for Write Journaling
	Battery Backup unit retains data when power outage occurs
	Multiple RAID Partitions supported
	Online Array Roaming
	Online RAID Level Migration (ORLM)
	Online Capacity Expansion (OCE)
	RAID Initialization Background/Foreground/Quick
	Global Hot Spare Disk support
	Automatic and configurable RAID Rebuilding Priority
	Disk Format compatible: 512, 512e, 4Kn
	Larger than 2 TB Drive and RAID Array support
	Spin down Massive Arrays of Idle Disks support
	Native Command Queuing
Staggered Drive Spin Up	
Write Back and Write Through	
Configurable RAID Block Size up to 1MB	
Storage Monitoring and Management Suite	

RAID Management Suites:	BIOS/Firmware configuration tool, Browser-Based management tool CLI (Command Line Interface) - scriptable configuration tool, API package
SMTP	Email Alert notification
Alarm Buzzer	Buzzer beeping for Fan Failure or Temperature exceeds 50°C
Operating System Support	
Windows	Window 2008 and Window 7 and later
Linux	Linux: RedHat Enterprise, Open SuSE, Fedora Core, Debian, Ubuntu / Linux Driver embedded into Kernel 3.9.4 and later
FreeBSD	Yes (Driver embedded in FreeBSD 9.0 and later)
Mac OS X	Mac OS X 10.6 and later (Driver embedded into Mac OS X 10.9 and later)
Operating Environment	
Temperature	(operating) 5°C - 45°C (non-operating) -40°C - 65°C
Relative Humidity	(operating) 8% - 90% RH (Non-condensing) (non-operating) 5% - 95% RH (Non-condensing)
Certification	CE, FCC, RoHS

RocketStor 6414S Enclosure Overview



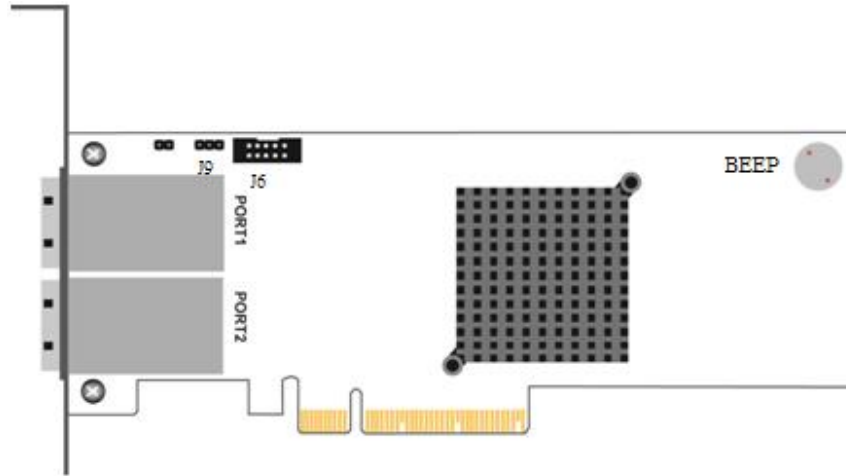
Front Panel Overview



Back Panel Overview

Front Panel	
Disk Present LED	Indicates disk is present and available
Disk Status LED	Indicates disk is performing I/O operations
Enclosure Power LED	Indicated enclosure is properly powered
Back Panel	
Mini-SAS port	SFF-8088 port
Mute Button	Mutes enclosure alarm only. Alarm sounds off only when FAN and TEMPERATURE fail.
Power Receptacle	Connect power cord here
On/Off Switch	O - Off / I - On

RocketRAID 4522 Overview



RocketRAID 4522 Key	
PORT1	mini-SAS (SFF-8088) Connection Corresponds to channel 1-4
PORT2	mini-SAS (SFF-8088) Connection Corresponds to channel 5-8
BEEP	Alarm/Beeper
J6	Battery Backup Unit (BBU) Connector

Getting Started

Thank you for purchasing HighPoint Technologies RocketStor 6414AS. You are only a few steps away from utilizing RAID storage using the industry's most affordable hardware RAID solution.

To start using your RocketStor 6414AS take the following steps:

1. Setting up the Hardware (pg. 9)
2. Install/Update drivers (pg. 12)
3. Install HighPoint RAID Management (WebGUI) (pg. 17)
4. Create RAID Arrays (pg. 21)
5. Initialize and format RAID Volumes (pg. 24)

Step 1: Setting Up the Hardware

Ensure all items listed under Kit Contents are included in your package. For any discrepancy contact your reseller or submit a support ticket online at www.highpoint-tech.com/websupport.

Preparing the Enclosure

1. Press then pull the blue tab on the disk tray to unlock and slide the disk tray out. Then mount your hard drives onto the tray using the provided screws. Repeat for up to four hard drives.



3.5" HDD mount points



2.5" SSD mount points

2. Place the enclosure upright on a stable, flat surface
3. Connect the enclosure to a power source with the AC Power Cord
4. Connect the enclosure to the included RocketRAID 4522 using the mini-SAS to mini-SAS cable (SFF-8088)



Mini-SAS connection on RocketStor 6414S enclosure back panel

Preparing the RocketRAID HBA (Host Bus Adapter)

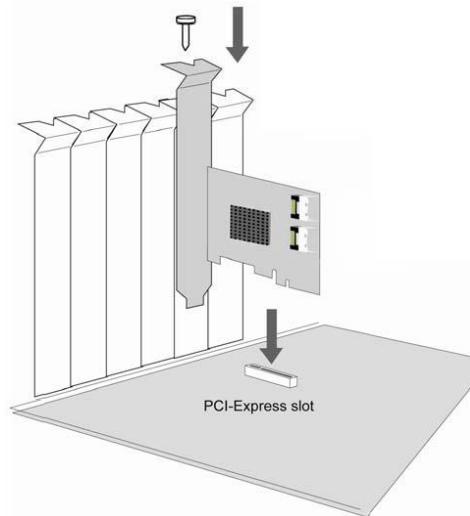
The following instructions describe how to prepare your RocketRAID 4522 HBA for use.

To install your RocketRAID 4522:

Important: Before installing the RocketRAID 4522 Controller, ensure that your system is powered OFF.

1. Locate a PCI Express 2.0 x8 slot (or compatible slot) on your PC motherboard.
 - **Note 1:** Refer to your PC manual for instructions on how to access your motherboard.
 - **Note 2:** Refer to your motherboard manual for instructions on how to locate your PCI Express slot.
2. Align the RocketRAID 4522 with the PCI Express slot and push straight down until the card is fully seated.
3. Tighten the connection by fastening the RocketRAID bracket and enclosure together with a screw.
4. Continue to Step 2: Install/Update Drivers

A PCI-Express 2.0 x8 card is compatible with PCI-Express 2.0 x16 and PCI-Express 3.0 x16 slots.



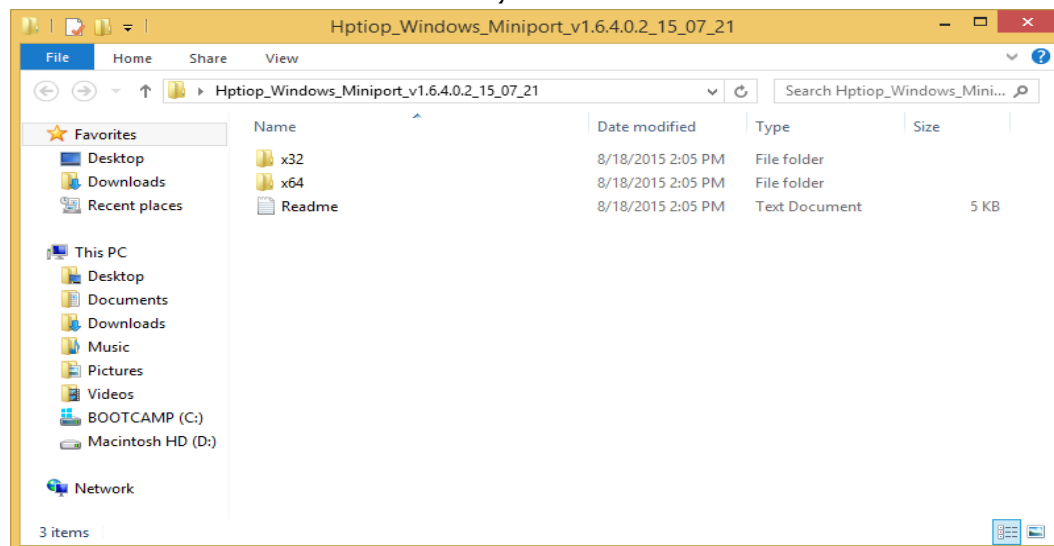
Step 2: Install/Update Drivers

Installing Drivers on an Existing Operating System

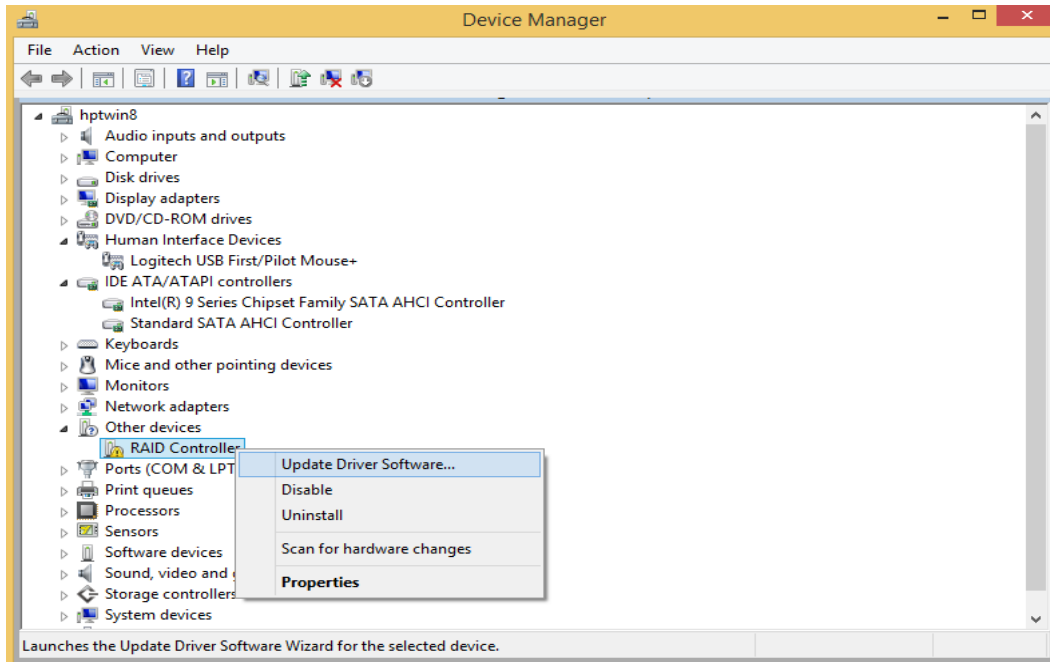
Drivers provide a way for your operating system to communicate with your new hardware. Updating to the latest drivers ensures your product has the latest performance, stability, and compatibility improvements. Drivers are updated regularly at www.highpoint-tech.com.

For **Windows** Users:

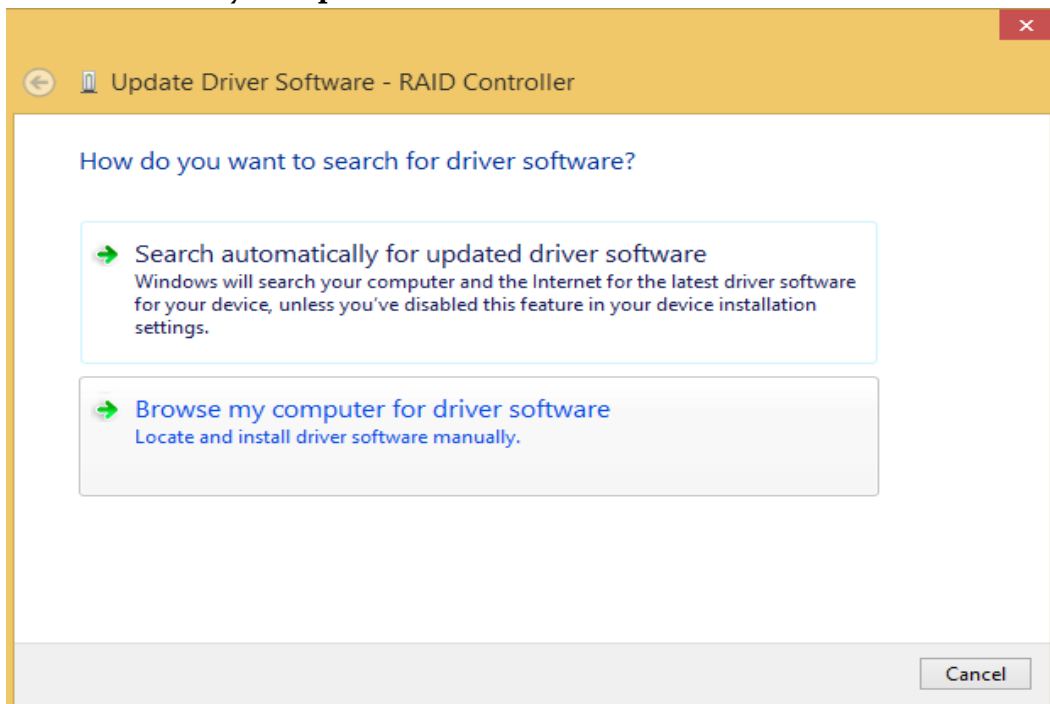
1. Download the latest driver files from our website www.highpoint-tech.com > Support > Documents and Downloads > RocketStor 6414AS
2. Extract the downloaded files onto your PC and note the location of the files.



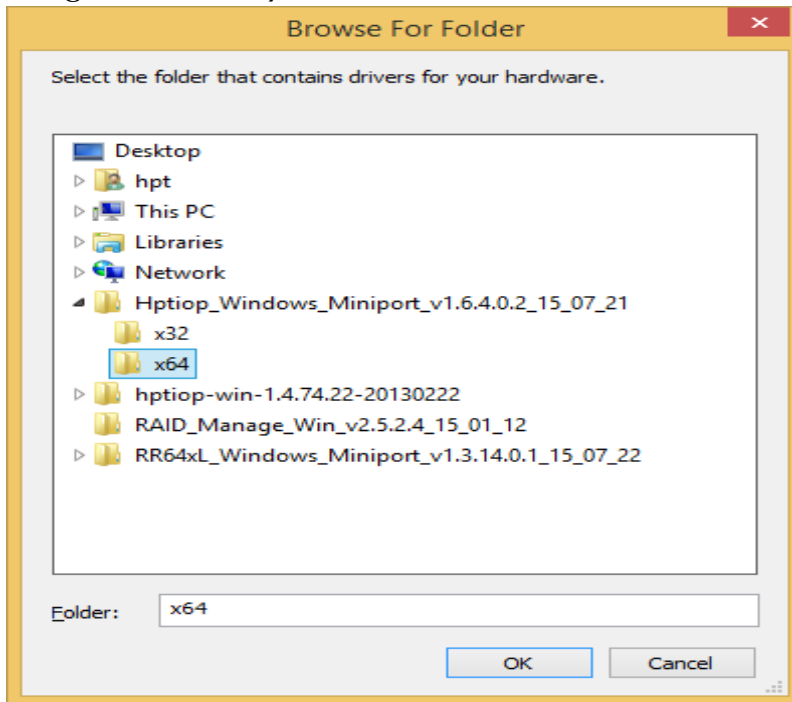
3. Open Windows **Device Manager** (Control Panel > Hardware and Sound > Devices and Printers > Device Manager).
4. Under Other devices, right-click **RAID Controller**.
5. Click **Update Driver Software**.



