PROMISE TECHNOLOGY

Pegasus R4i

MPX RAID Storage Module

Product Manual

Version 1.0

Copyright

Important data protection information

You should back up all data before installing any drive controller or storage peripheral. PROMISE Technology is not responsible for any loss of data resulting from the use, disuse or misuse of this or any other PROMISE Technology product.

Notice

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Recommendations

In this *Product Manual*, the appearance of products made by other companies, including but not limited to software, servers, and disk drives, is for the purpose of illustration and explanation only. PROMISE Technology does not recommend, endorse, prefer, or support any product made by another manufacturer.

About this guide

This *Product Manual* describes how to setup, use, and maintain the Pegasus R4i MPX RAID Storage Module. It also describes how to use the Pegasus Utility software that you install and run on your computer.

This manual is written specifically for the Pegasus R4i.

This manual includes a full table of contents, chapter task lists, and numerous cross-references to help you find the specific information you are looking for.

Also included are four levels of notices:

Note
A *Note* provides helpful information such as hints or alternative ways of doing a task.

Important
An *Important* notice calls attention to an essential step or point required to complete a task. Important items include things often missed.

CAUTION

A ***Caution*** **informs you of possible equipment damage or loss of data and how to avoid them.**

WARNING
A ***Warning*** notifies you of probable equipment damage or loss of data, or the possibility of physical injury, and how to avoid them.

FCC

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 when the equipment is operated in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and if not installed and used in accordance with the instruction manual 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.

Notice: The changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equivalent.

VCCI

この装置は、クラスB 情報技術装置です。この装置は、家庭環境で使用することを目

的としていますが、この装置がラジオやテレビジョン受信機に近接して使用されると、

受信障害を引き起こすことがあります。

取扱説明書に従って正しい取り扱いをして下さい。

ＶＣＣＩ－Ｂ

KCC

이 기기는 가정용(B급) 전자파적합기기로서 주로 가정에서
사용하는 것을 목적으로 하며, 모든 지역에서 사용할 수 있습니다.

BSMI RoHS Declaration of the Presence Condition of the Restricted Substances Marking

設備名稱： MPX RAID Storage Module 型號（型式）： Pegasus R4i
Equipment name Type designation (Type)

單元 Unit	限用物質及其化學符號 Restricted substances and its chemical symbols					
	鉛 Lead (Pb)	汞 Mercury (Hg)	鎘 Cadmium (Cd)	六價鉻 Hexavalent chromium (Cr^{+6})	多溴聯苯 Polybrominated biphenyls (PBB)	多溴二苯醚 Polybrominated diphenyl ethers (PBDE)
HDD	—	○	○	○	○	○
外殼	—	○	○	○	○	○
線材	○	○	○	○	○	○
電路板	—	○	○	○	○	○

備考1. 〝超出0.1 wt %〞及〝超出0.01 wt %〞係指限用物質之百分比含量超出百分比含量基準值。
Note 1：“Exceeding 0.1 wt %” and “exceeding 0.01 wt %” indicate that the percentage content of the restricted substance exceeds the reference percentage value of presence condition.
備考2. 〝○〞係指該項限用物質之百分比含量未超出百分比含量基準值。
Note 2：“○” indicates that the percentage content of the restricted substance does not exceed the percentage of reference value of presence.
備考3. 〝—〞係指該項限用物質為排除項目。
Note 3：The “–” indicates that the restricted substance corresponds to the exemption.

China RoHS Hazardous substance tables

設備名稱： MPX RAID Storage Module 型號（型式）： Pegasus R4i
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HDD	—	○	○	○	○	○
外殼	—	○	○	○	○	○
線材	○	○	○	○	○	○
電路板	—	○	○	○	○	○

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Note 3：The “–” indicates that the restricted substance corresponds to the exemption.

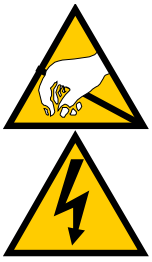
WEEE Information

For EU (European Union) member users:

According to the WEEE (Waste electrical and electronic equipment) Directive, do not dispose of this product as household waste or commercial waste.

Waste electrical and electronic equipment should be appropriately collected and recycled as required by practices established for your country.

For information on recycling of this product, please contact your local authorities, your household waste disposal service or the shop where you purchased the product.



CAUTION

The electronic components within the Pegasus R4i MPX RAID Storage Module are sensitive to damage from Electro-Static Discharge (ESD). Observe appropriate precautions at all times when handling the Pegasus R4i MPX RAID Storage Module or its subassemblies.

Introduction to Pegasus R4i

This chapter covers the following topics:

- “Packing List”
- “Architecture”
- “Protocol Support”
- “Key Benefits”
- “Specifications”
- “Hardware”

PROMISE Technology’s Pegasus R4i is a RAID storage solution in an MPX Module form factor for the Mac Pro.

Use the latest version of the Pegasus Utility to monitor the Pegasus R4i status and perform maintenance and management functions.

Architecture

Packing List

Check the shipping package to make sure you have the following items:

- Pegasus R4i
- Four drive modules (pre-installed)
- Quick Start Guide

The Pegasus R4i architecture is based on a state-of-the-art PMC Sierra 8067

I/O processor coupled with 1G of DDR3-1866 SDRAM memory and a world class enterprise-proven RAID engine.

Protocol Support

Pegasus R4i supports PCIe Gen3 high-speed serial computer expansion bus standard.

Key Benefits

- Supports RAID0, RAID1, RAID 5, RAID 6, RAID10
- Drive modules are swappable
- Pegasus Utility management tool
- Compatible with Apple Time Machine
- Driver in macOS

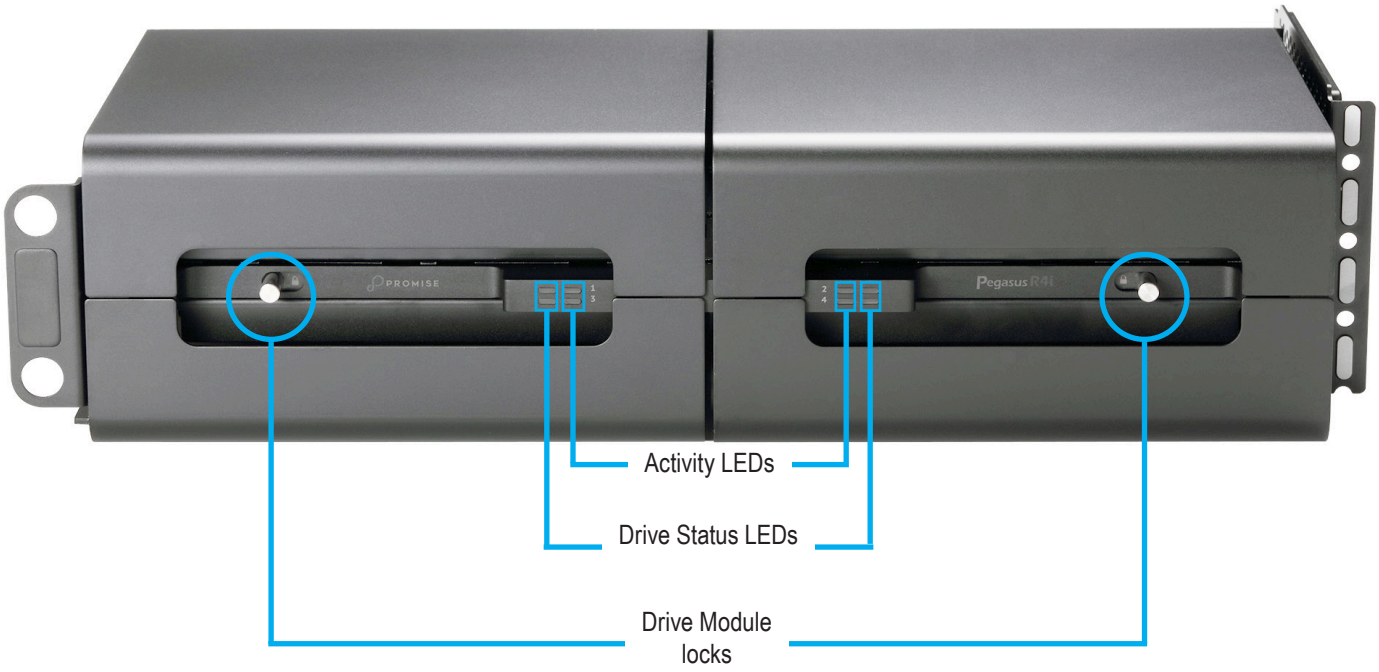
Specifications

Storage Disks	The Pegasus R4i is shipped with 3.5 inch 7200 rpm SATA Hard Disk Drive (HDD) Modules mounted in the drive bays.
Capacity	Total capacity depends on the size of the HDD shipped with the unit. The Pegasus R4i is shipped with four HDD
RAID function	RAID level support: RAID 0, 1, 1E, 5, 6, 10
OS Support	macOS 10.14+ or newer
Hardware monitoring	Temperature, Enclosure, Physical drives, Logical drives, RAID controller
Temperature	Operating: 5° ~ 35° C Non-operating: -40° ~ 70° C
Humidity	Operating: 10% ~ 95% non-condensing Storage: 5% - 95% non-condensing
Dimensions	337 x 164 x 80 mm (13.3 x 6.5 x 3.2 inch)
Weight	As shipped with all 3.5” HDD installed: 4.2 kg / 9.2 lb (with 4 HDDs)
Certification	FCC, CE, C-Tick, VCCI, BSMI

HARDWARE

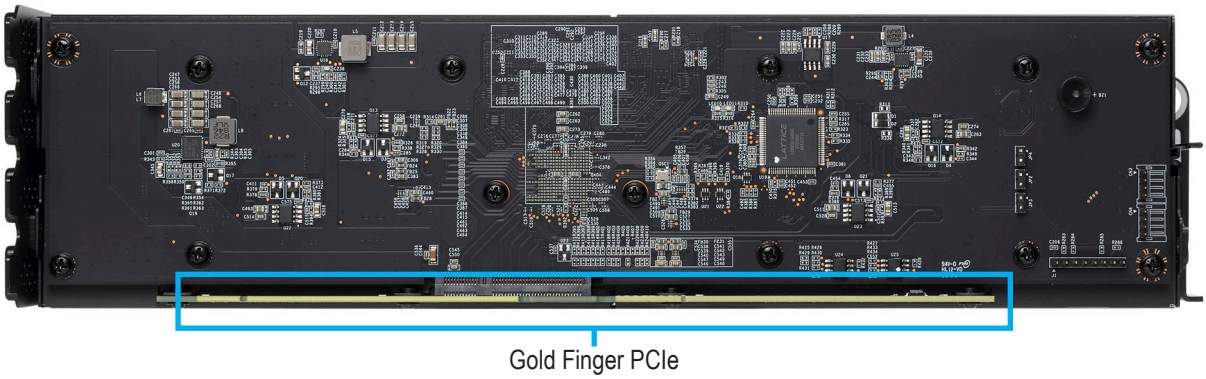
This section provides a brief introduction to the external hardware of the Pegasus R4i MPX RAID Storage Module.

Front view



LED	Description
Status	The Drive Status LED lights blue when functioning normally. A red Drive Status LED indicates a problem with the physical drive or an array.
Activity	The Drive Activity LED lights blue when the physical drive is present and blinks blue when there is activity on the drive.
Drive Module locks	The locks are used for the upper and lower drive modules on their respective side. To unlock the drive modules, slide the lock toward the center of the Pegasus R4i. To lock, slide to the outside.

Rear view



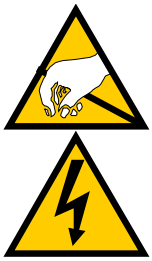
Top view

Feature	Description
Gold Finger PCIe	The Gold Finger PCIe contacts complete the physical link, it is the path through which the PCIe link is established.

Installation and Setup

This chapter contains the following topics:

- “Before you begin installation”
- “Installing Pegasus R4i into Mac Pro”
- “Installing the Software on Mac Pro”



CAUTION

The electronic components within the Pegasus R4i unit are sensitive to damage from Electro-Static Discharge (ESD). Observe appropriate precautions at all times when handling the Pegasus R4i unit or its subassemblies.

CAUTION

Make sure to protect the Pegasus R4i from dust, moisture, extreme temperatures and sudden large changes in temperature at all times, even if the unit is not installed.

Before you begin installation

- Carefully read and make sure you understand the entire installation procedure before you begin.
- The Mac Pro must be powered off before opening the enclosure, make sure the power cable is not connected to a power source before you begin the installation or removal procedure.
- Make sure an empty MPX bay is available in your Mac Pro to accommodate the Pegasus R4i. You can use either of the MPX bays, or both, if you are installing another Pegasus R4i.

Summary of the setup procedure

The setup procedure for the Pegasus R4i MPX RAID Storage Module is simple and easy. The device is shipped with hard disk drive modules installed and a RAID array configured, so all you need to do is plug in and secure the unit. It is important to immediately install the Pegasus Utility software used for monitoring and administration of the system. Please follow the setup procedure here or in the Quick Start Guide.

The setup process is summarized below.

1. Unpack the Pegasus R4i shipping package.
2. Power off Mac Pro and unplug power cable.
3. Install the Pegasus R4i MPX RAID Storage Module hardware in the Mac Pro.
4. Power on Mac Pro.
5. Locate the Pegasus Utility installation package on the device (Pegasus R4i is shipped with RAID 5 configuration) and install the management software utility on you Mac Pro.

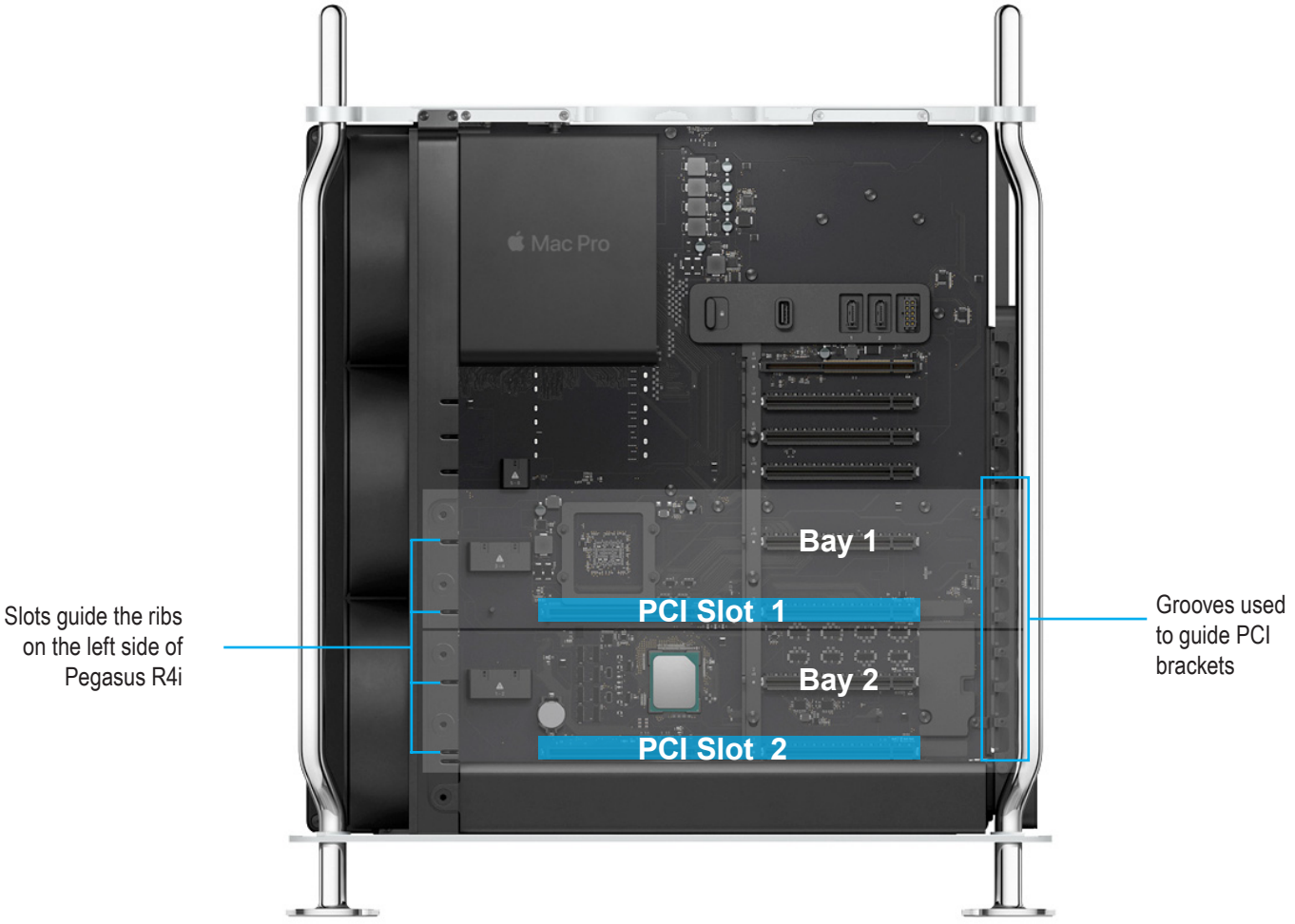
Installing Pegasus R4i into Mac Pro

Make sure your Mac Pro is powered off before opening the system enclosure. Please refer to your **Mac Pro Essentials Guide** for instructions to open the system enclosure in order to expose available MPX bays used for the Pegasus R4i installation and to remove the clamp plates before beginning the installation.

CAUTION

The system must be powered off before opening the Mac Pro enclosure. Make sure the power cable is not connected to a power source before you begin the installation, or removal of the Pegasus R4i.

Internal components on Mac Pro



Hardware Installation Overview

Follow the illustrated instructions beginning on the next page to install the Pegasus R4i is either of the available locations. The pictures below provide a visual summary of the procedure.

Guide the Pegasus R4i into an available MPX bay.

When the Pegasus R4i in place, it will look like this.

- Remove the clamp plates for the MPX bay to be used.
- Orient the Pegasus R4i to align with the MPX bay.
- Carefully insert Pegasus R4i into the MPX bay as shown in the picture.
- Notice the left side ribs on the Pegasus R4i insert into slots in the Mac Pro chassis. This will properly align the unit for insertion.

- The PCI faceplates on the right side of the Pegasus R4i must be inserted into the PCI ladder.

- Firmly push the Pegasus R4i until the PCI bracket clip clicks in place. At this point the unit is firmly seated and the PCI connector is fully engaged.

- Secure the clamp plate on the right side; secure the clamp plate on the left side of the Pegasus R4i to the bracket post in the enclosure.

Pegasus R4i installed in upper MPX bay (without clamp plates)

- Close the Mac Pro enclosure, connect the power and power on the system. Please refer to your **Mac Pro Essentials Guide** for instructions.

  When the system is booted up, you can install the **Pegasus Utility** to use some advanced features specially created for the Pegasus R4i. See “Installing the Software on Mac Pro” on the next page. The Pegasus Utility is located on the Pegasus R4i volume.

Installing the Software on Mac Pro

The Pegasus R4i unit ships ready to use without configuration or set-up; however it is strongly recommended to install the Pegasus Utility software even if you do not plan to make any changes to device configuration. The utility is critical for monitoring the system, troubleshoot and getting firmware updates.
The utility is necessary if you plan to change the default RAID configuration (Pegasus R4i is shipped with a RAID 5) or in case you ever need to swap out any of the hard disks shipped with the device.

The software utility installation package is located on the Pegasus R4i. Follow the instructions below to install the utility.

To install the Pegasus Software Utility:

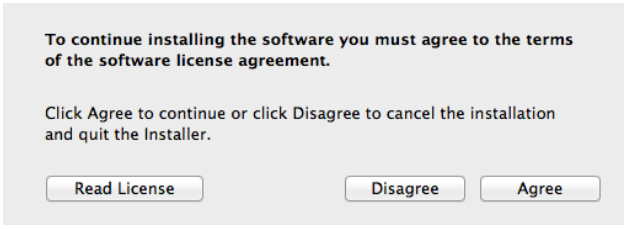
1. Double-click on the Promise Pegasus R4i icon on your desktop to view the device contents. See example to right.

2. Find the file “R_PROMISE_Utility_ 40400000x.dmg” and double-click on it to mount the virtual drive containing the installation software package.*

3. Double-click on the PROMISE_Utility_ 40400000x.pkg file to begin the software installation.*

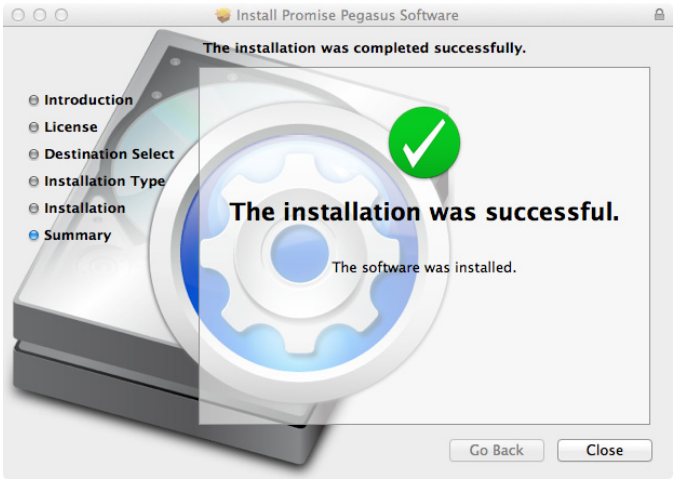
* The version number of the .dmg file and .pkg file will change as it is updated. The version number used in this example is just for the purpose of illustration.
The Welcome menu explains that software will be installed on the computer Click the **Continue** button to proceed with installation.

4. The Software License Agreement appears, please read the statement and click **Continue** to proceed.



5. Click **Agree** if you agree to the terms of the license. To read the license, click **Read License**. Choose **Disagree** if you do not agree the terms, in which case the installation procedure is terminated.

6. If you clicked Agree in the previous menu, the software is now ready to install. Click **Install** to begin.



7. It takes a few seconds for the utility software to be installed. When the installation has completed, a message informs you that the installation was successful. Click **Close** to end the installation procedure.

The Pegasus Utility is now available to be used for management of the Pegasus R4i. Use this to monitor the Pegasus R4i status and health, or change the default array configuration, or to update the device firmware. This is also useful for monitoring the status of the system and for troubleshooting. For more information on using the Pegasus Utility, including instructions on how to use the Wizard menus to install a different RAID array configuration, please read “Creating a Disk Array and Logical Drive with the Wizard” on page 78.

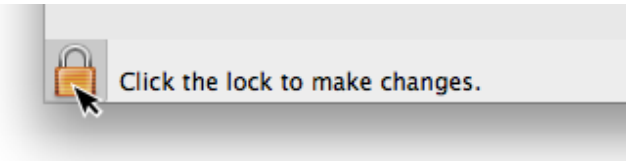
Unlocking the UI

By default, the UI is locked to prevent unauthorized changes to your RAID system. When the UI is locked, you cannot create logical drives or change settings on the Pegasus R4i unit.

Note
Unlocking the UI requires administrator privilege. Make sure you have the Mac OS X administrator Name and Password.

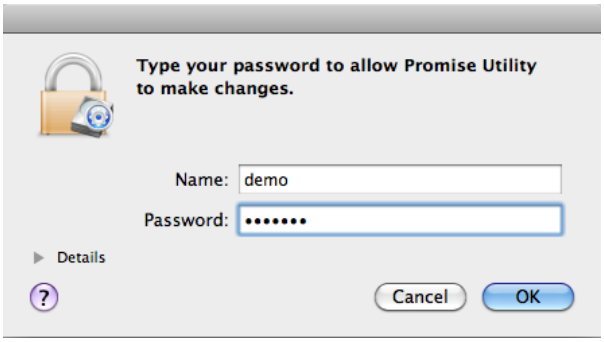
To unlock the UI:

1. At the lower left screen of the Pegasus Utility window, click the closed lock icon.



The Pegasus Utility password dialog box opens.

2. Type your Mac password into the Password field and click the **OK** button.



The lock icon changes to open and you can now add and delete logical drives, make settings, run background activities, and update your Pegasus R4i system.

To Create a Disk Array and Logical Drive

The Pegasus R4i is shipped with HDDs pre-installed and a RAID5 array configured, so it is not necessary to do this yourself. However, if you want to change the disk drives or configure a different RAID, you will need to create an array and logical drive to use the storage.

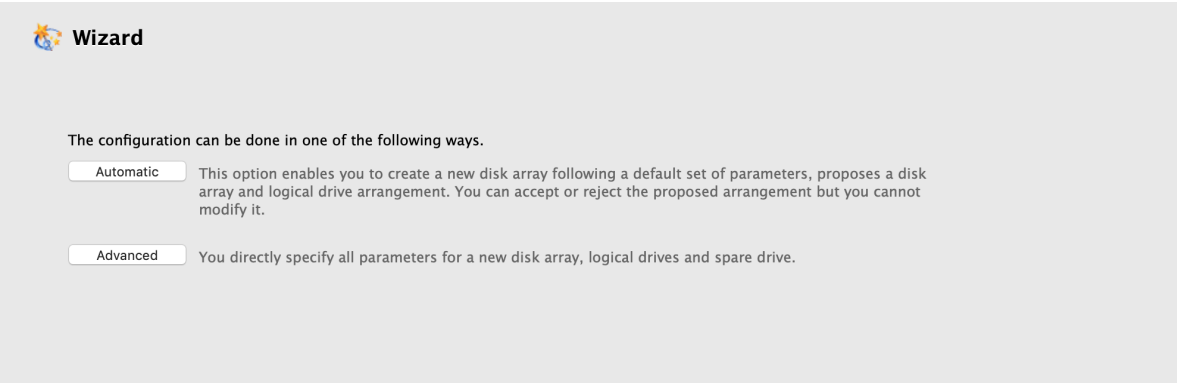
Important
The Pegasus R4i does NOT require any configuration to use the RAID storage. It is shipped ready to use with a RAID5 configuration.

If you are installing new disk drives, use the Wizard to create a disk array and logical drive. The procedures are described in the next chapter.

To see the **Wizard** menu, launch the Pegasus Utility, in the **Dashboard** menu, under **System Status**, click the Disk Array link. See “Perusing the Promise Utility interface” on page 19 for an overview of the Pegasus Utility interface.

The Wizard dialog box opens with three configuration methods.

Wizard dialog box



Choose the best method for your situation. See the table below.

Method	User options	Suggested for users who are	See
Automatic	None	New to data storage	page 79
Advanced	Individual parameters	Data storage professionals	page 80

MANAGING THE PEGASUS R4I

This chapter contains the following topics:

The Pegasus management software utility must be installed onto your computer before you can use it. Note that the management utility

Note
The software utility used from management of the Pegasus R4i, and other devices in the Pegasus line, is called *Promise Utility* in Mac Pro.

Accessing the Pegasus software utility

Access Promise Utility in Mac Pro

Accessing the Promise Utility includes:

- Opening and Closing
- Unlocking the UI

Opening

To open the Promise Utility, double-click the **Promise Utility** icon in the Macintosh Dock.

The Promise Utility window opens and displays the Dashboard.

See “The Promise Utility interface with the Dashboard displayed” on page 19.

Closing

There are two ways close the Promise Utility:

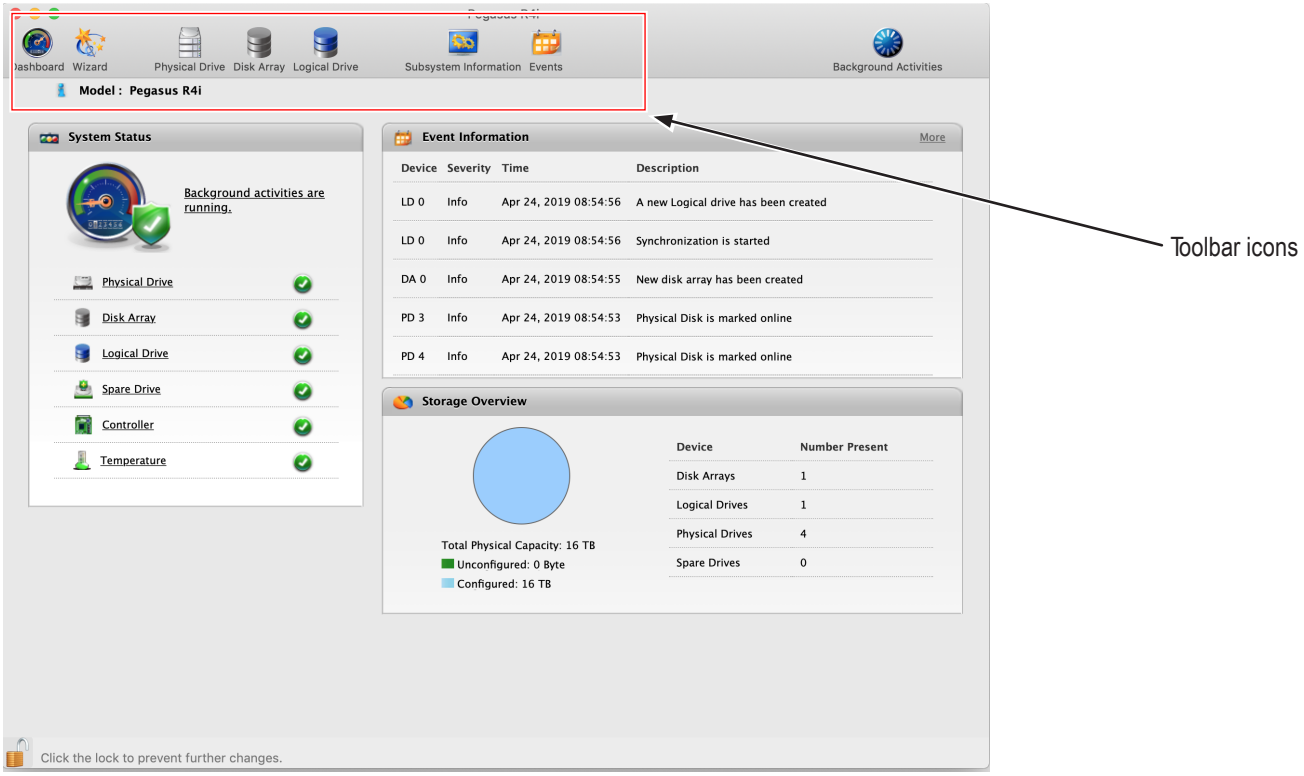
Promise Utility icon on Mac Pro desktop

- Click the Promise Utility dropdown menu and choose **Quit Promise Utility**
- Press cmd-Q (⌘ Q)

Perusing the Promise Utility interface

The Promise Utility interface consists of menus and icons, each leading you to a specific function.

The Promise Utility interface with the Dashboard displayed



- **Promise Utility** – About, Checking for Updates, Preferences, Services, Hide, Quit
- **View** – Show/Hide Toolbar, Customize Toolbar, Devices (Pegasus units)
- **Dashboard** – Show the Dashboard
- **Device** – Front View, Component List, Physical Drive List
- **Storage** – Wizard, Disk Array List, Logical Drive List, Spare Drive List
- **Admin** – Enclosure (Pegasus unit) Information, Events, Background Activities, Firmware Update, Performance Monitor and Restore Factory Default (settings)
- **Window** – Minimize, Zoom, Close Window, Bring All to Front, Pegasus unit
- **Help** – Online help search

Most of the functions accessed in the menu bar are described in this chapter.

Toolbar Icons

The default toolbar icons are listed here:

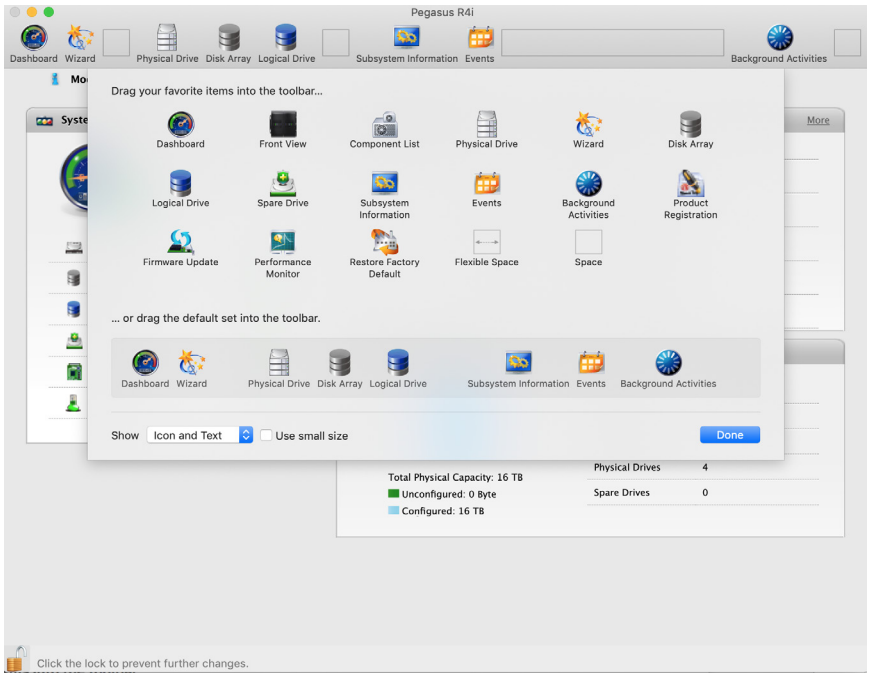
- **Dashboard** icon – Displays the Dashboard and overview
- **Wizard** icon - Displays the Wizard options for quickly setting up RAID arrays
- **Physical Drive** icon – Displays the physical drive list, settings and functions
- **Disk Array** icon - Display menu for monitoring, managing and creating disk arrays
- **Logical Drive** icon – Displays the logical drive list, settings and functions
- **Subsystem Information** icon – Displays Pegasus unit information and settings
- **Events** icon – Displays the event logs

Customizing the Toolbar

You can customize the toolbar by adding or removing icons. To add and remove toolbar icons:

1. From the Promise Utility window, click the **View** menu and choose **Customize Toolbar...** The toolbar options dialog box appears.
2. Do one or both actions are needed:
   - Click and drag an icon from the dialog box to the toolbar to add the icon.
   - Click and drag an icon from the toolbar to delete the icon.
3. When you are finished, click the **Done** button.

Customize toolbar

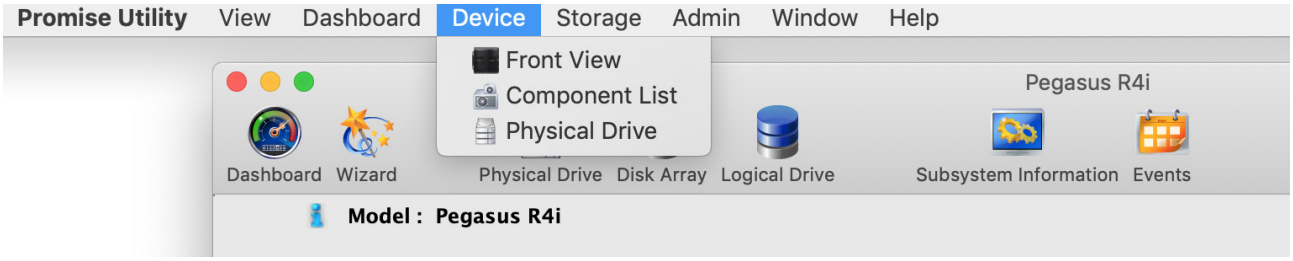


Device menus

Use the Device drop-down menu in the menu bar at the top of your desktop to view an active display of the Pegaus R4i device, as well as access to menus used to configure settings for device hardware and physical drives.

To view the Promise Utility menu bar, just select the Promise Utility window, and the menu bar lists the Device, Admin and other menus categories.