6. Click **Browse my computer for driver software**.



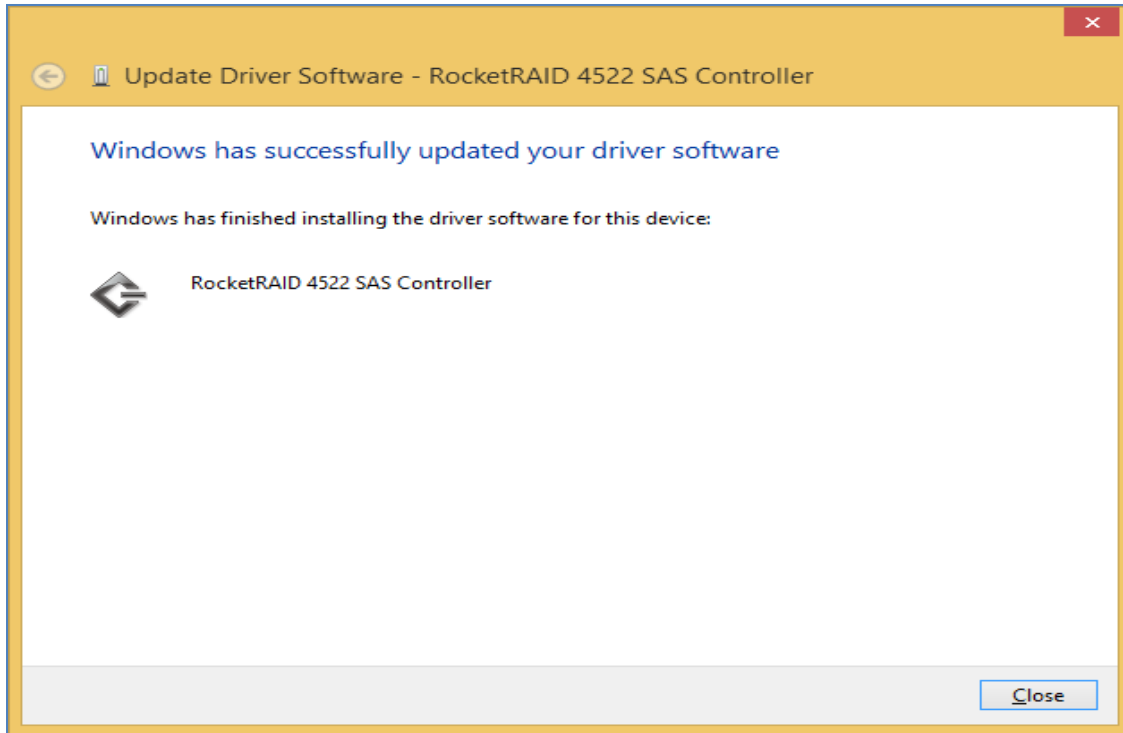
7. Navigate to where you saved the driver files.



8. Click **OK**.
9. Click **Next**, Windows security will prompt to ask if you are sure you want to install HighPoint Software.



10. After clicking **Install**, driver will be installed.



11. **Reboot** for changes to take effect.

For Mac Users:

1. Obtain latest driver online at www.hptmac.com > PCIe Controller Card > 6 Gb/s SAS/SATA RAID HBA > RocketRAID 4522 > Download
 - Navigate to your specific HBA controller page (Refer to **How to View HBA Properties** to find model name)

A screenshot of the HighPoint RAID Management software interface. The window title is "Controller(1): RR4522". The HighPoint Technologies, Inc. logo is in the top right. A navigation bar includes "Global View", "Physical", "Logical", "Setting", "Event", "SHI", "Recover", "Logout", and "Help". The "Global View" tab is active, showing two main panels: "HBA Properties" and "Storage Properties".
HBA Properties:

- Host Adapter model: RocketRAID 4522 SAS Controller
- Controller count: 1
- Enclosure count: 0
- Physical Drive: 4
- Legacy Disk: 4
- RAID Count: 4

Storage Properties:

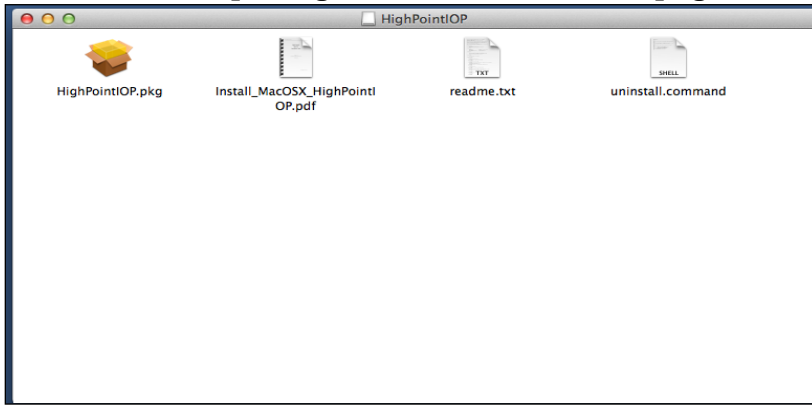
- Total Capacity: 14002 GB
- Configured Capacity: 14002 GB
- Free Capacity: 0 GB

A red bar at the bottom of the Storage Properties panel indicates "Configured 100.0%". The footer contains: "HighPoint RAID Management 2.5.5 Copyright (c) 1996-2015 HighPoint Technologies, Inc. All Rights Reserved".

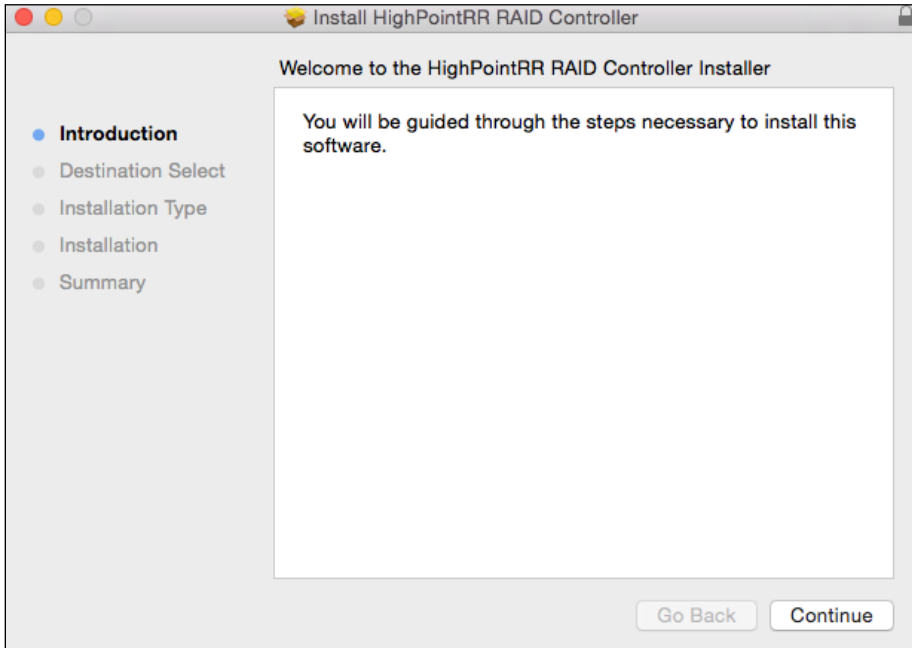
2. Click the downloaded file.



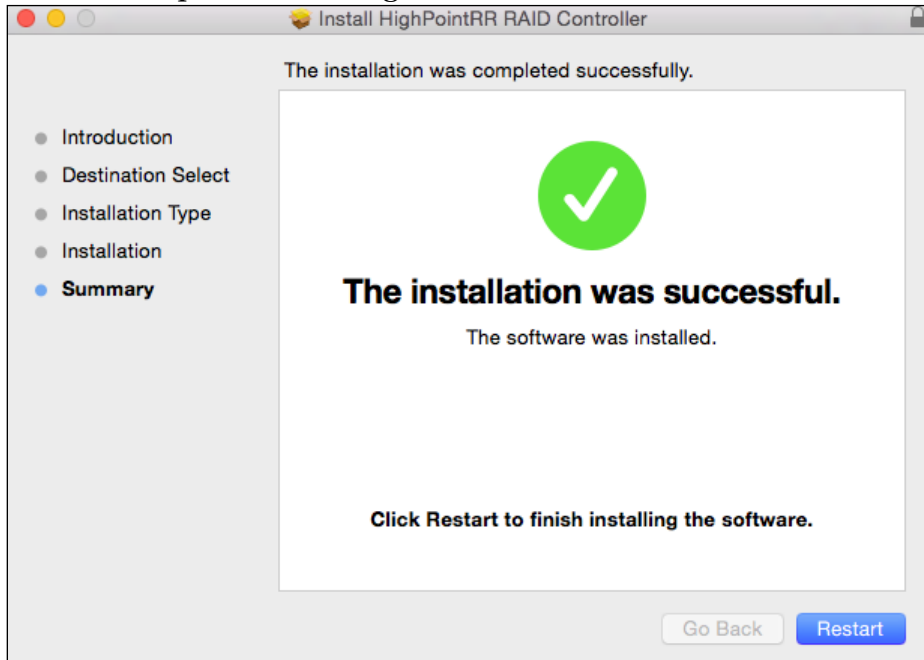
3. A mounted volume (eg. HighPointIOP) will appear on the desktop. Click the icon to open the volume.
4. Click the driver package to start installation (.pkg file)



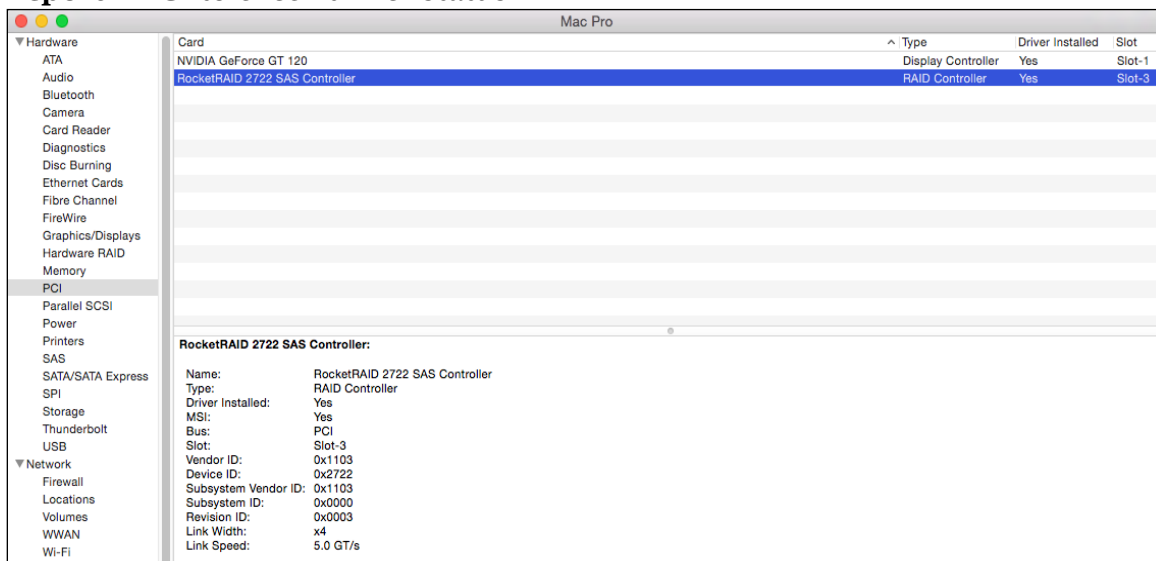
5. Follow the on-screen instructions of the installer.



6. **Reboot** computer for changes to take effect.



7. Make sure **Driver Installed** is **Yes**. Click **Apple Icon > About this Mac > System Report > PCI** to check driver status



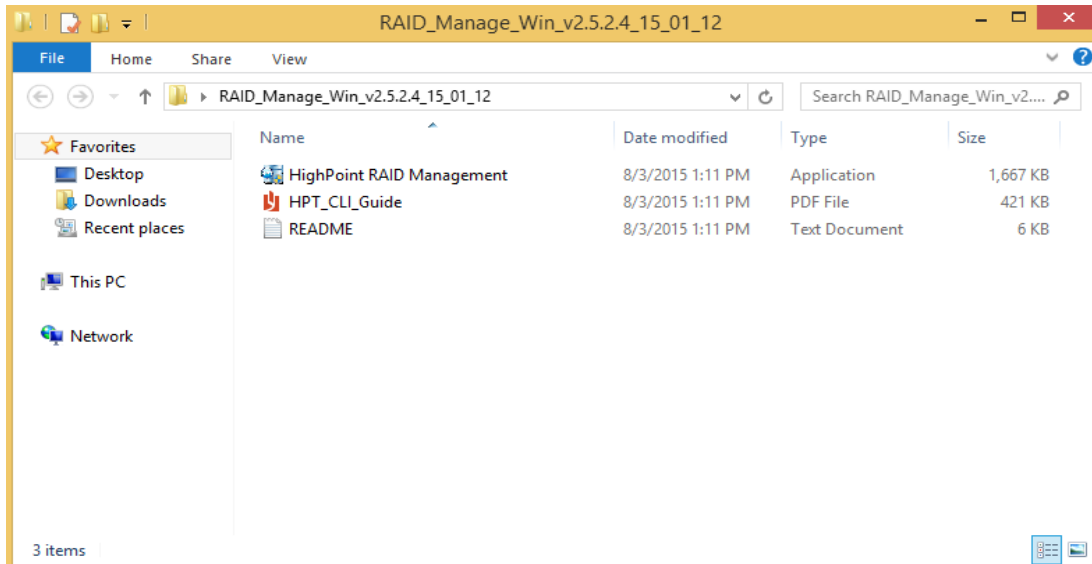
Click **Apple Icon > About this Mac > System Report > PCI**

Step 3: Install HighPoint RAID Management (WebGUI)

The HighPoint RAID Management (WebGUI) software is a useful tool used to create, maintain, and view your RAID arrays.

For Windows Users:

1. Download the latest WebGUI from our website at www.highpoint-tech.com > Support > Documents and Downloads > RocketStor 6414AS > Windows WebGUI.
2. Extract and open the contents of the downloaded file.



3. Double-click **HighPoint RAID Management.exe**.



4. Follow the on-screen instructions to complete the WebGUI installation

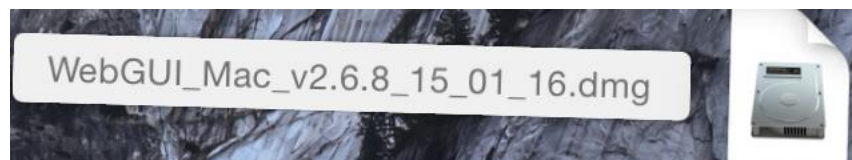
5. Double-click the **HighPoint RAID Management** desktop icon to start the WebGUI. Alternatively, type <http://localhost:7402> in your browser address bar.