Device menu options



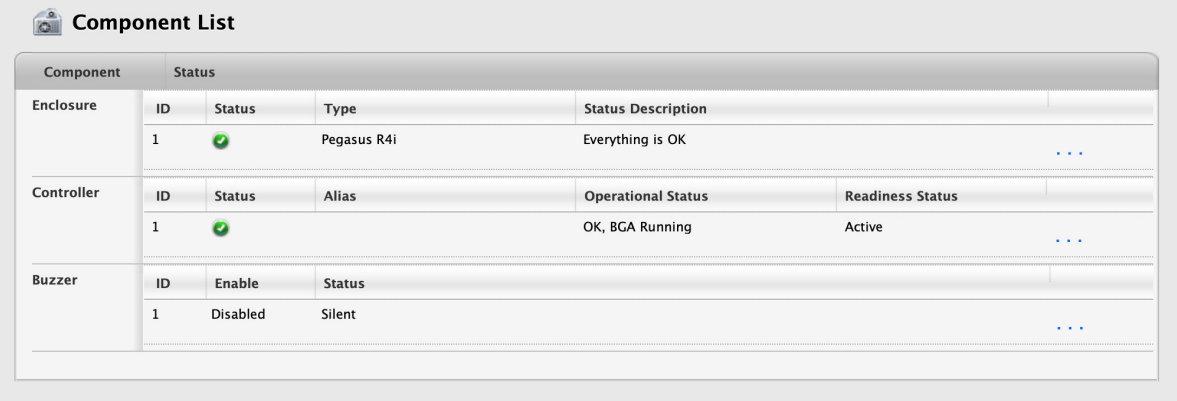
Note

The Physical Drive menu and Component List are also accessible using the Physical Drive and Controller menu links listed under System Status in the Dashboard menu.

Component List

Go to the **Device** drop-down menu and choose the *Component List* option to display the device ID, operational status, enclosure type, and status description of all enclosures. The Enclosure, Controller and Buzzer menus are described in relevant sections of this chapter. See “Viewing Controller Information” on page 34, “Viewing the Enclosure Information” on page 41, and “Buzzer Settings” on page 39 for more information.

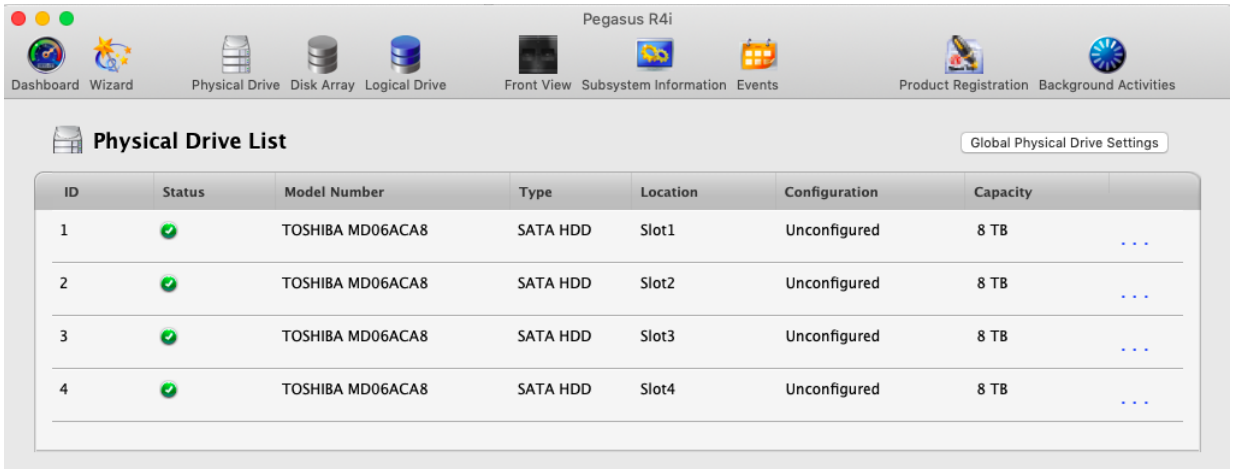
Component List



Physical Drive menu

Go to **Admin** drop-down menu and choose the *Physical Drive* option to display the Physical Drive menu. This is the same menu you see by clicking the Physical Drive menu button at the top of the Promise Utility window, or by clicking the Physical Drive menu link under System Status in the Dashboard. See “Managing Physical Drives” on page 60 for more information.

Physical Drives List



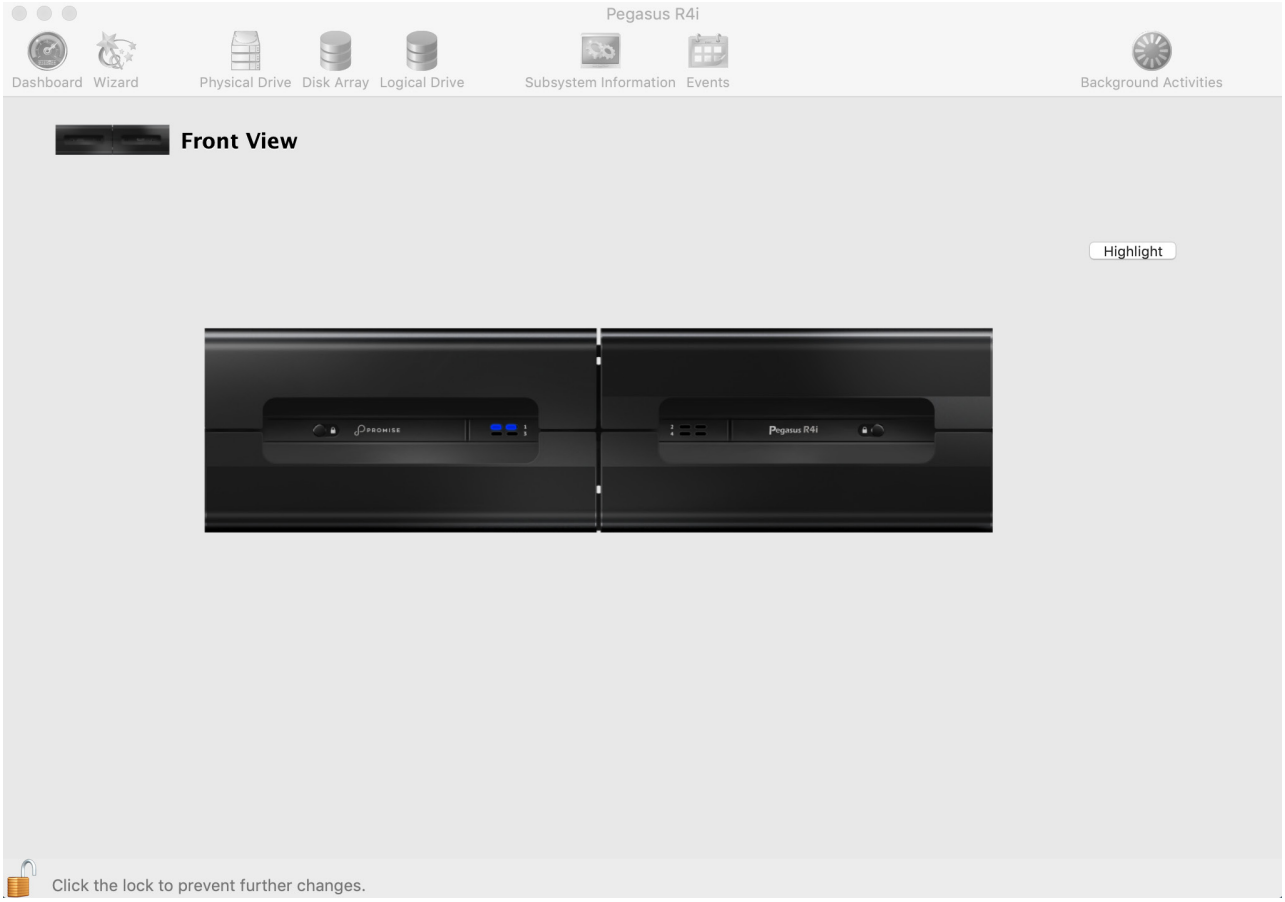
Front View

The Front View active menu lets you view the enclosures and all components on the front of the Pegasus R4i.

Move the cursor over the drive module to display the information of the installed physical drive, including the device ID, physical capacity, operational status, etc. Click on the drive to bring up the Physical Drive Information, displaying the detailed information of the device.

Front View options include the ability to indicate which modules contain unconfigured physical disks (colored green), or to highlight arrays (colored purple).

Device - Front View display menu



Show Unconfigured Physical Drives

Click the **Show unconfigured PD(s)** box to identify any unconfigured physical drives, these appear colored light green.

Highlight Arrays

Click the **Highlight Arrays** button to identify the physical drives assigned to a disk array, these appear colored purple.

Click on of the following items in the drop-down menu:

- All DA – Show all disk arrays
- DA0 (DA1, DA2, etc.) – a specific disk array
- close – Click to close the menu and return to normal view.

The modules containing drives that do not belong to the chosen disk array will be highlighted.

Managing Subsystems

Enclosure management includes:

- “Viewing Subsystem Information”
- “Subsystem Settings”
- “Clearing Statistics”
- “Restoring Factory Default Settings”
- “Saving a Service Report”
- “Updating Firmware”

Viewing Subsystem Information

The term *enclosure* refers to the Pegasus R4i MPX RAID Storage Module.

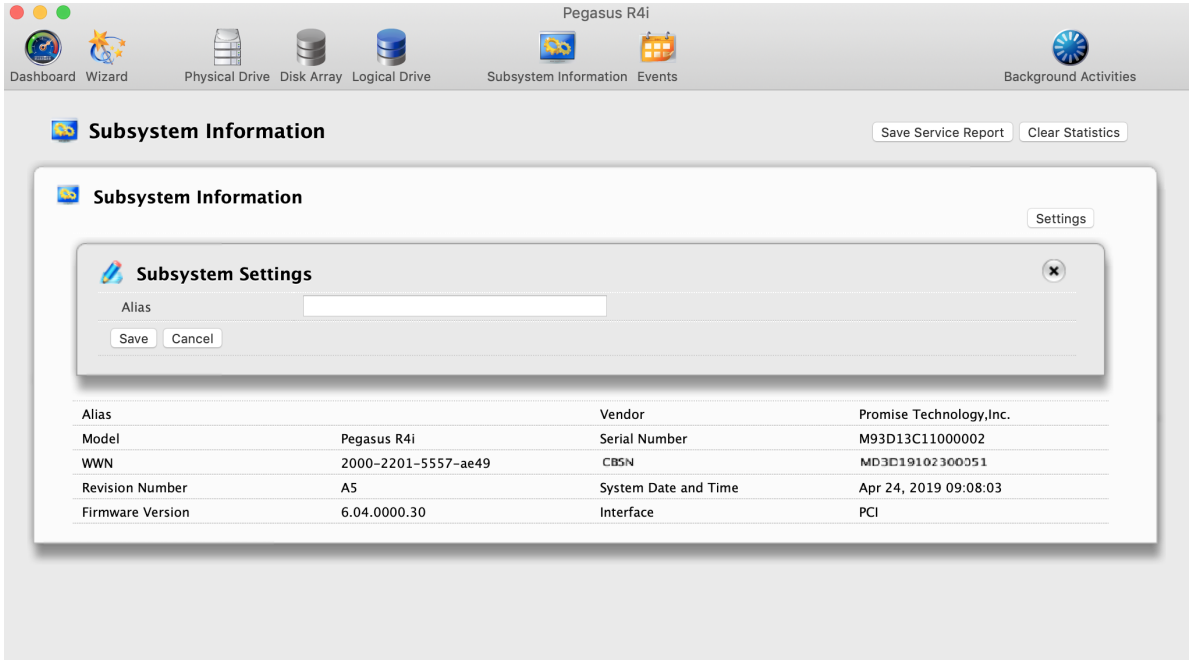
To view enclosure information, click the **Subsystem Information** icon.

Subsystem Information includes:

- Alias * – Same as controller alias
- Model
- WWN – World Wide Number
- Vendor
- Serial number
- Revision number
- System date and time
- Firmware Version

Items with an asterisk (*) are adjustable under “Subsystem Settings” below.

Subsystem Information

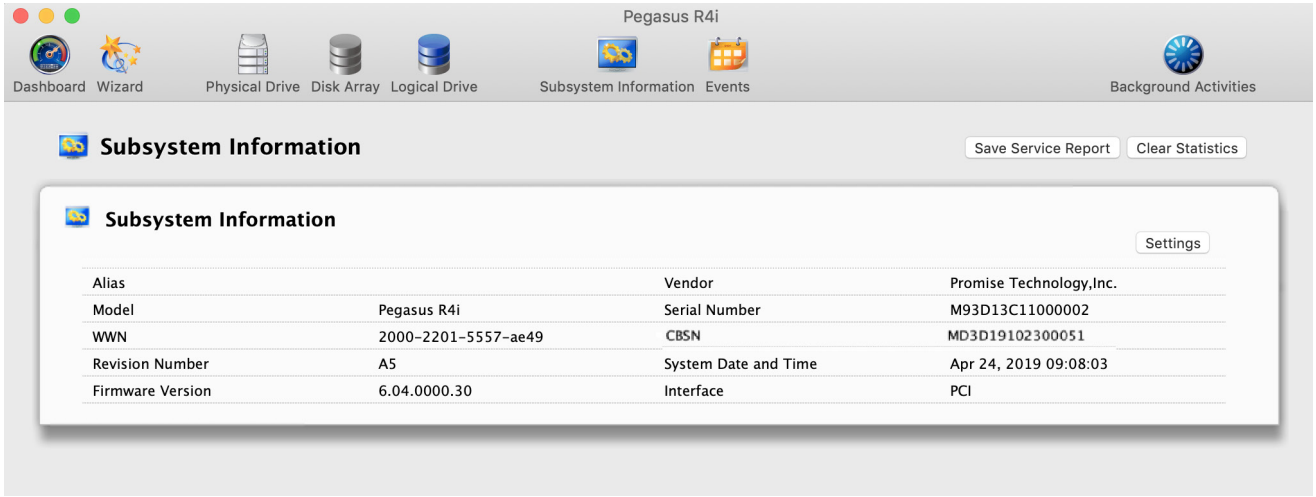


Subsystem Settings

To modify enclosure settings:

1. Click the **Subsystem Information** icon.
2. Click the **Settings** button.
3. Make changes as required:
    - Enter an alias or change the existing alias in the field provided.
4. Click the **Save** button.

Settings - Subsystem Information



Clearing Statistics

This function clears statistical data on the RAID controller, physical drives, and logical drives.

To clear statistics:

1. Click the **Subsystem Information** icon.
2. Click the **Clear Statistics** button.
3. Type the word “confirm” in the field provided.
4. Click the **Confirm** button.

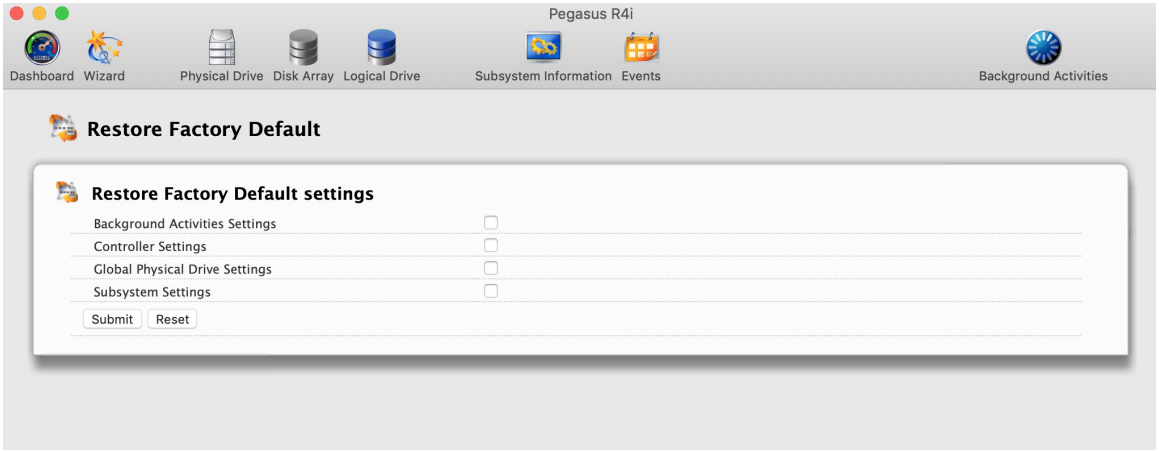
Restoring Factory Default Settings

This feature restores settings to their default values.

To restore all settings to their default values:

1. From the Admin drop-down menu in the menu bar at the top of your desktop, choose *Restore Factory Default*.
2. In the Restore Factory Default settings screen, check the boxes beside the settings you want to reset to default value.
    - Background activity settings
    - Controller settings
    - Physical drive settings
    - Enclosure settings
    - Smart Fan setting
3. Click the **Submit** button.
4. In the Confirmation box, type the word “confirm” in the field provided and click the **Confirm** button.

Restore Factory Default settings

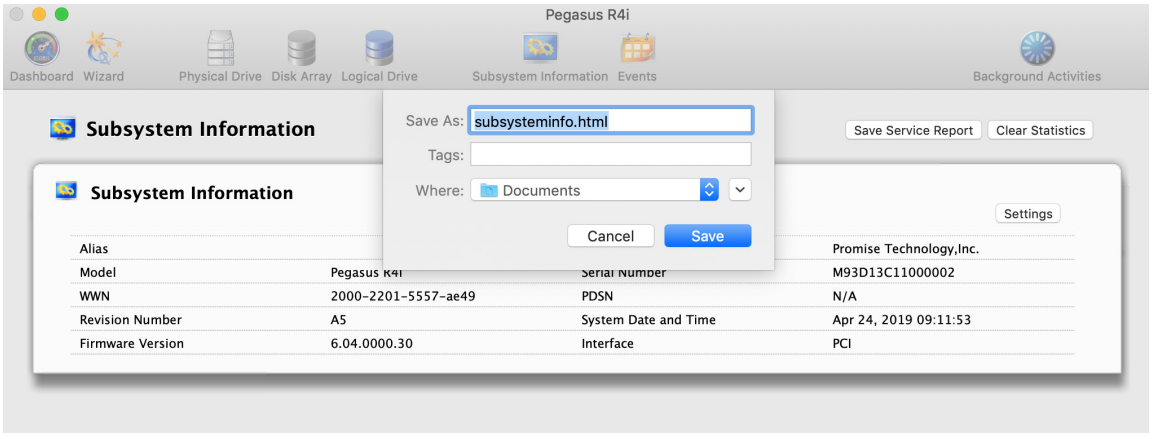


Saving a Service Report

A service report can be useful to technical support for troubleshooting or diagnosing issues on the device. To save a service report to your computer, click on the **Subsystem Information** menu link, and click on the **Save Service Report** button. A dialog prompt will ask you where you want to save the HTML file containing the service report. Choose a location and click the **Save** button. A technical support representative might ask you to email this file for system analysis.

Note
You must unlock the Promise Utility interface to allow selection of *Restore Factory Default*.

Saving a Service Report



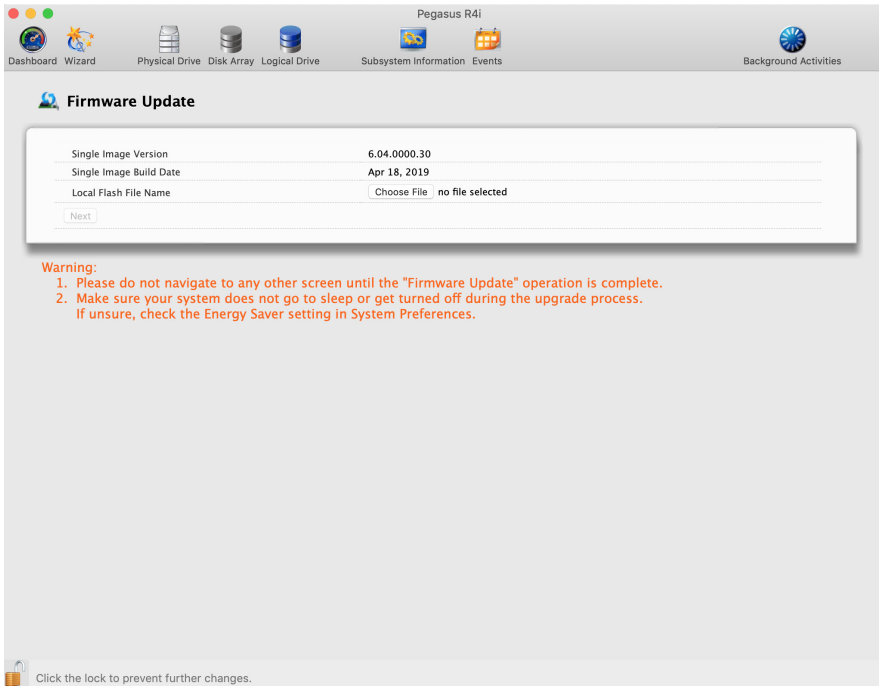
Updating Firmware

For best performance, it is a good idea to keep the Pegasus R4i firmware up to date. The update procedure is used for the controller and other system hardware. Download the latest firmware from the PROMISE website at www.PROMISE.com/support/download.aspx and place the .img file on your computer.

Keep in mind that after the update process, it will be necessary to restart your computer.

To update the controller firmware:

1. From the **Admin** drop-down menu in the menu bar at the top of your desktop, choose *Firmware Update*.



2. Click on the padlock icon to unlock the menu, and type in the password for your computer when the prompt appears.

3. Click the **Choose File** button and locate the .img file you downloaded from PROMISE.

4. Click the **Submit** button.

5. In the Confirmation box, type the word “confirm” in the field provided and click the **Confirm** button.

6. The process will take several seconds to complete. Once the process has completed, you will be prompted to restart the computer. Once you’ve restarted your computer, you may continue to use the Pegasus R4i.

Managing the RAID Controller

RAID controller management includes:

- “Viewing Controller Information”
- “Viewing Controller Statistics”
- “Controller Settings”
- “Buzzer Settings”

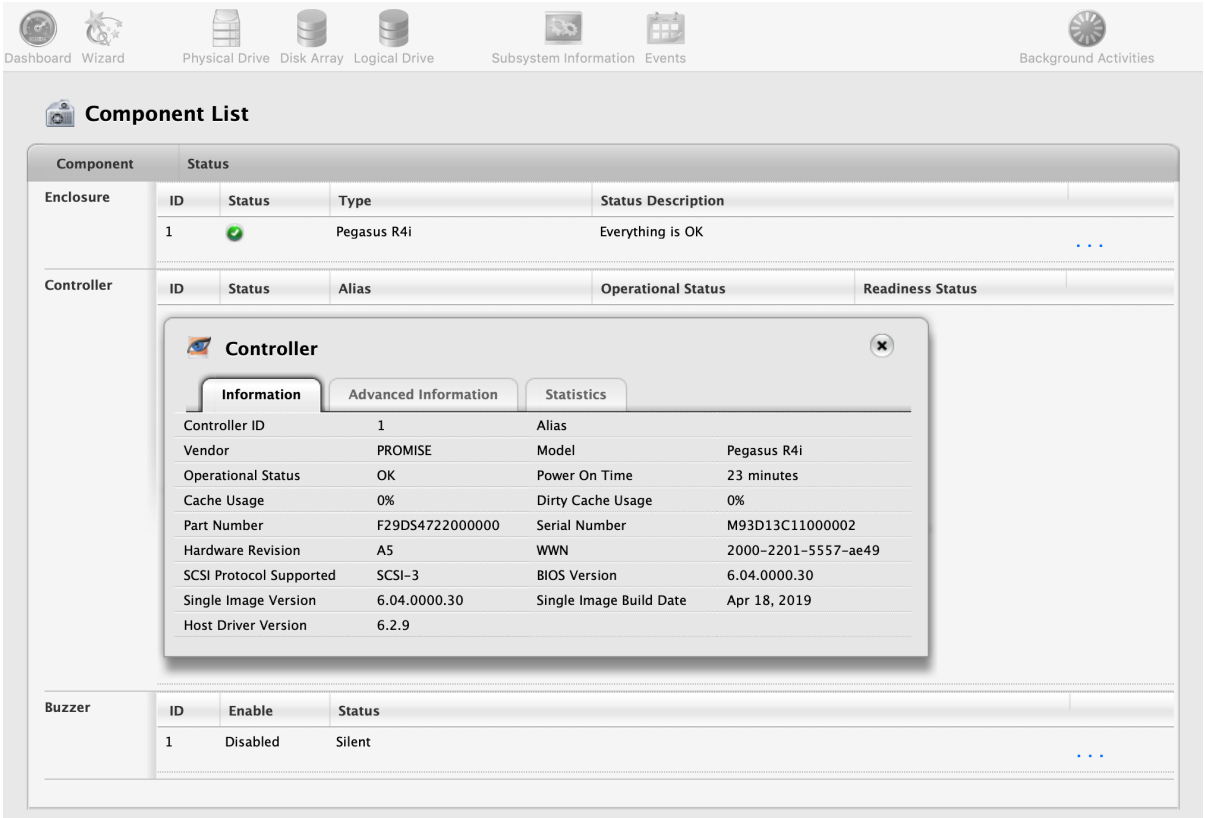
Viewing Controller Information

To view controller information, from the Device menu, choose **Component List**, the Information tab is displayed.

Controller information includes:

- Controller ID
- Vendor
- Operational Status
- Cache Usage – Percentage
- Part Number
- Hardware Revision
- SCSI Protocol Supported
- Single Image Version
- Host Driver Version
- Alias * – Same as enclosure alias
- Model
- Power On Time
- Dirty Cache Usage – Percentage
- Serial Number
- WWN – Worldwide Number
- BIOS Version
- Single Image Build Date

Controller Information



To view advanced information, click the **Advanced Information** tab.

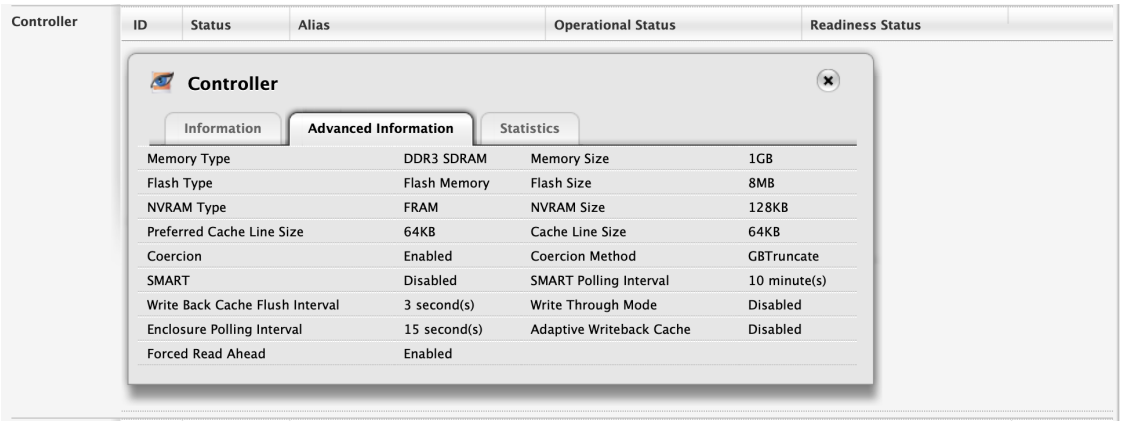
Advanced controller information includes:

- Memory Type
- Flash Type
- NVRAM Type
- Preferred Cache Line Size
- Coercion *
- SMART *
- Write Back Cache Flush Interval *
- Enclosure Polling Interval *
- Forced Read Ahead (cache) *
- Memory Size
- Flash Size
- NVRAM Size
- Cache Line Size
- Coercion Method *
- SMART Polling Interval *
- Write Through Mode *
- Adaptive Writeback Cache *

Items with an asterisk (*) are adjustable under “Controller Settings” on page 37.

Click the **X** icon to close the information panel.

Controller Advanced Information



Viewing Controller Statistics

To view controller statistics:

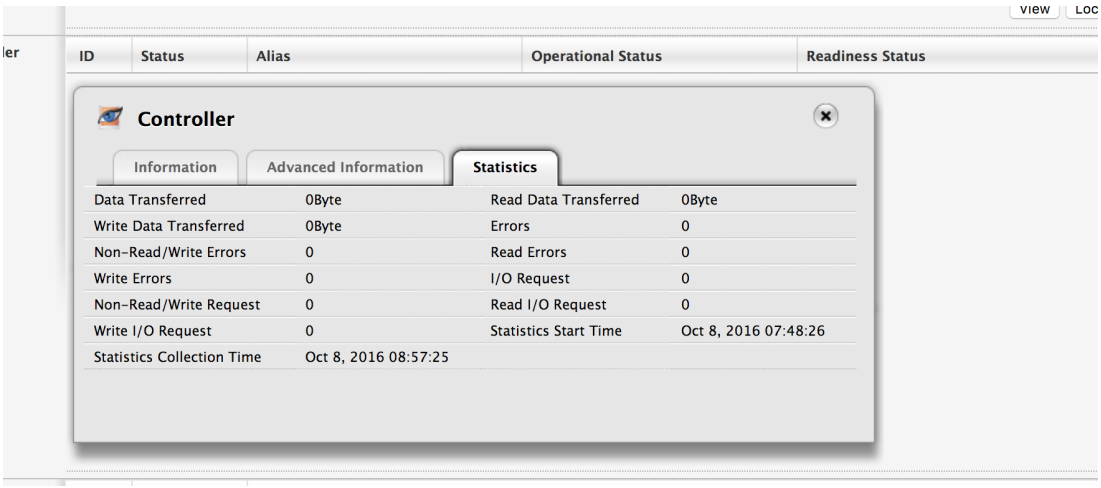
1. Click the **Dashboard** icon, then click the **Controller** link.
2. Click the **Statistics** tab.

   Controller statistics include:

   - Data Transferred
   - Write Data Transferred
   - Non-Read/Write Errors
   - Write Errors
   - Non-Read/Write Requests
   - Write I/O Requests
   - Statistics Collection date and time
   - Read Data Transferred
   - Errors
   - Read Errors
   - I/O Requests
   - Read I/O Requests
   - Statistics Start date and time

3. Click the **X** icon to close the information panel.

Controller Statistics



Controller Settings

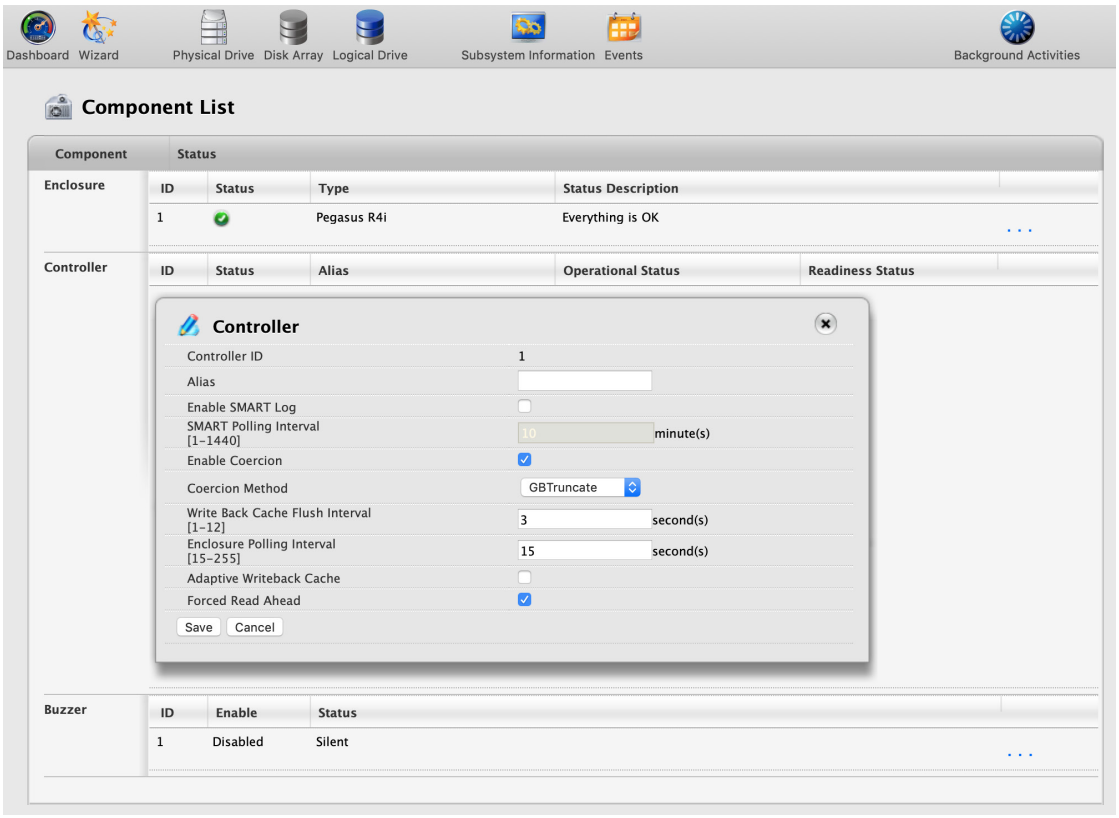
To modify controller settings:

1. From the Device menu, choose **Component List**.
2. Mouse-over the controller, then click the **Settings** button.

   Make setting changes as required:

   - Enter, change or delete the alias in the **Alias** field.
   - **SMART Log** – Check the box to enable or uncheck to disable.
   - **SMART Polling Interval** – Enter a value into the field, 1 to 1440 minutes. 1440 minutes = 24 hours
   - **Enable Coercion** – Check the box to enable or uncheck to disable.
   - **Coercion Method** – Choose a method from the dropdown menu:
     - GBTruncate
     - 10GBTruncate
     - GrpRounding
     - TableRounding
   - **Write Back Cache Flush Interval** – Enter a value into the field, 1 to 12 seconds.
   - **Enclosure Polling Interval** – 15 to 255 seconds.
   - **Adaptive Writeback Cache** – Check the box to enable or uncheck to disable.
   - **Forced Read Ahead** – Check the box to enable or uncheck to disable.
3. Click the **Save** button.
4. Click the **X** icon to close the settings panel.

Controller Settings



Buzzer Settings

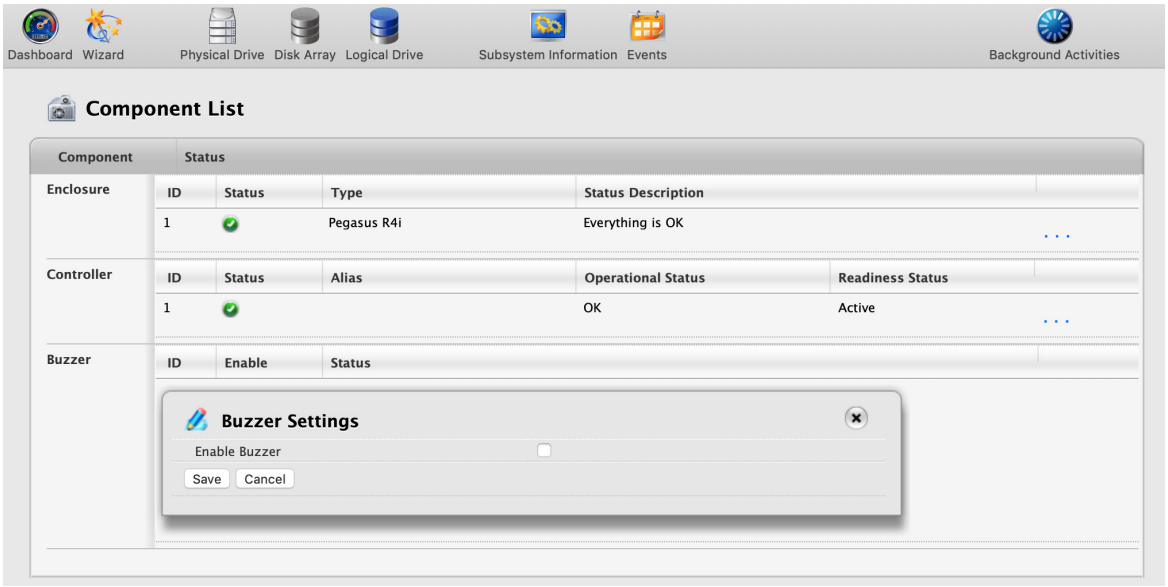
To modify buzzer settings:

1. From the Device menu, choose **Component List**.
2. Mouse-over the buzzer, then click the **Settings** button.
3. Check the **Enable Buzzer** box to enable the buzzer.

Or uncheck the box to disable.

4. Click the **Save** button.

Buzzer Settings



Managing Enclosures

Enclosure management includes the following functions:

- “Viewing the Enclosure Information”
- “Viewing Temperature Sensor Information”

Viewing the Enclosure Information

To access enclosure information:

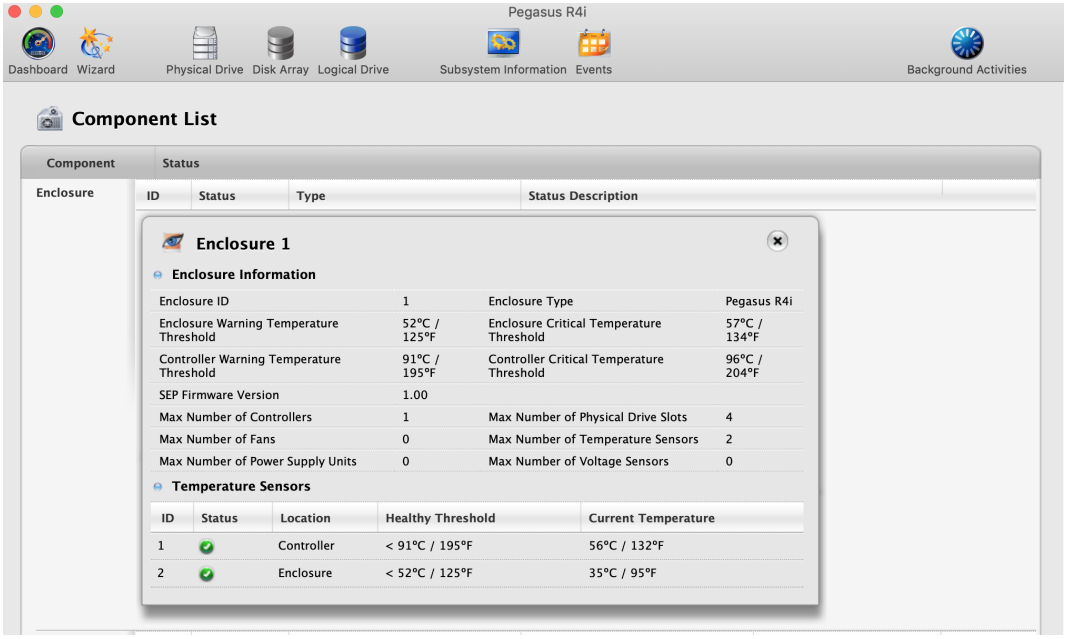
1. Click the **Dashboard** icon, then click the **Controller** link.
2. Mouse-over the **Enclosure**, then click the **View** button.

Enclosure information includes:

- Enclosure ID
- Enclosure Warning Temperature Threshold
- Controller Warning Temperature Threshold
- SEP Firmware Version
- Max Number of Controllers
- Max Number of Fans
- Max Number of Power Supply Units
- Enclosure Type
- Enclosure Critical Temperature Threshold
- Controller Critical Temperature Threshold
- Max Number of Physical Drive Slots
- Max Number of Temperature Sensors
- Max Number of Voltage Sensors

3. Click the **X** icon to close the information panel.

Enclosure Information



Viewing Temperature Sensor Information

To view the status of the temperature sensor:

1. Click the **Dashboard** icon, then click the **Temperature** link.
2. Scroll down until you see **Temperature Sensors**.

Temperature Sensors information includes:

- ID
- Status (Normal, Warning or Critical icon)
- Location (Controller or Enclosure)
- Healthy Threshold (Enclosure Warning Temperature Threshold)
- Current Temperature

3. Click the **X** icon to close the information panel.

Managing Background Activities

Background activity management includes:

- “Viewing Current Background Activities”
- “Viewing Scheduled Background Activities”
- “Adding a Scheduled Background Activity”
- “Changing a Background Activity Schedule”
- “Enabling or Disabling a Scheduled Background Activity”
- “Deleting a Scheduled Background Activity”
- “Media Patrol”
- “Redundancy Check”
- “Initialization”
- “Rebuild”
- “Migration”
- “PDM”
- “Transition”
- “Synchronization”

Background activities perform a variety of preventive and remedial functions on your physical drives, disk arrays, logical drives, and other components.

You can run a background activity immediately or schedule it to run at a later time. Scheduling options are described below.

Setting options for each activity are listed after the scheduling options. These settings determine how the background activity affects I/O performance.

Viewing Current Background Activities

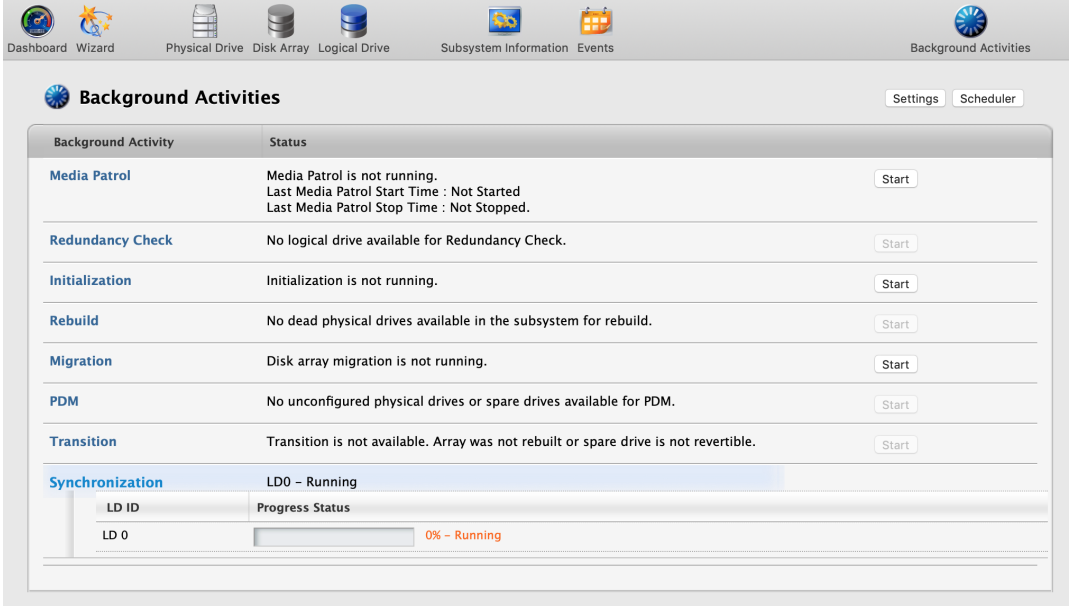
To view a list of background activities, click on the **Background Activities** icon.

The list of background appears:

- Media Patrol
- Redundancy Check
- Rebuild
- Migration
- PDM
- Transition
- Synchronization

Running activities will illustrate a progress bar of the process currently running in the background.

Background Activities



Viewing Scheduled Background Activities

To view a list of scheduled background activities:

1. Click on the **Background Activities icon.**
2. Click the **Scheduler** button.

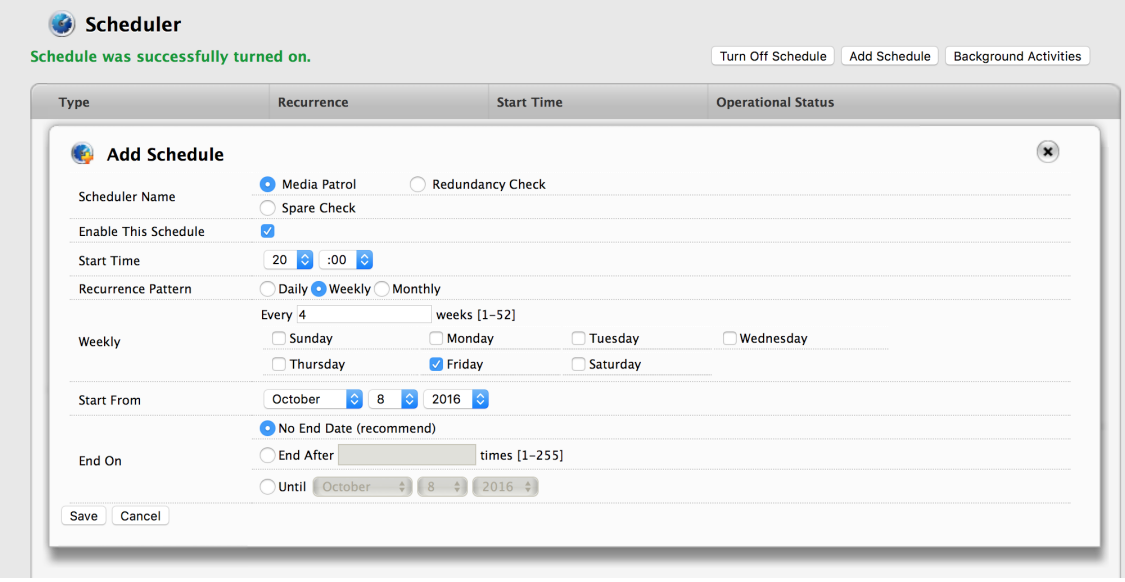
The list of scheduled background appears.

Adding a Scheduled Background Activity

To add a new scheduled background activity:

1. Click on the **Background Activities icon.**
2. Click the **Scheduler** button.
   The list of scheduled background activities appears.
3. Click the **Add Schedule** button.

Add a Background Activity Schedule



4. Modify schedule settings as desired. Choose the option for the activity you want to modify:

    - Media Patrol
    - Redundancy Check
    - Spare Check

    Choose a **Start Time** from the dropdown menus.

The menus have a 24-hour clock.

- Choose a **Recurrence Pattern** option, daily, weekly, or monthly.
    - For the Daily option, enter an interval in the Every field.
    - For the Weekly option, enter an interval in the Every field and choose one or more days of the week.
    - For the Monthly option, choose, Day of the Month option or a sequential and specific day from the dropdown menu. Also choose which months you will be designating for the reoccurrence pattern.
- Choose a **Start From** date from the dropdown menus.
- Choose an **End On** option:
    - No end date or perpetual.
    - End after a specific number of activity actions.
    - Until date from the dropdown menus.
- For Redundancy Check, choose:
    - **Auto Fix** option – Attempts to repair the problem when it finds an error. Check to enable
    - **Pause on Error** option – The process stops when it finds a non- repairable error. Check to enable
    - **Select LD** – Check the boxes for the logical drives to run

Redundancy Check. Check at least one logical drive.

5. Click the **Save** button.

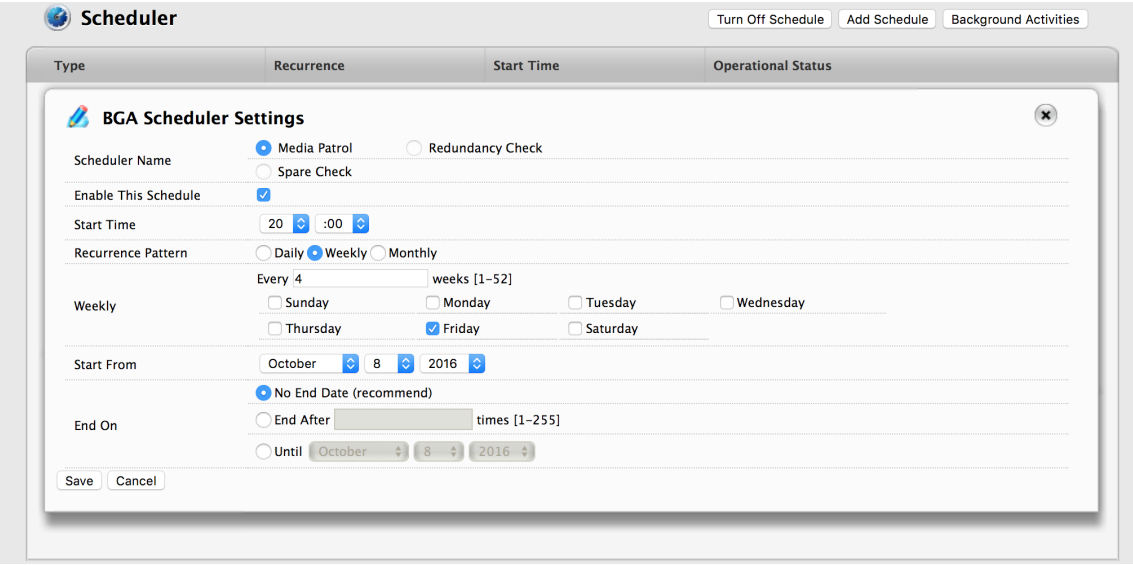
6. To return to the running background activities, click the **Background Activities** button.

Changing a Background Activity Schedule

To change an existing scheduled background activity:

1. Click on the **Background Activities icon.**
2. Click the Scheduler button.
   The list of scheduled background appears.
3. Mouse-over the background activity, then click the **Settings** button.

Change a Background Activity Schedule



4. Modify settings as needed.

   Choose the option for the activity you want to modify:

   - Media Patrol
   - Redundancy Check
   - Spare Check

   Choose a **Start Time** from the dropdown menus.

   The menus have a 24-hour clock.

   Choose a **Recurrence Pattern** option, daily, weekly, or monthly.

   - For the Daily option, enter an interval in the Every field.
   - For the Weekly option, enter an interval in the Every field and choose one or more days of the week.
   - For the Monthly option, choose, Day of the Month option or a sequential and specific day from the dropdown menu. Also choose which months you will be designating for the reoccurrence pattern.

   Choose a **Start From** date from the dropdown menus.

   Choose an **End On** option,

   - No end date or perpetual.
   - End after a specific number of activity actions.
   - Until date from the dropdown menus.

   For Redundancy Check, choose,

   - **Auto Fix** option – Attempts to repair the problem when it finds an error. Check to enable
   - **Pause on Error** option – The process stops when it finds a non- repairable error. Check to enable
   - **Select LD** – Check the boxes for the logical drives to run
   - Redundancy Check. Check at least one logical drive.

5. Click the **Save** button.

To return to the running background activities, click the **Background Activities** button.

Enabling or Disabling a Scheduled Background Activity

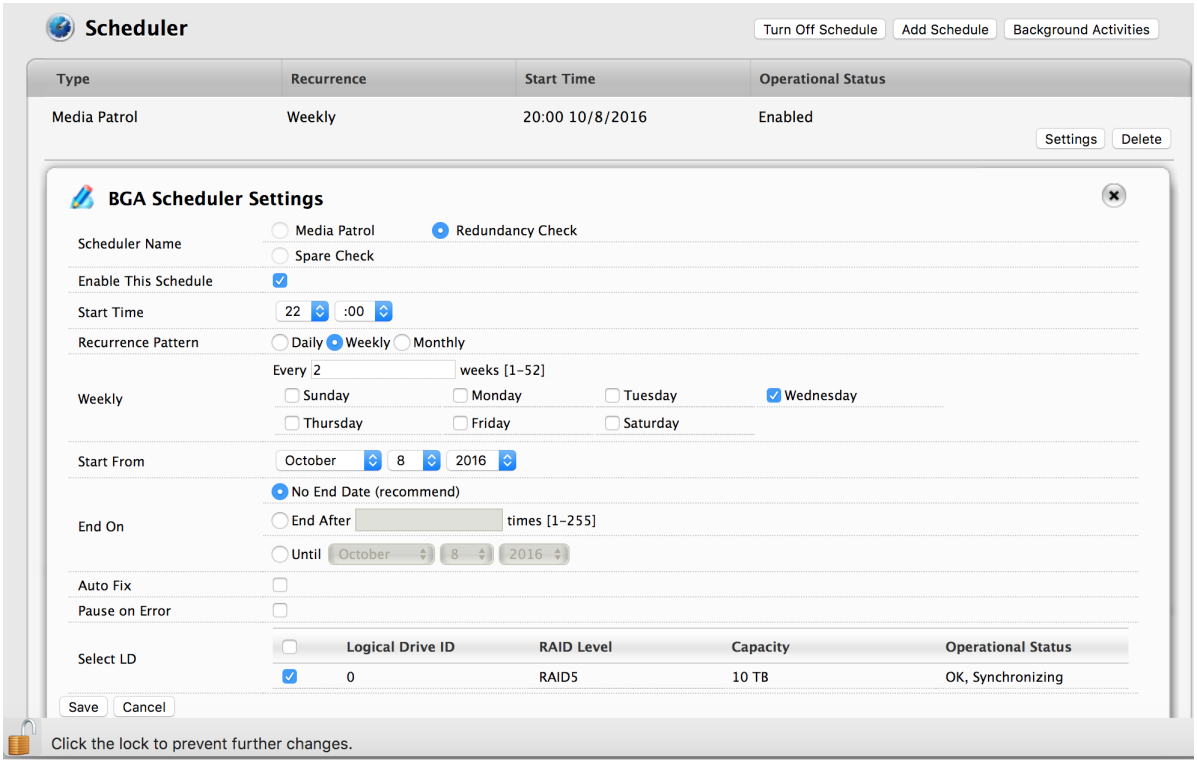
Background activity schedules are enabled by default when you create the schedule. If you want to stop a background activity now but plan to use it again in the future, disable the scheduled activity rather than deleting it.

To enable or disable change an existing scheduled background activity:

1. Click on the **Background Activities icon.**
2. Click the Scheduler button.
   The list of scheduled background appears.
3. Mouse-over the background activity and click the **Settings** button.
4. Uncheck the Enable This Schedule box to disable this schedule.
   Check the box to enable this schedule.
5. Click the **Save** button.

   To return to currently running background activities, click the Background Activities button.

Enable/disable a Background Activity Schedule

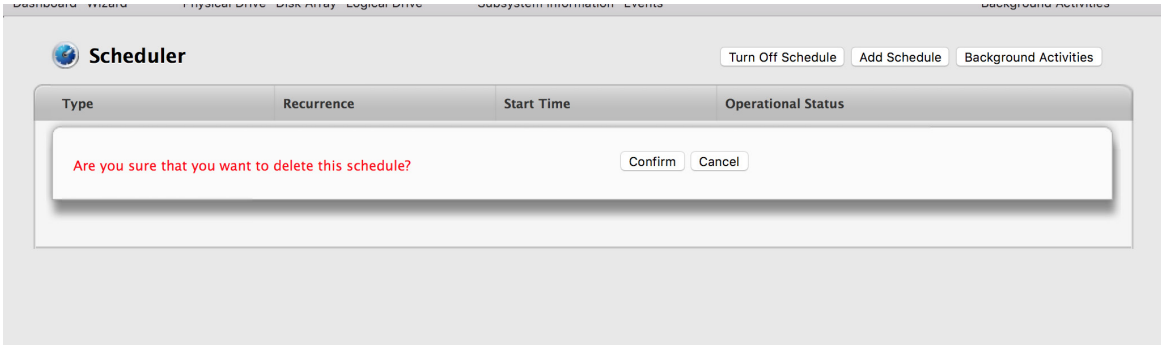


Deleting a Scheduled Background Activity

To delete a scheduled background activity:

1. Click on the **Background Activities icon.**
2. Click the Scheduler button.
   The list of scheduled background appears.
3. Mouse-over the background activity, then click the **Delete** button.
   To return to currently running background activities, click the Background Activities button.

Delete a Background Activity Schedule



Media Patrol

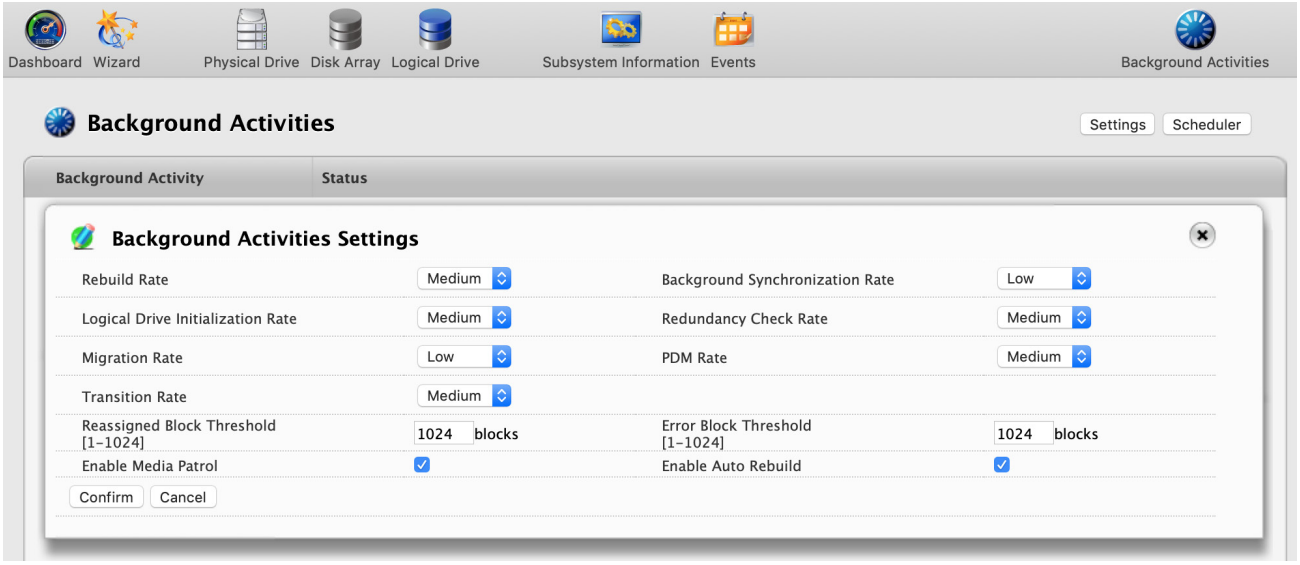
Media Patrol is a routine maintenance procedure that checks the magnetic media on each disk drive. Media Patrol checks are enabled by default on all disk arrays and spare drives. Media Patrol is concerned with the media itself, not the data recorded on the media. If Media Patrol encounters a critical error, it triggers PDM if PDM is enabled on the disk array. See “Making Disk Array Settings” on page 84.

Making Media Patrol Settings

To make Media Patrol settings:

1. Click on the **Background Activities icon.**
2. Click the **Settings** button.
3. Check the Enable Media Patrol box to enable, uncheck to disable.
   This settings enables or disables Media Patrol for all physical drives.
4. Click the **Confirm** button.
5. Click the **X** icon to close the background activities panel.

Media Patrol

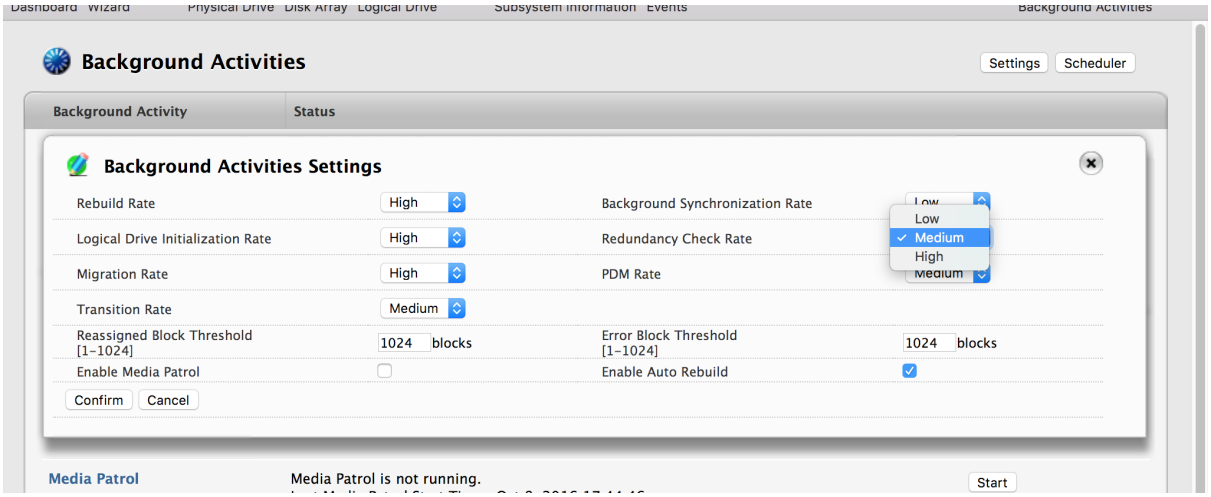


Redundancy Check

Redundancy Check is a routine maintenance procedure for fault-tolerant disk arrays (those with redundancy) that ensures all the data matches exactly. Redundancy Check can also correct inconsistencies.

See “Redundancy Check on a Logical Drive” on page 64.

Redundancy Check



Making Redundancy Check Settings

To make Redundancy Check settings:

1. Click on the **Background Activities icon.**
2. Click the **Settings** button.
3. Click the **Redundancy Check Rate** dropdown menu and choose a rate:
   - **Low** – Fewer system resources to Redundancy Check, more to data read/write operations.
   - **Medium** – Balances system resources between Redundancy Check and data read/write operations.
   - **High** – More system resources to Redundancy Check, fewer to data read/write operations.
4. Click the **Confirm** button.
5. Click the **X** icon to close the background activities panel.

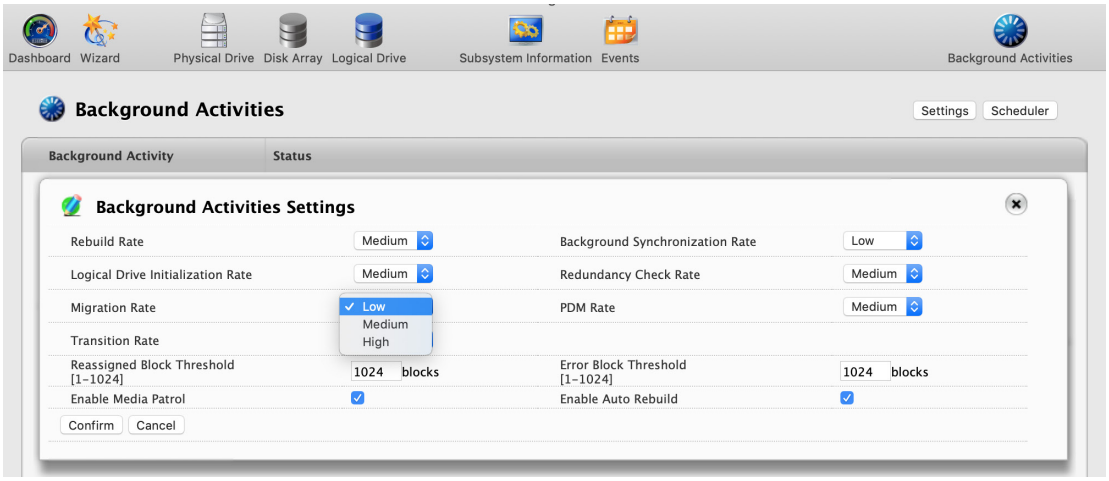
Initialization

Technically speaking, Initialization is a foreground activity, as you cannot access a logical drive while it is Initializing.

Initialization is normally done to logical drives after they are created from a disk array. Initialization sets all data bits in the logical drive to zero. The action is useful because there may be residual data on the logical drives left behind from earlier configurations. For this reason, Initialization is recommended whenever you create a logical drive.

See “Initializing a Logical Drive” on page 102.

Initialization



Making Initialization Settings

To make initialization settings:

1. Click on the **Background Activities icon.**
2. Click the **Settings** button.
3. Click the **Logical Drive Initialization Rate** dropdown menu and choose a rate:
   - **Low** – Fewer system resources to Initialization, more to data read/write operations.
   - **Medium** – Balances system resources between Initialization and data read/write operations.
   - **High** – More system resources to Initialization, fewer to data read/write operations.
4. Click the **Confirm** button.
5. Click the **X** icon to close the background activities panel.

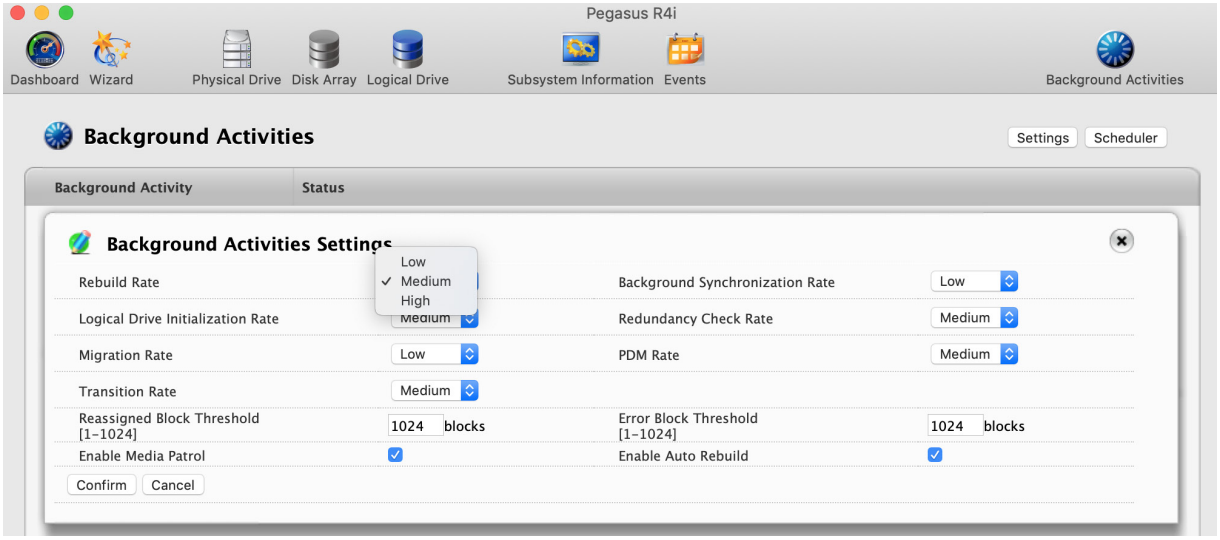
Rebuild

When you rebuild a disk array, you are actually rebuilding the data on one physical drive.

- When a physical drive in a disk array fails and a spare drive of adequate capacity is available, the disk array begins to rebuild automatically using the spare drive.
- If there is no spare drive of adequate capacity, but the **Auto Rebuild** function is ENABLED, the disk array begins to rebuild automatically as soon as you remove the failed physical drive and install an unconfigured physical drive in the same slot. See “Making Rebuild Settings” on page 55.
- If there is no spare drive of adequate capacity and the Auto Rebuild function is DISABLED, you must replace the failed drive with an unconfigured physical drive, then perform a **Manual Rebuild**.

See “Rebuilding a Disk Array” on page 140 and ”Managing Spare Drives” on page 113. Also see “Disk Array and Logical Drive Problems” on page 138.

Rebuild Settings



Making Rebuild Settings

1. Click on the **Background Activities icon.**
2. Click the **Settings** button.
3. Click the **Rebuild Rate** dropdown menu and choose a rate:
    - **Low** – Fewer system resources to the Rebuild, more to data read/write operations.
    - **Medium** – Balances system resources between the Rebuild and data read/write operations.
    - **High** – More system resources to the Rebuild, fewer to data read/write operations.
4. Check the **Enable Auto Rebuild** box to enable Auto Rebuild (rebuilds when you swap out the failed drive with a new one).
5. Click the **Confirm** button.
6. Click the **X** icon to close the background activities panel.

Migration

The term “Migration” means either or both of the following:

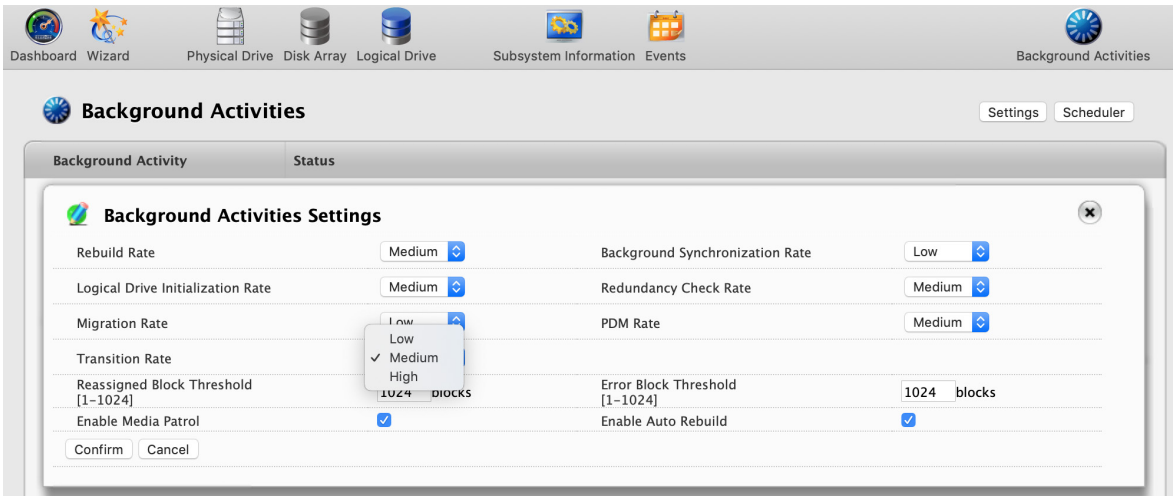
- Change the RAID level of a logical drive.
- Expand the storage capacity of a logical drive.
  See “Migrating a Logical Drive” on page 108.

Making Migration Settings

To make migration settings:

1. Click on the **Background Activities icon.**
2. Click the **Settings** button.
3. Click the Migration Rate dropdown menu and choose a rate:
   - **Low** – Fewer system resources to Migration, more to data read/write operations.
   - **Medium** – Balances system resources between Migration and data read/write operations.
   - **High** – More system resources to Migration, fewer to data read/write operations.
4. Click the **Confirm** button.
5. Click the **X** icon to close the background activities panel.

Migration



PDM

Predictive Data Migration (PDM) is the migration of data from the suspect disk drive to a spare drive, similar to rebuilding a disk array. But unlike rebuilding, PDM automatically copies your data to a spare drive *before* the drive fails and your logical drive goes Critical.

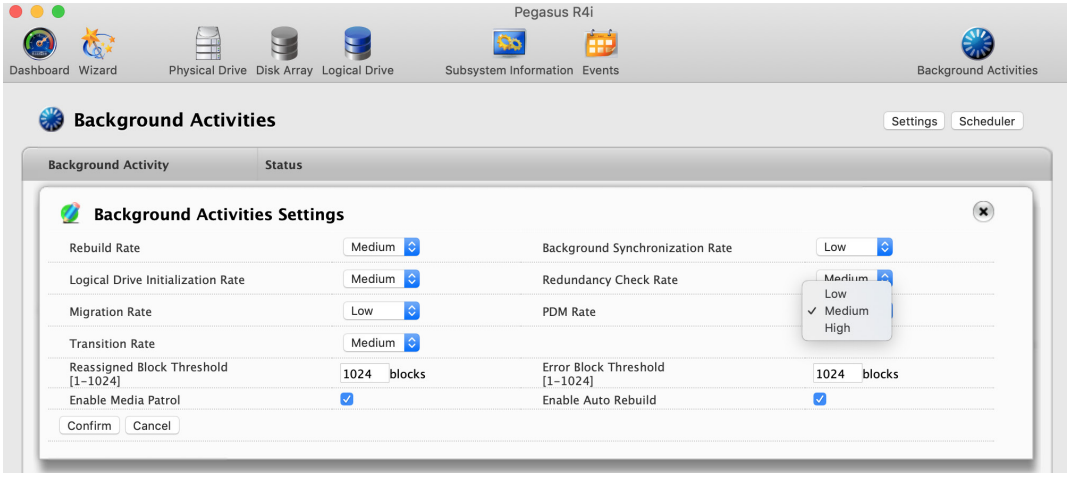
PDM can be triggered automatically by Media Patrol. Also see ”Running PDM on a Logical Drive” on page 110.

PDM Settings

To modify PDM settings:

1. Click on the **Background Activities icon.**
2. Click the **Settings** button.
3. The following settings are required:
    - Click the **PDM Rate** dropdown menu and choose a rate:
        - **Low** – Fewer system resources to PDM, more to data read/write operations.
        - **Medium** – Balances system resources between PDM and data read/write operations.
        - **High** – More system resources to PDM, fewer to data read/write operations.
    - Highlight the current values in the block threshold fields and input new values. Reassigned block threshold range is 1 to 512 blocks. Error block threshold range is 1 to 2048 blocks.
4. Click the **Confirm** button.
5. Click the X icon to close the background activities panel.

PDM



Transition

Transition is the process of replacing a revertible spare drive that is currently part of a disk array with an unconfigured physical drive or a non-revertible spare drive.