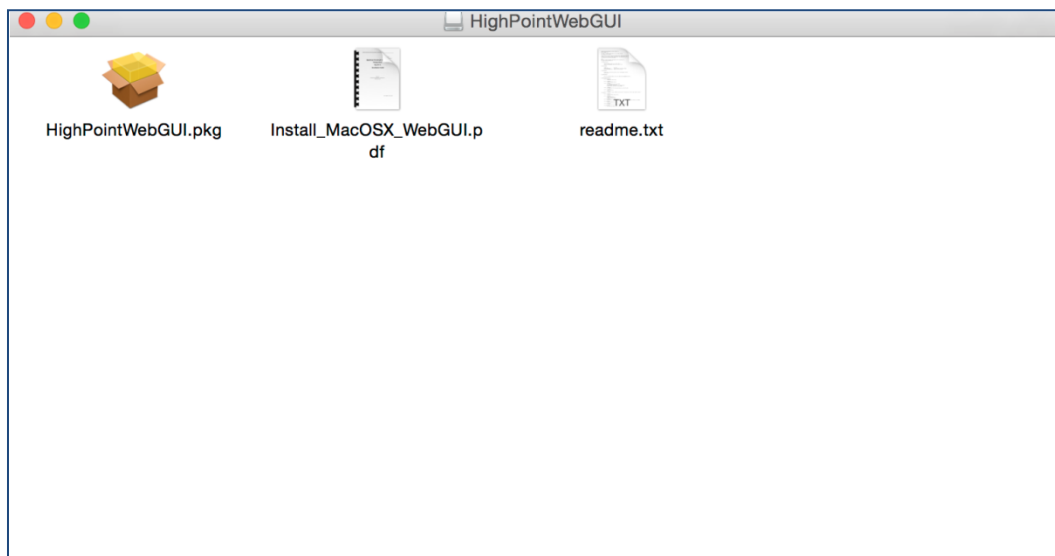
6. Your default web browser will open and prompt for a username and password (Default username: **RAID** / password: **hpt**). Username and password are case-sensitive.

For **Mac** Users:

1. Download the latest WebGUI from our website www.hptmac.com > [PCIe Controller Card](#) > [6 Gb/s SAS/SATA RAID HBA](#) > [RocketRAID 4522](#) > [Download](#)
2. Double Click the downloaded Mac WebGUI file.



3. Double click the **HighPointWebGUI.pkg** to start the WebGUI installer.



4. Follow the installer on-screen instructions to complete the WebGUI installation.
5. Double-click the HighPoint RAID Management desktop icon to start the WebGUI.



6. Your default web browser will open and prompt for username and password (Default username: **RAID** / password: **hpt**). Username and password are case-sensitive.

Uninstalling HighPoint RAID Management (WebGUI)

For **Windows** Users:

1. Open Control Panel.
2. Click Uninstall a program.
3. Select HighPoint RAID Management to uninstall.

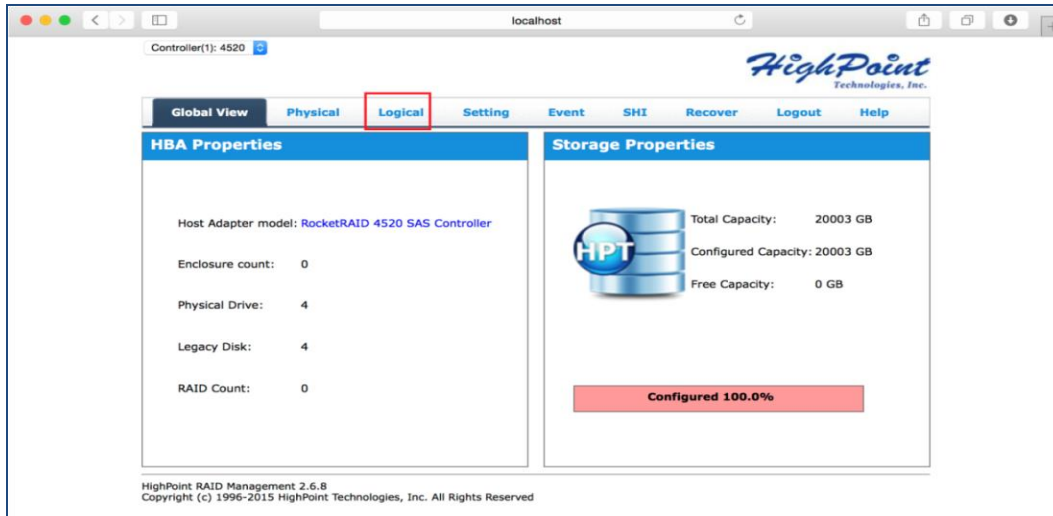
For **Mac** Users:

1. Navigate to /Applications/HPTWEBGUI/uninstall.
2. Click on the uninstall script.
3. Type in the Administrator password when prompted.

Step 4: Create RAID Arrays using WebGUI

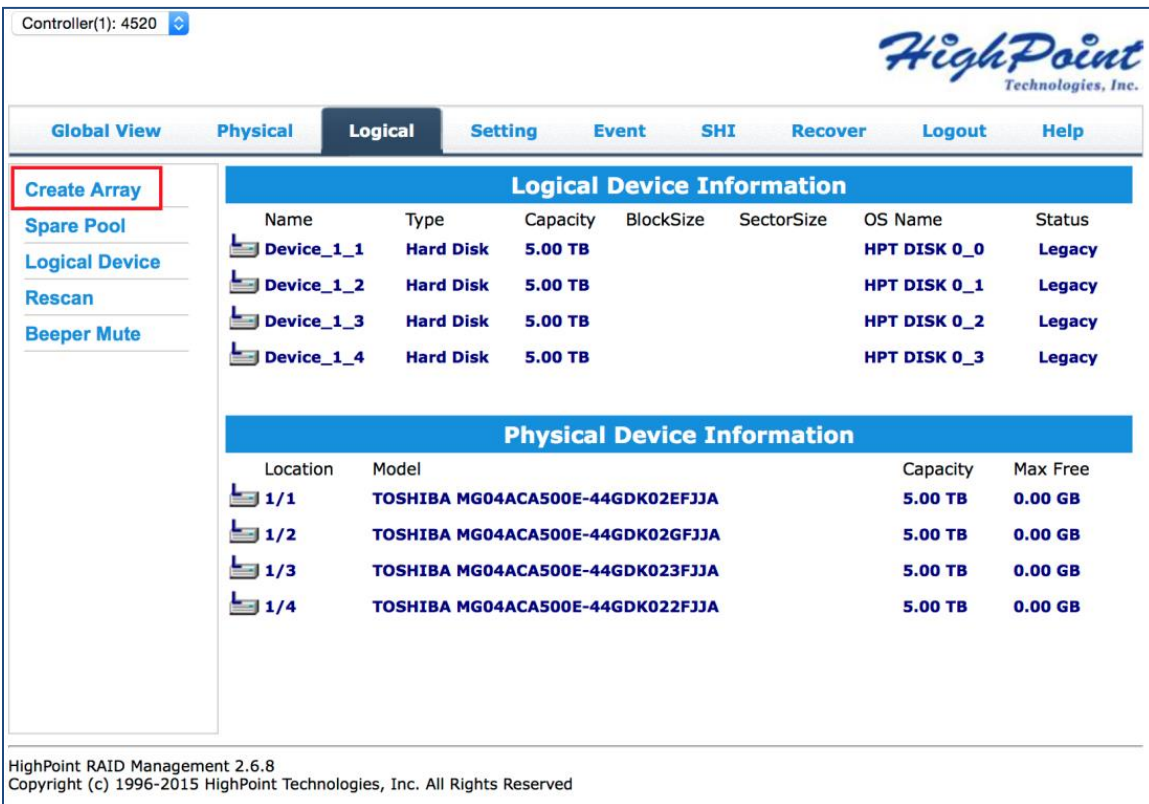
For both **Mac** and **Windows** users:

1. Login to WebGUI (Default username: **RAID** / password: **hpt**).
2. Once logged in, click the Logical tab.



Click Logical to go to create array page.

3. Click Create Array:



4. The RAID creation page provides many features, options, and settings. Detailed descriptions are provided on pg.50.
5. Select **RAID 5** for Array Type. (RAID Quick Reference on pg.66)

6. Set array name as "Tutorial_Array".
7. Select **Quick Init** as the initialization method. (**Note:** Quick Init gives immediate access to the array by skipping parity synchronization. Recommended for testing/verification purposes or when new disks are used.)
8. Select **Write Back** as the **Cache Policy** for better disk write performance.
9. Select **64K** as the **Block Size**.
10. Select all 4 available disks.
11. Leave the **Capacity**, **Sector Size**, **DV mode**, and **Disk Cache Policy** settings at their default values.
12. Click **Create**

The screenshot shows the 'Create Array' configuration page. The 'Logical' tab is active. The array name is 'Tutorial_Array'. The configuration is as follows:

- Array Type: RAID 5
- Array Name: Tutorial_Array
- Initialization Method: Quick Init
- Cache Policy: Write Back
- Block Size: 64K
- Number of RAID5 member disks: -1

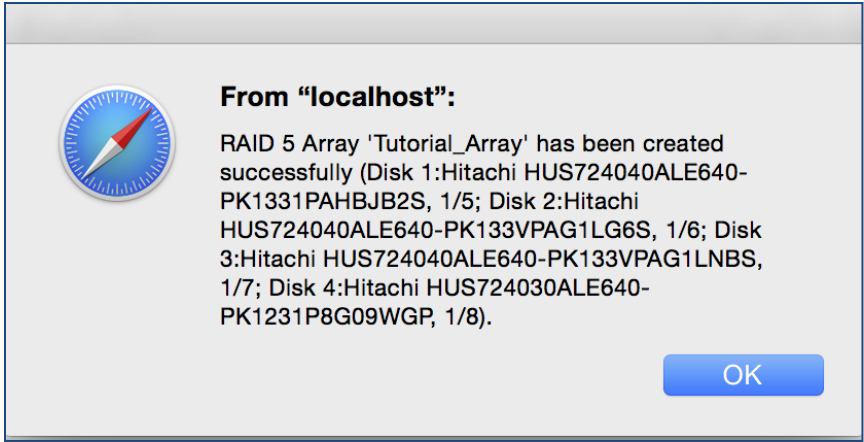
Available Disks table:

Location Model	Capacity	Max Free
<input checked="" type="checkbox"/> 1/5 Hitachi HUS724040ALE640-PK1331PAHBJB2S	4.00 TB	0.00 GB
<input checked="" type="checkbox"/> 1/6 Hitachi HUS724040ALE640-PK133VPAG1LG6S	4.00 TB	0.00 GB
<input checked="" type="checkbox"/> 1/7 Hitachi HUS724040ALE640-PK133VPAG1LNBS	4.00 TB	0.00 GB
<input checked="" type="checkbox"/> 1/8 Hitachi HUS724030ALE640-PK1231P8G09WGP	3.00 TB	0.00 GB

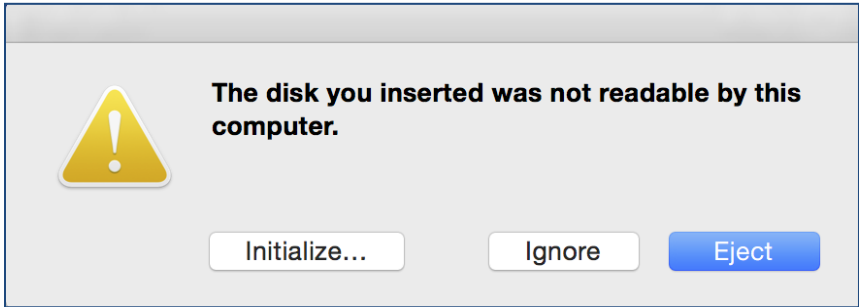
Other settings: Capacity (Maximum MB), DV Mode (Disable), Margin (5%), Disk Cache Policy (Unchange). A 'Create' button is located at the bottom right.

Create Array page.

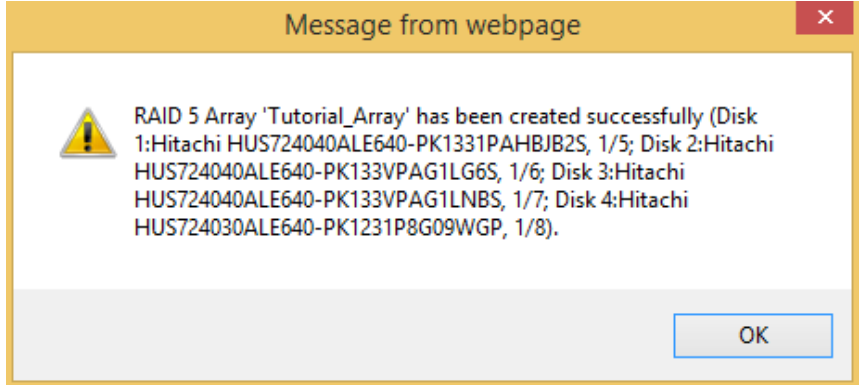
13. Once created, the WebGUI will acknowledge the array has been created and the system will prompt you to initialize the new volume.



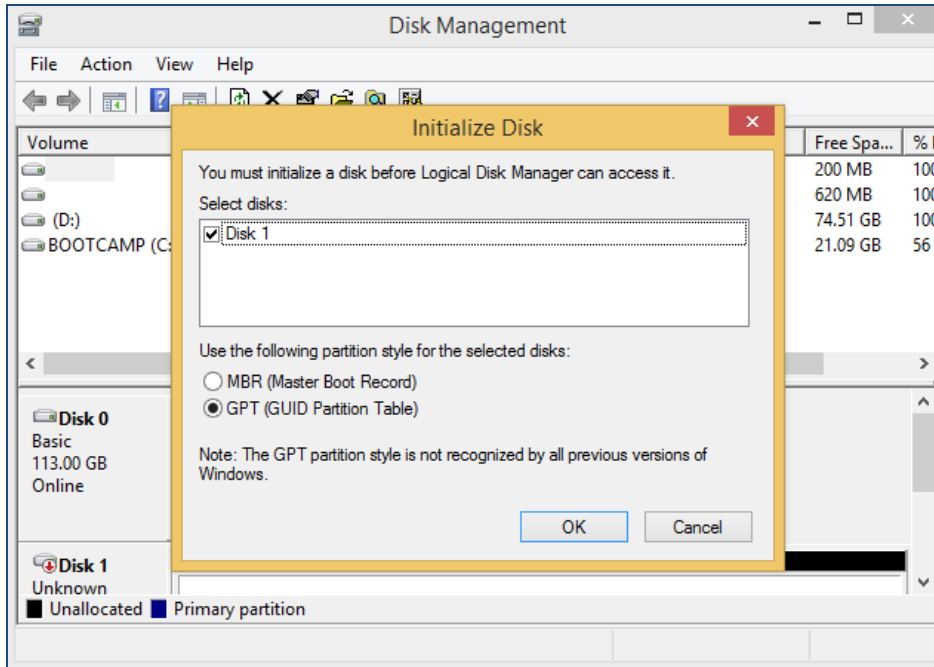
(Mac OS X) Array successfully created.



New volume needs to be initialized before use.




(Windows) Array successfully created.



(Windows) For Windows platforms, user will be prompted to initialize disks in Disk Management.

14. Tutorial_Array can now be seen under Logical Device Information. (Take note that the OS name is HPT DISK 0_0; this will help identify which volume to initialize)

Logical Device Information						
Name	Type	Capacity	BlockSize	SectorSize	OS Name	Status
 Tutorial_Array	RAID 5	9.00 TB	64k	512B	HPT DISK 0_0	Normal Maintenance

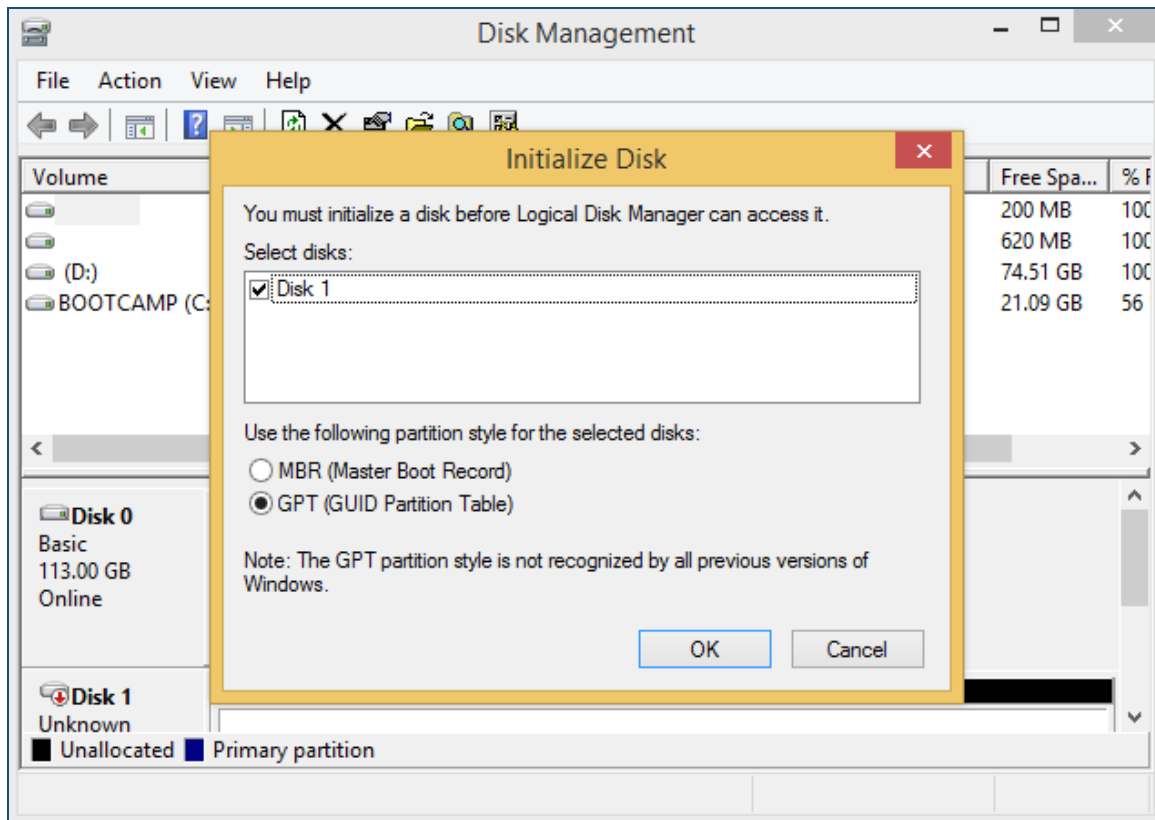
Tutorial_Array is now created and can be seen in Logical tab.

Step 5: Initialize and format the RAID Array

Before using the newly created RAID array, you must initialize and format the new volume.

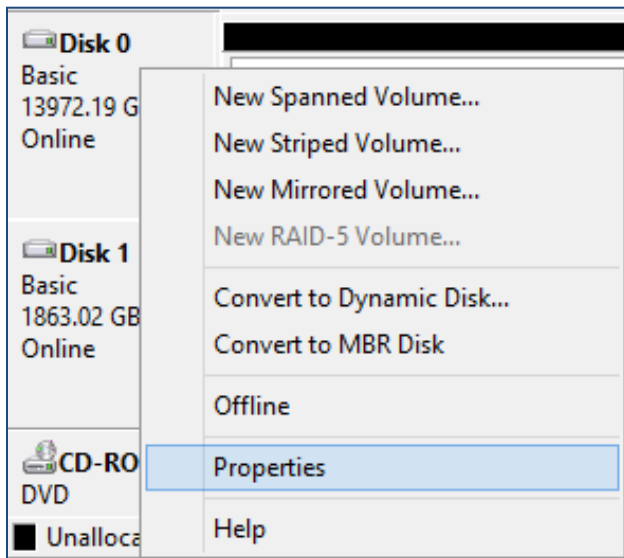
For **Windows** Users:

1. After creating the RAID array, open Windows **Disk Management**.
2. Disk Management will ask to initialize unknown disks either in MBR format or GPT.

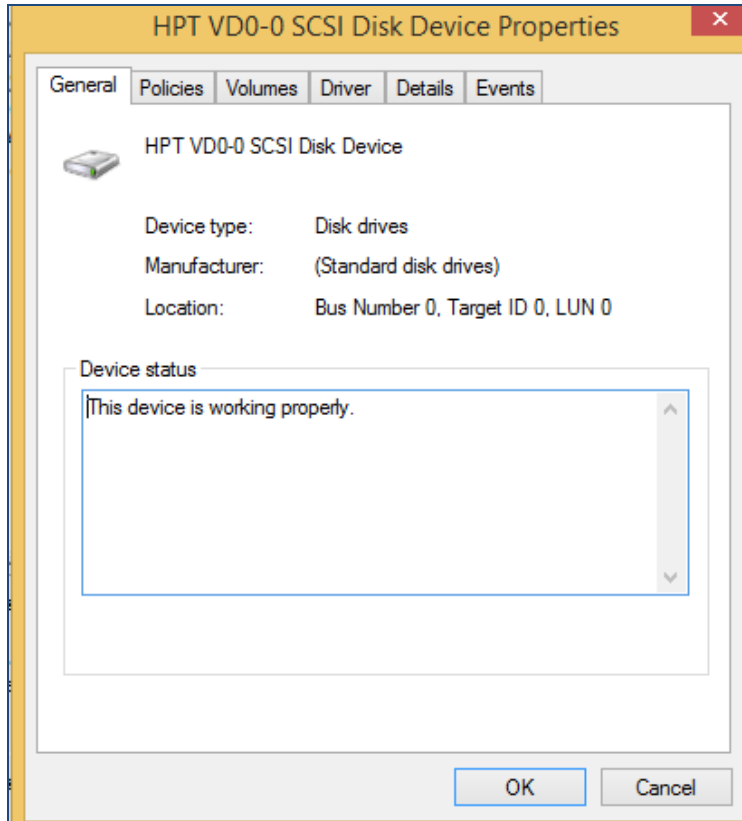


(Windows) Disk Management asks to initialize the disks before use. As a general rule, select MBR for disks less than 2TB and GPT for disks greater than 2TB.

3. Right click the new disk, and click properties.

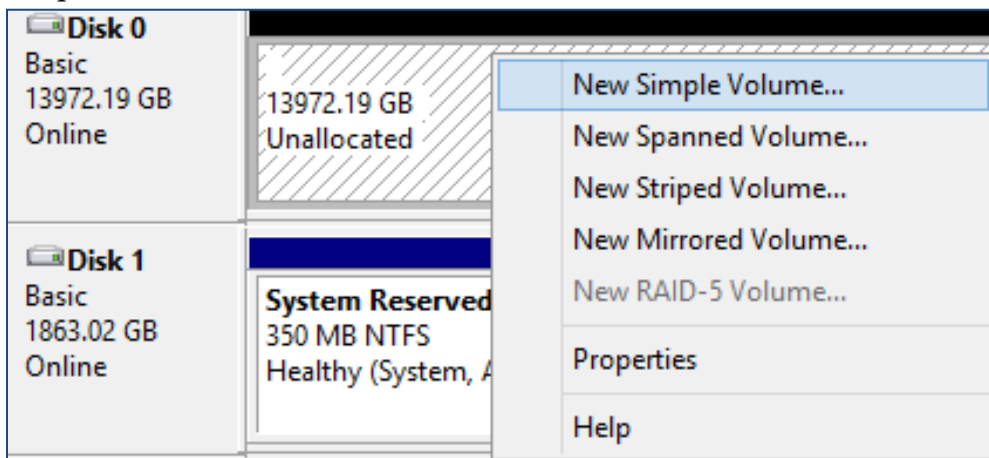


4. In properties, check and make sure it is a HPT VD (HighPoint Virtual Disk).



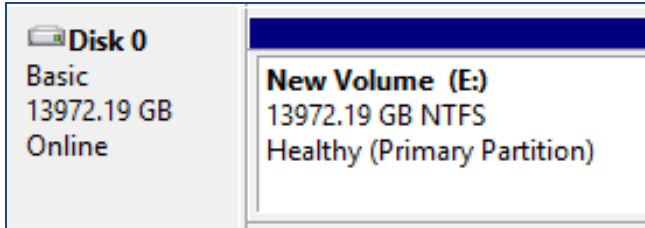
Disk properties show HPT VD 0-0.

5. Once the disk has been confirmed, right click the unallocated space and click New Simple Volume.



Right Click unallocated space, then click New Simple Volume.

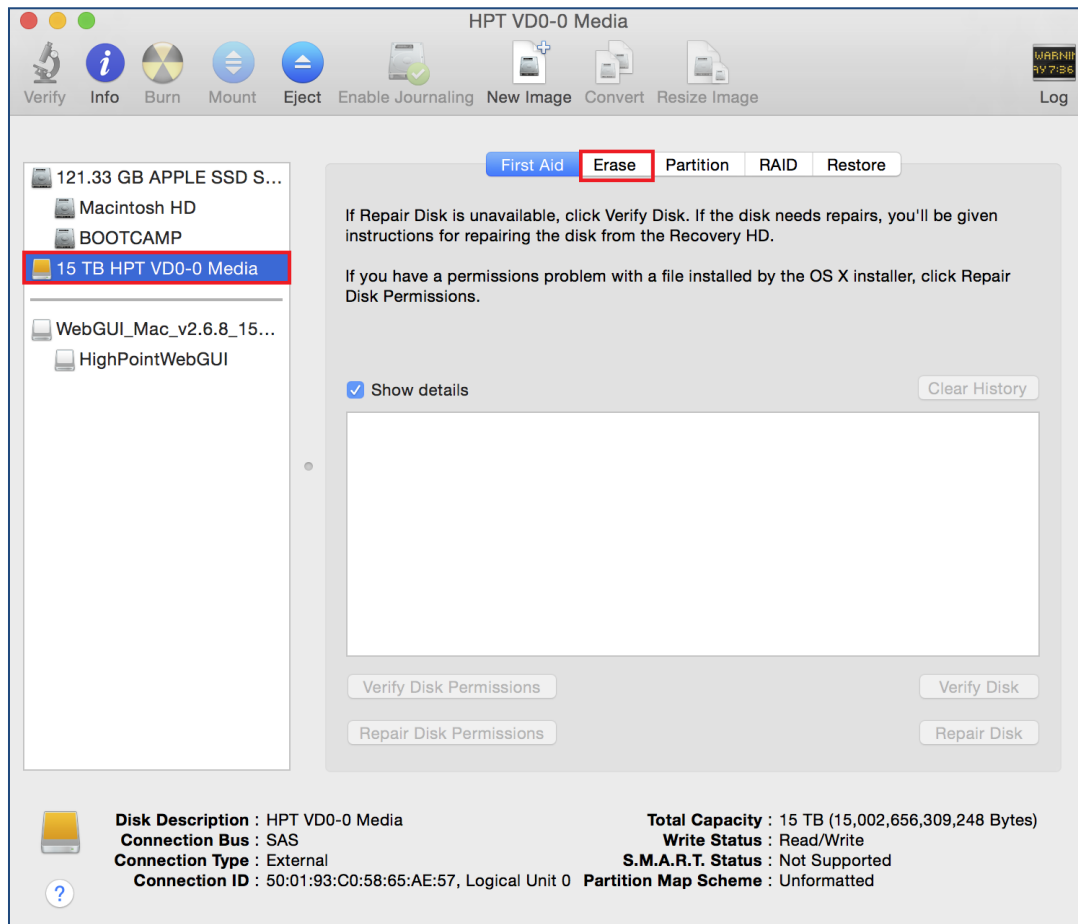
6. Follow the on-screen instructions to configure and format the drive.
7. Once finished, the new volume will receive a drive letter and be available for use.



RAID array is now formatted as NTFS and drive letter E:

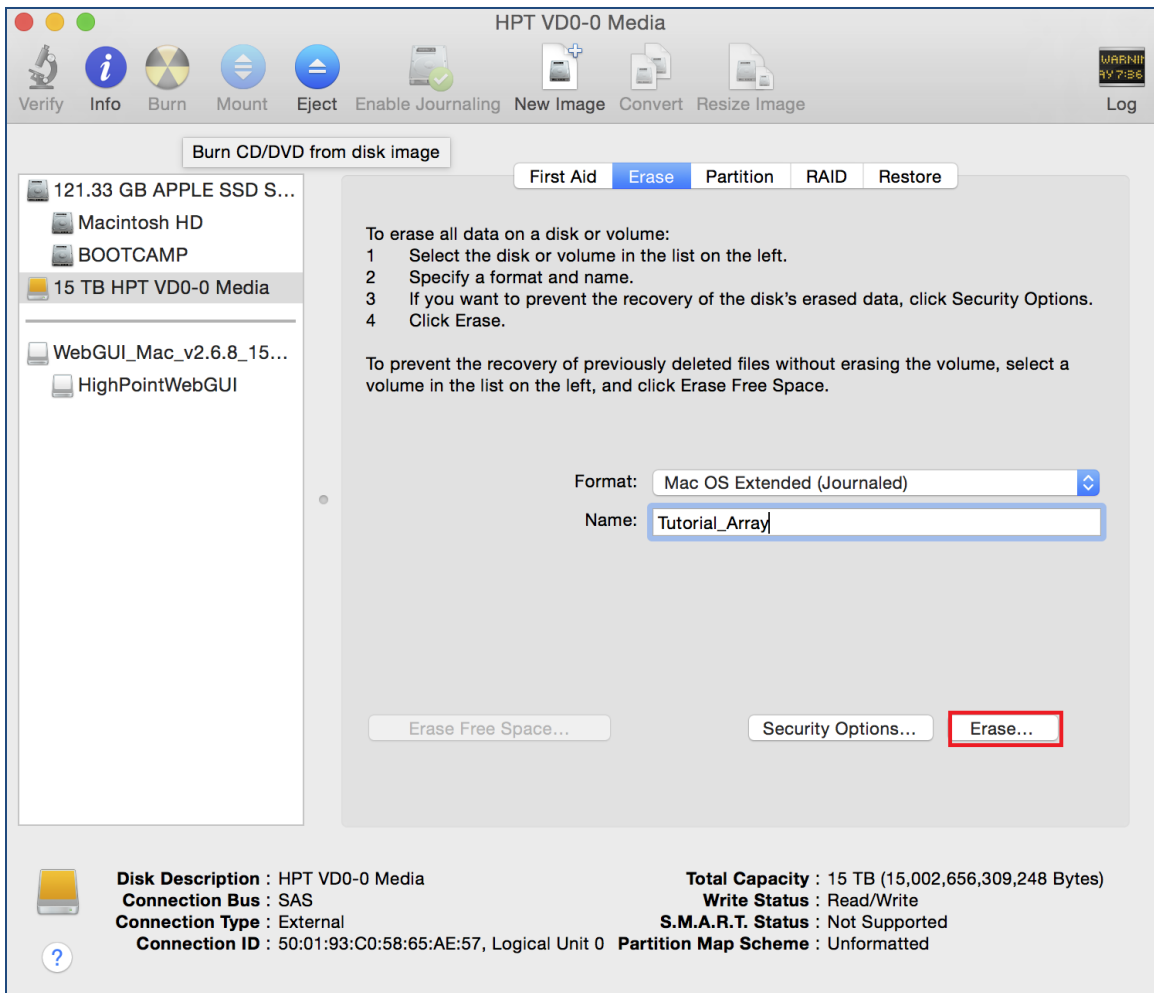
For Mac Users:

1. After creating a RAID array, click Initialize when prompted. (**Note:** If you ignored the prompt, simply open Disk Utility).