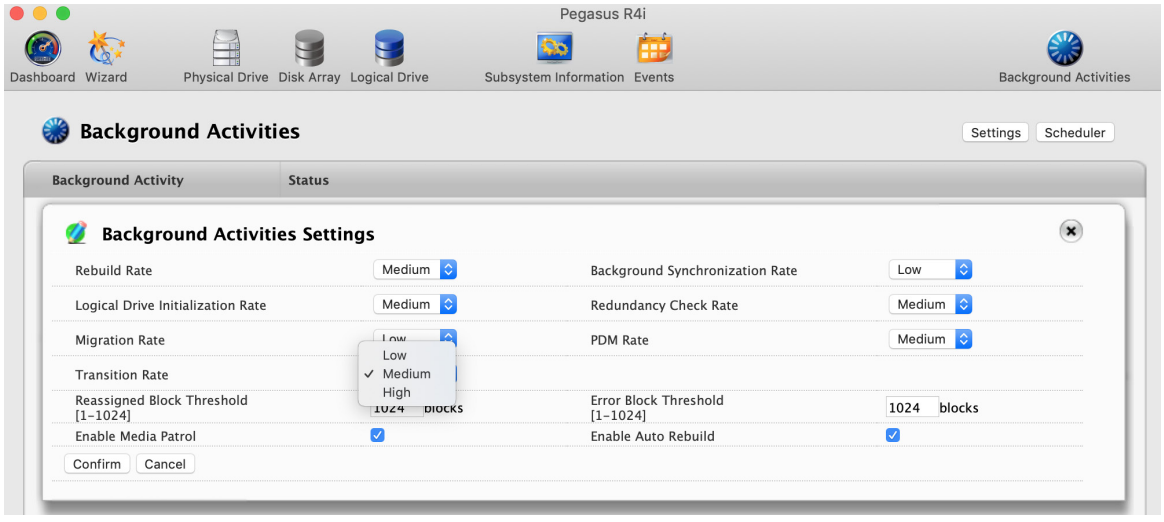
See “Running a Transition” on page 121.

Making Transition Settings

To make Transition settings:

1. Click on the **Background Activities icon.**
2. Click the **Settings** button.
3. Click the **Transition Rate** dropdown menu and choose a rate:
   - **Low** – Fewer system resources to Transition, more to data read/write operations.
   - **Medium** – Balances system resources between Transition and data read/write operations.
   - **High** – More system resources to Transition, fewer to data read/write operations.
4. Click the **Confirm** button.
5. Click the **X** icon to close the background activities panel.

Transition



Synchronization

Synchronization is automatically applied to logical drives when they are created. Synchronization recalculates the redundancy data to ensure that the working data on the physical drives is properly in sync.

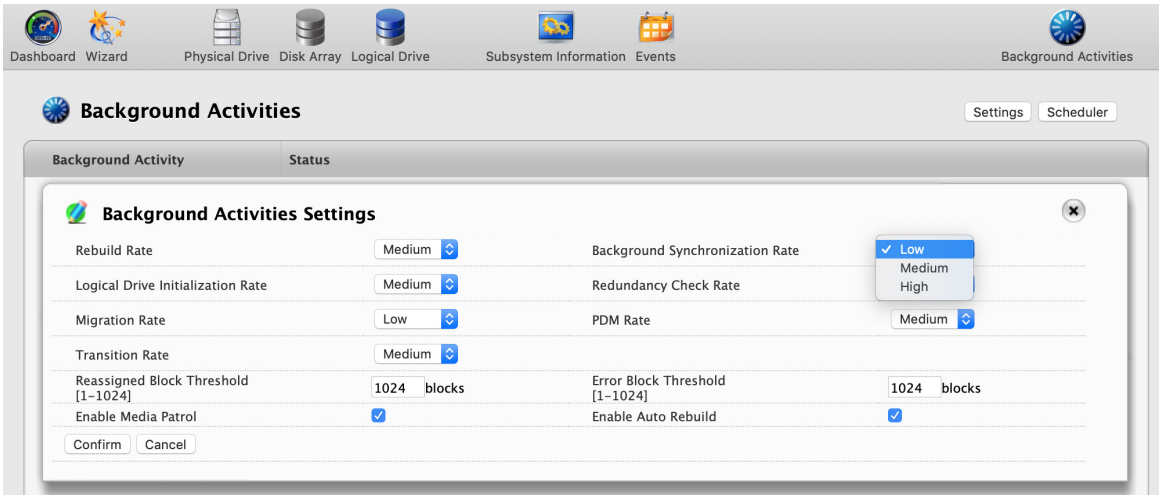
Mouse-over on the logical drive, click the **View** button, and look under Logical Drive Information beside the line that says **Synchronized**. A **Yes** means the logical drive was synchronized. See “Viewing Logical Drive Information” on page 93.

Synchronization Settings

To modify Synchronization settings:

1. Click on the **Background Activities icon.**
2. Click the **Settings** button.
3. Click the **Background Synchronization Rate** dropdown menu and choose a rate:
   - **Low** – Fewer system resources to Synchronization, more to data read/write operations.
   - **Medium** – Balances system resources between Synchronization and data read/write operations.
   - **High** – More system resources to Synchronization, fewer to data read/write operations.
4. Click the **Confirm** button.
5. Click the **X** icon to close the background activities panel.

Synchronization



Managing Physical Drives

Physical drive management includes:

- “Viewing a List of Physical Drives”
- “Viewing Physical Drive Information”
- “Viewing Physical Drive Statistics”
- “Viewing Physical Drive SMART Log Information”
- “Locating a Physical Drive”
- “Making Global Physical Drive Settings”
- “Making Individual Physical Drive Settings”
- “Making Physical Drive SMART Log Settings”
- “Clearing a Stale or a PFA Condition”

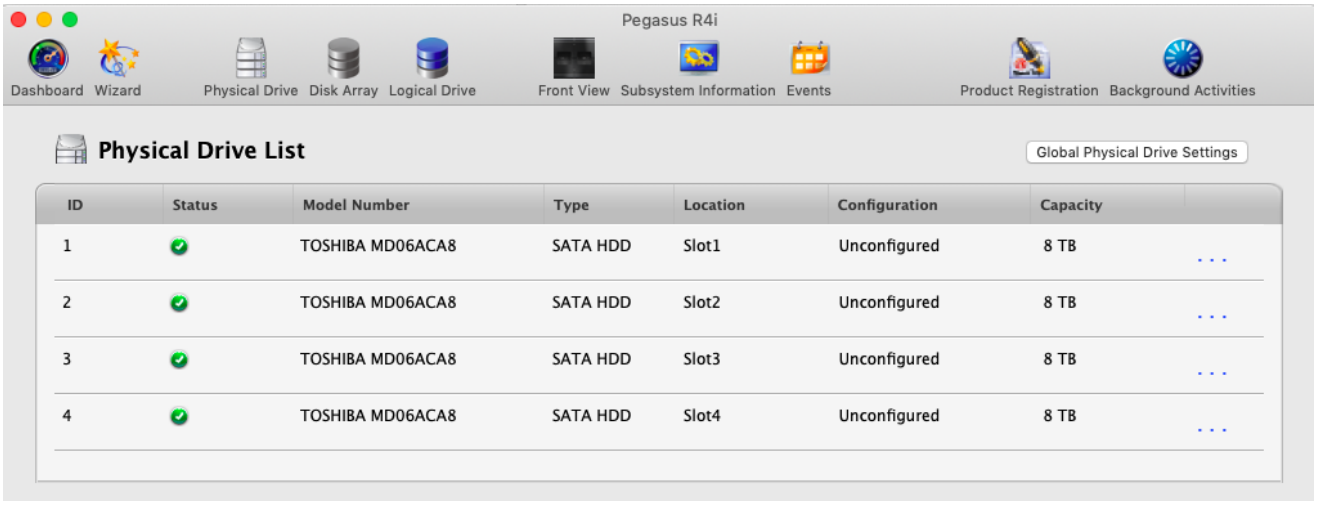
Viewing a List of Physical Drives

To view a list of physical drives in the Pegasus R4i MPX RAID Storage Module, click the **Physical Drive** icon.

Physical drive information includes:

- **ID** – ID number of the physical drive
- **Status** (Normal, Stale or PFA or Dead icon)
- **Model Number**
- **Type** – SATA, HDD or SSD
- **Location** – Enclosure number and slot number
- **Configuration** – Array number and sequence number, spare number, unconfigured, or stale configuration
- **Capacity** – In GB

Physical Drive List



Viewing Physical Drive Information

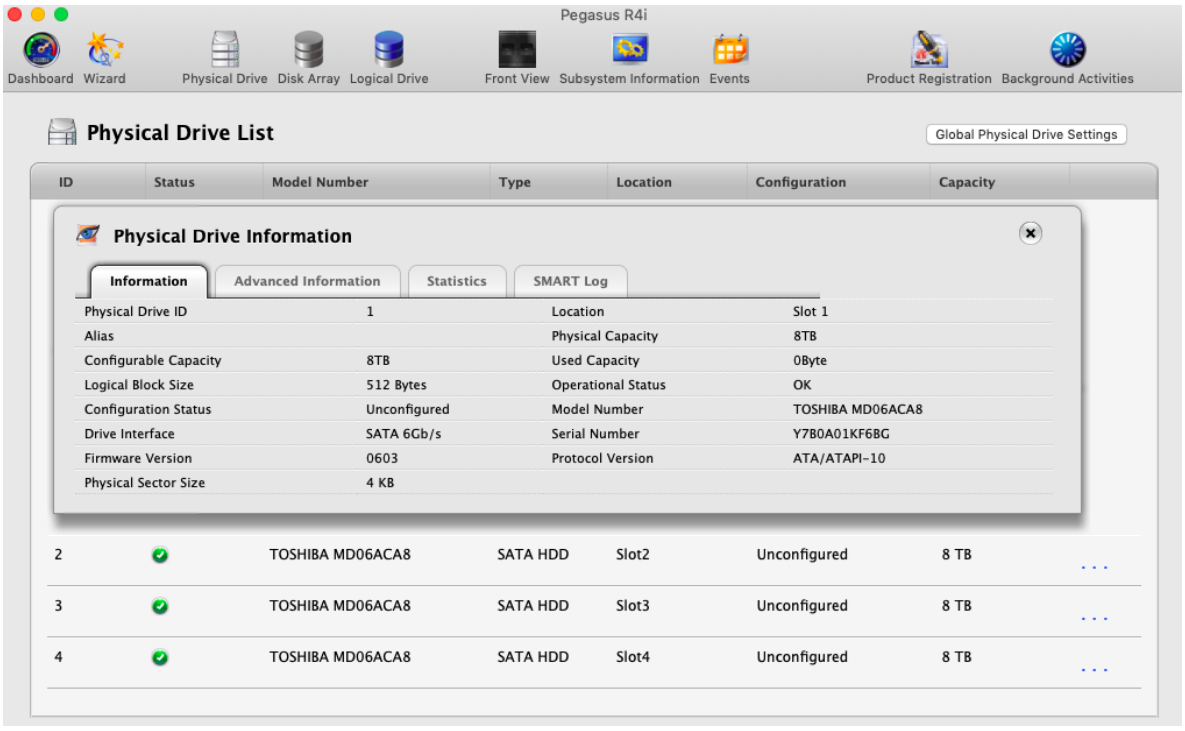
To view physical drive information:

1. Click the **Physical Drive** icon.
2. Mouse-over the physical drive you want then click the **View** button.

Physical drive information includes:

- **Physical Drive ID** – ID number of the physical drive
- **Location** – Enclosure number and slot number
- **Alias** – If assigned
- **Physical Capacity** – Total capacity in GB
- **Configurable Capacity** – Usable capacity in GB
- **Used Capacity** – Capacity actually used in GB
- **Block Size** – Typically 512 Bytes
- **Operational Status** – OK is normal, Stale, PFA, Dead
- **Configuration Status** – Array number and sequence number, spare number
- **Model Number** – Make and model of the drive
- **Drive Interface** – SATA 1.5Gb/s or 3Gb/s
- **Serial Number** – Serial number of the drive
- **Firmware Version** – Firmware version on the drive
- **Protocol Version** – ATA/ATAPI protocol version

Physical Drive Information



3. Click the **Advanced Information** tab.

Advanced information for physical drives includes:

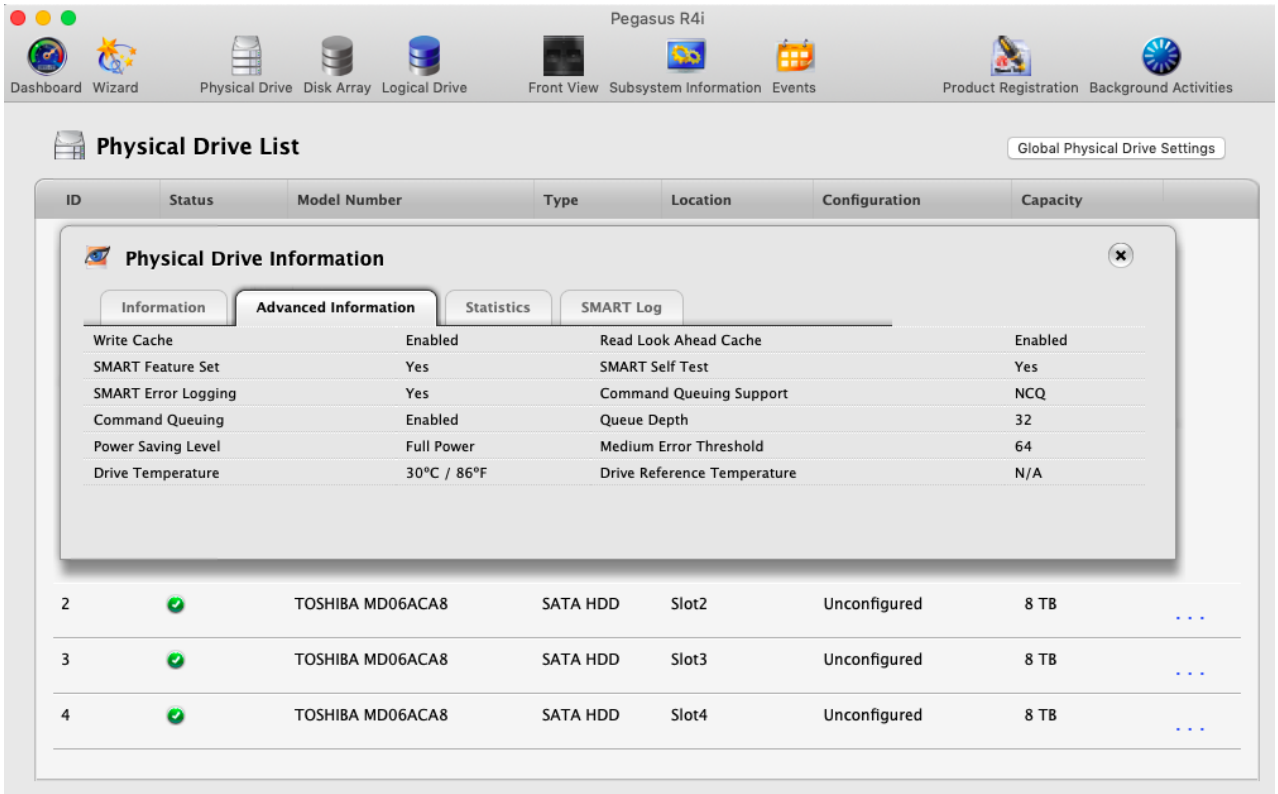
- Write Cache – Enabled or disabled *
- Read Look Ahead Cache – Enabled or disabled *
- SMART Feature Set – Yes or No
- SMART Self Test – Yes or No
- SMART Error Logging – Yes or No
- Command Queuing Support – TCQ or NCQ
- Command Queuing – Enabled or disabled *
- Queue Depth – Number of commands
- Power Saving Level – Supported by this drive
- Medium Error Threshold **
- Drive Temperature
- Drive Reference Temperature

Items with an asterisk (*) are adjustable under “Viewing Physical Drive Statistics” on page 64.

Items with two asterisks (**) are adjustable under “PDM Settings” on page 57.

4. Click the **X** icon to close the information panel.

Physical Drive Advanced Information



Viewing Physical Drive Statistics

To view physical drive statistics:

1. Click the **Physical Drive** icon.
2. Mouse-over the physical drive you want then click the **View** button.
3. Click the **Statistics** tab.

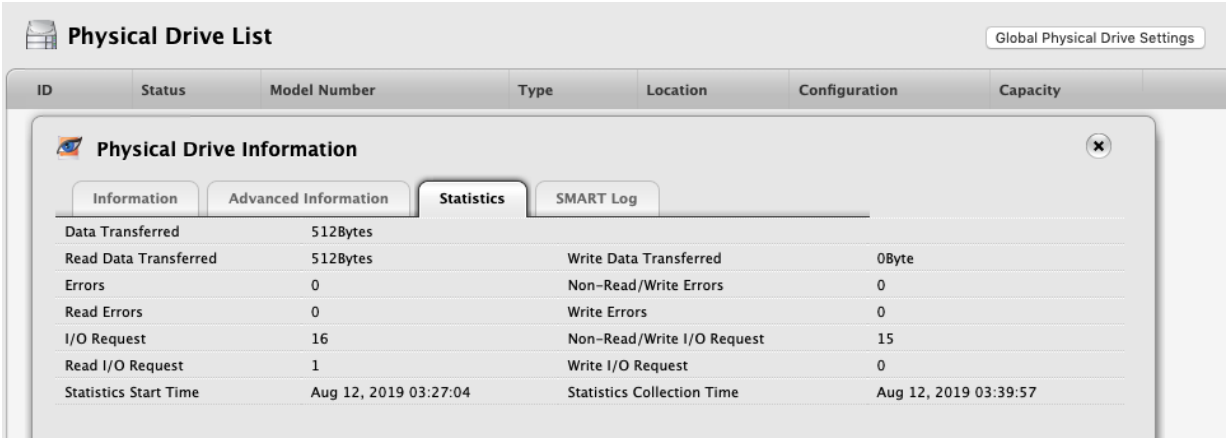
Physical drive statistics include:

- Data Transferred
- Read Data Transferred
- Write Data Transferred
- Errors – Number of errors
- Non Read/Write Errors
- Read Errors
- Write Errors
- I/O Request – Number of requests
- Non Read/Write Request – Number of requests
- Read I/O Request – Number of requests
- Write I/O Request – Number of requests
- Statistics Start Time – Time and date
- Statistics Collection Time – Time and date

To clear physical drive statistics, see “Clearing Statistics” on page 29.

4. Click the **X** icon to close the settings panel.

Physical Drive Information - Statistics



Viewing Physical Drive SMART Log Information

To view physical drive SMART Log information:

1. Click the Physical Drive icon.
2. Mouse-over the physical drive you want then click the **View** button.
3. Click the SMART Log tab.

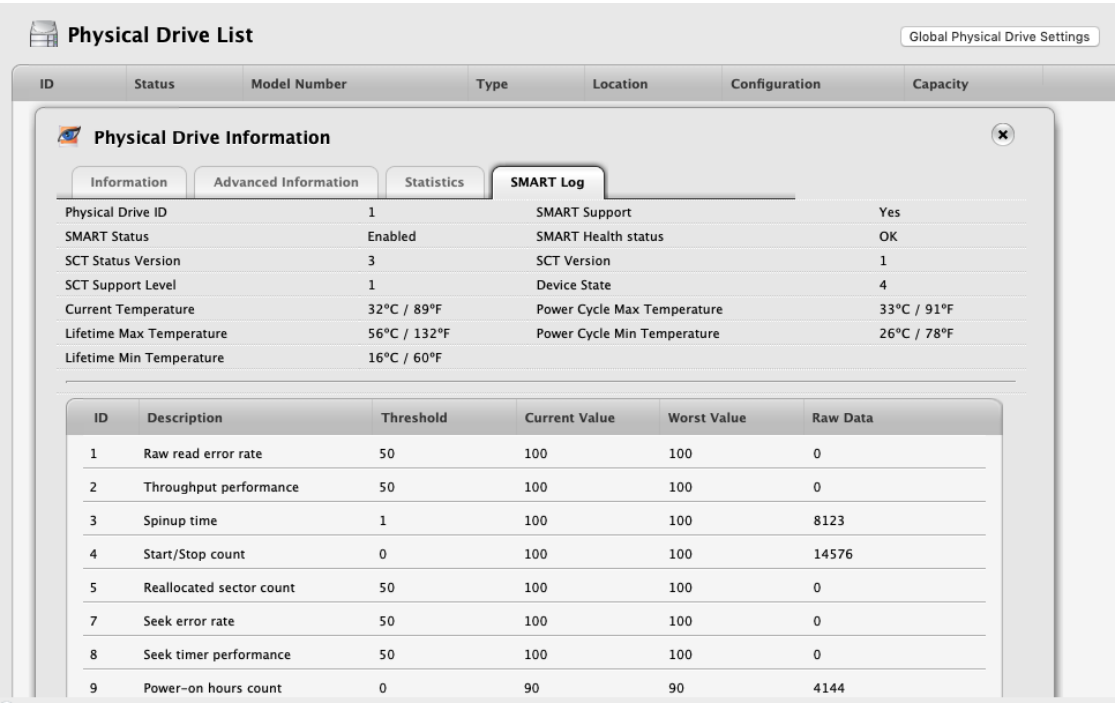
   SMART Log information includes:

   - Physical Drive ID
   - SMART Support – Yes or No, depending on the drive
   - SMART Status – Enabled or disabled *
   - SMART Health Status – OK is normal

Items with an asterisk (*) are adjustable under “Controller Settings” on page 37.

4. Click the **X** icon to close the settings panel.

Physical Drive SMART Log Information

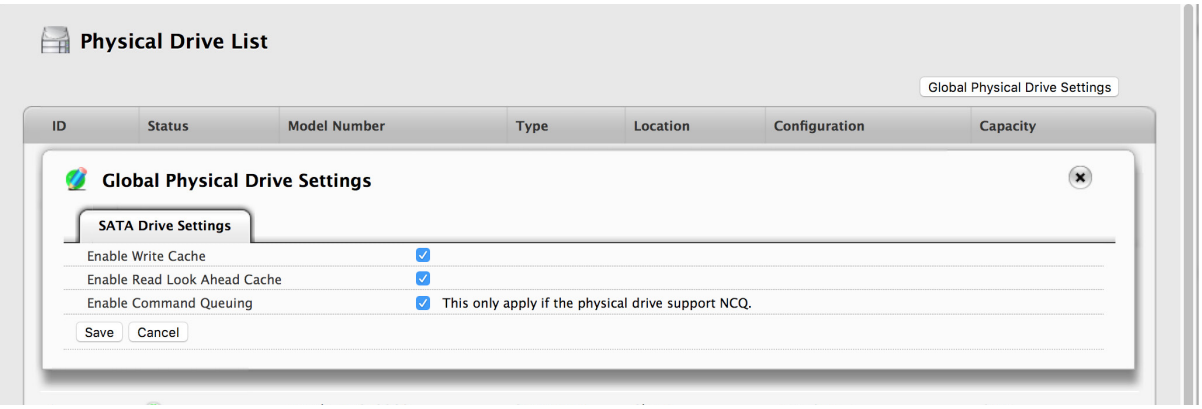


Making Global Physical Drive Settings

To make global physical drive settings:

1. Click the Physical Drive icon..
2. Click the **Global Physical Drive Settings** button.
3. Check the boxes to enable, uncheck to disable.
   - Enable Write Cache
   - Enable Read Look Ahead Cache
   - Enable Command Queuing
4. Click the **Save** button.
5. Click the **X** icon to close the settings panel.

Physical Drive Global Settings



Locating a Physical Drive

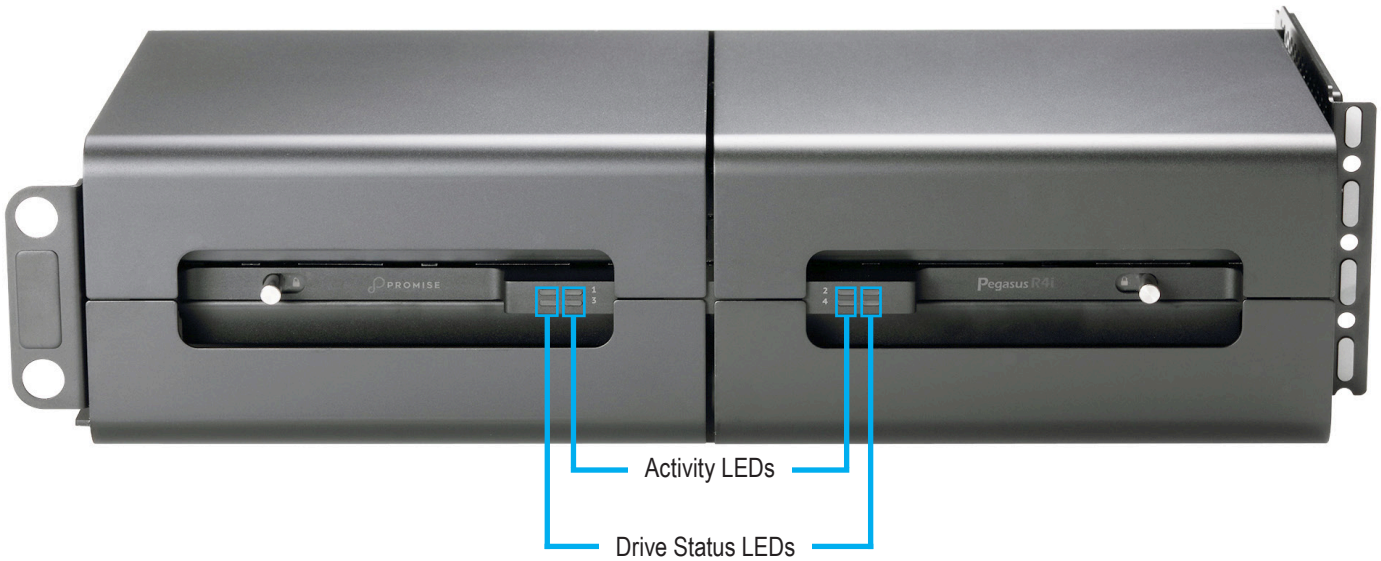
This feature causes the drive module LEDs to blink for one minute to assist you in locating the physical drive, and is supported by RAID enclosures and JBOD expansion units.

To locate a physical drive:

1. Click the Physical Drive icon.

2. Mouse-over the physical drive you want then click the Locate button.
   The Drive Status LED for the drive module holding that drive blinks blue and orange for one minute.

Running the Locate function to identify a physical drive

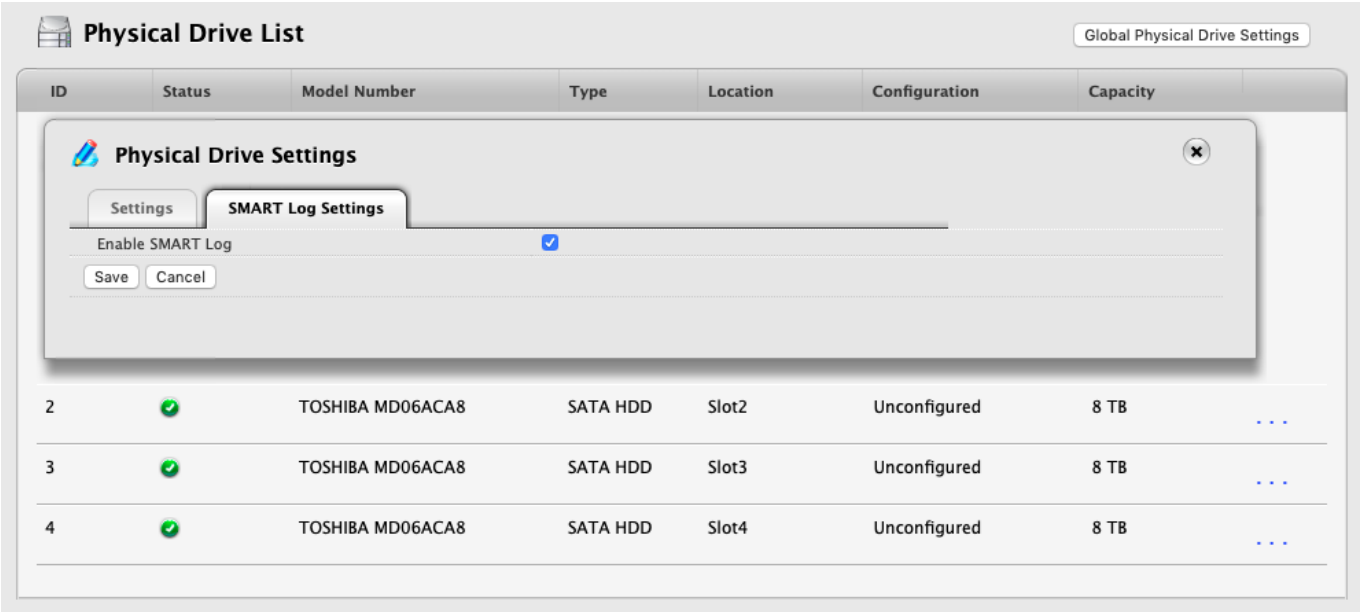


Making Physical Drive SMART Log Settings

To make physical drive SMART log settings:

1. Click the **Physical Drive** icon.
2. Mouse-over the physical drive you want then click the **Settings** button.
3. Click the **SMART Log Settings** tab.
4. Check the box to enable the SMART log.
5. Click the **Save** button.
6. Click the **X** icon to close the settings panel.

Physical Drive SMART Log Settings



Making Individual Physical Drive Settings

CAUTION

Changing the status of a pass-through disk will destroy any data on the disk. Back up your data before you proceed.

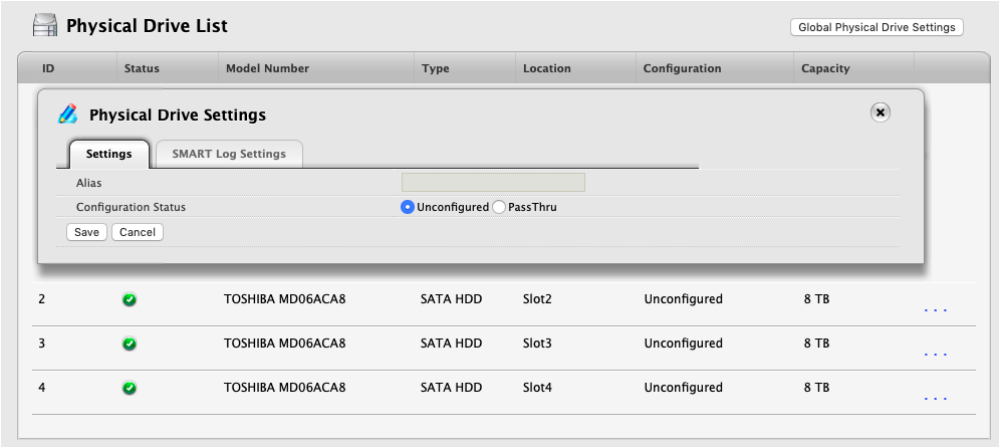
To make individual physical drive settings:

1. Do one of the following actions:
   - Click the Physical Drive icon.
   - From the Device menu, choose Physical Drive.
2. Mouse-over the physical drive you want then click the **Settings** button.
3. Make changes as needed:
   - Enter, change, or delete the alias in the Alias field.
   - Choose Unconfigured or PassThru Configuration.

     Unconfigured drives are not visible to your computer. Use them to make disk arrays.

     PassThru drives are visible to your computer and are configured as individual drives. They cannot be used to make a disk array.
4. Click the **Save** button.
5. Click the **X** icon to close the settings panel.

Physical Drive Settings



Clearing a Stale or a PFA Condition

Stale – The physical drive contains obsolete disk array information.

PFA – The physical drive has errors resulting in a prediction of failure.

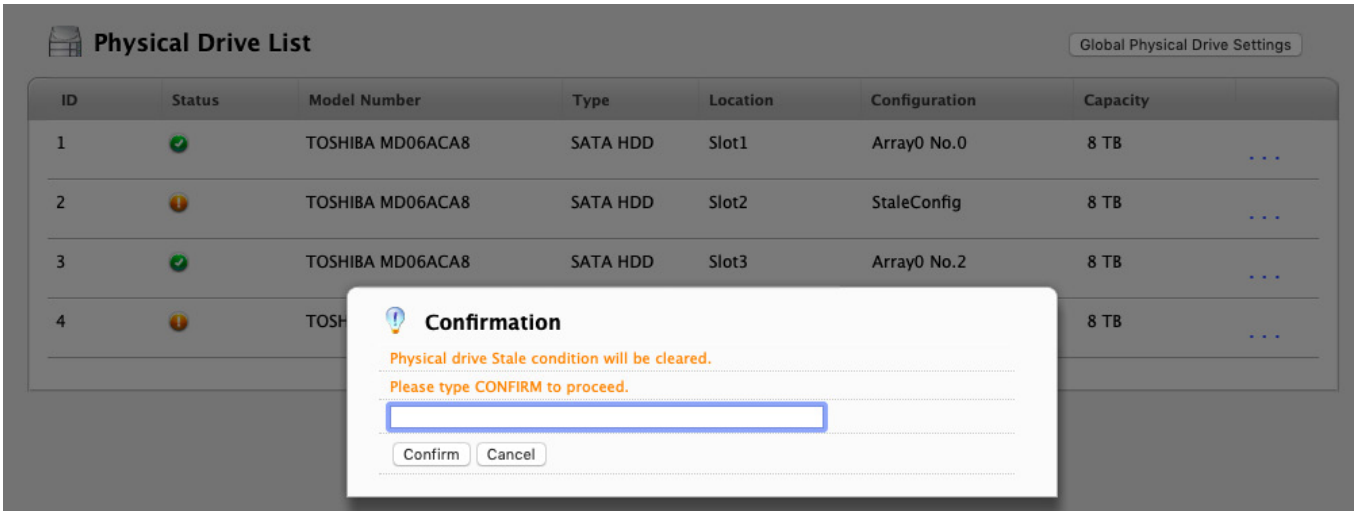
Be sure you have first corrected the condition by a physical drive replacement, rebuild operation, etc. Then clear the condition.

To clear a Stale or a PFA condition:

1. Click the **Physical Drive** icon.
2. Mouse-over the physical drive you want then click the **Clear** button.
3. Click the **Confirm** button.

If the physical drive has *both* a Stale condition *and* a PFA condition, the first click removes the Stale condition. Click the **Clear** button a second time to remove the PFA condition.

Clear a stale drive or PFA condition



Running Media Patrol on your Physical Drives

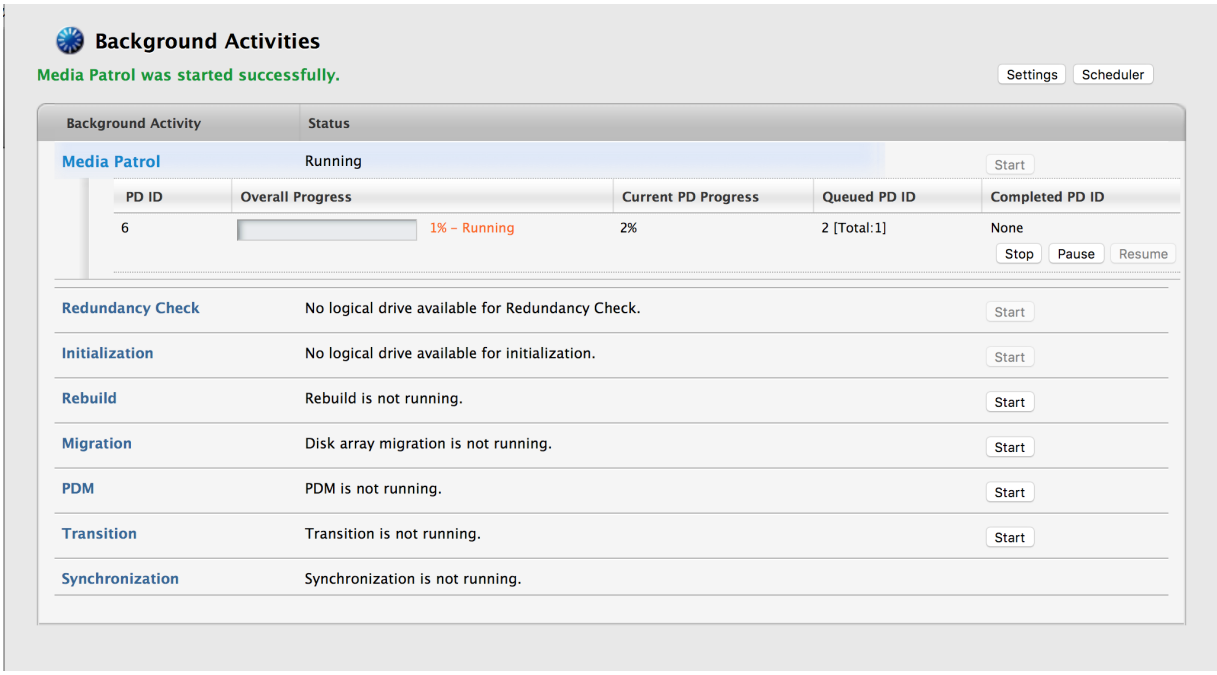
Media Patrol is a routine maintenance procedure that checks the magnetic media on each disk drive. Media Patrol checks are enabled by default on all disk arrays and spare drives. Media Patrol is concerned with the media itself, not the data recorded on the media. If Media Patrol encounters a critical error, it triggers PDM if PDM is enabled on the disk array. Media Patrol checks all physical drives one at a time.