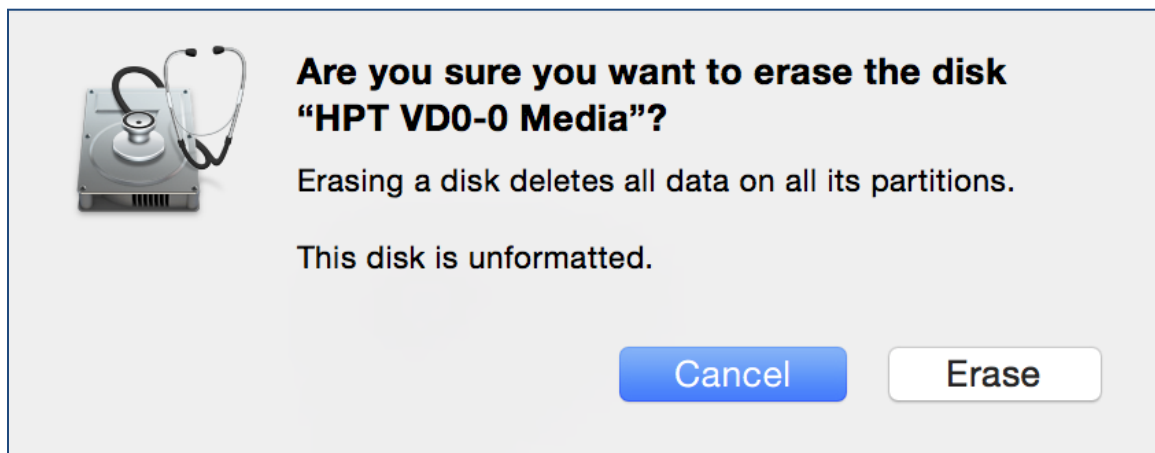


Disk Utility for Mac.

2. In Disk Utility, select the Volume you created on the right, then click the Erase tab.



3. Select the desired disk format and disk name then click **Erase**. (Note: All previous data on disks will be erased.)



4. When finished, your new RAID volume will be available for use.



(Mac) Tutorial_Array volume created and mounted on desktop.

Manage your RAID array

The following features allow you to monitor and maintain your arrays to prevent any critical failures from occurring:

- Spare Pool (pg. 29)
- Email Notifications (pg. 29)
- SMART Monitoring (pg. 29)
- Health Inspector Scheduling (pg. 29)

RAID Spare Pool

Physical drives marked as a spare will automatically be added to a redundant RAID array (RAID levels 1, 10, 5, and 6) whenever there is a disk failure. Enabling this feature minimizes the chances of data loss since it reduces the time an array is in critical status.

Add/Remove Spare

Using WebGUI:

1. Log in WebGUI
2. Click **Logical**
3. Click **Spare Pool**
4. Check the box for the disk you want as a spare from **Available Disks**
5. Click **Add Spare**

Disks added to the spare pool will show under **Spare Pool** and can be removed by checking the disk checkbox from **Spare Pool** > Click **Remove Spare**.

Email Notifications

When enabled, all added recipients will receive an email notification for any event log entries. (More information about events refer to pg. 61)

To set up email alerts:

1. Check the Enable Event Notification box.

2. Enter the ISP server address name or SMTP name.
3. Type in the email address of the **sender** (email account that is going to **send** the alert).
4. Type in the account name and password of the sender.
5. Type in the SMTP port (default: 25).
6. Check support SSL box if SSL is supported by your ISP (port value will change to **465**, refer to your ISP if you have a specific SMTP port).

Note: After you click 'Change Setting' the password box will become blank.

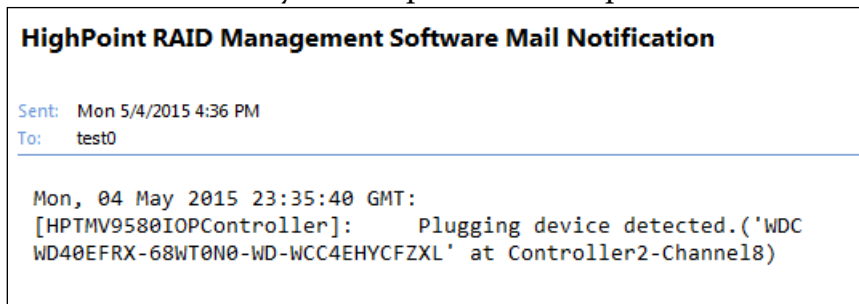
Adding Email Recipients

Recipients		
E-mail	Name	Event Level
Add Recipient		
E-mail:	<input type="text"/>	
Name:	<input type="text"/>	
Event Level:	<input type="checkbox"/> Information <input type="checkbox"/> Warning <input type="checkbox"/> Error	
<input type="button" value="Add"/> <input type="button" value="Test"/>		

You can add multiple email addresses as receivers of a notice.

1. Type the email of the recipient in the **E-mail** text box.
2. Type the name of the recipient in the **Name** text box.
3. Check which type(s) of events will trigger an email in the respective **Event Level** check boxes.
4. (**Optional**) Click **test** to confirm settings are correct by sending out a test email.
5. Click **add** to add the recipient to recipient list.
6. The added recipient will display in under **Recipients**.

The email will send to your recipients the output recorded in the event log.



Example: event log email message.

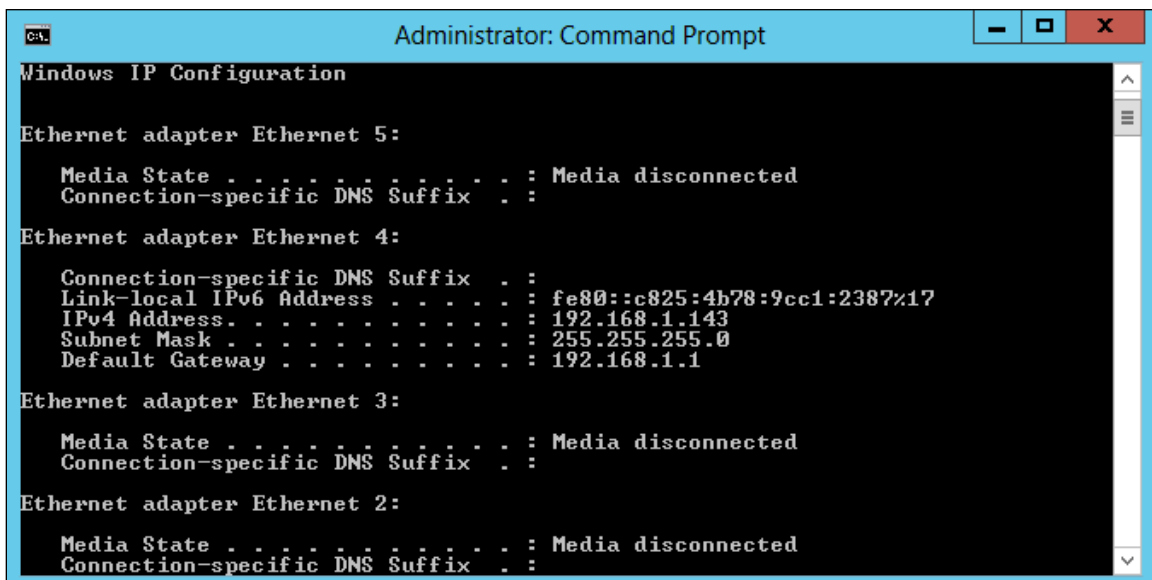
WebGUI Remote Login

A user connected to a local network can remotely access the WebGUI using the IP address of the host device.

To obtain your IP address

For **Windows** Users:

1. Open a command prompt window on the host computer.
2. Type **ipconfig**.
3. Look for the section that contains your network adapter information.
4. Note the IP address.



Example: The IPv4 address is under Ethernet adapter Ethernet 4 and is 192.168.1.143

Note: Make sure **Restrict to localhost access** is **disabled** in **WebGUI Setting** (Refer to setting)

You can then remotely access the WebGUI using any other computer that is in your local network by opening any web browser and typing **http://{IP address of host computer}:7402** (default port is 7402).

For **Mac** Users:

1. Open a **terminal** window on the host computer (computer that is connected to the RocketStor 6414AS enclosure.)
2. Type **ifconfig**.
3. Look for the connection that has **status: active**
4. Write the IP address located after **inet**:

```
hpt-lab — bash — 80x24
Last login: Fri May  8 09:36:50 on ttys002
You have new mail.
hpt-labs-pro:~ hpt-lab$ ifconfig
lo0: flags=8049<UP,LOOPBACK,RUNNING,MULTICAST> mtu 16384
    options=3<RXCSUM,TXCSUM>
    inet6 ::1 prefixlen 128
    inet 127.0.0.1 netmask 0xff000000
    inet6 fe80::1%lo0 prefixlen 64 scopeid 0x1
    nd6 options=1<PERFORMNUD>
gif0: flags=8010<POINTOPOINT,MULTICAST> mtu 1280
stf0: flags=0<> mtu 1280
en2: flags=8863<UP,BROADCAST,SMART,RUNNING,SIMPLEX,MULTICAST> mtu 1500
    ether 54:e4:3a:ef:74:5b
    inet6 fe80::56e4:3aff:feef:745b%en2 prefixlen 64 scopeid 0x4
    inet 192.168.1.254 netmask 0xfffff00 broadcast 192.168.1.255
    nd6 options=1<PERFORMNUD>
    media: autoselect
    status: active
```

Example: en2 has active status, the IP is 192.168.1.254

Storage Health Inspection (SHI)

The Storage Health Inspector (SHI) monitors each individual disk's health. Monitoring disk SMART attributes can prevent critical RAID failures from occurring.

This section covers the following:

- Enabling SMART Monitoring
- Disabling SMART Monitoring
- Changing HDD Temperature Threshold

Enabling SMART Monitoring

Controller(1): 4520 ▾

HighPoint
Technologies, Inc.

Global View Physical Logical Setting Event **SHI** Recover Logout Help

[Schedule](#)

Storage Health Inspector(SHI)

Controller ID	Port#	Device Serial Number	RAID	°F	Bad Sectors Found & Repaired	Device Status	
1	1	WD-WCC4ENSLV3U6	None	96	None	OK	SMART
1	2	WD-WX11D74RHV7A	None	96	None	OK	SMART
1	3	WD-WMC4N0DCFMUT	None	95	None	OK	SMART
1	4	WD-WCC4EHYCFZXL	None	100	None	OK	SMART

HDD Temperature Threshold

Set harddisk temperature threshold (F):

HighPoint RAID Management 2.6.8
Copyright (c) 1996-2015 HighPoint Technologies, Inc. All Rights Reserved

To access the SMART attributes of an individual disk:

1. Log in to WebGUI (default **user**: RAID **password**: hpt).
2. Select the proper controller using the drop down menu on the top left.
3. Click the **SHI** tab.
4. Click **SMART** on the desired disk.
5. Click **Enable** to enable SMART monitoring.

Disabling SMART monitoring

You have the option to disable SMART monitoring on each individual disk:

1. Select the proper controller using the drop down menu on the top left.
2. Click the **SHI** tab.
3. Click **SMART** on desired disk.
4. Click **Disable**.

Note: Disabling SMART will prompt the Storage Health Inspector to change the disk status to 'Failed'. The RocketRAID alarm will **not** alert you when this setting is disabled. Any potential warnings related to S.M.A.R.T attribute technology will not trigger.

Changing HDD Temperature Threshold

To ensure hard disk temperatures remain cool, enable SMART to monitor disk temperatures. In **SHI**, you can set a threshold so that the WebGUI or controller alarm (if enabled) can warn you when physical disks get too hot.

1. Log in to WebGUI.
2. Select the controller from the drop down on the top left.
3. Click **SHI**.
4. Type the desired hddisk temperature threshold ($^{\circ}F$).
5. Click **Set**.

Utilizing the Health Inspector Scheduler

The **Health Inspector Scheduler (HIS)** enables you to periodically check your disk/arrays to ensure they are functioning optimally.

The screenshot displays the HighPoint RAID Management WebGUI interface. At the top, the controller is identified as 'Controller(1): 4520'. The navigation menu includes 'Global View', 'Physical', 'Logical' (selected), 'Setting', 'Event', 'SHI', 'Recover', 'Logout', and 'Help'. The 'SHI' logo is visible in the top right corner.

The main content area is titled 'Tasks List' and contains a table with the following entry:

Name	Description
test0	Check all disks every week on Tuesday at 16:20:0

A 'Delete' button is located below the 'test0' entry.

Below the 'Tasks List' is the 'New Verify Task' section. It includes a radio button for 'RAID_5_1' and a 'Task Name' input field. The scheduling options are:

- Occurs one time on 2015-5-5 at 0:0:0
- Occurs every 4 Month(s) on Tuesday 12 at 0:0:0

Start date: 2015-5-5, End date: 2015-5-5, and No end date are also present. A 'Submit' button is at the bottom of this section.

The 'Health Inspector Scheduler' section is below. It includes a 'Task Name' input field, a 'Select a Schedule' dropdown with options: Daily, Weekly, Bi-Weekly, Monthly. The 'Select a time' dropdown is set to 'Sunday' with a time of 1:00:00. A 'Submit' button is at the bottom of this section.

At the bottom of the page, the footer text reads: 'HighPoint RAID Management 2.6.8 Copyright (c) 1996-2015 HighPoint Technologies, Inc. All Rights Reserved'.

Creating a New Verify Task

All arrays will appear under New Verify Task

1. Log in to WebGUI.
2. Select the proper controller from the top left drop down.
3. Click **SHI**.
4. Click **Schedule**.
5. Select the array you want to schedule the verify task.
6. Type the name in **Task Name** entry box.
7. Choose whether you want to schedule.
 - One time verify task on specific date (YYYY-MM-DD) at (HH:MM:SS, 24-hr clock).
 - Or a specific schedule you can adjust based on Daily, Weekly, or Monthly options.
8. Click **Submit**.
9. Your entry will appear under **Tasks List**.

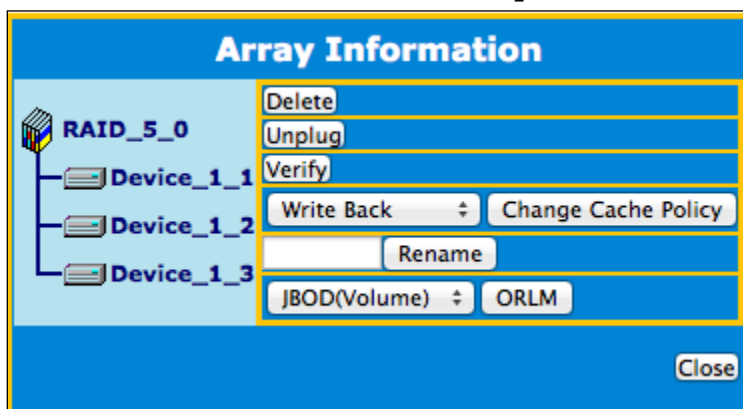
Note: New Verify Task box only appears if you have normal status arrays. If you have a critical array, New Rebuild Task will replace New Verify Task.

RAID Expansion (OCE/ORLM)

Important: It is recommended to **Verify/Rebuild** your array before **Expanding** or **Migrating**. Once you start an **OCE/ORLM** procedure, you *can* stop the process but it **must** be resumed until completion.

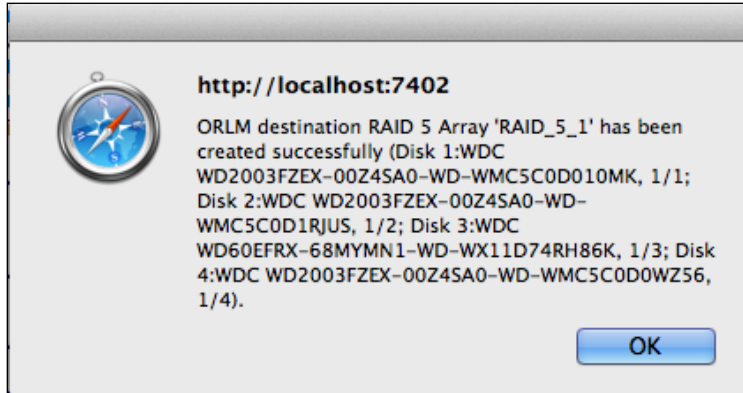
To add more capacity to your current configuration follow these steps:

1. Log in WebGUI
2. Select desired controller from drop down menu on top left
3. Click **Logical**
4. Click **Maintenance** for the array you want to change
 - Select a **different** RAID level to **Migrate**
 - Select the **same** RAID level to **Expand**



5. **Important:** Record all the physical drives currently in array.
6. Click **ORLM**
7. Select the physical drives you recorded earlier and the drives you want to add
8. Click **Submit**

Upon submission, you will receive a prompt stating ORLM created successfully.



The **Logical Device Information** for the migrating/expanding array will change status to **migrating/expanding**.

Updating RocketRAID HBA BIOS/Firmware

Having the latest BIOS ensures you have the latest firmware stability and performance improvements. Make sure to read the README before making any changes.

A few reasons as to why update BIOS/Firmware:

Compatibility fixes	Updating firmware may fix issues that occur when using new hardware
Bug fixes	Bugs that are discovered post release are fixed in subsequent updates.

Updating BIOS/Firmware using WebGUI

Keeping the firmware up to date ensures that your RAID controller the latest compatibility and performance updates.

1. Locate the latest firmware on our webpage at www.highpoint-tech.com.
2. Extract the contents of the file.

3. Refer to the readme (if included) to make sure you have the correct firmware for your HBA **Note:** Your HBA name and properties can be found in the **WebGUI > Physical Tab**.
4. Locate the proper firmware file
5. Login to WebGUI, then click the Physical tab.
6. Under **Update Firmware**, click **Browse** and browse to your firmware file.
7. Click **Submit**.
8. **Reboot** for changes to take effect.

Troubleshooting - Hardware

If you face any hardware related issues involving the RocketStor 6414S enclosure, disk drives or RAID controller, refer to the following sections for troubleshooting tips. For all other problems, submit a support ticket at www.highpoint-tech.com/websupport.

Enclosure Mute Button

The mute button on the back will mute the alarm for enclosure related issues such as enclosure FAN or TEMPERATURE failures. Failures associated with the RAID controller will trigger the RAID card alarm, and cannot be muted with the enclosure mute button.

LED Activity


The following information tells you how to interpret LED activity seen on the enclosure and disk trays.



Table 1. LED Status Information

LED Status	Interpretation
STABLE GREEN	<ul style="list-style-type: none"> Disk is detected and connection has been made
BLINKING BLUE	<p>Disk is in use and performing I/O activity such as:</p> <ul style="list-style-type: none"> Rebuilding an array Verifying data integrity Transferring data
STABLE BLUE	<ul style="list-style-type: none"> Enclosure is properly powered on
UNLIT	<ul style="list-style-type: none"> Unit is powered OFF Disk tray is empty

Table 2. LED Diagrams

LED Location	Icon	Normal	Faulty
Disk Tray Top LED		<ul style="list-style-type: none"> When powered on, the top LED will be a STABLE GREEN 	N/A



Disk Tray Bottom LED		<ul style="list-style-type: none"> When I/O operations are running normally, LED will be BLINKING BLUE. 	N/A
Power LED		<ul style="list-style-type: none"> When enclosure is powered on LED will be SOLID BLUE Power LED will be UNLIT if not connected to a running host system 	N/A

Table 3. LED Reference Chart

	Present	Active	Failed	Identify
Disk Tray	GREEN	BLUE	N/A	N/A
Enclosure LEDs	BLUE	N/A	N/A	N/A

Present - Indicates that the disk is present and available.

Active - Indicates the disk is performing disk I/O

Failed - N/A

Identify - N/A

Troubleshooting - Software

If you face any software related issues involving the HighPoint RAID Management (WebGUI), refer to the following sections for troubleshooting tips. For all other problems, submit a support ticket at www.highpoint-tech.com/websupport.

WebGUI – Connection cannot be established

1. Check the connection of the card with its PCI Express slot. (PCIe 2.0 x8 for RR4522)
2. Check and make sure the cables are not faulty.
3. Check Device Manager (Windows) or System Report (Mac) to verify the device and drivers are installed and detected by the OS
 - a. **For Windows Users:**
 - Open **Device Manager**.
 - Click on the **Storage Controller** tab.
 - Check to see if **RocketRAID 4522 SAS Controller** is listed.
 - If **RocketRAID 4522 SAS Controller** is not listed, check to see if **RAID Controller** is under **Unknown devices**.
 - If **RAID Controller** is under **Unknown Devices**, re-install RocketRAID drivers.
 - If RAID Controller is **not** present, recheck your hardware and cables.
 - b. **For Mac Users:**
 - Click the Apple Icon on the menu bar.
 - Click About this Mac > System Report.
 - Click **PCI**.
 - Check to see the **Type: RAID Controller** and **Driver Installed: Yes**.
 - If Driver Installed is **No**, re-install the drivers.
 - If **RAID Controller** is not present, recheck your hardware and cables.

Troubleshooting – RAID

If you face any RAID related issues involving your RAID array, refer to the following sections for troubleshooting tips. For all other problems, submit a support ticket at www.highpoint-tech.com/websupport.

Critical Arrays

When your disk is critical, that means your array as a whole is still accessible, but a disk or two is faulty (depending on your RAID level) is in danger of failing.

Common scenarios for critical array status

- **Unplugging disk that is part of an array**
 - **Bad sector detected on a disk part of the array**
 - **Unrecoverable data during rebuilding**
 - **Defective port or cable interrupts rebuilding process**
-

To recover from this situation,

1. Backup your existing data.
2. Identify which disk is faulty.
 - You can refer to the LED lights on the enclosure.
 - Refer to the WebGUI Logical tab and Event tab.
3. Re-insert the faulty disk or replace with a new disk.
 - Array will rebuild automatically if you enable auto-rebuild setting and you simply reseated the faulty disk. **Note:** Click **Rescan** if array still does not rebuild automatically.
4. Once a new disk is added, add the new disk into the critical array.
 - Log in to WebGUI.
 - Click **Logical** Tab.
 - Click **Maintenance** > **Add disk** > select the appropriate disk.
5. Rebuild should start automatically.
 - If rebuild does not start, click 'Rescan' on the left hand panel.

Note: Rebuilding an array takes on average 2 hours per 1 Terabyte of disk capacity. The process will scan through the entire disk, even if you have very little *used* disk space.

Rebuild failed

If rebuilding fails to complete due to bad disk sector errors (check in the Event Log), there is an option to continue rebuilding on error in HighPoint WebGUI.

1. Log in to WebGUI.
2. Click **Setting** tab.
3. Under **System Setting**, change **Enable Continue Rebuilding on Error** to **Enabled**.

This option will enable rebuilding to ignore bad sectors and attempt to make your data accessible. It is important to backup immediately after backup is complete and replace or repair any disk(s) with bad sectors.

Critical array becomes disabled when faulty disk was removed

If this is the case, check to make sure you removed the correct disk. When you remove the wrong disk from a critical array, the array status may become disabled. Data is inaccessible for disabled arrays. Follow these steps to restore the previous state:

1. Shut down your PC.
2. Shut down the RocketStor 6414S Enclosure.
3. Place all disks, including the removed disks, back to original array configuration.
4. Boot up PC.
5. Once array is back to critical status, identify the correct disk (using the event log) and replace it.

Disabled Arrays

If two or more disks in your array go offline due to an error or physical disconnection your array will become **disabled**.

To recover a disabled array, using the 'Recover Tab' will yield the best results. To utilize the **Recover** tab, you will need to insert the **exact** physical drives that are listed on the recover list. The goal of using recover is to get the RAID status back to critical/normal, allowing you to access and back up your data.

Example: RAID 5 Disabled Array:

Recover with RAID Maintenance

1. Log in to WebGUI.
2. Click **Maintenance** for the array that is disabled.
3. Click **Recover**.

Recover RAID with Recover Tab

Before using the Recover tab to recover your array, check to see if the RAID array is listed in your **Recover List**. Once you have confirmed the RAID array is there, proceed to delete the disabled array.

1. Log in to WebGUI.
2. Click **Maintenance** for the array that is disabled.
3. Click **delete**, to delete the disabled array.
4. Click **Recover** Tab.
5. Select the RAID configuration you just deleted.
6. Click **Recover Array**.

Frequently Asked Questions

This section covers some commonly asked questions:

- How do I recover my WebGUI password? (pg. 43)
- If I purchase another HighPoint RAID Controller, will my data be retained?
Yes, the RAID configuration metadata is stored on hard disks. Users don't need to re-configure RAID while migrating to another HighPoint RAID Controller.(pg.44)

Recovering your Password

For **Mac** Users:

1. Open **Terminal**
2. Type or navigate to `cd /usr/share/hpt`
3. Type `rm hptuser.dat`, to remove the file. (*Note: must* be root user mode to remove this file)
4. Reboot

For **Windows** Users:

1. Open file explorer
2. Navigate to `C:/Windows/`
3. Delete **hptuser.dat**
4. Reboot

Battery Backup Unit (BBU, sold separately)

When you set your RAID array or HDD to utilize write back cache, you sacrifice reliability for performance. Utilizing Write Through cache allows you to safe guard your data from power related failures, but it will be much slower.

A BBU is primarily used to safe guard arrays utilizing write back cache. When a power failure occurs, the battery will provide enough power to maintain the data in the cache for however long the battery capacity is.

Attaching the BBU

The connection will be made directly on the RAID controller J6 pins.

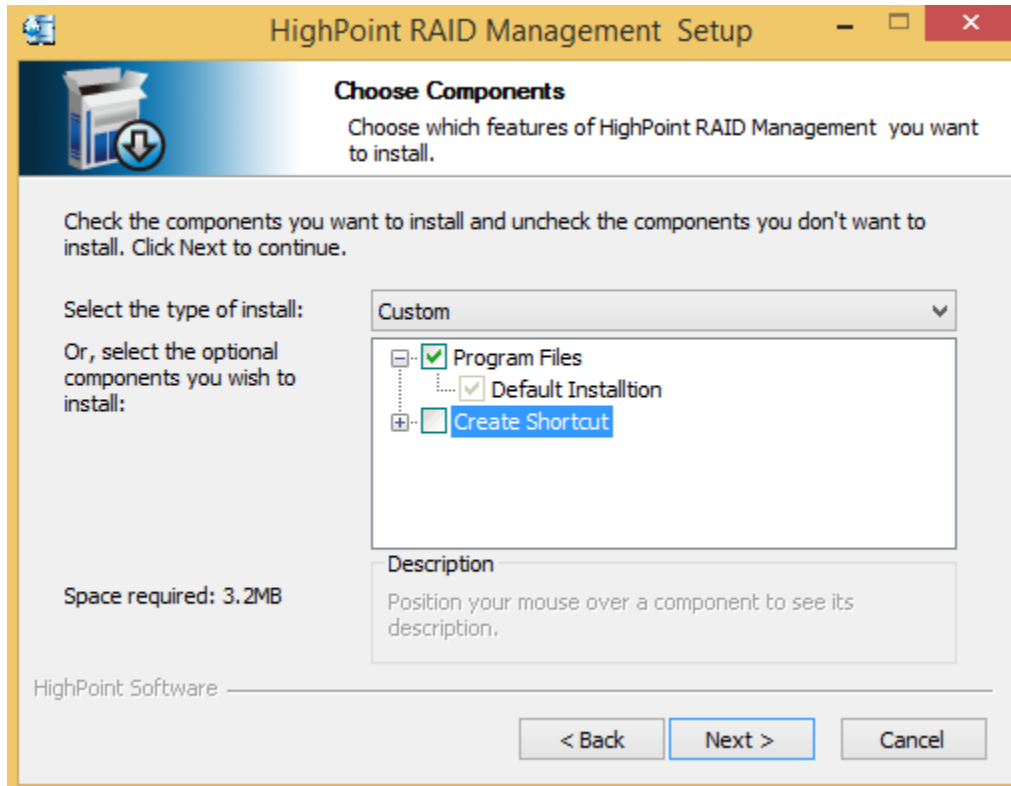
Checking the Battery Status

1. Log into WebGUI
2. Select the Controller the BBU is connected to

3. Select the Physical Tab
4. Charge status should be listed under Extended Information
5. For CLI, type `query controllers`

WebGUI Installer Stuck

Solution: During the WebGUI installation, **uncheck** Create a Desktop Shortcut



Online Array Roaming

One of the features of all HighPoint RAID controllers is online array roaming. Information about the RAID configuration is stored on the physical drives. So if the RS6314A fails or you wish to use another RAID controller, the RAID configuration data can still be read by another HighPoint card.