To run Media Patrol on your physical drives:

1. Click on the **Background Activities** icon.
   The list of background activities appears.

2. Mouse-over Media Patrol and click the **Start** button.

Running Media Patrol



Pausing and Resuming a Media Patrol

To pause or resume a Media Patrol:

1. Click on the **Background Activities icon.**
   The list of background activities appears.

2. Mouse-over Media Patrol and click the **Pause** or **Resume** button.

Stopping a a Media Patrol

To stop is to cancel the Media Patrol:

1. Click on the **Background Activities** icon.
   The list of background activities appears.

2. Mouse-over Media Patrol and click the **Stop** button.

3. In the Confirmation box, type the word “confirm” in the field provided and click the **Confirm** button.

Managing Disk Arrays

Disk array management includes:

- “Viewing a List of Disk Arrays”
- “Viewing Disk Array Information”
- “Creating a Disk Array Manually”
- “Making Disk Array Settings”
- “Locating a Disk Array”
- “Deleting a Disk Array”
- “Preparing a Disk Array for Transport”
- “Rebuilding a Disk Array”

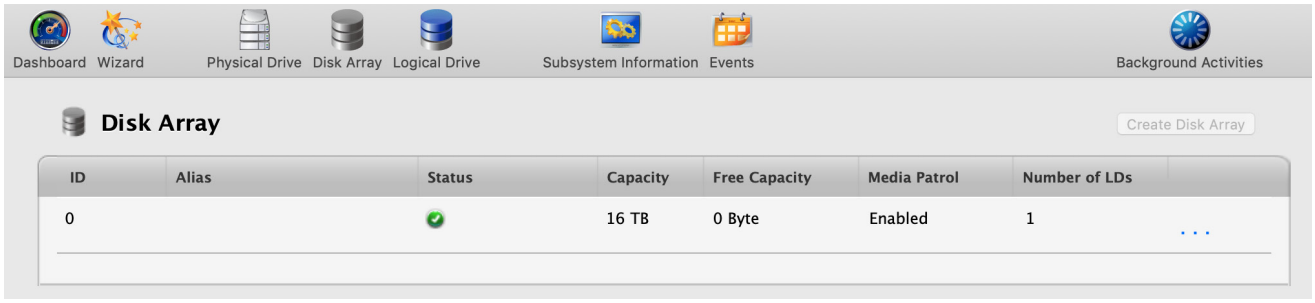
Also see “Disk Array and Logical Drive Problems” on page 138.

Viewing a List of Disk Arrays

To view a list of disk arrays, do one of the following actions:

- From the Dashboard window, click the **Disk Array** link.
- From the Storage menu, choose **Disk Array**. The list of disk arrays appears. Each disk array lists:
- **ID** – DA0, DA1, etc.
- **Alias** – If assigned
- **Status** (Normal, Degraded or Incomplete/physical drive missing icon)
- **Capacity** – Data capacity of the array
- **Free Capacity** – Unconfigured or unused capacity on the physical drives
- **Media Patrol** – Enabled or disabled on this array
- **Number of Logical Drives** – The number of logical drives on this array

List of Disk Arrays



Viewing Disk Array Information

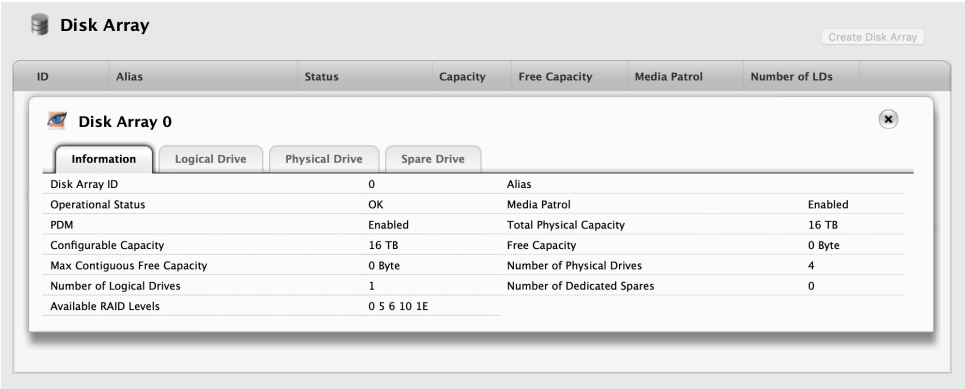
To view disk array information:

1. Do one of the following actions:
    - From the Dashboard window, click the **Disk Array** link.
    - From the Storage menu, choose **Disk Array**.
2. Mouse-over the disk array you want then click the **View** button.

Disk array information includes:

- **Disk Array ID** – DA0, DA1, etc.
- **Alias** – If assigned
- **Operational Status** – OK, Degraded, or Offline
- **Media Patrol** – Enabled or disabled on this array
- **PDM** – Enabled or disabled on this array
- **Total Physical Capacity** – Maximum capacity, including used and unused capacity on the physical drives
- **Configurable Capacity** – Data capacity of the array
- **Free Capacity** – Unconfigured or unused capacity on the physical drives
- **Max. Contiguous Free Capacity** – A single chunk of used capacity on the physical drives
- **Number of Physical Drives** – The number of physical drives on this array
- **Number of Logical Drives** – The number of logical drives on this array
- **Number of Dedicated Spares** – The number of spare drives dedicated to this array
- **Available RAID Levels** – RAID levels that this disk array can support

Disk Array Information



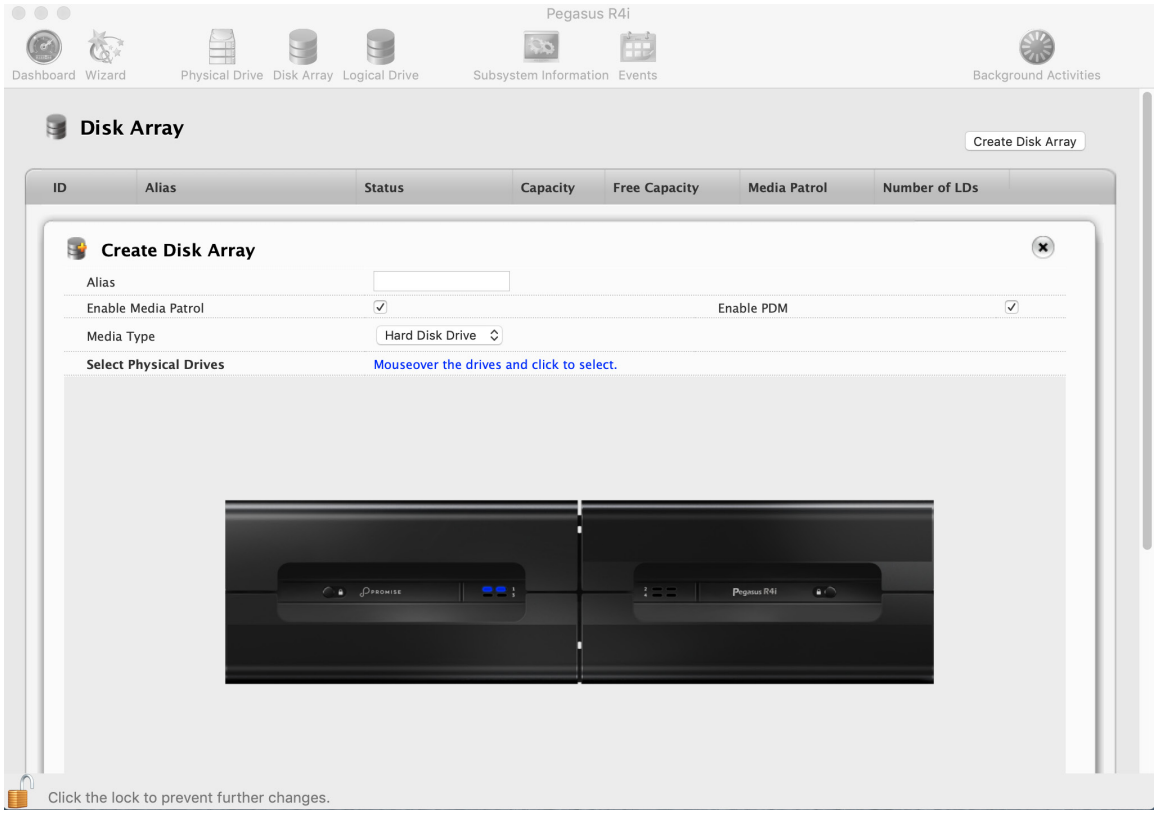
Creating a Disk Array Manually

This feature creates a disk array only. You can also use the Wizard to create a disk array with logical drives and spare drives at the same time.

To create a disk array:

1. From the Dashboard menu, click the **Disk Array** link.
2. Click the **Create Disk Array** button.
3. Accept the defaults or make changes:
    - Enter an alias in the **Alias** field
      Maximum of 32 characters; letters, numbers, space between characters, and underscore.
    - **Enable Media Patrol** – Uncheck to disable on this array.
      For more information, see “Media Patrol” on page 51.
    - **Enable PDM** – Uncheck to disable on this array.
      For more information, see “PDM” on page 57.

Create Disk Array



4. In the **Select Physical Drives** diagram, click the drives to add them to your array.
   The drive modules turn blue when you click them. The physical drives' ID numbers appear in the field below the diagram.

5. When you have finished your settings and choices, click the Submit button.
   The new array appears in the list.

   - If you are done creating disk arrays, click the **Finish** button.
   - To create additional disk arrays, click the Create More button.

After you create a disk array, create a logical drive on it. See "Creating a Logical Drive Manually" on page 98.

Creating a Disk Array and Logical Drive with the Wizard

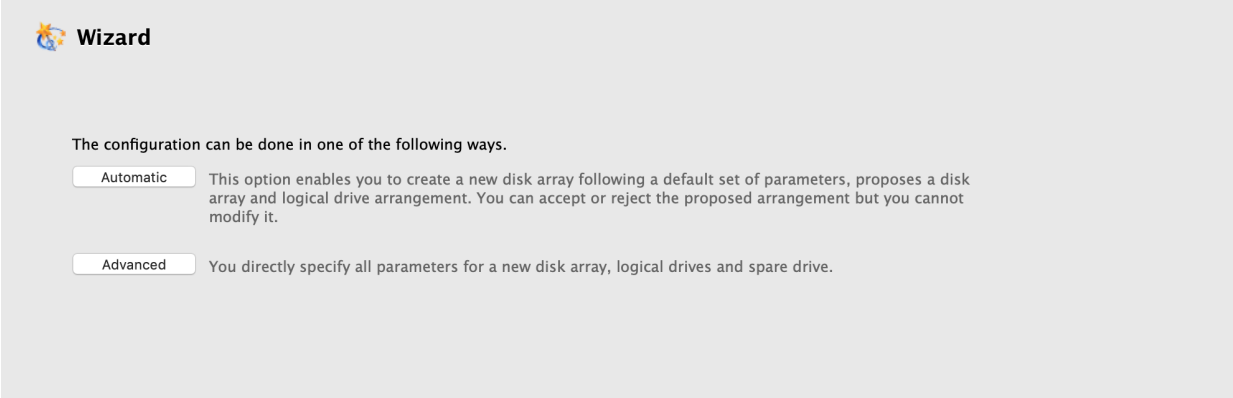
A disk array is the method of organizing the hard disk drives or solid state drives in the Pegasus. A logical drive is created on a disk array. The logical drive is where your computer saves files on the Pegasus.

The Pegasus Utility includes a Wizard to help you set up a disk array, logical drives, and spare drive.

To open the Wizard, click the Storage menu and choose **Wizard**.

The Wizard dialog box opens with three configuration methods.

Wizard dialog box



Choose the best method for your situation. See the table on the next page.

Method	User Options	Suggested for users who are	Page
Automatic	None	New to data storage	page 79
Advanced	Individual parameters	Data storage professionals	page 80

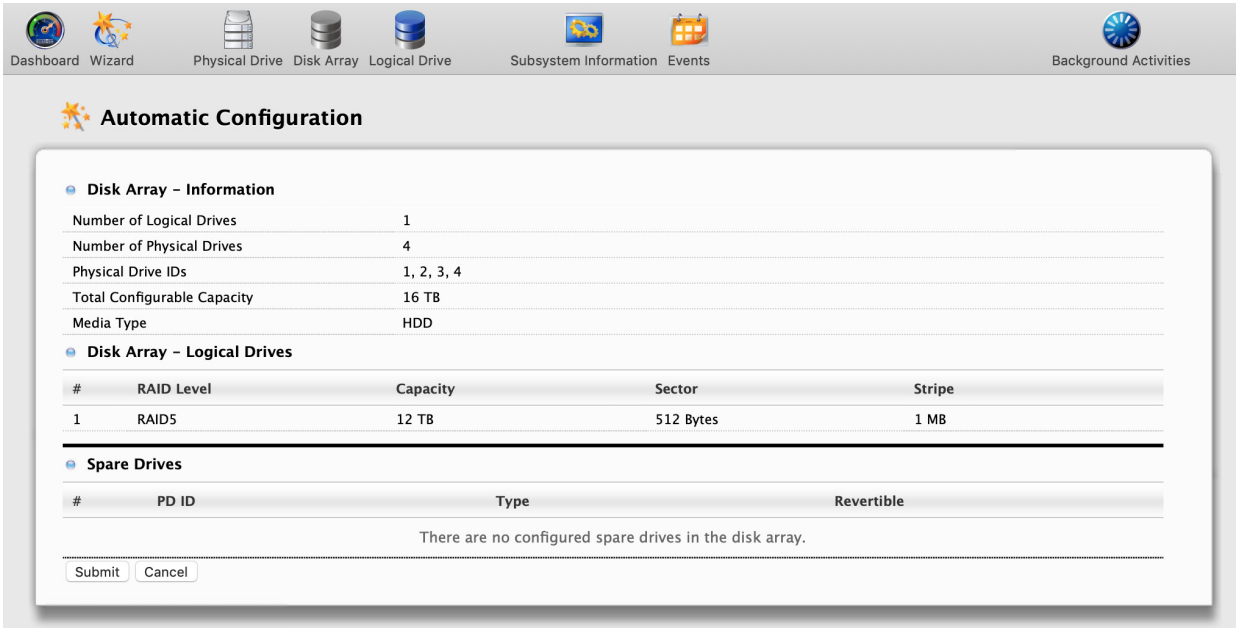
Choosing Automatic Configuration

To use the Automatic Configuration Wizard:

1. From the Storage menu choose **Wizard**.
2. Click the **Automatic** button.

The Automatic Configuration dialog box appears.

Automatic Configuration dialog box



3. Do one of the following actions:

   - If you agree with the proposed configuration, click the Submit button.
     The Wizard creates your disk array and logical drive. If you have a Pegasus R4i, the Wizard also creates a spare drive.
   - If you do NOT agree with the proposed configuration, click the **Cancel** button to return to the original Automatic Configuration menu.

Choosing Advanced Configuration

This option enables you to directly specify all parameters for a new disk array, logical drives, and spare drives.

To use the Advanced Configuration Wizard:

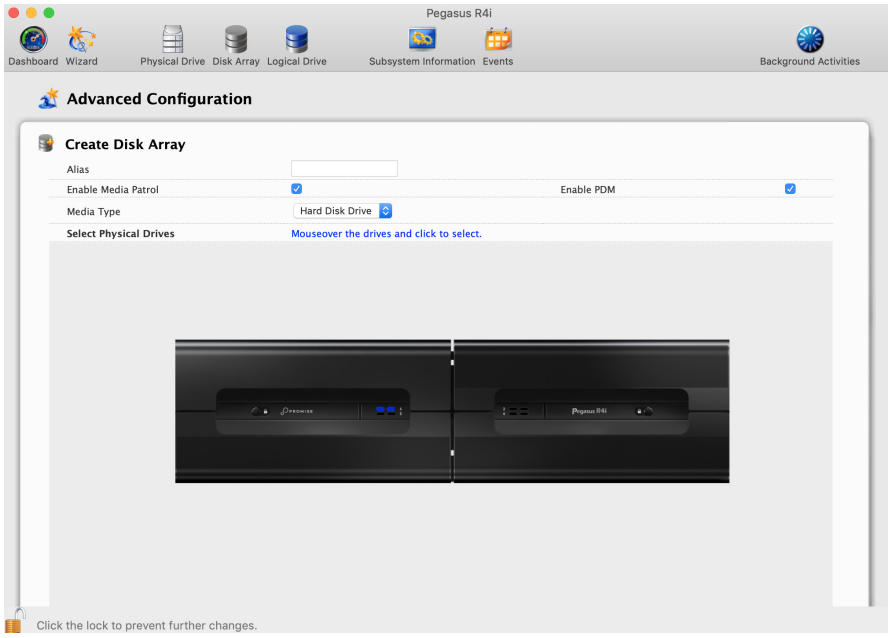
1. From the Storage menu choose **Wizard**.
2. Click the **Advanced** button.
   The Create Disk Array screen displays.

Task 1 – Disk Array Creation

To create your disk array:

1. Accept the defaults or make changes:
   - Enter an alias in the **Alias** field.
     Maximum of 32 characters; letters, numbers, space between characters, and underscore.
   - **Media Patrol** – Uncheck to disable on this array.
     For more information, see “Media Patrol” on page 51.
   - **PDM** – Uncheck to disable on this array.
     For more information, see “PDM” on page 57.
2. In the Select Physical Drives diagram, click the drives to add them to your array.
   The drive modules turn blue when you click them. The physical drives’ ID numbers appear in the field below the diagram.
3. Click the Next button to continue.
   The Create Logical Drive screen displays.

Advanced Configuration - Create Disk Array



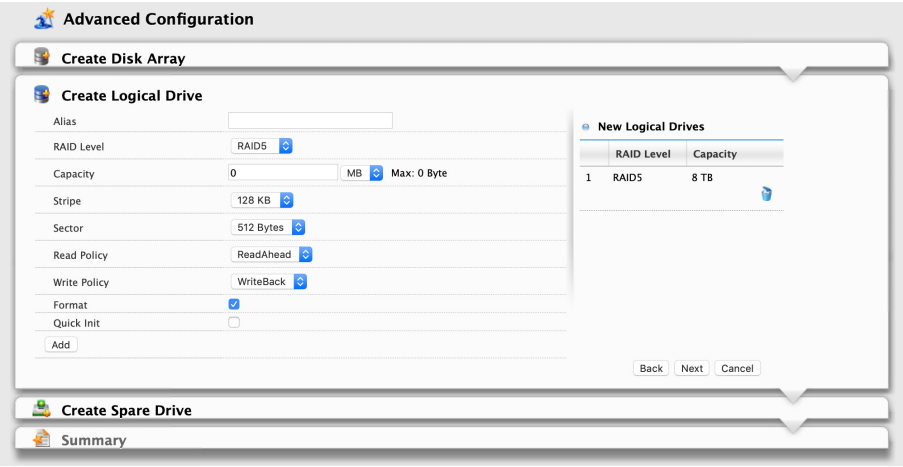
Task 2 – Logical Drive Creation

To create your logical drive:

1. Enter your information and choose your options.
   - Enter a logical drive alias in the field provided
   - Choose a RAID level from the dropdown menu.
     Note the Max: capacity value. Then enter a capacity value the field provided and choose a unit of measure from the dropdown menu.
   - Enter a value for Capacity and choose the unit for the value (MB, GB, TB)
   - Choose a Stripe size.
     64 KB, 128 KB, 256 KB, 512 KB, and 1 MB are available.
   - Choose a Sector size.
     512 B, 1 KB, 2 KB, and 4 KB are available.
   - Choose a Read (cache) Policy.
     The choices are Read Cache, Read Ahead (cache), and None.
   - Choose a Write (cache) Policy.
     The choices are WriteThru (write through) and WriteBack. Write back requires a Read Cache or Read Ahead Read Cache Policy.
   - If you want the Pegasus Utility to format your logical drives, leave the Format box checked. For additional format options, see “Formatting Your Logical Drives” on page 100.
2. Click the Add button.
   The new logical drive appears on the list at the right.
   If there is capacity remaining, you can create an additional logical drive.
3. Click the Next button to continue.
   The Create Spare Drive screen displays.

Task 3 – Spare Drive Creation

Advanced Configuration - Create Logical Drive



To create your spare drive:

1. For each of the following items, accept the default or change the settings as required:

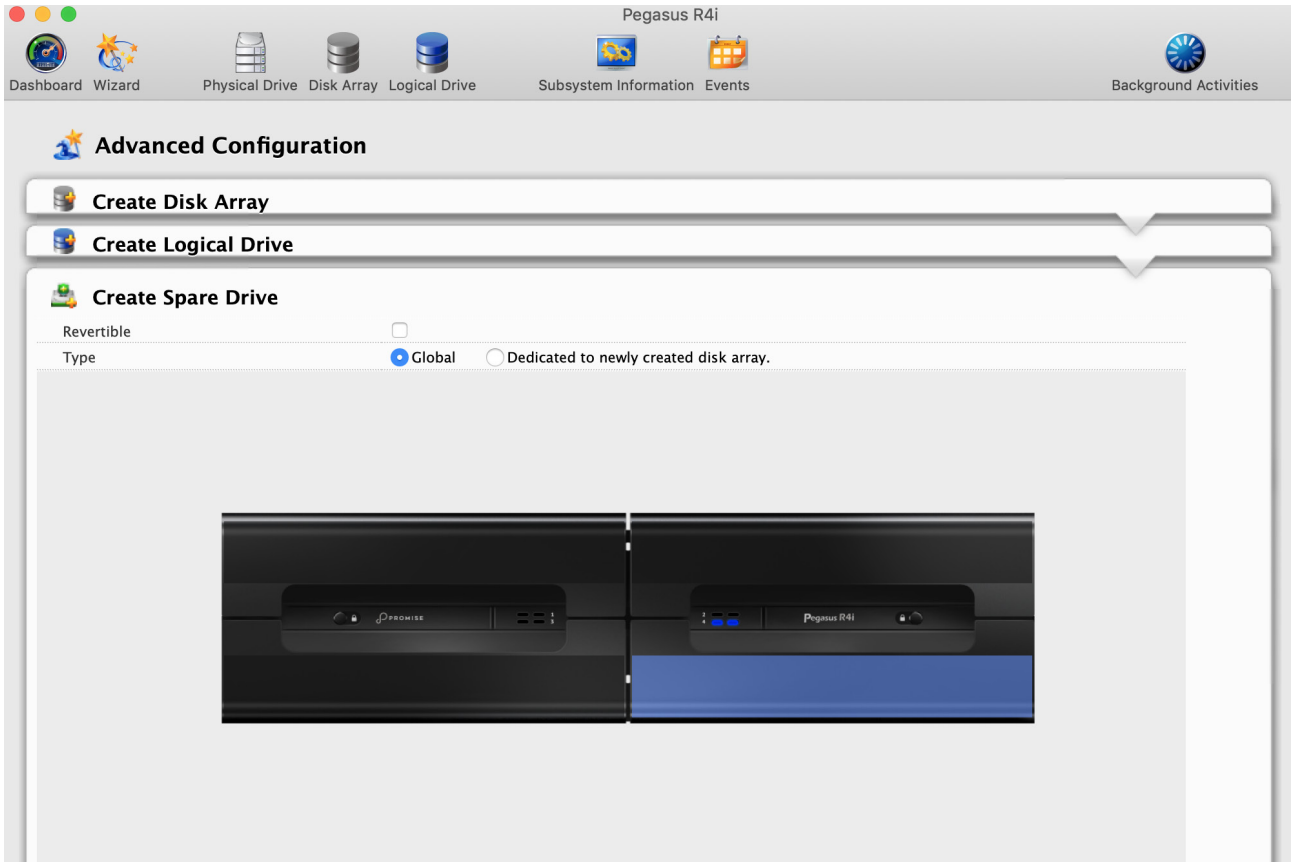
   - Check the Revertible box if you want a revertible spare drive.
     A revertible spare drive returns to its spare drive assignment after you replace the failed physical drive in the disk array and run the Transition function.
   - **Global** – Can be used by any disk array
   - **Dedicated** to newly created disk array – The disk array you are now creating.

2. In the Select Physical Drives diagram, click a drive to choose it for your spare.
   The drive module turns blue when you click it. The physical drive's ID number appears in the field below the diagram.

3. Click the Next button to continue.
   The Summary screen displays.

Task 4 – Summary

Advanced Configuration - Create Spare Drive

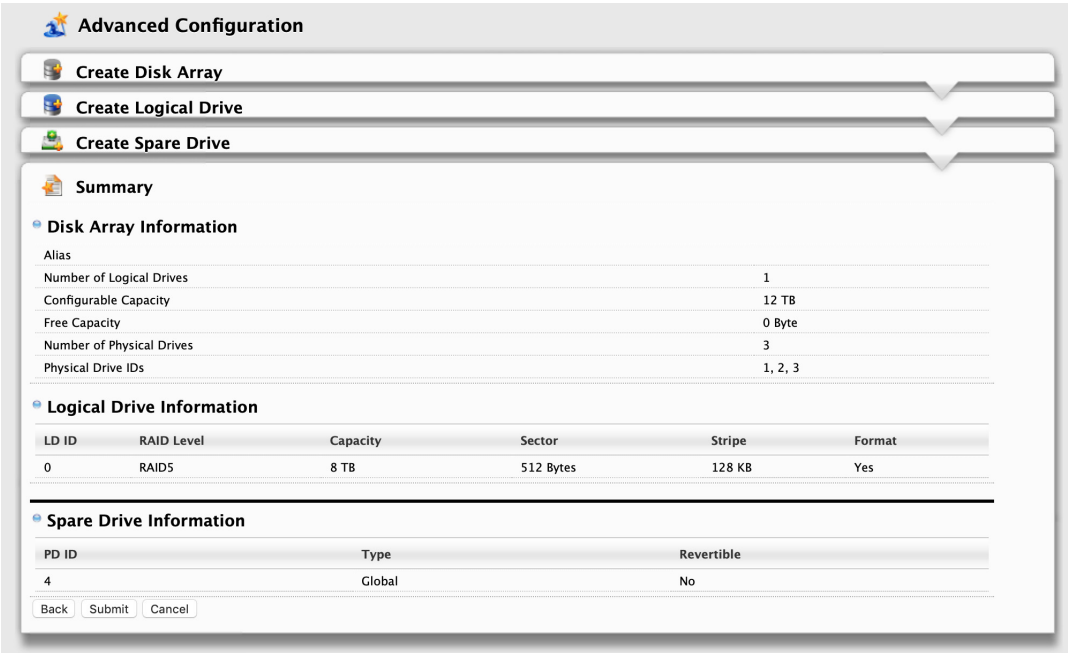


1. Review your choices of disk array, logical drives, and spare drive.

   - To make a change, click the **Back** button to reach the appropriate screen.
   - To accept, click the Submit button.
     The disk array, logical drive, and spare drive take a few moments to create.

2. Click the **Finish** button to close the Wizard.

Advanced Configuration - Configuration Summary



Formatting your Logical Drives

If you left the **Format** box checked under *Task 2 – Logical Drive Creation*, your logical drives are formatted automatically.

If you UNchecked the **Format** box, you must format your logical drives manually.

When the Pegasus Utility has finished the partition and format operation, new removable-drive icons, each representing one logical drive, appear on your desktop (right).

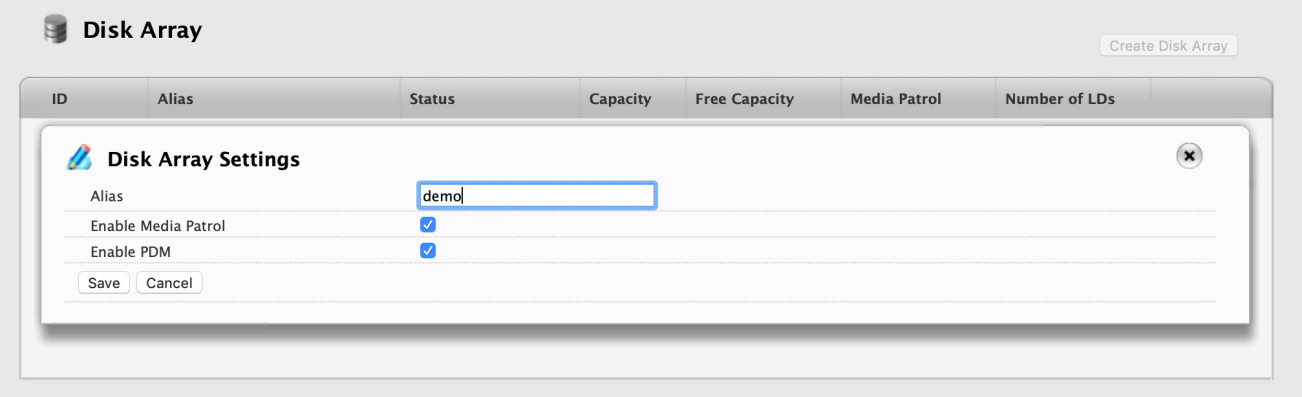
When you see the icon, your logical drive is ready to use.

Making Disk Array Settings

To make disk array settings:

1. Do one of the following actions:
   - From the Dashboard window, click the **Disk Array** link.
   - From the Storage menu, choose **Disk Array**.
2. Mouse-over the disk array you want then click the **Settings** button.
3. Make setting changes as required:
   - Enter, change or delete the alias in the Alias field
     Maximum of 32 characters; letters, numbers, space between characters, and underscore.
   - **Enable Media Patrol** – Check to enable, uncheck to disable on this array.
   - **Enable PDM** – Check to enable, uncheck to disable on this array.
4. Click the **Save** button.

Create a Disk Array



Deleting a Disk Array

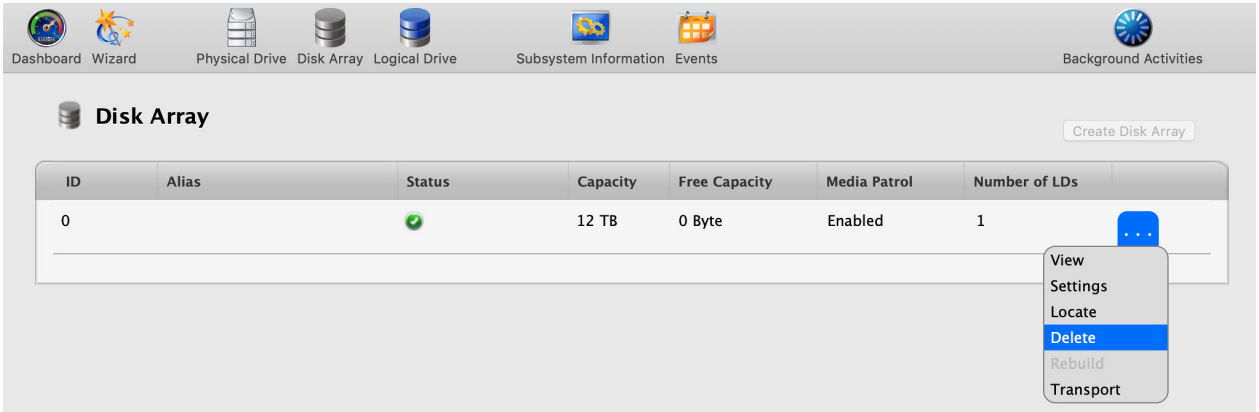
CAUTION

When you delete a disk array, you also delete any logical drives that belong to it, along with the data on those logical drives. Back up any important data before deleting a disk array.

To delete a disk array:

1. Do one of the following actions:
   - From the Dashboard window, click the **Disk Array** link.
   - From the Storage menu, choose **Disk Array**.
2. Mouse-over the disk array you want then click the **Delete** button.
3. In the Confirmation box, type the word “confirm” in the field provided and click the **Confirm** button.

Delete a Disk Array



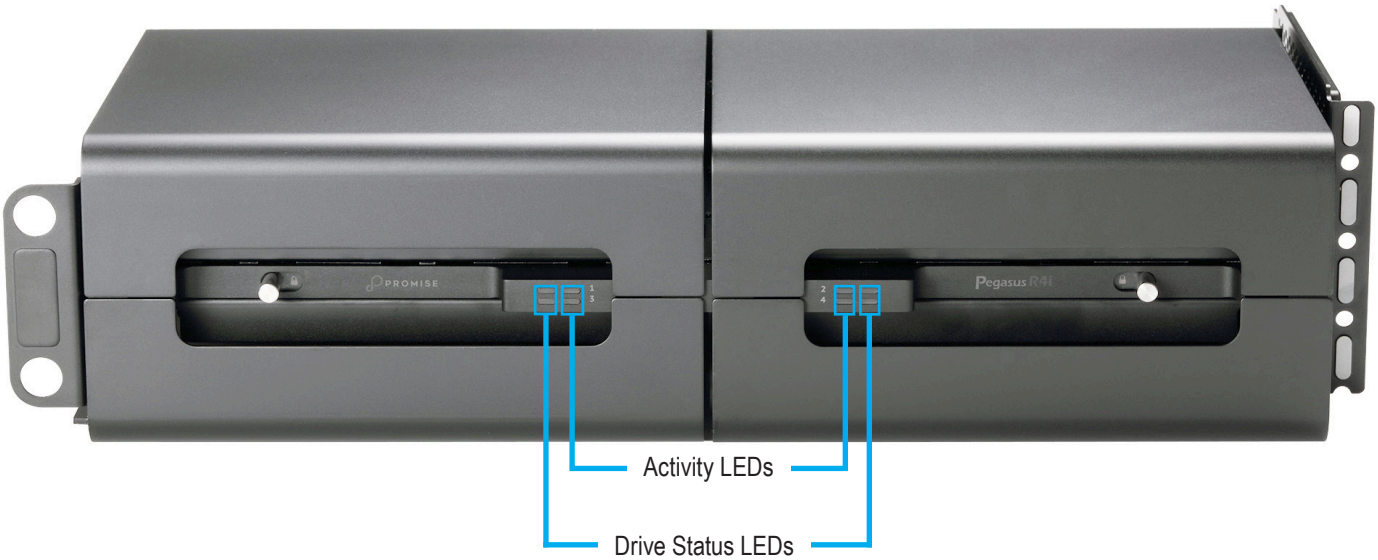
Locating a Disk Array

This feature causes the drive module LEDs to flash for one minute to assist you in locating the physical drives that make up this disk array.

To locate a disk array:

1. Do one of the following actions:
   - From the Dashboard window, click the **Disk Array** link.
   - From the Storage menu, choose **Disk Array**.
2. Mouse-over the disk array you want then click the Locate button.
   The Drive Power / Status LED for the physical drives that make up the disk array blink blue and orange for one minute.

Running the Locate function to identify a disk array



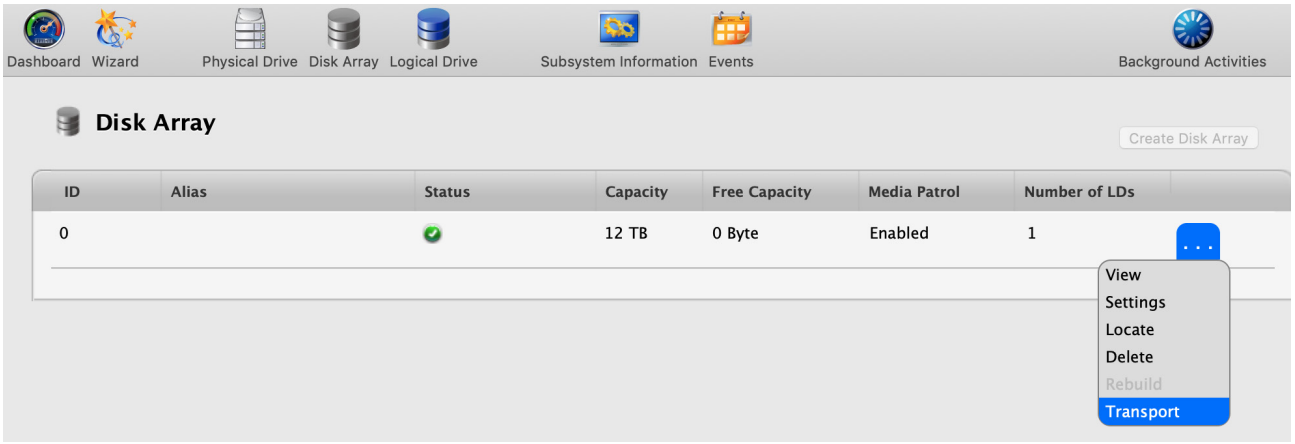
Preparing a Disk Array for Transport

This feature prepares the physical drives that make up the disk array to be removed from the enclosure and installed in a different location.

To prepare a disk array for transport:

1. Do one of the following actions:
   - From the Dashboard window, click the **Disk Array** link.
   - From the Storage menu, choose **Disk Array**.
2. Mouse-over the disk array you want then click the **Transport** button.
3. In the Confirmation box, type the word “confirm” in the field provided and click the **Confirm** button.
   The disk array status changes to Transport Ready.
4. Remove the physical drives and install them in their new location.
   See “Transport” on page 141 for more information.

Transporting a disk array



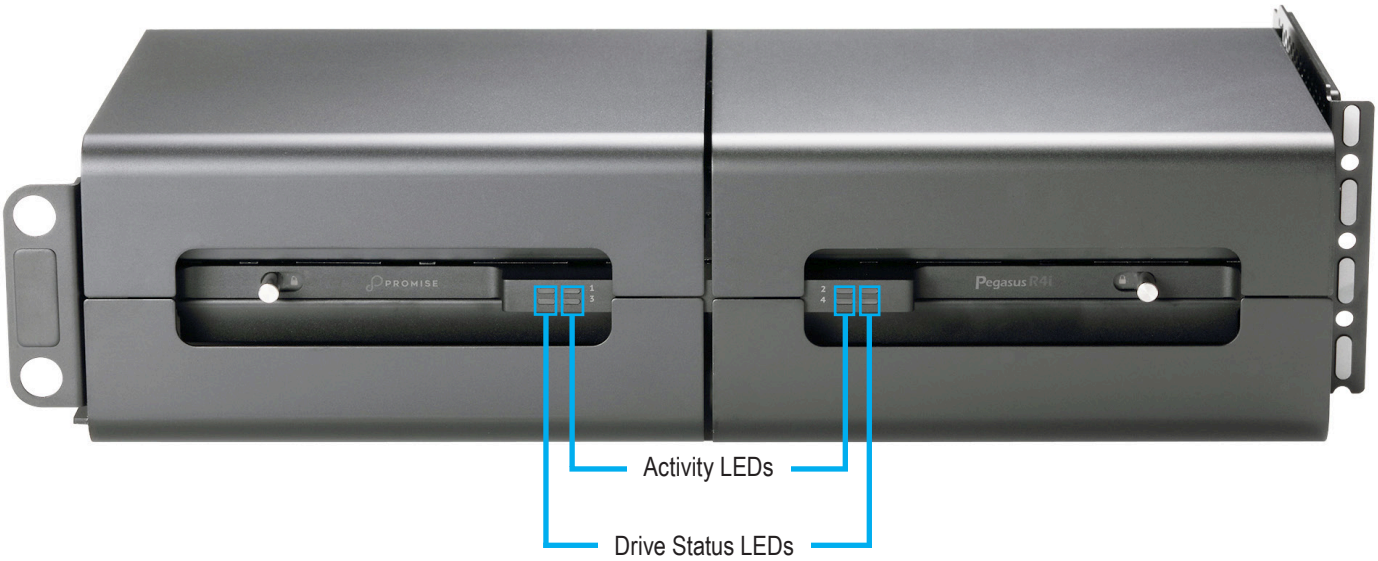
Rebuilding a Disk Array

When you rebuild a disk array, you are actually rebuilding the data on one of its physical drives.

If there is no spare drive of adequate capacity, you must replace the failed drive with an unconfigured physical drive, then perform a *Manual Rebuild*.

On the module with the failed drive, the Drive Status LED is red and the Drive Activity LED is dark. That is the physical drive you must replace.

Drive module LEDs

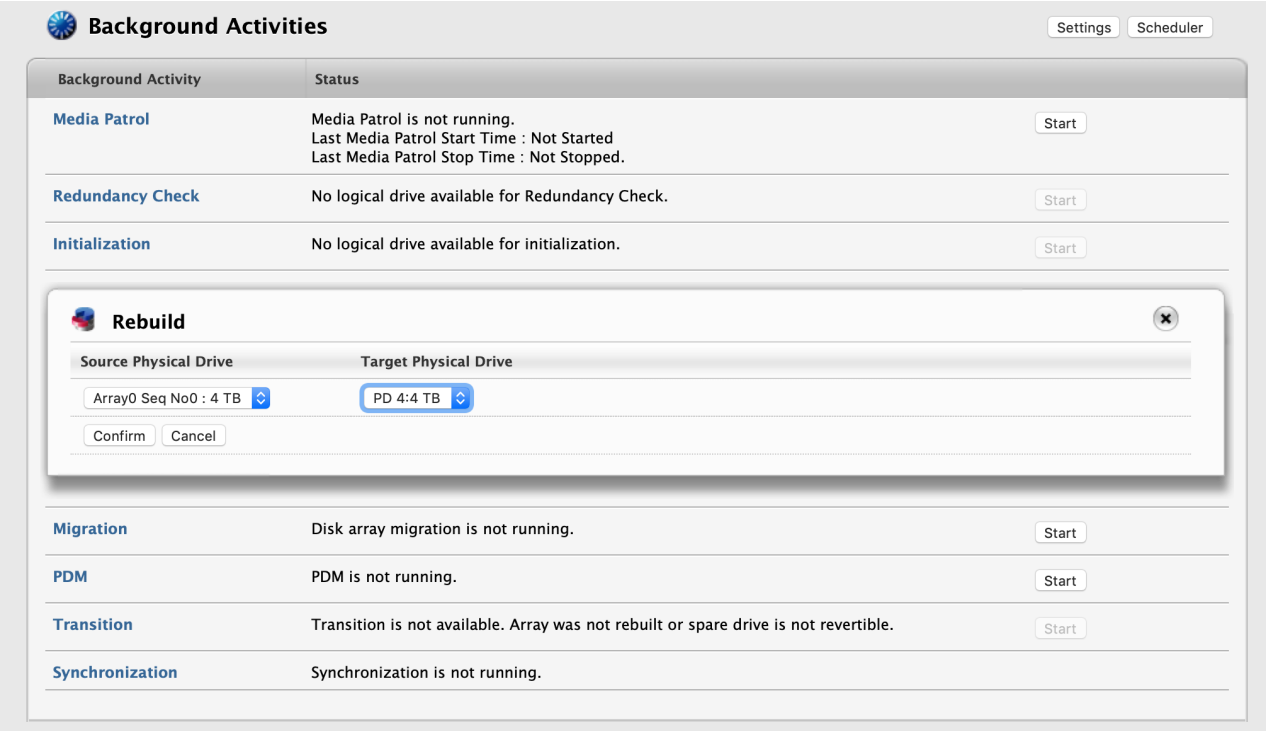


Performing a Manual Rebuild

To perform a manual rebuild:

1. Click on the **Background Activities** icon.
2. Mouse-over Rebuild and click the **Start** button.
3. From the **Source Physical Drive** dropdown menu, choose a **Source** disk array and physical drive.
   Arrays have an ID No. Physical drives have a Seq. No.(sequence number)
4. From the **Target Physical Drive** dropdown menu, choose a **Target** physical drive.
5. In the Confirmation box, type the word “confirm” in the field provided and click the **Confirm** button.
   When the disk array is rebuilding:
   - The disk array shows a green check icon and **Rebuilding** status.
   - Logical drives under the disk array continue to show a yellow icon and **Critical, Rebuilding** status.
   - If the buzzer is enabled, the Pegasus emits two quick beeps every five seconds. When the beeps stop, the rebuild is done.

Rebuilding a disk array

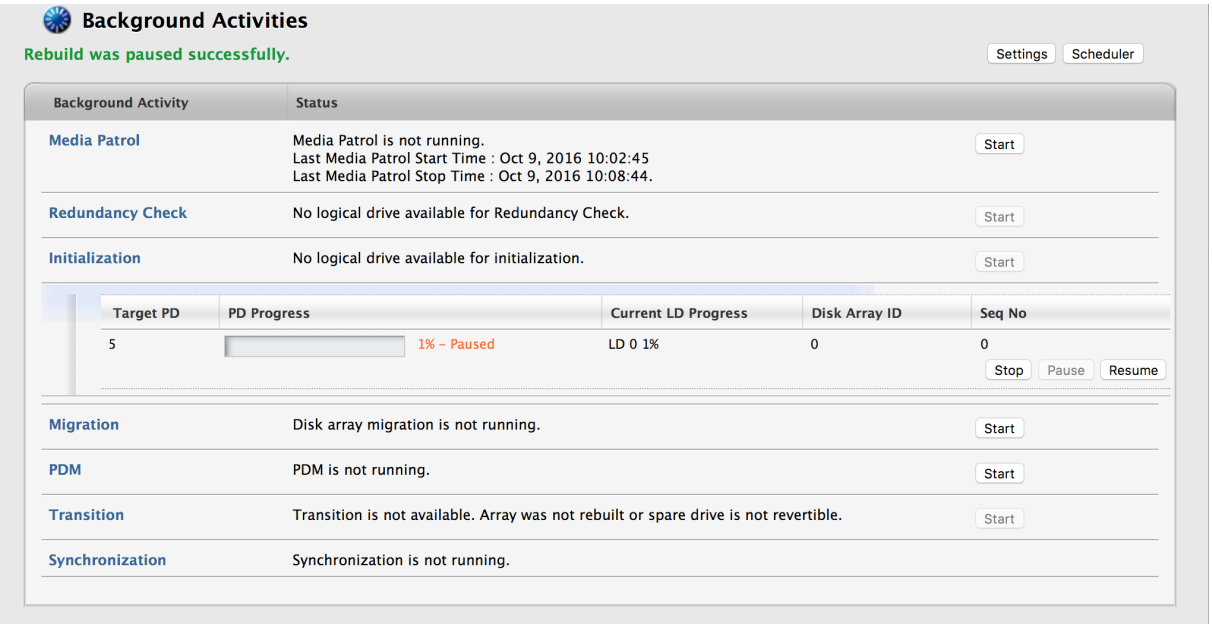


Pausing and Resuming a Rebuild

To pause or resume a Rebuild:

1. Click on the **Background Activities icon.**
2. Mouse-over Rebuild and click the **Pause** or **Resume** button.

Pausing a disk array rebuild

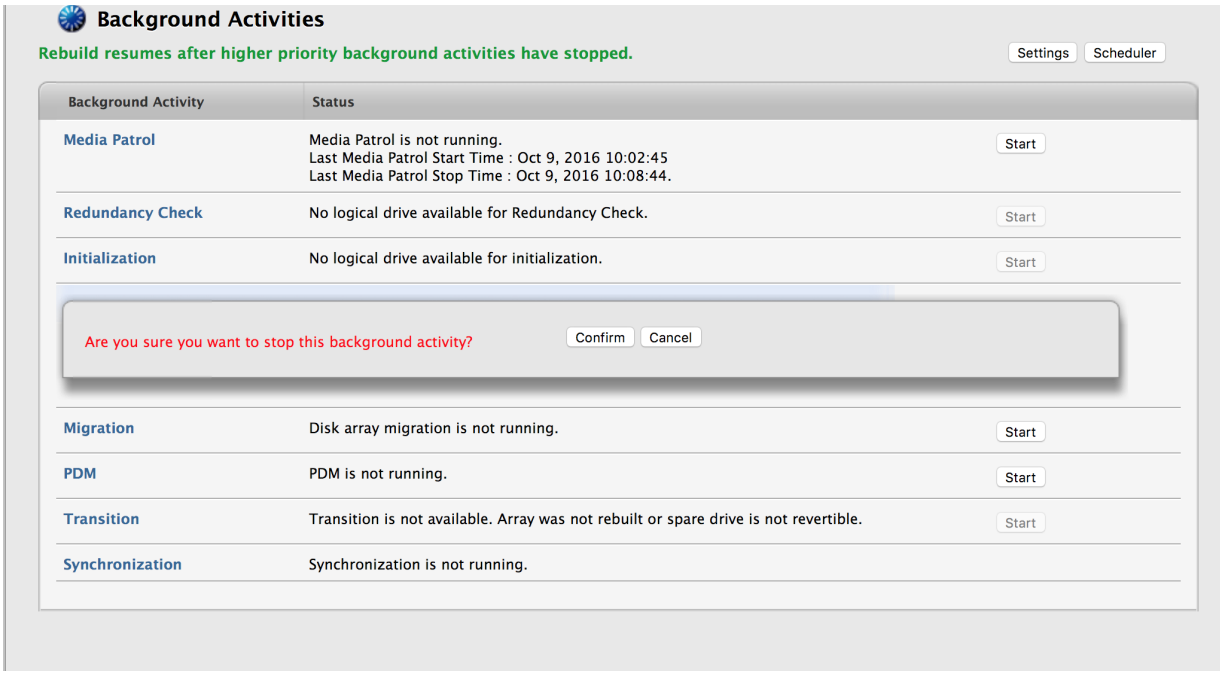


Stopping a Rebuild

To stop or cancel a Rebuild:

1. Click on the **Background Activities** icon.
2. Mouse-over Rebuild and click the **Stop** button.
3. Click the **Confirm** button.
   Also see “Making Rebuild Settings” on page 55.

Stopping a disk array rebuild



Managing Logical Drives

Logical drive management includes:

- “Viewing a List of Logical Drives”
- “Viewing Logical Drive Information”
- “Viewing Logical Drive Statistics”
- “Making Logical Drive Settings”
- “Viewing Logical Drive Check Tables”
- “Creating a Logical Drive Manually”
- “Formatting Your Logical Drives”
- “Initializing a Logical Drive”
- “Redundancy Check on a Logical Drive”
- “Migrating a Logical Drive”
- “Running PDM on a Logical Drive”

Viewing a List of Logical Drives

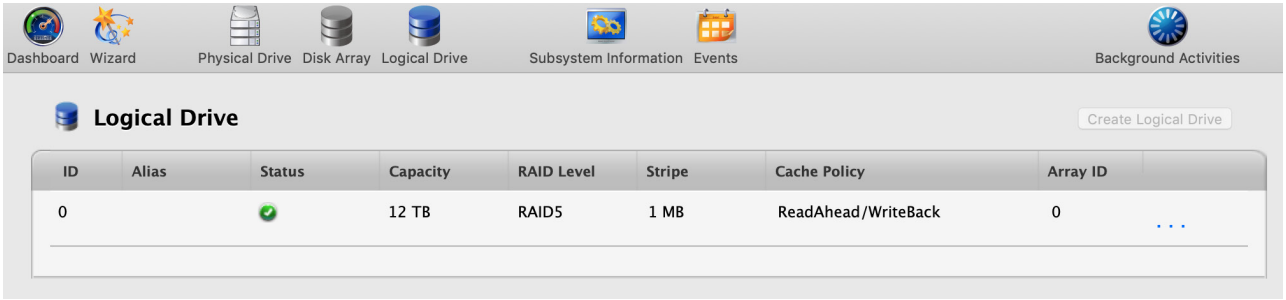
To view a list of logical drives, do one of the following actions:

- Click the **Logical Drive** icon.
- From the Storage menu, choose **Logical Drive**.

The list of logical drives appears. Logical drive information includes:

- **ID** – LD0, LD1, etc.
- **Alias** – If assigned.
- **Status** (Normal, Critical or Offline icon)
- **Capacity** – Data capacity of the logical drive.
- **RAID Level** – Set when the logical drive was created.
- **Stripe** – Set when the logical drive was created.
- **Cache Policy** – Read cache and Write cache settings.
- **Array ID** – ID number of the disk array where this logical drive was created.

Logical Drive list

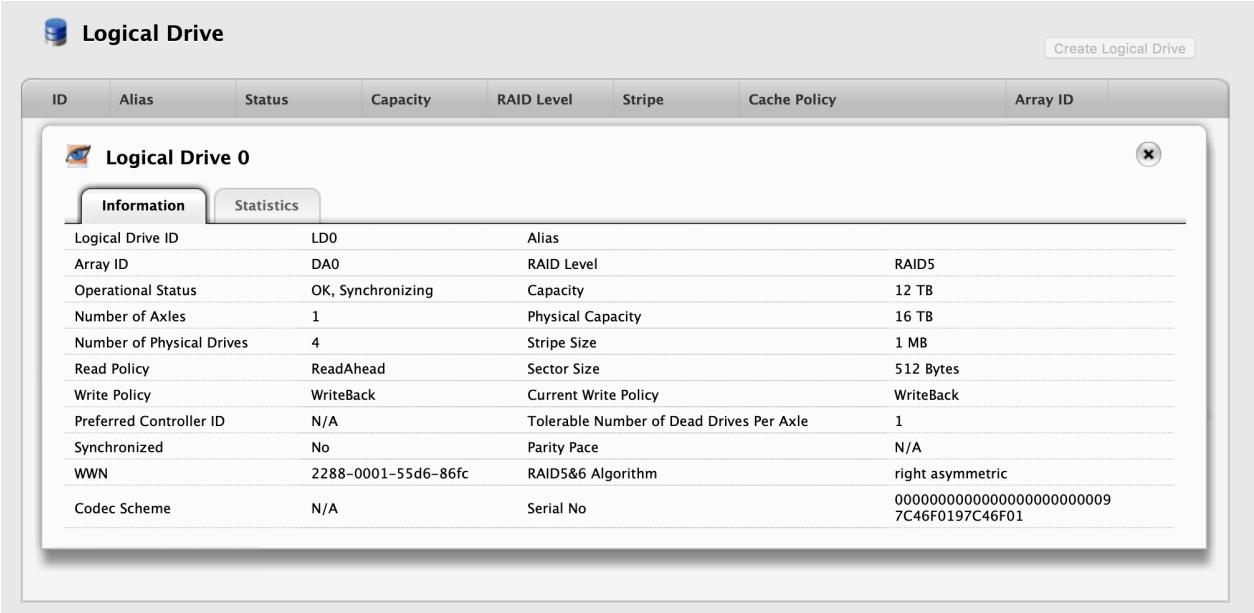


Viewing Logical Drive Information

To view logical drive information:

1. Do one of the following actions:
   - Click the **Logical Drive** icon.
   - From the Storage menu, choose **Logical Drive**. The list of logical drives appears.
2. Mouse-over the logical drive you want then click the **View** button.
3. Click the **X** icon to close the information panel.

Logical Drive Information



Logical Drive information displays, including:

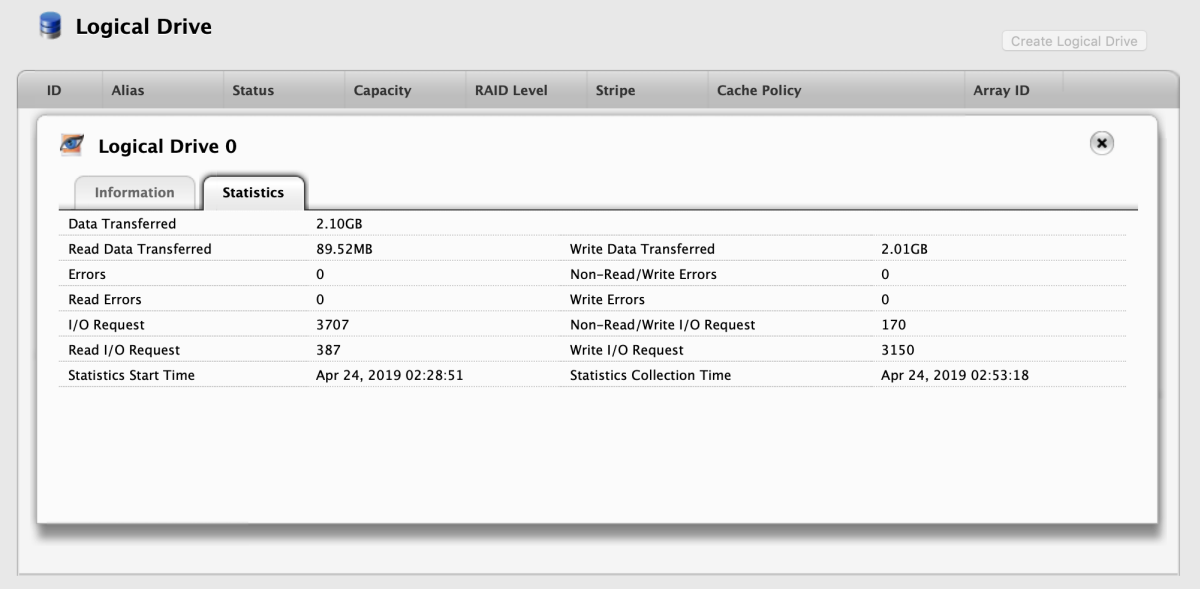
- **Logical Drive ID** – LD0, LD1, etc.
- **Alias** – If assigned
- **Array ID** – ID number of the disk array where this logical drive was created
- **RAID Level** – Set when the logical drive was created
- **Operational Status** – OK, Critical, or Offline
- **Capacity** – Data capacity of the logical drive
- **Number of Axles** – For RAID 10, 2 axles
- **Physical Capacity** – Data capacity of the physical drives
- **Number of Physical Drives** – The number of physical drives in the disk array
- **Stripe size** – Set at logical drive creation
- **Read Policy** – ReadCache, ReadAhead, or None *
- **Sector size** – Set at logical drive creation
- **Write Policy** – WriteThru or WriteBack *
- **Current Write Policy** – May change from WriteBack to WriteThru under certain conditions.
- **Preferred Controller ID** – Not applicable
- **Tolerable Number of Dead Drives Per Axle** – Number of physical drives that can fail without the logical drive going offline
- **Synchronized** – A new logical drive shows **"**No**"** until synchronizing is completed. See "Synchronization" on page 59
- **Parity Pace** – Pertains to some RAID levels
- •**WWN** – Worldwide Number, a unique identifier assigned to this logical drive
- •**RAID 5 & 6 Algorithm** – Pertains to RAID 5 and 6
- •**Codec Scheme** – Pertains to some RAID levels
- •**Serial No** – Serial number assigned to this logical drive

Viewing Logical Drive Statistics

To view logical drive statistics:

1. Do one of the following actions:
   - Click the **Logical Drive** icon.
   - From the Storage menu, choose **Logical Drive**. The list of logical drives appears.
2. Mouse-over the logical drive you want then click the **View** button.
3. Click the **Statistics** tab.

Logical Drive Statistics



4. Logical Drive statistics display, including:
   - Data Transferred – In megabytes
   - Read Data Transferred – In megabytes
   - Write Data Transferred – In megabytes
   - Errors
   - Non-Read/Write Errors
   - Read Errors
   - Write Errors
   - I/O Requests
   - Non-Read/Write I/O Requests
   - Read I/O Requests
   - Write I/O Requests
   - Statistics Start Time
   - Statistics Collection Time
5. Click the **X** icon to close the statistics panel.

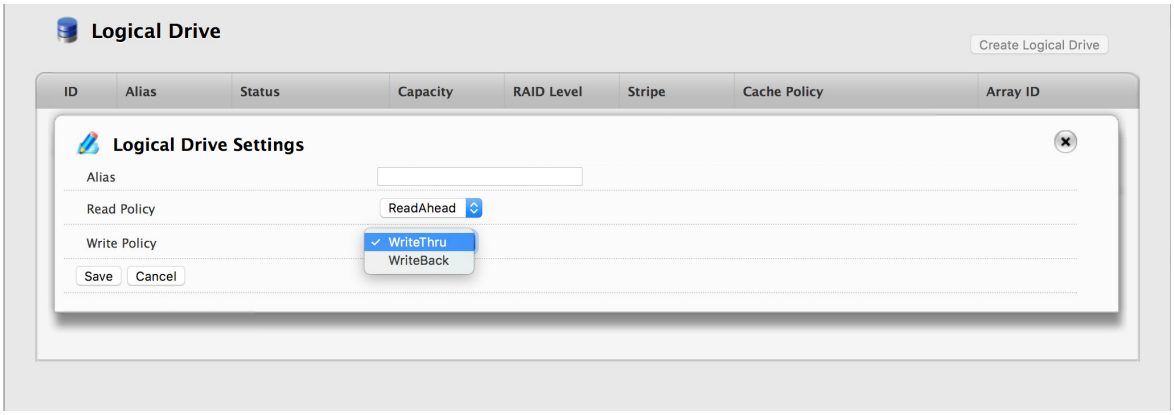
To clear the check tables, see “Clearing Statistics” on page 29.

Making Logical Drive Settings

To make logical drive settings:

1. Do one of the following actions:
   - Click the **Logical Drive** icon.
   - From the Storage menu, choose **Logical Drive**. The list of logical drives appears.
2. Mouse-over the logical drive you want then click the **Settings** button.
3. Make setting changes as required:
   - Enter, change, or delete the alias in the Alias field.
     Maximum of 32 characters; letters, numbers, space between characters, and underscore.
   - Choose a Read (cache) Policy.
     Read Cache, Read Ahead, and No Cache are available.
   - Choose a Write (cache) Policy.
     Write Back and Write Through (Thru) are available.
4. Click the **Save** button.

Logical Drive Settings



Viewing Logical Drive Check Tables

This feature enables you to view error tables. Use this information to evaluate the integrity of the logical drive and to determine whether corrective action is needed.

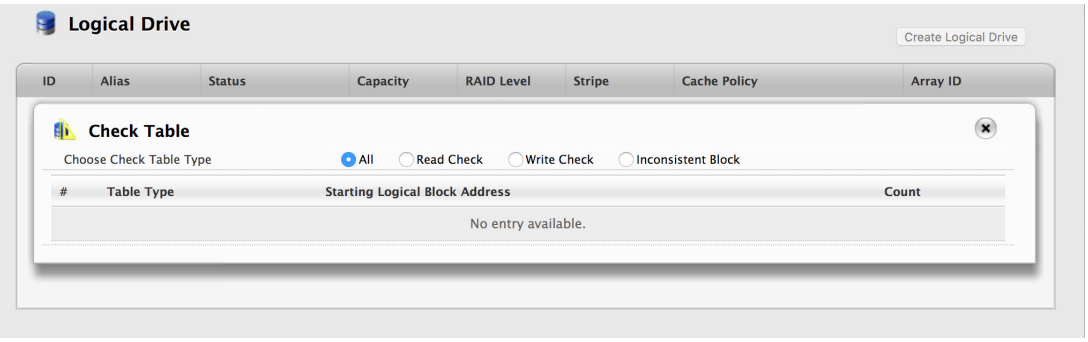
To view logical drive check tables:

1. Do one of the following actions:
   - Click the **Logical Drive** icon.
   - From the Storage menu, choose **Logical Drive**. The list of logical drives appears.
2. Mouse-over the logical drive you want then click the **Check Table** button.
3. Choose an option:
   - **All** – All errors. The default choice.
   - **Read Check** – Read errors for this logical drive.
   - **Write Check** – Write errors for this logical drive.
   - **Inconsistent Block** – Inconsistent blocks for this logical drive. Mirror data for RAID levels 1, 1E and 10 or Parity data for RAID levels 5 and 6. Identified by the Redundancy Check.

   The Check Table lists:
   - **Table Type** – Read Check, Write Check or Inconsistent Block.
   - **Start Logical Block Address** – LBA of the first block for this entry.
   - **Count** – Number of errors or continuous blocks starting from this LBA.
4. Click the **X** icon to close the information panel.

To clear the check tables, see “Clearing Statistics” on page 29.

Logical Drive Check Table

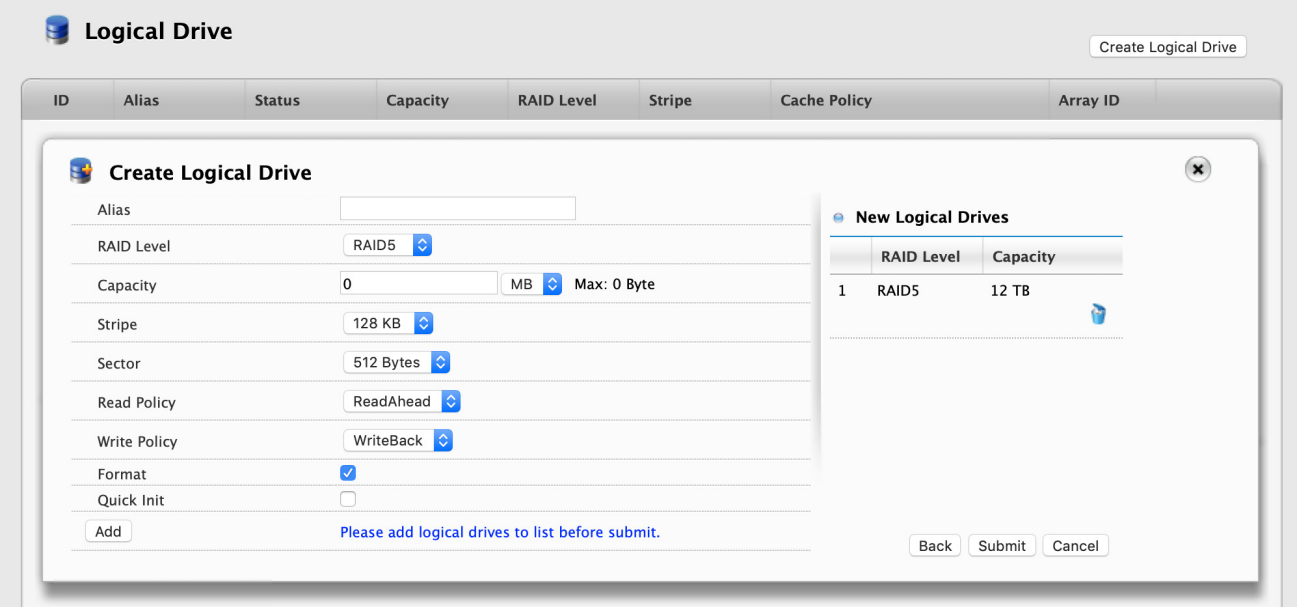


Creating a Logical Drive Manually

This feature creates a logical drive only. You can also use the Wizard to create a disk array with logical drives and spare drives at the same time. See “Creating a Disk Array and Logical Drive with the Wizard” on page 78.To create a logical drive manually:

1. Do one of the following actions:
   - Click the **Logical Drive** icon.
   - From the Storage menu, choose **Logical Drive**.
2. Click the **Create Logical Drive** button.
3. Click the radio button of the disk array you want to use and click the **Next** button.

Create a Logical Drive



4. Accept the defaults or make changes:

    - Optional. Enter an alias in the **Alias** field.
      Maximum of 32 characters; letters, numbers, space between characters, and underscore.

    - Choose a **RAID level**.
      The choice of RAID levels depends the number of physical drives in the disk array.

    - In the Capacity field, accept the default maximum capacity or enter a lesser capacity and size in MB, GB or TB.
      Any remaining capacity is available for an additional logical drive.

    - Choose a Stripe size.
      64 KB, 128 KB, 256 KB, 512 KB, and 1 MB are available.

    - Choose a Sector size.
      512 B, 1 KB, 2 KB, and 4 KB are available.

    - Choose a Read (cache) Policy.
      Read Cache, Read Ahead, and No Cache are available.

    - Choose a Write (cache) Policy.
      Write Back and Write Through (Thru) are available.
      The Write Cache is always set to WriteThru when the Read Cache is set to NoCache.

    - For RAID 6 logical drives, choose a Codec Scheme from the dropdown menu.
      P+Q and Q+Q are available.

    - If you want the Pegasus Utility to format your logical drives, leave the **Format** box checked.
      See “Formatting Your Logical Drives” on page 100.

5. Click the **Add** button.
   The new logical drive appears on the list at the right.
   If there is capacity remaining, you can create an additional logical drive. Pegasus supports up to 32 logical drives.

6. When you are finished, click the **Submit** button.
   The new logical drive or drives appear in the logical drive list.

Formatting Your Logical Drives

If you left the **Format** box checked when you created your logical drives, they are formatted automatically.

If you UNchecked the **Format** box, you must format your logical drives manually.
See “Formatting Your Logical Drives” on page 100.

When the Pegasus Utility has finished the format operation, new removable-drive icons, each representing one logical drive, appear on your desktop.
When you see the icon, your logical drive is ready to use. Your logical drives are ready to use.

Locating a Logical Drive

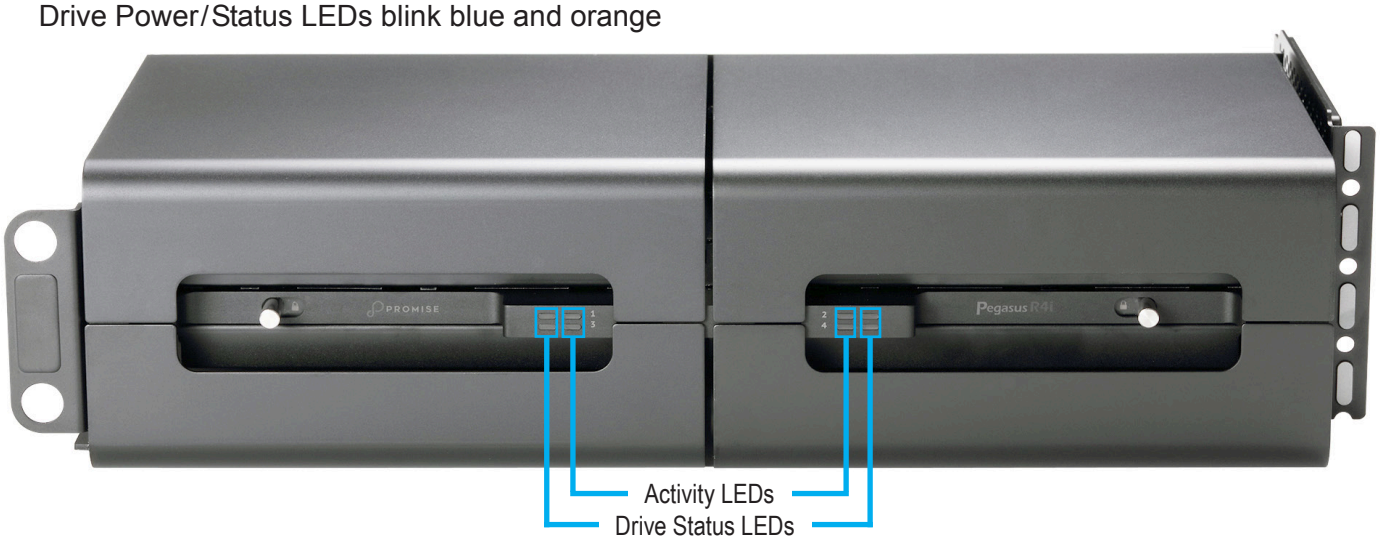
This feature causes the drive module LEDs to flash for one minute to assist you in locating the physical drives that make up this logical drive.

To locate a logical drive:

1. Click the **Storage** tab.
2. Click the **Logical Drive** icon.
   The list of logical drives appears.
3. Mouse-over the logical drive you want then click the **Locate** button.
   The Drive Power/Status LEDs for the physical drives that make up the logical drive blink blue and orange for one minute.

Running the Locate function to identify a disk array

Drive Power/Status LEDs blink blue and orange



Deleting a Logical Drive

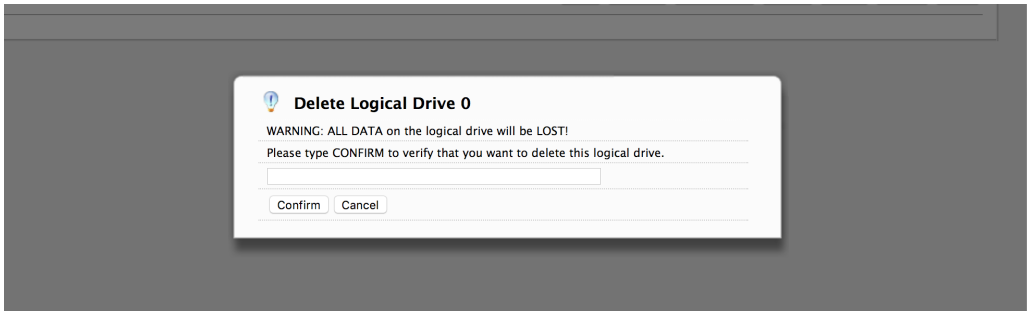
CAUTION

When you delete a logical drive, all the data on the logical drive is lost. Back up any important data before deleting a logical drive.