Appendix A: Navigating the HighPoint WebGUI

The HighPoint WebGUI management utility allows you to do several key things:

- View general system overview (see pg. 46)
- Update firmware and BIOS (see pg. 36)
- Create and remove arrays (see pg. 21)
- Change enclosure settings (see pg. 58)
- Troubleshoot faulty drives (see pg. 61)
- Monitor disk health (see pg. 62)

Tab Name	Function
Global View	View HBA (Host Bus Adapter) and Storage Properties
Physical	View Additional Controller properties Update BIOS/Firmware View disk properties Adjust selected disk behaviors
Logical	Manage and create RAID arrays
Setting	Adjust WebGUI controls settings
Event	Show WebGUI Event Log
SHI (Storage Health Inspector)	View and schedule S.M.A.R.T monitoring
Recover	Revert to previously created arrays
Logout	Logout of WebGUI
Help	Additional WebGUI documentation Online Web Support

[How to Login HighPoint WebGUI](#)

You can reach the HighPoint WebGUI log in page either by:

- Double clicking on the **HighPoint RAID Management** icon created on your desktop
- Opening your preferred web browser and typing <http://localhost:7402> in the address bar.

The default username and password to login is

Username: RAID
Password: hpt

Username and Password are Case-Sensitive (Username is not changeable)

Appendix A-1: Global Tab

The screenshot shows the HighPoint RAID Management web interface. At the top left, there is a dropdown menu for 'Controller(2): 4520'. The HighPoint Technologies, Inc. logo is in the top right. Below the logo is a navigation bar with tabs: Global View (selected), Physical, Logical, Setting, Event, SHI, Recover, Logout, and Help. The main content area is split into two columns: HBA Properties and Storage Properties. The HBA Properties section lists: Host Adapter model: RocketRAID 4520 SAS Controller, Enclosure count: 0, Physical Drive: 4, Legacy Disk: 0, and RAID Count: 1. The Storage Properties section features an HPT logo, a progress bar, and the following information: Total Capacity: 17002 GB, Configured Capacity: 17002 GB, Free Capacity: 0 GB, and a red bar indicating 'Configured 100.0%'. At the bottom left, the footer text reads: HighPoint RAID Management 2.6.8, Copyright (c) 1996-2015 HighPoint Technologies, Inc. All Rights Reserved.

The WebGUI Global view provides an overview of what each HighPoint controller card connected to your computer detects. It is also the first page you see when logging in.

- Host Bus Adapter Properties
- Storage Properties

On the top left of the page is a drop down menu that allows you to select which controller you want to manage (if you have multiple HighPoint controllers connected).
HBA Properties

- **Host Adapter model:** the model name of the controller

- **Enclosure Count:** number of external enclosures detected
- **Physical drives:** number of drives seen by the controller
- **Legacy Disks:** number of Legacy disks connected. Legacy disks are physical drives that have previous partitions stored on them.

Storage Properties

- **Total capacity:** the combined capacity of each physical disk connected to controller
- **Configured capacity:** the amount of space used for creating arrays
- **Free Capacity:** total amount of space unused

Appendix A-2: Physical Tab

The screenshot shows the HighPoint RAID Management web interface. The browser address bar shows 'localhost'. The page title is 'Controller(1): 4522'. The HighPoint Technologies, Inc. logo is in the top right. A navigation menu includes 'Global View', 'Physical' (selected), 'Logical', 'Setting', 'Event', 'SHI', 'Recover', 'Logout', and 'Help'. On the left, a sidebar has 'Controller', 'Devices', and 'Rescan' options. The main content area is divided into three sections:

- Controller Information:**
 - Model Name:** RocketRAID 4522 SAS Controller
 - BIOS Version:** v1.8
 - Vendor:** HighPoint Technologies, Inc.
- Extended Information:**
 - IOP Model: 88RC9580 (9580B3)
 - CPU Temperature: 37°C
 - Board Temperature: 32°C
 - Power 3.3V Voltage: 3.27V
 - Power 2.5V Voltage: 2.52V
 - Power 1.8V Voltage: 1.80V
 - Power 1.5V Voltage: 1.48V
 - Power 1.0V Voltage: 1.02V
 - SDRAM Size: 512 M
 - Battery Installed: Not Installed
 - Firmware Version: v1.8.1.0
 - Serial Number: 1350M48000597
 - SAS Address: 500193c030025501
- Update Firmware:**
 - Select the bif file to update Firmware. This process may take some time.
 - Buttons: Choose File (no file selected), Submit

At the bottom, the footer reads: 'HighPoint RAID Management 2.6.8 Copyright (c) 1996-2015 HighPoint Technologies, Inc. All Rights Reserved'.

The physical tab shows general and extended information about the controller you are using. Information about the firmware, BIOS, and operating temperatures are all located here. This information is useful for identifying what RAID controller model you have and to make sure you have the most updated version available.

The physical tab contains the following information:

- Controller Information

- Extended Information
- Update Firmware
- Physical Devices Information

Controller Information: Lists the controller model name, BIOS version, and vendor.

- Model Name: RocketRAID 4522 SAS Controller
- BIOS Version: v1.0
- Vendor: HighPoint Technologies, Inc.

Extended Information: Gives you additional information concerning the HBA (Host Bus Adapter) in the enclosure

- **IOP Model:** IOP chip model number
- **CPU Temperature:** Displays computer temperature in Celcius (°C).
- **Board Temperature:** Displays the board temperature in Celcius (°C).
- **SDRAM Size:** SDRAM size of the HighPoint controller card
- **Battery Installed:** Battery Backup Unit information
- **Firmware Version:** Firmware version of the HBA
- **SAS address:** the SAS address

Update Firmware: Allows you to update the controller BIOS through the WebGUI.

Update Firmware

Select the blf file to update Firmware.
This process may take some time.

no file selected

Controller(1): 4520

HighPoint
Technologies, Inc.





Global View **Physical** Logical Setting Event SHI Recover Logout Help

Controller

Devices

Rescan

Physical Devices Information

 Device_1_1	Model	WDC WD40EFRX-68WT0N0-WD-WCC4ENSLV3U6	Capacity	4.00 TB
Unplug	Revision	80.00A80	Read Ahead	Enabled Change
	Location	1/1	Write Cache	Enabled Change
	Max Free	0.00 GB		
	Status	Legacy	NCQ	Enabled Change
	Serial Num	WD-WCC4ENSLV3U6	Identify LED	[ON] [OFF]
 Device_1_2	Model	WDC WD60EFRX-68MYMN1-WD-WX11D74RHV7A	Capacity	6.00 TB
 Device_1_3	Model	WDC WD30EFRX-68EUZNO-WD-WMC4N0DCFMT	Capacity	3.00 TB
 Device_1_4	Model	WDC WD40EFRX-68WT0N0-WD-WCC4EHYCFZXL	Capacity	4.00 TB

HighPoint RAID Management 2.6.8
Copyright (c) 1996-2015 HighPoint Technologies, Inc. All Rights Reserved

The following properties are part of the **Physical Devices Information** box under the physical tab.

- **Model** - Model number of the physical drive
- **Capacity** - Total capacity of the physical drive
- **Revision** - HDD device firmware revision number
- **Read Ahead*** - (Enable/Disable) Disk read ahead.
- **Location** - Device location (example: 1/2 states controller 1, slot 2)
- **Write Cache*** - (Enable/Disable) the disk write cache
- **Max Free** - space on disk that is not configured in an array
- **Status** - (Normal, disabled, critical) status of the disk
- **NCQ*** - (Enable/Disable) Native Command Queuing
- **Serial Number** - serial number of the physical disk
- **Identify LED** - N/A
- **Unplug** - Safely ejects selected disk. Other methods of disk removal will trigger alarm if enabled.

* Disk properties that can be adjusted.

Read Ahead

Enabling disk read ahead will speed up read operations by pre-fetching data and loading it into RAM.

Write Cache

Enabling write cache will speed up write operations.

NCQ (Native Command Queuing)

A setting that allows disks to queue up and reorder I/O commands for maximum efficiency.

Identify LED

N/A

Rescan

Clicking rescan will immediately signal the controller to scan for any changes in the connection. Clicking this button will also stop any alarm if currently ringing.

Appendix A-3: Logical Tab

Controller(1): 4520

HighPoint Technologies, Inc.

Global View Physical **Logical** Setting Event SHI Recover Logout Help

Create Array
Spare Pool
Logical Device
Rescan
Beeper Mute

Logical Device Information

Name	Type	Capacity	BlockSize	SectorSize	OS Name	Status
Device_1_1	Hard Disk	4.00 TB			HPT DISK 0_3	Legacy
Device_1_2	Hard Disk	6.00 TB			HPT DISK 0_2	Legacy
Device_1_3	Hard Disk	3.00 TB			HPT DISK 0_1	Legacy
Device_1_4	Hard Disk	4.00 TB			HPT DISK 0_0	Legacy

Physical Device Information

Location	Model	Capacity	Max Free
1/1	WDC WD40EFRX-68WT0N0-WD-WCC4ENSLV3U6	4.00 TB	0.00 GB
1/2	WDC WD60EFRX-68MYMN1-WD-WX11D74RHHV7A	6.00 TB	0.00 GB
1/3	WDC WD30EFRX-68EUZN0-WD-WMC4N0DCFMUT	3.00 TB	0.00 GB
1/4	WDC WD40EFRX-68WT0N0-WD-WCC4EHYCFZXL	4.00 TB	0.00 GB

HighPoint RAID Management 2.6.8
Copyright (c) 1996-2015 HighPoint Technologies, Inc. All Rights Reserved

The Logical tab is where you are edit, delete, and maintain your RAID configurations, as well as, adding drives to your spare pool. The logical tab has the following settings:

- Create Array
- Spare Pool

- Logical Device
- Rescan
- Beeper Mute

An array is a collection of physical disks that will be seen as one virtual drive by your Operating System (OS). The RocketStor 6414AS has a RocketRAID 4522 controller capable of creating the following array types

Controller(1): 4520

Global View
Physical
Logical
Setting
Event
SHI
Recover
Logout
Help

[Create Array](#)

[Spare Pool](#)

[Logical Device](#)

[Rescan](#)

[Beeper Mute](#)

Create Array

Array Type:

Array Name:

Initialization Method:

Cache Policy:

Block Size:

Number of RAID5 member disks:

		Location Model	Capacity	Max Free
Available Disks:	<input type="checkbox"/>	1/1 WDC WD40EFRX-68WT0N0-WD-WCC4ENSLV3U6	4.00 TB	0.00 GB
	<input type="checkbox"/>	1/2 WDC WD60EFRX-68MYMN1-WD-WX11D74RHV7A	6.00 TB	0.00 GB
	<input type="checkbox"/>	1/3 WDC WD30EFRX-68EUZNO-WD-WMC4N0DCFMUT	3.00 TB	0.00 GB
	<input type="checkbox"/>	1/4 WDC WD40EFRX-68WT0N0-WD-WCC4EHYCFZXL	4.00 TB	0.00 GB

Capacity: (According to the max free space on the selected disks) (MB)

DV Mode: Margin:

(Enable special cache ploice for DV/sequential write applications) (Adjust the larger marge will achive more stable performance, but it will decrease the maximume write performance.)

Disk Cache Policy:

HighPoint RAID Management 2.6.8
 Copyright (c) 1996-2015 HighPoint Technologies, Inc. All Rights Reserved

Array Type:

- JBOD - Just a Bunch of Disks
- RAID 0 - Striping
- RAID 1 - Mirroring
- RAID 5 - Rotating Parity bit
- RAID 1/0 - Striping of Mirrored Drives
- RAID 6 - Double Parity Bit

Each RAID level has its pros and cons based on the application you use it for (Note: Refer to RAID level Quick Reference)

Array Name: the name that will be displayed in Logical Device Information (Default: RAID_<level>_<array number>)

Initialization Method:

- **Keep Old Data:** Opts to keep all the data on each drive untouched. Best for users that already have HighPoint RAID data on the selected drives.
- **Quick Init:** Grants immediate access to the array volume. This option will delete previous user data, but will not build parity. Recommended for testing purposes only or when new disks are used. Not recommended for RAID 5, and RAID 6.
- **Foreground:** The array initialization process will be set at high priority. During this time array will be non-accessible, but initialization completion time will be shorter.
- **Background:** The array initialization process will have a lower priority. During this time array will be accessible, but initialization completion time will be longer.

Note 1: Initialization takes a significant amount of time (approximately 2 hours per 1 TB).

Cache Policy (Default: Write Back)

Write Back - Any data written to the array will be stored as cache, resulting in better I/O performance at the risk of data failures due to power outages. Data will be stored as cache before it is physically written to the disk; when a power outage occurs, any data in the cache will be lost.

Write Through - Data written to an array is directly written onto the disk, meaning lower write performance for higher data availability. Without cache acting as a buffer, write performance will be noticeably slower but data loss due to power outages or other failures is significantly minimized.

Block Size (default: 64K)

[16K, 32K, 64K, 128K, 256K, 512K, 1024K are the supported block sizes]

This option allows you to specify the block size (also known as “stripe size”) for specific array types (RAID 0, 1, 5, 6, and 10). Adjusting the block size allows you to tailor the array performance towards specific application. Consider the sizes of disk I/O data you are dealing with; as a general rule larger disk I/O may benefit from smaller block sizes, and smaller disk I/O may benefit from larger block sizes. A block size of 64 KB is recommended since it gives balanced performance for most applications.

Capacity (Default: Maximum)

The total amount of space you want the RAID array to take up. When creating RAID levels, disk capacities are limited by the smallest disk.

Example Capacity calculation:

A RAID 5 organizes data in the manner shown below. All parity data will become unusable for the user and not included in the total disk capacity.

Disk 1	Disk 2	Disk 3	Disk 4
Data 1	Data 2	Data 3	Parity
Data 4	Data 5	Parity	Data 6
Data 7	Parity	Data 8	Data 9
Parity	Data 10	Data 11	Data 12

Therefore, RAID 5 capacity will be [SMALLEST DISK CAPACITY] * (number of disks - 1).

Sector Size (Default: 512B)

This option is irrelevant for Windows XP 64 and later. Current OS already support larger volumes, and introduce a partitioning method known as GPT (GUID partition table). This option, also known as VSS (Variable Sector Size) allows you to specify the sector size of the array, for use with older Windows Operating Systems.

DV Mode

This mode is specifically designed for video applications. The default firmware cache policy provides balanced performance for standard applications such as workstations, file servers, and web servers. But for DV mode, a special cache firmware is implemented specifically for large sequential writing (large I/O requests such as video files). Enabling DV mode will maintain the performance and consistency of transferring and processing video files.

There are several factors concerning DV mode to take note:

- DV mode only available for RAID 0, 5, and 6
- Only 1 RAID array you created can enable DV mode
- DV mode only works when array status is normal

DV Mode: (Enable special cache policy for DV/sequential write applications)	<input checked="" type="checkbox"/> Disable <input type="checkbox"/> Enable	Margin: (Increasing the margin % will result in more stable performance, but decrease the maximum write performance.)	5% <input type="button" value="v"/>
--	--	--	-------------------------------------

Margin

[5% - 25%]

When DV mode is enabled, you have the option to set the margin. This percentage represents the amount of space the designated cache will hold before flushing the data onto the drive. Increasing the margin % will result in more stable performance, but decrease the maximum write performance.

Alternatively, you can change the margin anytime in Logical > Maintenance for DV enabled array.