This action requires Administrator or Super User privileges. To delete a logical drive:

1. Do one of the following actions:
   - Click the **Logical Drive** icon.
   - From the Storage menu, choose **Logical Drive**. The list of logical drives appears.
2. Mouse-over the logical drive you want then click the **Delete** button.
3. In the Confirmation box, type the word “confirm” in the field provided and click the **Confirm** button.

Delete a Logical Drive



Initializing a Logical Drive

Initialization is normally done to logical drives after they are created from a disk array.

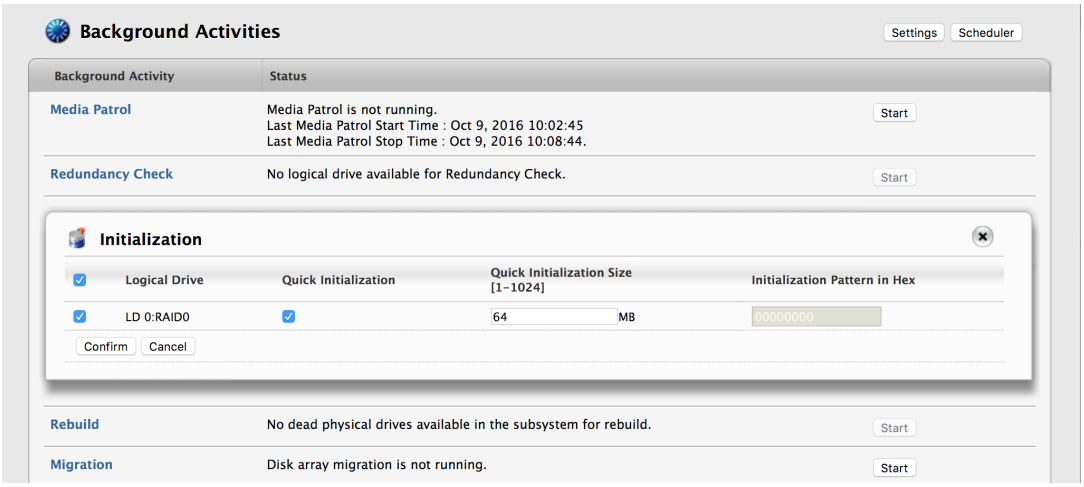
CAUTION

When you initialize a logical drive, all the data on the logical drive is lost. Backup any important data before you initialize a logical drive.

To initialize a logical drive:

1. Click on the **Background Activities** icon.
   The list of background activities appears.
2. Mouse-over Initialization and click the **Start** button.
3. Check the box to the left of the logical drive you want to initialize.
4. Choose the initialization option you want:
   - **Quick Initialization** – Check the box and enter a value in the Quick Initialization Size field. This value is the size of the initialization blocks in MB.
   - **Full Initialization** – Do not check the box. Enter a hexadecimal value in the Initialization Pattern in Hex field or use the default 00000000 value.
5. Click the **Confirm** button.
6. In the Confirmation box, type the word “confirm” in the field provided and click the **Confirm** button.

Logical Drive Initialization



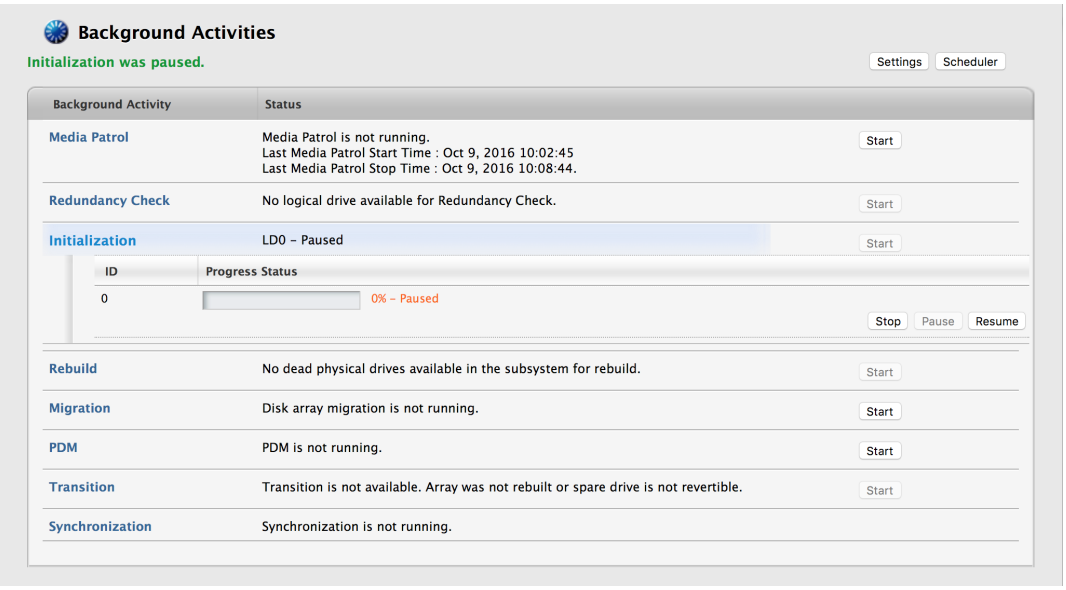
Pausing and Resuming an Initialization

To pause or resume Initialization:

1. Click on the **Background Activities icon.**
   The list of background activities appears.

2. Mouse-over Initialization and click the **Pause** or **Resume** button.

Pause/Resume Initialization



Stopping an Initialization

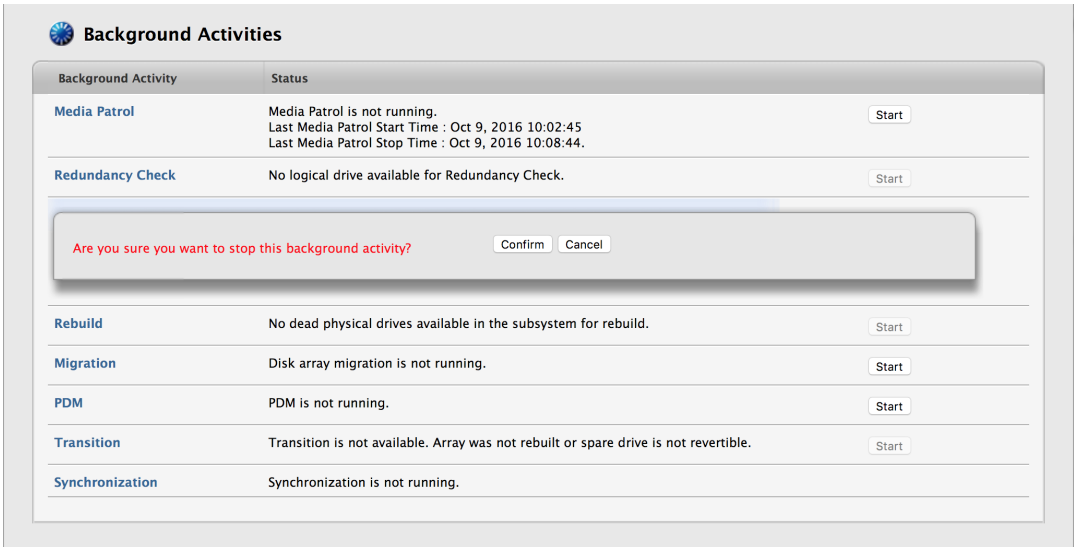
To stop means to cancel an Initialization:

1. Click on the **Background Activities icon.**
   The list of background activities appears.

2. Mouse-over Initialization and click the **Stop** button.

3. In the Confirmation box, type the word “confirm” in the field provided and click the **Confirm** button.

Stop Initialization



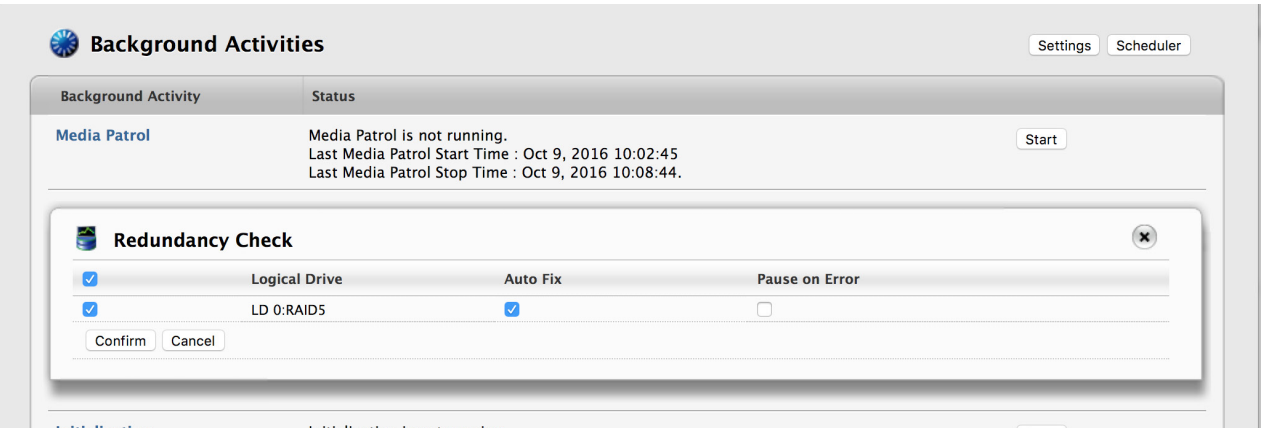
Redundancy Check on a Logical Drive

Redundancy Check is a routine maintenance procedure for fault-tolerant disk arrays (those with redundancy) that ensures all the data matches exactly. Redundancy Check can also correct inconsistencies.

To run Redundancy Check on a logical drive:

1. Click on the **Background Activities** icon.
   The list of background activities appears.
2. Mouse-over Redundancy Check and click the **Start** button.
3. Check the boxes to the left of the logical drives on which to run Redundancy Check.
4. Check the options you want:
   - **Auto Fix** – Attempts to repair the problem when it finds an error
   - **Pause on Error** – The process stops when it finds a non-repairable error
5. Click the **Confirm** button.

Redundancy Check



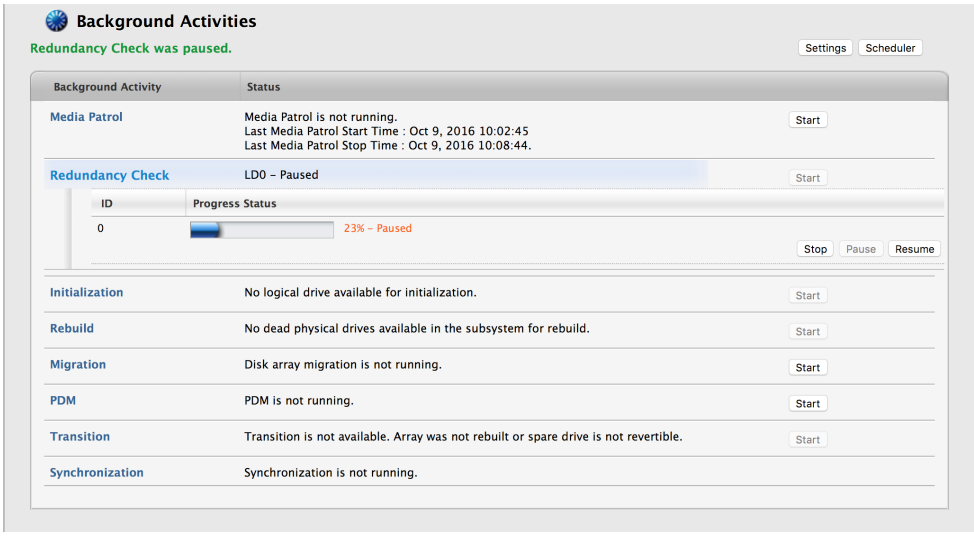
Pausing and Resuming a Redundancy Check

To pause or resume a Redundancy Check:

1. Click on the **Background Activities icon.**
   The list of background activities appears.

2. Mouse-over Redundancy Check and click the **Pause** or **Resume** button.

Pause/Resume Redundancy Check



Stopping a Redundancy Check

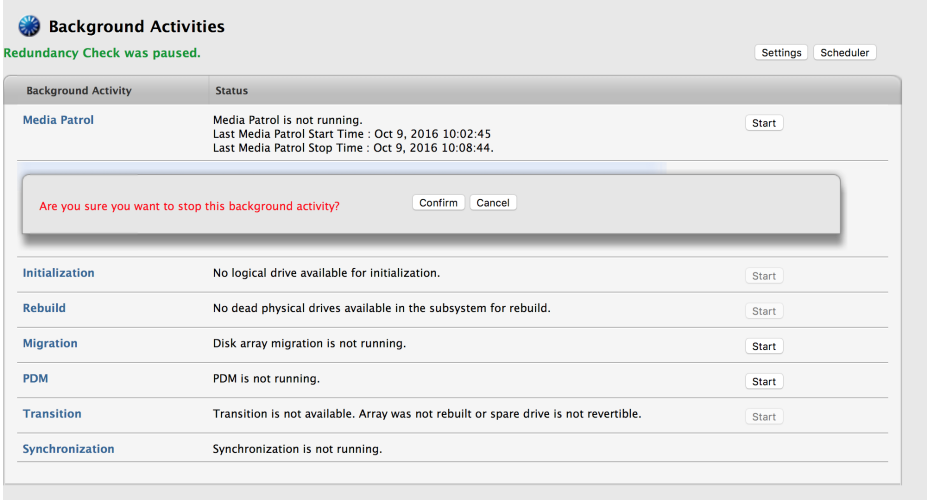
To stop is to cancel the Redundancy Check:

1. Click on the **Background Activities icon.**
   The list of background activities appears.

2. Mouse-over Redundancy Check and click the **Stop** button.

3. Click the **Confirm** button.

Stop Redundancy Check



Migrating a Logical Drive

The term “Migration” means either or both of the following:

- Change the RAID level of a logical drive.
- Expand the storage capacity of a logical drive.

Before you begin a migration, examine your current disk array to determine whether:

- The physical drives in your array can support the target RAID level.
- There is sufficient capacity to accommodate the target logical drive size.

If you need to add physical drives to your array, be sure there are unassigned physical drives are installed in your RAID system before you begin migration.

Migration

To migrate a logical drive:

1. Click on the **Background Activities** icon.
   The list of background activities appears.

2. Mouse-over Migrate and click the **Start** button.

3. In the **Select Disk Array** dropdown menu, choose the source disk array.

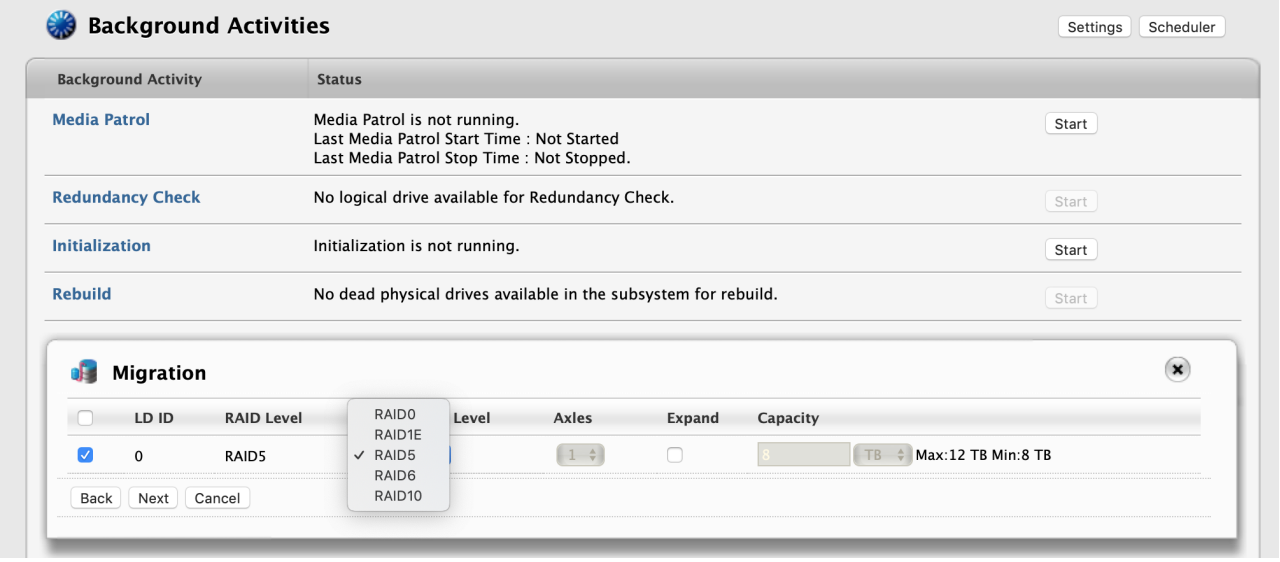
4. In the **Select Physical Drives** diagram, click the drives to add them to your array.
   The ID numbers of the chosen drives appear in the field below the diagram.

5. Click the **Next** button.

6. Check the box next to the logical drive you want to modify.

7. From the dropdown menu, choose a **target RAID level**.
   The choice of RAID levels depends the number of physical drives in the disk array. See the Note below.

Migration - choose RAID



8. In the **Capacity** field, accept the current capacity.
   Or check the **Expand Capacity** box and enter a greater capacity and size in MB, GB or TB.
   If there is capacity remaining, you can create an additional logical drive.

9. Click the **Next** button.
   The logical drive ID numbers, with the original and target RAID levels and capacities are shown

10. To accept the proposed target values, type “Confirm” and click the **Confirm** button.

Running PDM on a Logical Drive

Predictive Data Migration (PDM) is the migration of data from the suspect disk drive to a spare drive, similar to rebuilding a disk array. But unlike rebuilding, PDM automatically copies your data to a spare drive *before* the drive fails and your logical drive goes Critical.

PDM can be triggered automatically by Media Patrol. See “PDM” on page 57. To run PDM on a logical drive:

1. Click on the **Background Activities** icon.
   The list of background activities appears.

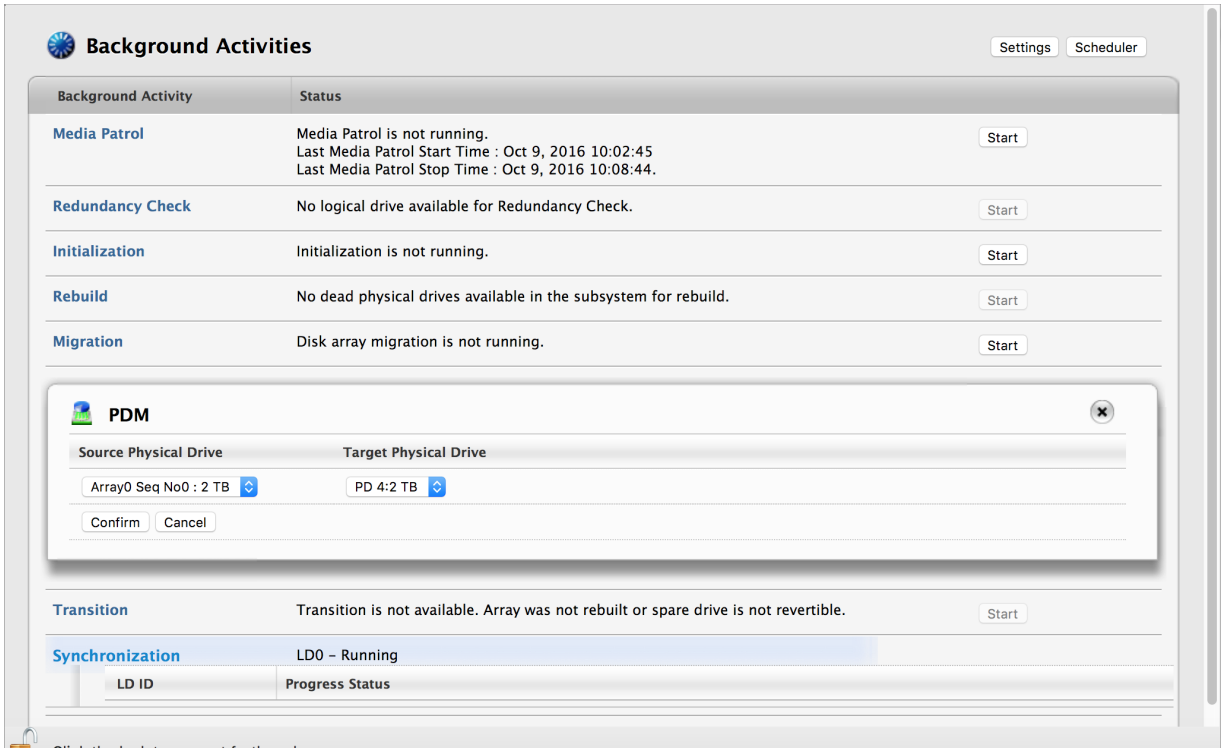
2. Mouse-over PDM and click the **Start** button.

3. Choose a Source Physical Drive.
   The Source Physical Drive is the drive suspected of possible failure. Source Physical Drives are identified by the disk array number and their sequence number in the disk array.

4. Choose a Target Physical Drive.
   The Target Physical Drive is the replacement drive.
   Target physical drives are identified by their physical drive ID number.

5. Click the **Confirm** button.

Run PDM



Pausing and Resuming PDM

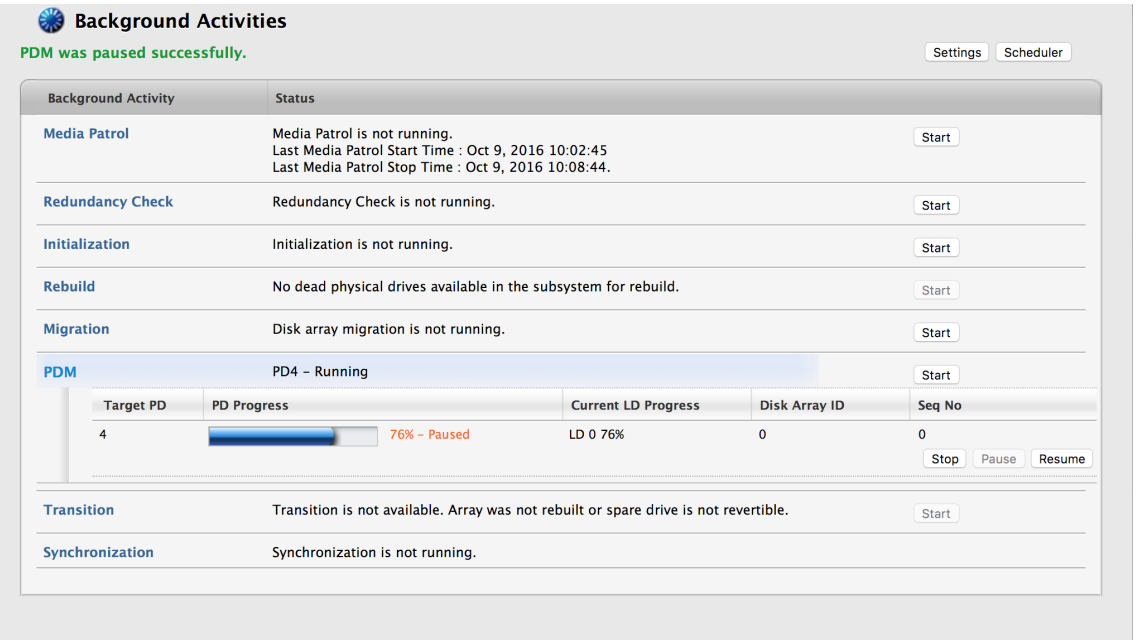
To pause or resume PDM:

1. Click on the **Background Activities icon.**

   The list of background activities appears.

2. Mouse-over PDM and click the **Pause** or **Resume** button.

Pause/Resume PDM



Stopping PDM

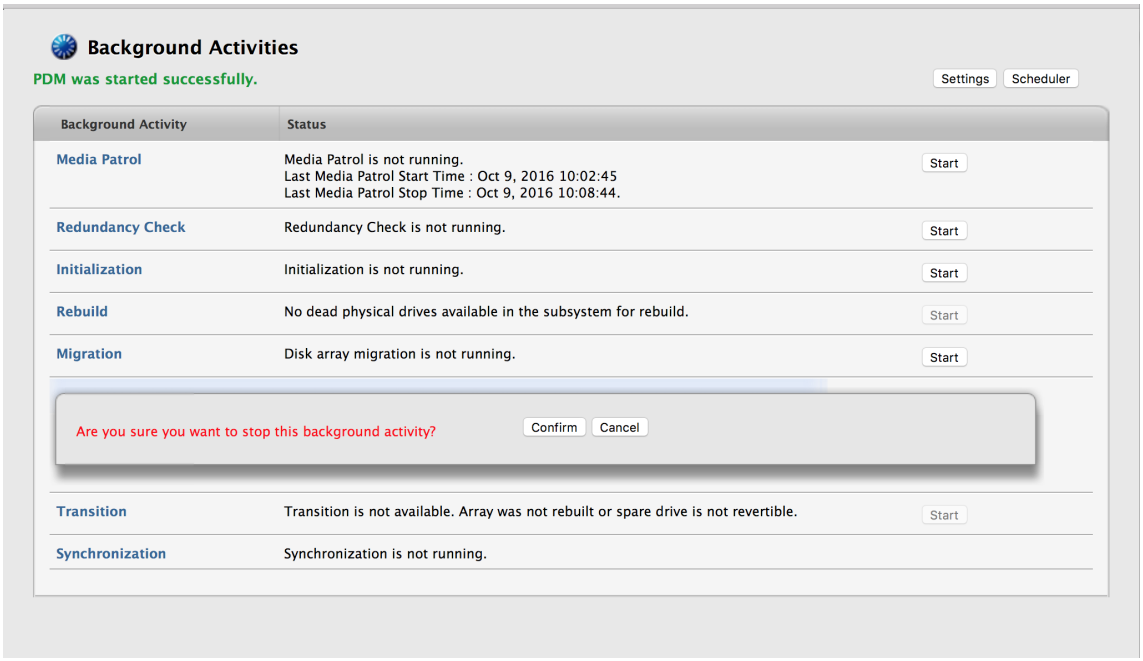
To stop is to cancel PDM:

1. Click on the **Background Activities icon.**
   The list of background activities appears.

2. Mouse-over PDM and click the **Stop** button.

3. Click the **Confirm** button.

Pause/Resume PDM



Managing Spare Drives

Spare drive management includes:

- “Viewing a List of Spare Drives”
- “Viewing Spare Drive Information”
- “Creating a Spare Drive Manually”
- “Making Spare Drive Settings”
- “Running Spare Check”
- “Deleting a Spare Drive”
- “Running a Transition”

Viewing a List of Spare Drives

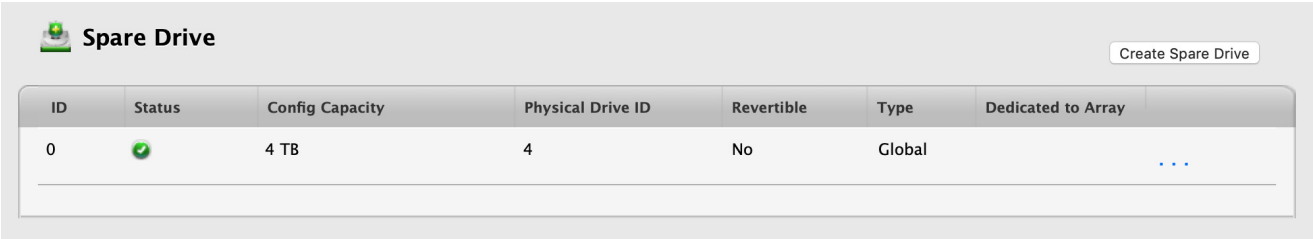
To view a list of spare drives, do one of the following actions:

- From the Dashboard window, click the **Spare Drive** link.
- From the Storage menu, choose **Spare Drive**.

Spare Drive information displays, including:

- **ID** – Spare0, Spare1, etc.
- **Status** (Normal, Rebuilding or Failed/missing icon)
- **Configurable Capacity** – Usable capacity of the spare drive
- **Physical Drive ID** – ID number of the physical drive chosen for this spare
- **Revertible** – Yes or No
- **Spare Type** – Global or Dedicated
- **Dedicated to Array** – ID number of the disk array to which the spare is dedicated

List of Spare Drives



Viewing Spare Drive Information

To view spare drive information:

1. Do one of the following actions:
   - From the Dashboard window, click the **Spare Drive** link.
   - From the Storage menu, choose **Spare Drive**. The list of spare drives appears.
2. Mouse-over the spare drive you want then click the **View** button.

   Spare Drive information displays, including:

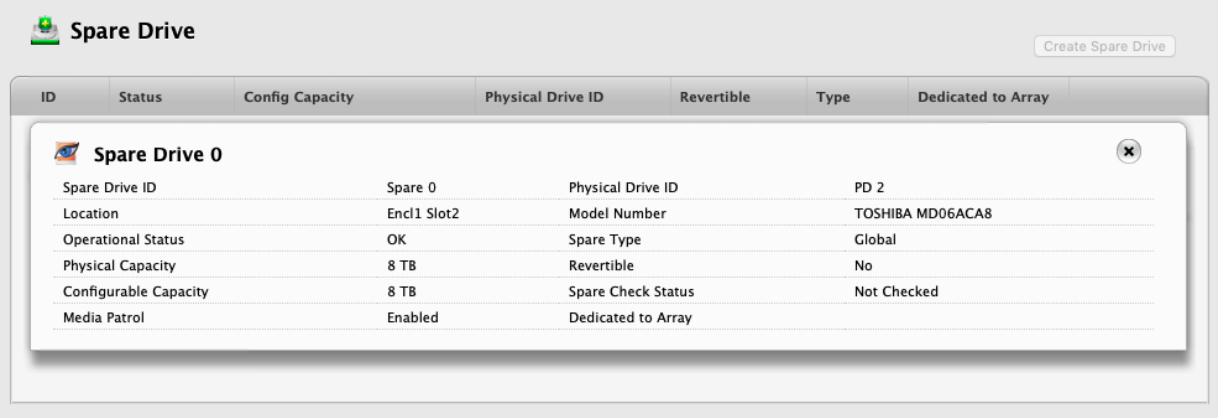
- **Spare Drive ID** – Spare0, Spare1, etc.
- **Physical Drive ID** – ID number of the physical drive chosen for this spare
- **Location** – Enclosure number and slot number
- **Model Number** – Make and model of the physical drive
- **Operational Status** – OK, Rebuilding, Failed or Missing
- **Spare Type** – Global or Dedicated *
- **Physical Capacity** – Total data capacity of the spare drive
- **Revertible** – Yes or No *
- **Configurable Capacity** – Usable capacity of the spare drive
- **Spare Check Status** – Not Checked or Healthy
- **Media Patrol** – Enabled or Not Enabled *
- **Dedicated to Array** – ID number of the disk array to which the spare is dedicated *

Items with an asterisk (*) are adjustable under “Making Spare Drive Settings” on page 118.

For Spare Check, see “Running Spare Check” on page 119.

3. Click the **X** icon to close the information panel.

Spare Drive information



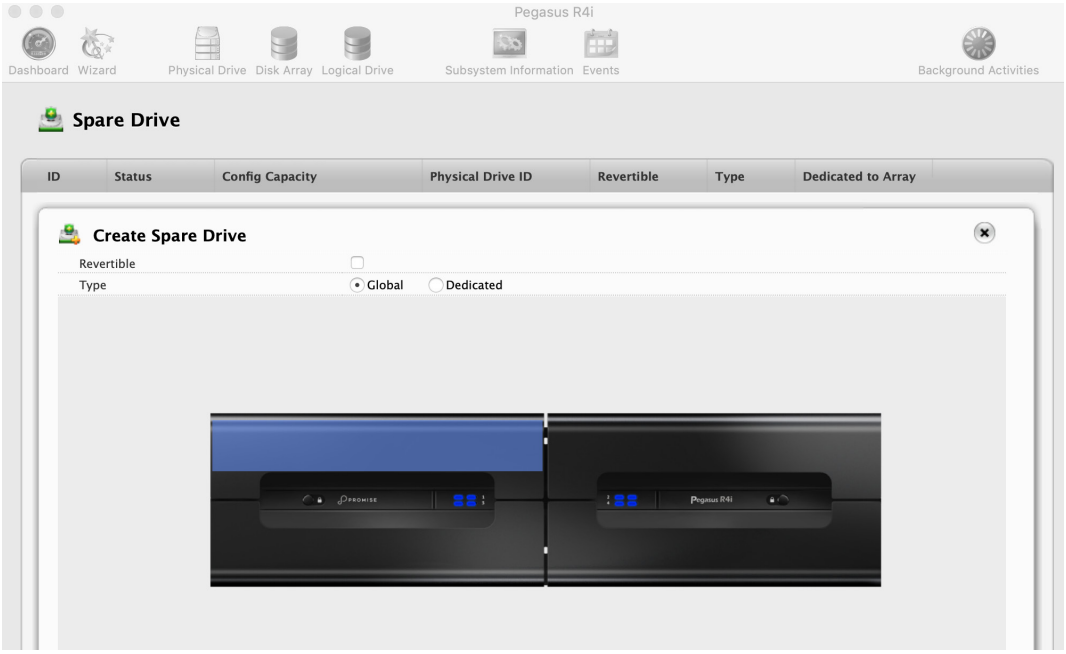
Creating a Spare Drive Manually

This feature creates a spare drive only. You can also use the Wizard to create a disk array with logical drives and spare drives at the same time.

To create a spare drive:

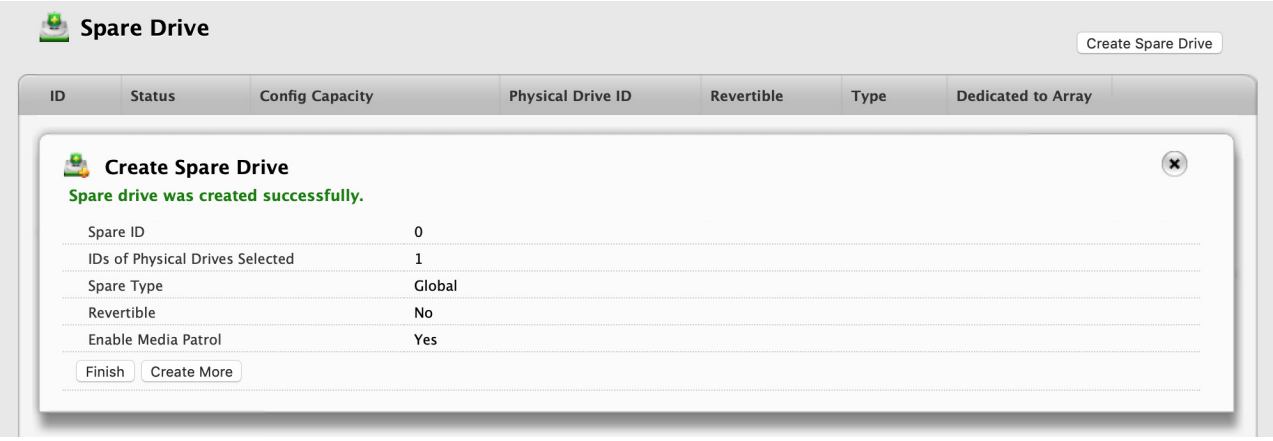
1. From the Dashboard window, click the **Spare Drive** link.
2. Click the **Create Spare Drive** button.

Create Spare Drive - Choose physical drive



3. For each of the following items, accept the default or change the settings as required:
    - Check the **Revertible** box if you want a revertible spare drive.
      A revertible spare drive returns to its spare drive assignment after you replace the failed physical drive in the disk array and run the Transition function.
    - **Type** (choose spare type)
        - **Global** – Can be used by any disk array
        - **Dedicated** to a disk array. Click the radio button next to the disk array to which this spare drive is dedicated.
    - **Media Type** If you have more than one type of physical drive installed (SSD and HDD for example) choose the type of drive for the spare.

Create Spare Drive - Summary



4. In the **Create Spare Drive** diagram, click a drive to choose it for your spare.
   The drive module turns blue when you click it. The physical drive's ID number appears in the field below the diagram.