DV Mode: (Enable special cache policy for DV/sequential write applications)	<input type="checkbox"/> Disable <input checked="" type="checkbox"/> Enable <input type="button" value="v"/>	Margin: (Increasing the margin % will result in more stable performance, but decrease the maximum write performance.)	<input checked="" type="checkbox"/> 5% <input type="checkbox"/> 10% <input type="checkbox"/> 15% <input type="checkbox"/> 20% <input type="checkbox"/> 25%
--	---	--	--

Logical Device Information

Logical device tab is the default page upon clicking the Logical tab of the WebGUI. This page contains information about your RAID arrays and individual disks your system detects.

Logical Device Information

Arrays you create and the properties associated with them will appear here.

Maintenance

Once an array has been created, click maintenance for options to manage your array.

Array Information

Clicking on the maintenance button will show you the Array information box. Different array statuses (Normal, critical, disabled) will have different maintenance options.

Normal Status

The screenshot displays the 'Logical Device Information' page. At the top, a table lists RAID arrays. The first entry is 'RAID_5_0', a RAID 5 array with a capacity of 9.00 TB, block size of 64k, sector size of 512B, and OS Name 'HPT DISK 0_0'. Its status is 'Normal', and a 'Maintenance' link is visible. Below this, an 'Array Information' dialog box is open for 'RAID_5_0'. The dialog shows a tree view of the array's components: 'Device_1_1', 'Device_1_2', 'Device_1_3', and 'Device_1_4'. To the right of the tree, a list of maintenance options is shown: 'Delete', 'Unplug', 'Verify', 'Write Back' (with a dropdown arrow), 'Change Cache Policy', 'Disable' (with a dropdown arrow), 'Change Margin', 'Rename', 'JBOD(Volume)' (with a dropdown arrow), and 'ORLM'. A 'Close' button is at the bottom right of the dialog. In the background, another table shows disk details with columns for 'Location', 'Model', 'Capacity', and 'Max Free'.

A Normal Status Array has the following options:

Delete - deletes the selected RAID array

Unplug - powers off the selected RAID array

Verify - verifies the integrity of the RAID array

Change Cache Policy - Toggles between Write through and Write back cache

Change Margin - Adjust margin when DV mode is enabled

Rename - renames the RAID array

OCE/ORLM - Online Capacity Expansion / Online RAID Level Migration

Critical Status

Name	Type	Capacity	BlockSize	SectorSize	OS Name	Status
RAID_5_0	RAID 5	9.00 TB	64k	512B	HPT DISK 0_0	Critical Maintenance

Location	Model	Capacity	Max Free
1/1	WDC WD40	TB	1.00 TB
1/2	WDC WD60	TB	3.00 TB
1/3	WDC WD30	TB	0.00 GB
1/4	WDC WD40	TB	1.00 TB

A critical status array has all the normal status options except the following:

- The Array can no longer be renamed
- **Add disk** replaces the **verify disk** option

Once array status changes to critical, the faulty disk will be taken offline and you can either:

- Reinsert the same disk
- Insert new disk

Reinserting the same disk should trigger rebuilding status, since data on the disk would be recognized.

If you insert a new disk, clicking **add disk** will give you the option to select that disk and add it to the array.

Disabled Status

The screenshot displays the 'Logical Device Information' interface. At the top, a table lists RAID_5_0 with a status of 'Disabled' and a 'Maintenance' link. An 'Array Information' dialog box is open, showing a tree view of the RAID array with four devices: Device_1_1, Device_1_2, Device_1_3, and Device_1_4. Device_1_3 and Device_1_4 are marked with red 'X' icons, indicating they are missing. The dialog box includes 'Delete', 'Unplug', and 'Recover' buttons. In the background, a table lists the physical devices with their locations and models.

Name	Type	Capacity	BlockSize	SectorSize	OS Name	Status
RAID_5_0	RAID 5	9.00 TB	64k	512B		Disabled Maintenance

Location	Model	Capacity	Max Free
1/1	WDC WD40	4.00 TB	1.00 TB
1/2	WDC WD60	6.00 TB	3.00 TB
1/3	WDC WD30	3.00 TB	0.00 GB
1/4	WDC WD40	4.00 TB	1.00 TB

A disabled status array means that your RAID level does not have enough disks to function.

- Your data will be inaccessible.
- Rebuilding will not trigger, since RAID does not have enough parity data to rebuild upon.

Your options in Maintenance are:

Delete - will delete the array

Unplug - will take array offline, making it safe to remove

Recover - will attempt to recover the array using the list from the recover tab

Physical Device Information

Controller(1): 4520

HighPoint Technologies, Inc.

Global View Physical **Logical** Setting Event SHI Recover Logout Help

Create Array
Spare Pool
Logical Device
Rescan
Beeper Mute

Logical Device Information							
Name	Type	Capacity	BlockSize	SectorSize	OS Name	Status	
RAID_5_0	RAID 5	4.00 TB	64k	512B	HPT DISK 1_3	Migrating 0%	Maintenance
RAID_5_1	RAID 5	6.00 TB	64k	512B		Migrating 0%	Maintenance
Device_1_6	Hard Disk	6.00 TB			HPT DISK 1_0	Legacy	
Device_1_7	Hard Disk	6.00 TB			HPT DISK 1_1	Legacy	
Device_1_8	Hard Disk	6.00 TB			HPT DISK 1_2	Legacy	

- **Location** - which controller and port the drive is located in
- **Model** - model number of the drive connected
- **Capacity** - total capacity of the drive
- **Max Free** - total capacity that is not configured

Rescan

Clicking rescan will force drivers to report array status. For any disk(s) you hot plug into the device, do not click rescan until all physical drives are detected and appear under Logical Device Information.

Beeper Mute

The controller emits a beeping sound whenever an

- Array falls into **critical** status
- Array falls into **disabled** status
- You unplug a disk
- Your disk fails due to bad sectors
- SMART sensors anticipate drive failure

If device is currently beeping, clicking Beeper Mute will mute the sound immediately.

Note: This button does not permanently mute the alarm. To permanently mute the alarm go to **Setting > Enable audible alarm > Disabled**.

[Appendix A-4: Setting Tab](#)

Controller(1): 4520

HighPoint Technologies, Inc.

Global View Physical Logical **Setting** Event SHI Recover Logout Help

System

Email

System Setting

Enable auto rebuild. Disabled

Enable Continue Rebuilding on error. Disabled

Enable audible alarm. Disabled

Set Spindown Idle Disk(minutes): Disabled

Restrict to localhost access. Disabled

Set Rebuild Priority: Medium

Port Number: 7402

Submit

Password Setting

Password:

Confirm:

Submit

HighPoint RAID Management 2.6.8
Copyright (c) 1996-2015 HighPoint Technologies, Inc. All Rights Reserved

System Settings

Enable auto rebuild (default: Enabled)

When a physical drive fails, the controller will take the drive offline. Once you re-insert or replace the disk, the controller will not automatically rebuild the array unless this option is enabled.

Enable continue rebuilding on error (default: Enabled)

When enabled, the rebuilding process will ignore bad disk sectors and continue rebuilding until completion. When rebuild is finished, the data may be accessible but data inconsistency due to ignored bad sectors may cause problems in the future. If this option is enabled, HighPoint recommends user to check the event log for bad sectors.

Enable audible alarm (default: Enabled)

When a physical disk fails, the controller will emit an audible sound signaling failure. This option mutes the alarm.

Set Spindown Idle Disk (minutes) (default: Disabled)

When set, physical drives will spindown a certain amount of time after disk activity ceases. Only 10, 20, 30, 60, 120, 180, 240 minutes setting are available.

Restrict to localhost access (default: Enabled)

Remote access to the controller will be restricted when **enabled**, other users in your

network will be unable to remotely log in to the WebGUI.

Rebuild Priority (default: Medium)

You can specify the amount of system resources you want to dedicate to rebuilding the array. There are 5 levels of priority [Lowest, Low, Medium, High, Highest]

Port Number (default: 7402)

The default port that the HighPoint WebGUI listens on is 7402. You may change it to any open port.

Password Setting

Changing your WebGUI password

Under Password Setting type your new password and confirm it, then click submit.

Email Setting

You can set the controller to send an email out to recipients of your choosing when certain events (refer to Event Tab) trigger.

Appendix A-5: Recover Tab

Controller(1): 4520

HighPoint Technologies, Inc.

Global View Physical Logical Setting Event SHI **Recover** Logout Help

Recover List

Total items:(0), valid items:(0), only valid items are displayed.

Backup To File Clear All

Recover Array

Update Recover List

Select the rec file to update Recover List.
This process may take some time.

Choose File no file selected Submit

HighPoint RAID Management 2.6.8
Copyright (c) 1996-2015 HighPoint Technologies, Inc. All Rights Reserved

Previously created arrays will be stored under this tab. Recovering an array from here will attempt to recover a **'disabled'** array and make it **'normal'**.

The Recover List will list all your previous and current created arrays. Each entry will list the following properties:

- Array name
- RAID level
- Array Capacity
- Time created (YYYY/MM/DD, HH/MM/SS, 24 hr clock format)
- Location of physical drives
- Model of physical drives

Important: When recovering an array it is important to note the **location** and **model** of each physical drive because you can **only** recover using those **exact** positions and drive model.

How to Backup your Recover List

The recover list is a record of your previously created arrays containing the model and location information of your physical drives. Recovering from the list could help bring a **disabled** array back to **normal** status for emergency data retrieval.

To backup your recover list:

1. Log in to WebGUI
2. Click **Recover** Tab
3. Click **Backup to File**

Note: The file will be saved as **hptrec.rec**

How to Reload your Backup Recover List

In the case that you cleared the recover list or it does not appear for any reason, you can recover it if you saved the list beforehand.

To reload your recover list

1. Log in to WebGUI
2. Click **Recover** Tab
3. Under **Update Recover List** click **Browse...**
4. Locate your previously saved **hptrec.rec** file and select it
Note: loading a back up recover list will completely replace the current recover list.
5. Click **Submit**

Appendix A-6: Event Tab




In the event tab, you can see log entries associated with the HighPoint device. The event log provides useful information when troubleshooting your set up.

In the event tab, there are four options available:

- Download - Save the log file on your computer

- Clear - Clears all log entries
- Prev - View previous log page
- Next - View next log page

Table 4. Event Log Icon Guide

Icon	Name	Definition
	Information	Includes general administrative tasks: <ul style="list-style-type: none"> • Create/delete arrays • Configuring spares • Rebuilding arrays • Configuring event notifications • Configuring maintenance
	Warning	Alerts issued by the Host Adapter: <ul style="list-style-type: none"> • High temperatures • Sector errors • Communication errors • Verification errors
	Error	Hardware related problems <ul style="list-style-type: none"> • Hard disk failure • Broken errors • Memory failure

The event view is a basic error logging tool built into the HighPoint WebGUI.

[Appendix A-7: SHI \(Storage Health Inspector\)](#)

- S.M.A.R.T Attributes
- HDD Temperature Threshold
- Storage Health Inspector Scheduling

The SHI outputs information collected using SMART (Self-Monitoring Analysis and Reporting Technology) Hard Drive Technology. The data provided on this tab helps you to anticipate any disk failures based on a variety of monitored hard disk properties.

Appendix B: WebGUI Icon Guide

	Critical – missing disk A disk is missing from the array bringing it to ‘critical’ status. The array is still accessible but another disk failure could result in data loss.
	Verifying The array is currently running a disk integrity check.
	Rebuilding The array is currently rebuilding meaning you replaced a failed disk or added a new disk to a ‘critical’ state array.
	Critical – rebuild required The array has all disks, but one disk requires rebuilding.
	Disabled The icon represents a disabled array, meaning more than one disk failed and the array is no longer accessible
	Initializing The array is initializing. The two types of initialization is Foreground and Background. (See Initialization)
	Uninitialized The array initialization process has been interrupted, and the process is incomplete.
	Not Initialized Disk is not initialized yet, and needs to be initialized before use
	OCE/ORLM Array is performing a OCE/ORLM operation
	OCE/ORLM has stopped The array expansion process has been stopped.
	Legacy An existing file system has been detected on the disk. These disk are classified as legacy drives.
	Spare The device is a spare drive, it will automatically replace any failed drive part of an array.
	Normal The array status is normal



Initializing

The array is initializing, either foreground or background initialization



Initialization Stopped

The initialization has been stopped. Current status is uninitialized.



Critical – Inconsistency

Data in the array is inconsistent and needs to be rebuilt.



Critical – missing disk

A disk has been removed or experienced failure, and user needs to reinsert disk or add a new disk.



Rebuilding

The array is currently rebuilding.



Verifying

The array is performing a data consistency check. Array status will show 'verifying'.



Disabled

The array does not have enough disks to maintain the RAID level. A disabled array is not accessible.



OCE/ORLM

Array is expanding its capacity or migrating to a different raid level. Status will display 'Expanding/Migrating'



OCE/ORLM stopped

The 'Expansion/Migrating' process has been stopped. The status will display 'Need Expanding/Migrating'



Critical – OCE/ORLM

A disk member is lost during the OCE/ORLM process.



Critical – OCE/ORLM - rebuild

The expanding/migrating array requires a rebuild.

Appendix C: RAID Level Reference Guide¹

Type	Description	Min. disks	Usable space	Advantage	Disadvantage	Application
JBOD	Just a bunch of disk	1	100%	Each drive can be accessed as a single volume	No fault tolerance - failure of one drive results in complete data loss	Backup
RAID 0	Disk Striping	2	100%	Offers the highest performance	No fault tolerance - failure of one drive in the array results in complete data loss	Temporary file, performance driven application.
RAID 1	Disk Mirroring	2	50%	Provides convenient low-cost data redundancy for smaller systems and servers	Useable storage space is 50% of total available capacity. Can handle 1 disk failure.	Operating system, backup, and transaction database.
RAID 10	Disk Mirroring followed by stripe	4	50%	High read performance and medium write performance with data protection for up to 2-drive failures	Useable storage capacity equals total capacity of all drives in the array minus two	Fast database and application servers which need performance and data protection
RAID 5	Disk Striping with Rotating parity	3	67-94%	High read performance, and medium write performance with data protection with a single drive failure	Not recommended for database applications that require frequent/heavy write sessions. Can handle 1 disk failure.	Data archives, and ideal for application that require data protection
RAID 6	Disk Striping with dual rotating parity	4	50-88%	High read performance, and medium write performance with data protection in case of up to two drives failure	Not recommended for applications that require frequent/heavy write sessions.	Data archives and ideal for application that requires data protection

¹ Refer to the RAID controller product specifications for supported RAID levels.

Help

Online Help redirects you to additional documentation concerning the HighPoint WebGUI.

Register Product takes you to HighPoint's web support. On this page you can create a new customer profile where you can register your product or post an online support ticket.

HighPoint List of Recommended Hard Drives

HighPoint maintains a list of tested hard drives suitable for RAID applications. Since not every hard drive in the market can be tested, this list is meant to be a general guideline for selecting hard drives operating in a RAID environment. Regular, desktop grade drives are highly not recommended for RAID use.

http://highpoint-tech.com/PDF/Compatibility_List/RocketRAID_600_2700_3600_and_4500_Series_RAID_HBA_Hard_Drive_Compatibility_List.pdf

Contacting Technical Support

For any help and support, submit a support ticket online at <http://www.highpoint-tech.com/websupport/>.

You may also call us during our regular business hours:
Monday – Friday (Excluding Holidays), 9 AM to 6 PM (PST)

Phone: (408) 240-6108