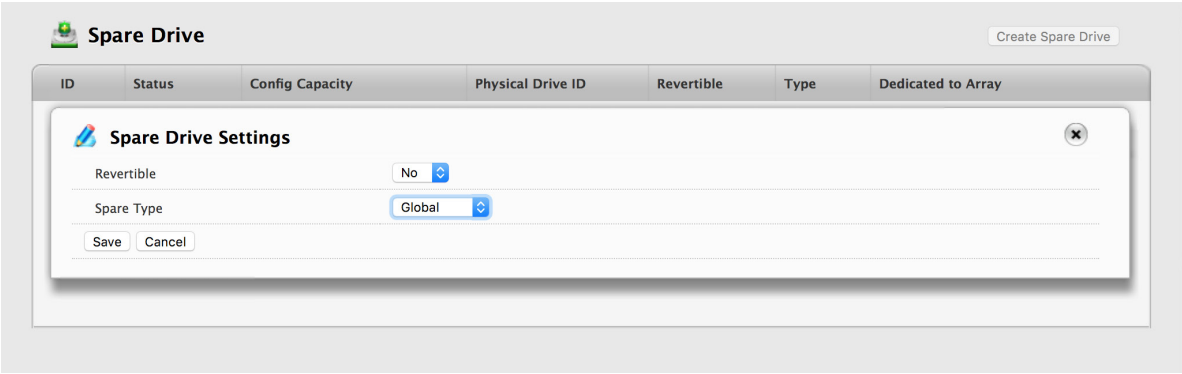
5. Click the **Submit** button to continue.
   If you are done creating spare drives, click the **Finish** button. To create another spare drive, click the **Create More** button.

Making Spare Drive Settings

To make spare drive settings:

1. From the Dashboard window, click the **Spare Drive** link.
   The list of spare drives appears.
2. Mouse-over the spare drive you want then click the **Settings** button.
3. Accept the default or change the settings as required:
   - In the **Revertible** dropdown menu, choose Yes or No.
   - In the **Spare Type** dropdown menu, choose **Global** or **Dedicated**.
   - If you use chose a Dedicated spare, check the box beside the disk array to which this spare drive is assigned.
4. Click the **Save** button.

Spare Drive Settings



Running Spare Check

Spare Check verifies the status of your spare drives. To run spare check:

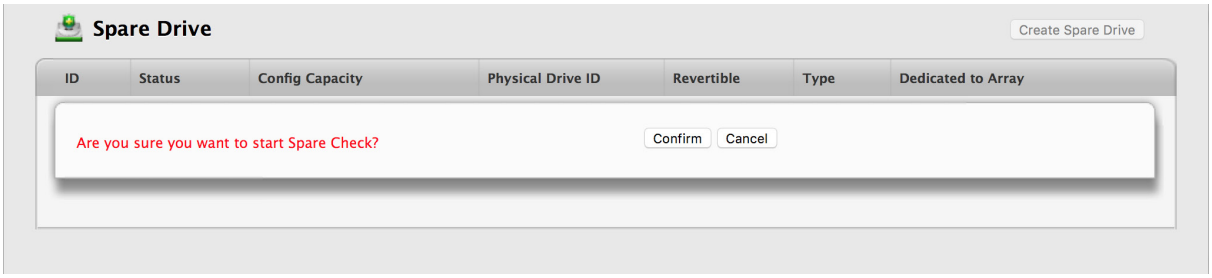
1. From the Dashboard window, click the **Spare Drive** link.
   The list of spare drives appears.

2. Mouse-over the spare drive you want then click the Spare Check button.

3. Click the **Confirm** button.
   Spare Check has no pause, resume or stop functions. When the Spare Check is completed, it adds *Healthy* next to Spare Check Status on the Spare Drive information box.

After the “Spare Check completed” message appears, click the **View** button to see Spare Check Status.

Run a Spare Check



Deleting a Spare Drive

This action requires Administrator or a Super User privileges. To delete a spare drive:

1. From the Dashboard window, click the **Spare Drive** link.
   The list of spare drives appears.
2. Mouse-over the spare drive you want then click the **Delete** button.
3. In the Confirmation box, type the word “confirm” in the field provided and click the **Confirm** button.

Running a Transition on a Spare Drive

Transition is the process of replacing a revertible spare drive that is currently part of a disk array with an unconfigured physical drive or a non-revertible spare. You must specify an unconfigured physical drive of the same or larger capacity and same media type as the revertible spare drive.

Also see “Transition” on page 58.

Running a Transition

To run a transition on a revertible spare drive:

1. Click on the **Background Activities** icon.
   The list of background activities appears.

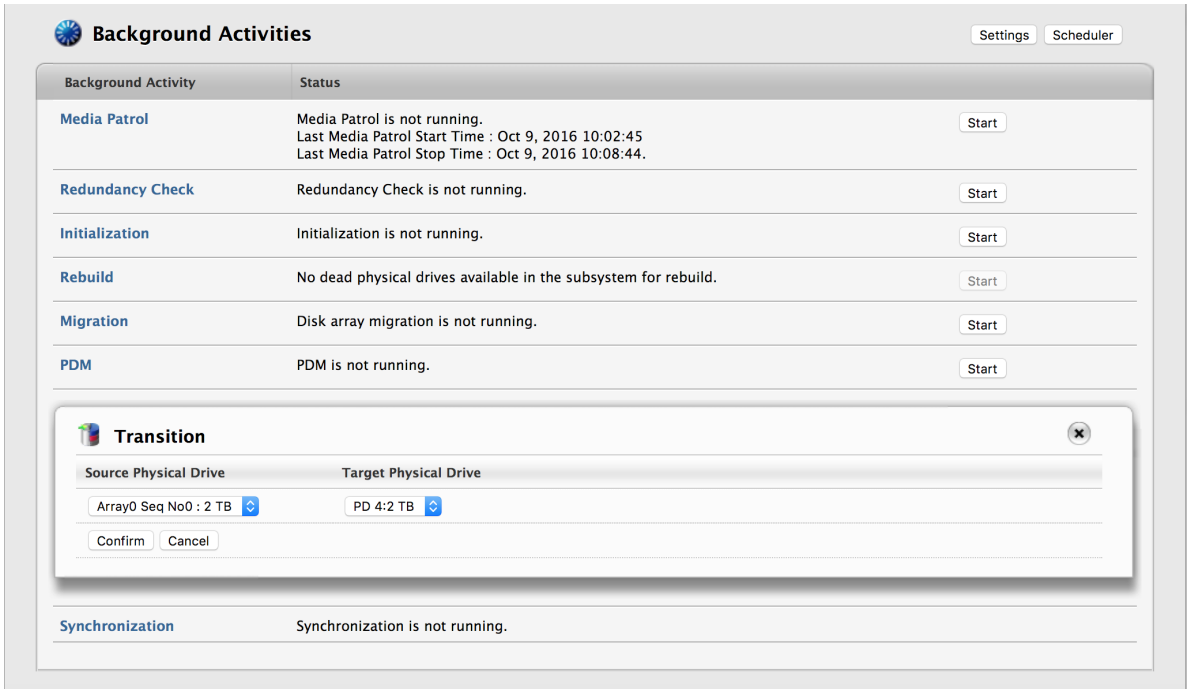
2. Mouse-over Transition and click the **Start** button.

3. Choose a Source Physical Drive.
   The Source Physical Drive is the revertible spare drive that is now part of the disk array.
   Source Physical Drives are identified by the disk array number and their sequence number in the disk array.

4. Choose a Target Physical Drive.
   The Target Physical Drive is the drive that replaces the revertible spare. Target physical drives are identified by their physical drive ID number.

5. Click the **Confirm** button.

Running a Transition



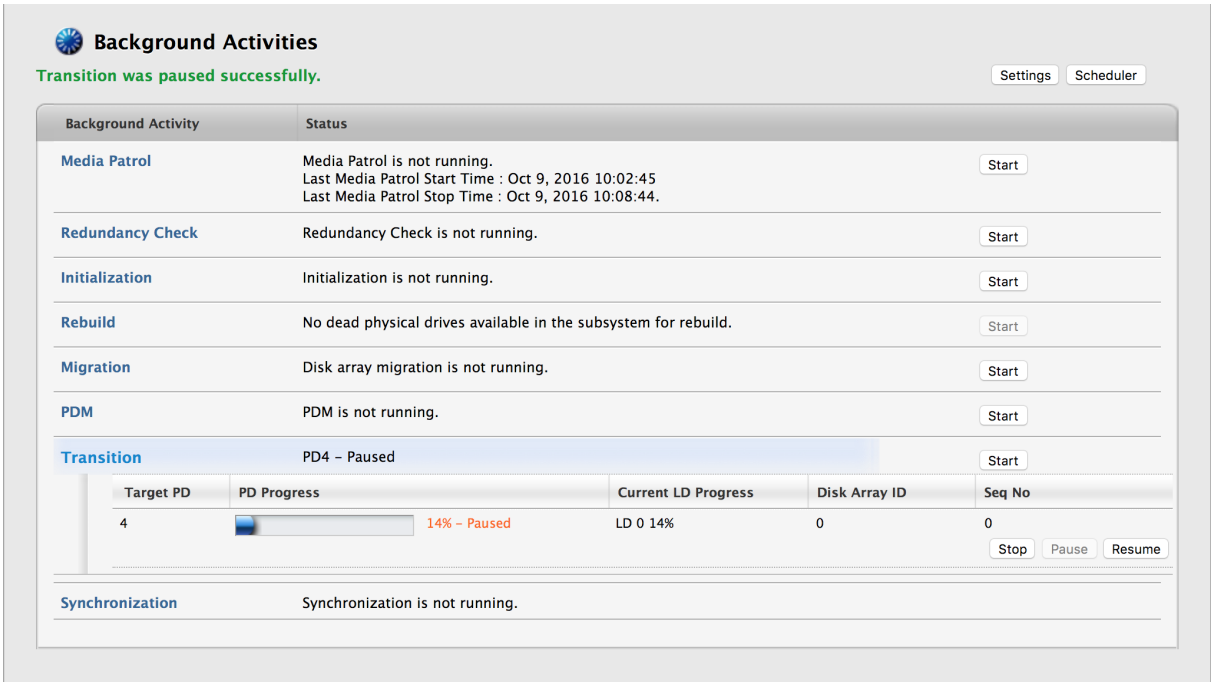
Pausing and Resuming a Transition

To pause or resume Transition:

1. Click on the **Background Activities icon.**
   The list of background activities appears.

2. Mouse-over Transition and click the **Pause** or **Resume** button.

Pausing/Resuming a Transition



Stopping, Pausing or Resuming a Transition

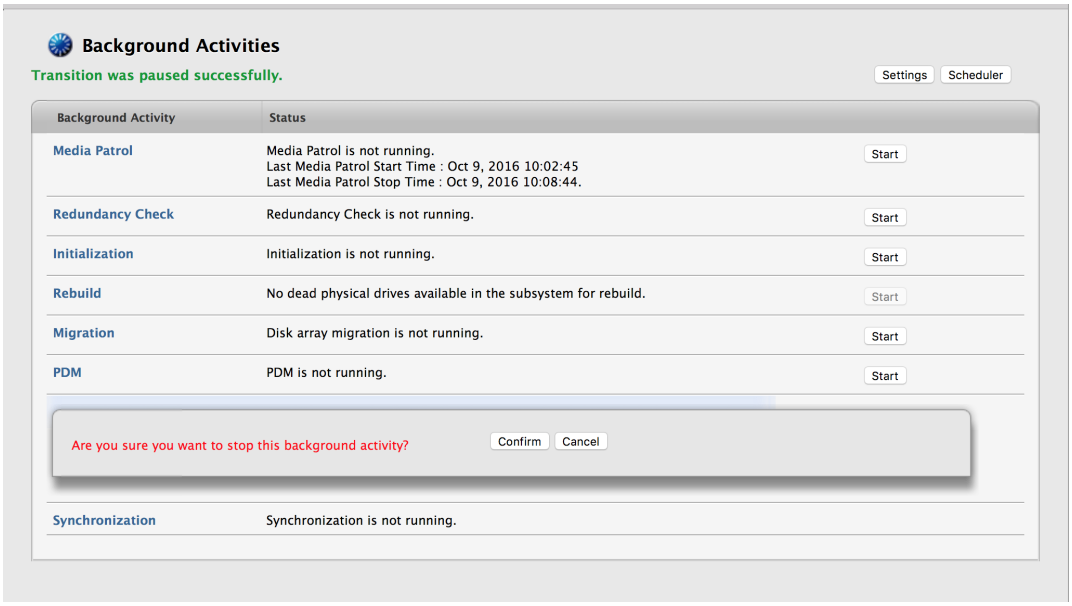
To stop is to cancel a Transition:

1. Click on the **Background Activities icon.**
   The list of background activities appears.

2. Mouse-over Transition and click the **Stop** button.

3. Click the **Confirm** button

Stopping a Transition



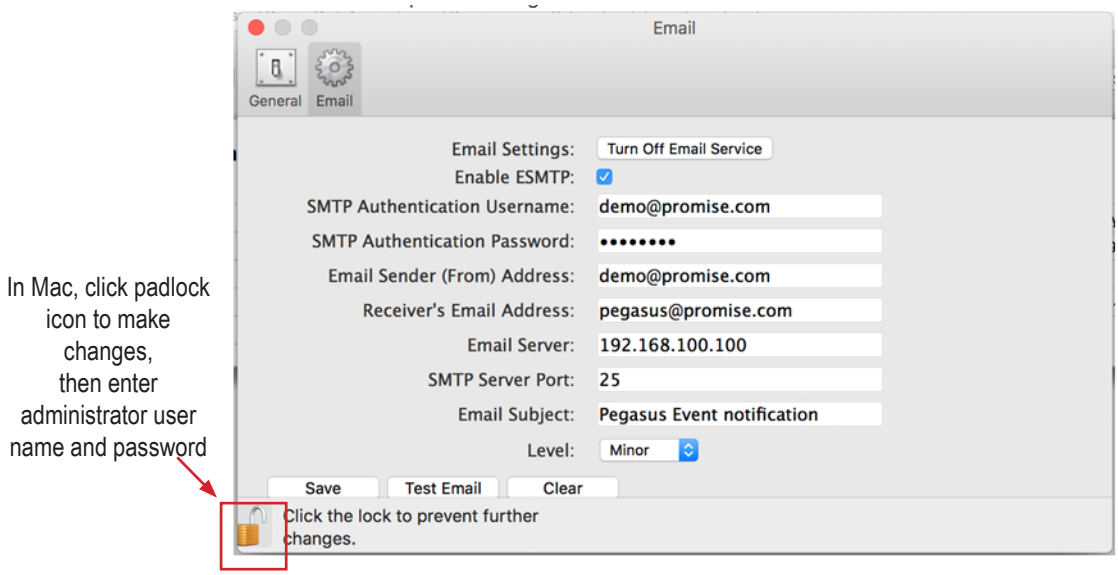
Setting Up Email Notifications

You can use email notifications to receive alerts about events such as a drive error or drive failure on the Pegasus R4i, so that you can take corrective action.

To setup Email notification settings:

1. Click on **Promise Utility** in the top menu bar and select *Preferences*, click on the **Email** menu tab.

2. Click the padlock icon to the menu so you can make settings changes. You need to enter the administrator user name and password to change settings.
   Note that you need to click the padlock icon even if it is unlocked when the Preferences menu appears.



3. Click on **Turn On Email Service**.

4. Click to **Enable ESMTP** based on your own Email service environment.
Typically ESMTP should be enabled for most users. You can test the email notification to see if it works with ESMTP enabled. If it does not work, try disabling ESMTP and testing it again.

5. If ESMTP is enabled, enter your email account user name in the **SMTP Authenticaiton Username** entry field, and enter your email account password in the **SMTP Authentication Password** entry field. Again, this is only needed if you have ESMTP enabled (See step 4).

Note

If you are using a public email server, such as Google Gmail or Yahoo mail, for the Email Sender address, you might not be able to receive the Pegasus Event Email Notification. Instead, you will receive an **email server blocking notification**. This because the email server security mechanism does not allow the Pegasus to sign in. It will be necessary to change the security settings on the account in order to allow the Pegasus to sign in and send notification emails. Consult the security settings instructions of your email service to lower the security level if you want to use this public email service for notifications. Use the Test Email button to test the email notifications after making the changes.

6. Enter the email address used for the sender's address in **Email Sender (From) Address**.

7. Enter the email address to receive the email notification in **Reciever's Email Address**.

8. The default value in **SMTP Server Port** is 25, change this only if your company uses a different port for SMTP.

9. Enter the subject text used for the notification emails in **Email Subject**.

10. Use the **Level** dropdown menu In Level to select the event urgency level of the notifications to be sent. Note that your choice of notification urgency level effects how frequently an email notification will be sent. For example, if you choose *Warning*, you will receive many emails which are not urgent. It is recommended to use the *Major* level to alert of significant events that might effect performance or device health so that *Critical* or *Fatal* events might be avoided.

11. Click **Save** to save the settings.

12. It is recommended to run a test of the settings to make sure you are able to receive notifications. Click **Test Email** to send test email to the receiver. If the test email is received, you do not need to change any settings. If an email is not received, check the settings again to make sure they were correctly typed. Also try disabling ESMTP and test the email notifications settings again.

To clear the settings entered in the menu, click the **Clear** button.

TROUBLESHOOTING

This chapter deals problems you might encounter with your Pegasus unit and how to resolve them.

Responding to an Audible Alarm

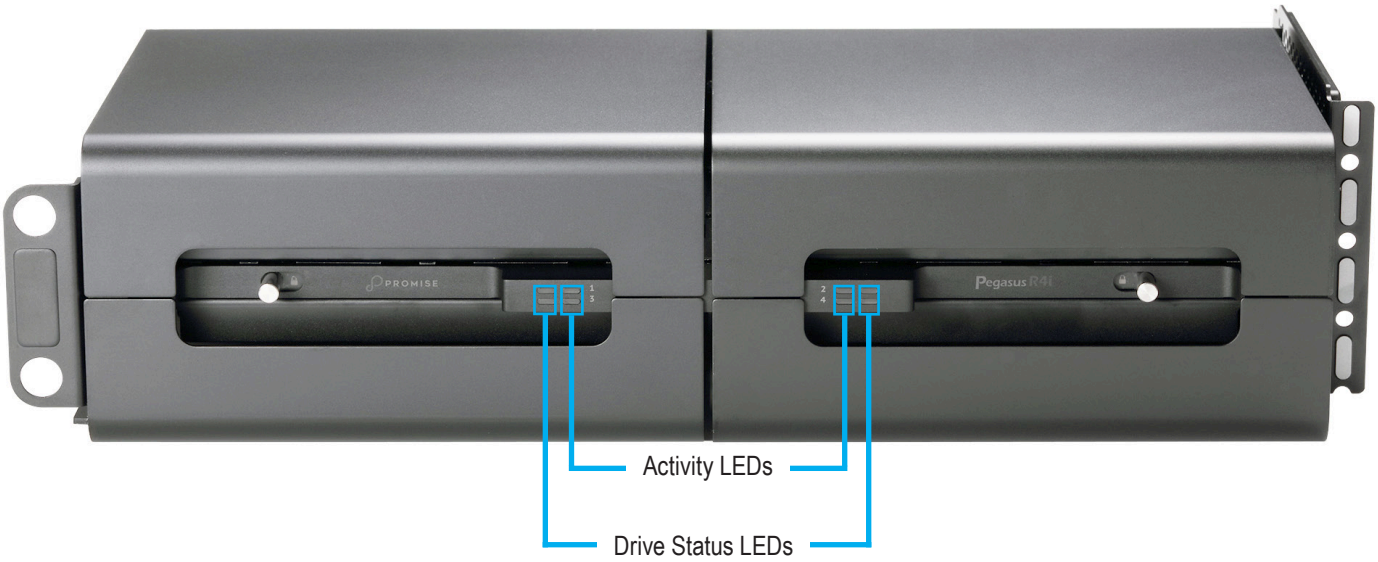
The Pegasus R4i has an audible alarm that beeps in a pattern to provide some information about a problem that requires immediate attention. The table below lists the beep pattern, what it might indicate and what response is needed, if any.

Audible warning	Event Severity	Reason	Recommended Action
Three beeps, continuously repeated	Critical	Some Pegasus temperatures are over their threshold	Run Pegasus Utility and check details in Event list. Let the system cool down before resuming activity
	Major	A Drive Module is marked dead	Run Pegasus Utility and check details in Event list. Replace the flagged Drive Module per instructions
	Minor	A Drive Module had some correctable errors	Run Pegasus Utility and check details in Event list.
Continuous long beep	Major	A Logical Drive is offline	Run Pegasus Utility, check status of physical drives and disk array. Contact Promise Technical support
Two beeps repeated continuously	Major	Logical Drive status is abnormal	Run Pegasus Utility, check status of physical drives and disk array. Contact Promise Technical support
Six beeps, repeated twice	Minor	A command timed out	Run Pegasus Utility and check details in Event list.
Two beeps, not repeated	Minor	Some minor defects were detected on a physical drive	Run Pegasus Utility and check details in Event list.
	Info only	The Pegasus is powering up	N/A

Checking LEDs

When you boot Pegasus the drive module Activity and Status LEDs turn blue.

Front view



LED	Description
Status	The Drive Status LED lights blue when functioning normally. A red Drive Status LED indicates a problem with the physical drive or an array.
Activity	The Drive Activity LED lights blue when the physical drive is present and blinks blue when there is activity on the drive.

Pegasus Utility

If you can open the Pegasus Utility, but you cannot create or delete disk arrays and logical drives, nor can you make settings changes, check the UI lock. See “Unlocking the UI in Mac” on page 65.

Viewing the Event Logs

Viewing Event Logs includes:

- “Viewing Runtime Events”
- “Viewing NVRAM Events”
- “Event Severity Descriptions”

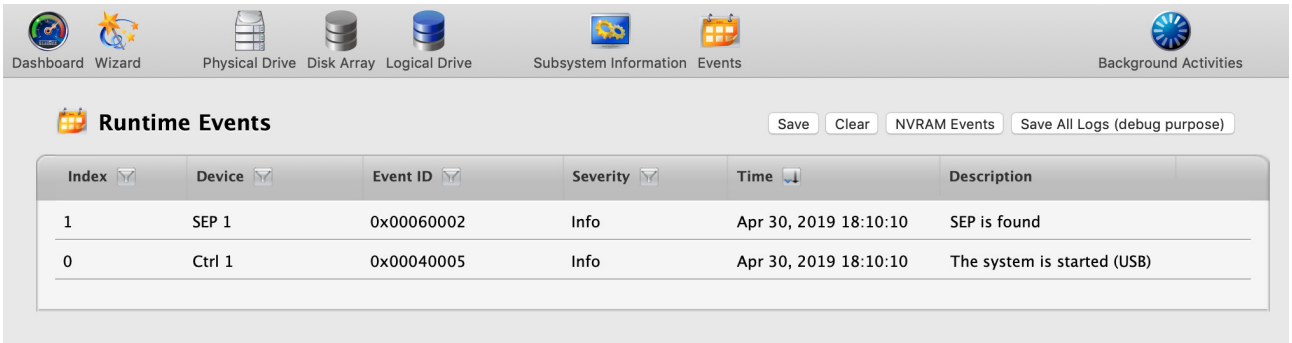
Viewing Runtime Events

To display Runtime Events, click the **Events** icon. The log of Runtime Events appears.

Events are added to the top of the list. Each event includes:

- **Index** – Sequence number of the event. Begins with 0 at system startup.
- **Device** – Disk Array, Logical Drive, Physical Drive by its ID number.
- **Event ID** – Hexadecimal identifier of the event
- **Severity** – (lowest to highest) Information, Warning, Minor, Major, Critical and Fatal
- **Time** – Date and time the event happened.
- **Description** – A description of the event in plain language.

View Runtime Events



Viewing NVRAM Events

This screen displays a list of and information about 300 most important events over multiple subsystem startups.

To display NVRAM events:

1. Click the **Events** icon.

The log of Runtime Events appears.

2. Click the **Runtime Events** button.

The log of NVRAM Events appears.

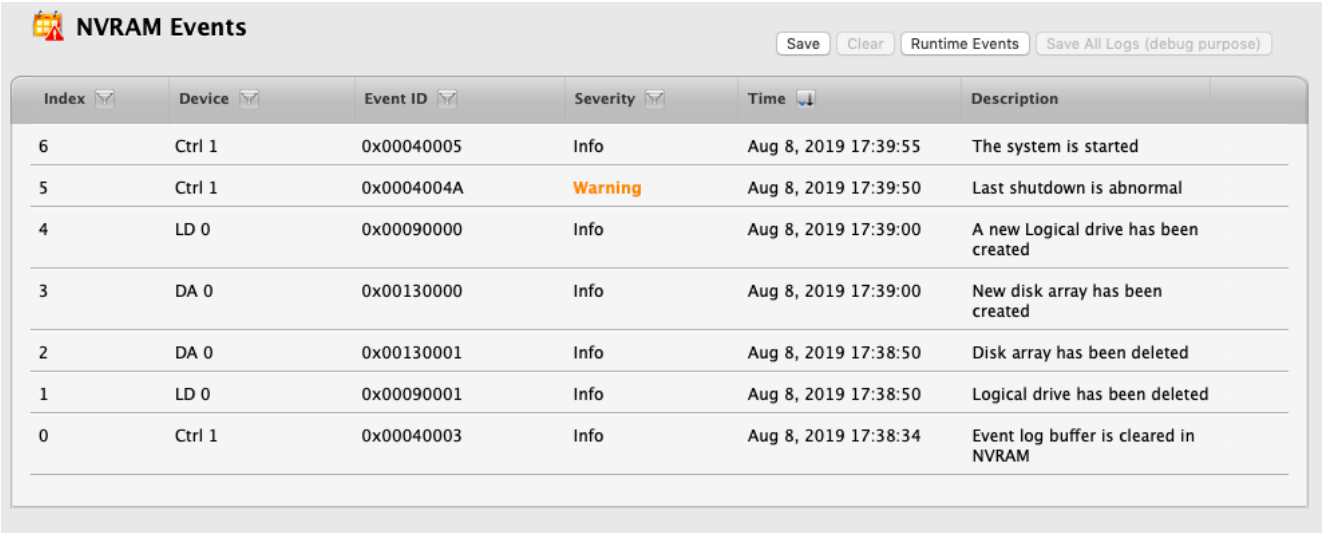
Events are added to the top of the list. Each item includes:

- **Index** – Sequence number of the event. Begins with 0 at system startup.
- **Device** – Disk Array, Logical Drive, Physical Drive by its ID number.
- **Event ID** – Hexadecimal identifier of the event
- **Severity** – (lowest to highest) Information, Warning, Minor, Major, Critical and Fatal
- **Time** – Date and time the event happened.
- **Description** – A description of the event in plain language.

Event Severity Descriptions

Level	Meaning
Fatal	Non-Recoverable error or failure has occurred
Critical	Action is required now and the implications of the condition are serious
Major	Action is required now
Minor	Action is required but the condition is not a serious at this time
Warning	User can decide whether or not action is required
Information	Information only, no action is required

View NVRAM Events



Index	Device	Event ID	Severity	Time	Description
6	Ctrl 1	0x00040005	Info	Aug 8, 2019 17:39:55	The system is started
5	Ctrl 1	0x0004004A	Warning	Aug 8, 2019 17:39:50	Last shutdown is abnormal
4	LD 0	0x00090000	Info	Aug 8, 2019 17:39:00	A new Logical drive has been created
3	DA 0	0x00130000	Info	Aug 8, 2019 17:39:00	New disk array has been created
2	DA 0	0x00130001	Info	Aug 8, 2019 17:38:50	Disk array has been deleted
1	LD 0	0x00090001	Info	Aug 8, 2019 17:38:50	Logical drive has been deleted
0	Ctrl 1	0x00040003	Info	Aug 8, 2019 17:38:34	Event log buffer is cleared in NVRAM

Saving All Logs

To save event logs,

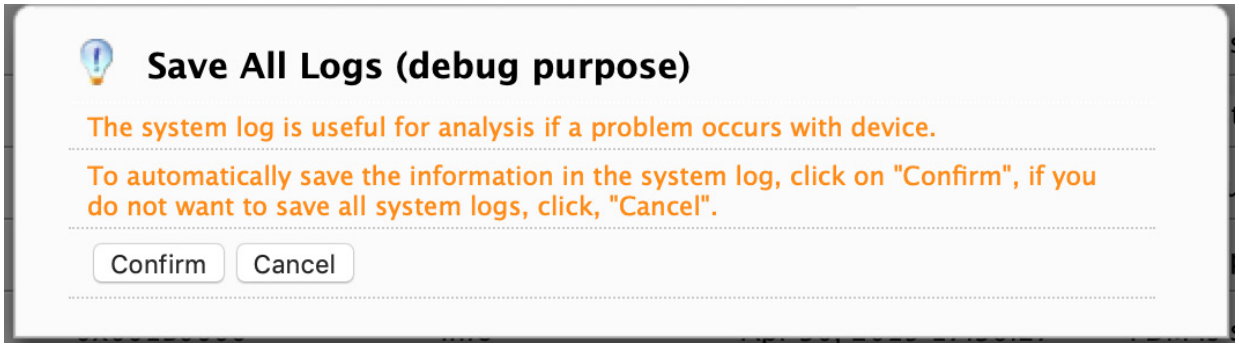
1. Click the **Events** icon.

   The log of Runtime Events appears.

2. Click the **Save All Logs (debug purpose)** button in the top of the menu.

3. You are asked to confirm that you want to save all logs. In the Confirmation box, type the word “confirm” in the field provided and click the **Confirm** button.

Save All Logs



Physical Drive Problems

Physical drive troubleshooting includes:

- “Diagnosis using the Pegasus Utility”
- “Locating a Physical Drive”
- “Replacing a Drive Module”

Physical drives are the foundation of data storage. A physical drive problem can affect your entire RAID system.

Diagnosis using the Pegasus Utility

In the Pegasus Utility, when a yellow !  icon or a red X  icon appears beside a physical drive, check the drive’s operational status:

1. Click the **Physical Drive** icon.
2. Mouse-over and click the physical drive you want then click the **View** button.

   Look under Operational Status for the condition of the physical drive.

   - **Offline** – Check the drive for:
   - **PFA Condition** – Caused by a bad block or sector. See Note 1 below.
   - **Stale Condition** – Caused by obsolete array information on the physical drive. See Note 2 below.
   - **Drive Failed or Dead** – The physical drive cannot be repaired. You must replace the failed drive.

Note 1: Clear the error condition. Then the physical drive is available. See “Clearing a Stale or a PFA Condition” on page 120.

Note 2: Identify the disk array to which the physical drive belongs. Then delete the disk array. If the error condition remains on the physical drive, clear the error condition.

Locating a Physical Drive

To locate a physical drive:

1. Do one of the following actions:
    - Click the **Physical Drive** icon.
    - From the Device menu, choose **Physical Drive**.
2. Mouse-over and click the physical drive you want then click the **Locate** button.

The Status LED for the drive module holding that drive blinks blue and orange for one minute.

Replacing a Drive Module

CAUTION

The system must be powered off before opening the Mac Pro enclosure. Make sure the power cable is not connected to a power source before you begin the installation, or removal of the Pegasus R4i.

A failed physical drive displays a red X  icon in the Pegasus Utility and a red Status LED on the drive module.

Check the failed drive, then obtain a replacement drive module.

Follow the instructions below if you want to remove a drive module from the Pegasus R4i MPX RAID Storage Module, or to reinsert a drive module. You need to remove the drive module if you want to replace it.

- To unlock the drive module, slide the lock toward the center of the Pegasus R4i enclosure. Note that each lock secures two drive modules - in the upper and lower drive module bays.

- Use two hands to gently slide the module straight out from the enclosure. Make sure you support the bottom of the module so it does not drop when it is free of the enclosure hardware.

- To replace the drive module, make sure the drive bay lock is in the open position, then use both hands to align the drive module so it fits into the grooves, supporting the entire assembly so it remains level.

- Gently push the drive module in as far as it goes until the connectors on the back are firmly seated. Note that if the drive module is not fully inserted, you will not be able to slide the lock to the locked position.

- Slide the lock toward the outside of the Pegasus R4i enclosure to secure it. The drive module is now ready for use.

Disk Array and Logical Drive Problems

Disk array and logical drive troubleshooting includes:

- “Disk Array Degraded / Logical Drive Critical”
- “Disk Array Offline / Logical Drive Offline”
- “Repairing an Offline Disk Array or Logical Drive”
- “Rebuilding a Disk Array”
- “Incomplete Array”
- “Unreadable Disk Warning”

Disk array problems typically result from a physical drive failure. The most common problem is a degraded disk array. The RAID controller can rebuild a degraded disk array. See “Rebuilding a Disk Array” on page 140.

Disk Array Degraded/Logical Drive Critical

Disk arrays are made up of physical drives. Logical drives are created on the disk array.

When one of the physical drives in a disk array fails:

- The operational status of the disk array becomes **Critical**.
- The operational status of the logical drives becomes **Critical** or **Degraded**.
- The operational status of the physical drive becomes **Dead** or **Offline**. The Pegasus Utility reports these conditions in the following places:
- Dashboard icon – A yellow !  icon beside the disk arrays, logical drives, and physical drives under System Status.
- Physical Drive icon – Physical drives are shown Dead or Offline and marked with a red X  icon, or Missing.
- Logical Drive icon – Disk Array and Logical Drive are marked Critical with a yellow !  icon. RAID 6 logical drives are marked:
    - Degraded with a yellow !  icon when ONE physical drive is offline.
    - Critical with a yellow !  icon when TWO physical drives are offline. RAID 0 logical drives show Offline status and a red X  icon.
- Events icon – Logs a Major event for the logical drives and a Warning event for the physical drive.

If there is no spare drive in the Pegasus unit, you must provide the replacement drive. See “Replacing a Drive Module” on page 135.

Disk Array Offline/Logical Drive Offline

Disk arrays are made up of physical drives. Logical drives are created on the disk array. When a disk array and its logical drives go **Offline**, the data stored in the logical drives is no longer accessible.

RAID 0 logical drives go **Offline** when ONE physical drive is removed or fails. RAID 1, 1E, 5, and 10 logical drives go **Offline** when TWO physical drives are removed or fail.

RAID 6 logical drives go **Offline** when THREE physical drives are removed or fail.

The Pegasus Utility reports these conditions in the following places:

- **Dashboard** icon – A red X icon appears beside the disk arrays, logical drives, and physical drives under System Status.
- **Physical Drive** icon – Physical drives are shown Dead, Offline, or Missing.
- **Logical Drive** icon – Disk Array and Logical Drives are marked with a red X icon.
- **Event** icon – Major event for the logical drive and a Warning event for the physical drive. Under Background Activities, no Rebuild takes place. See Repairing, below.

Repairing an Offline Disk Array or Logical Drive

RAID 1, 1E, 5, 6, and 10 Logical Drives

If a fault-tolerant logical drive, RAID 1, 1E, 5, 6, and 10, goes **Offline**, it may be possible to recover your data.

WARNING

Take no further corrective action until you have consulted with Technical Support!

RAID 0 Logical Drives

If a logical drive based on a non-fault-tolerant disk array, RAID 0, goes offline, all of the data on the logical drive is lost.

To recreate your logical drive:

1. Identify the failed physical drive.

   See “Locating a Physical Drive” on page 135.

2. Replace the failed drive.

   See “Replacing a Drive Module” on page 135.

3. If the disk array had more than one physical drive, delete the disk array and re-create it.

   See “Deleting a Disk Array” on page 137 and “Creating a Disk Array and Logical Drive with the Wizard” on page 128.

4. Restore the data from your backup source.

Rebuilding a Disk Array

When you rebuild a disk array, you are actually rebuilding the data on one of its physical drives.

If there is no spare drive of adequate capacity, you must replace the failed drive with an unconfigured physical drive, then perform a Rebuild manually.

See “Replacing a Drive Module” on page 135. To perform a manual rebuild:

1. Click on the **Background Activities** menu icon.
2. Mouse-over *Rebuild* and click the **Start** button.
3. From the **Source Physical Drive** dropdown menu, choose a **Source** disk array and physical drive.

   Arrays have an ID No. Physical drives have a Seq. No.(sequence number)

4. From the **Target Physical Drive** dropdown menu, choose a **Target** physical drive.
5. In the Confirmation box, type the word “confirm” in the field provided and click the **Confirm** button.

   When the disk array is rebuilding:

   - The disk array shows a green check  icon and **Rebuilding** status.
   - Logical drives under the disk array continue to show a yellow !  icon and **Critical, Rebuilding** status.
   - If the buzzer is enabled, the Pegasus R4i unit emits two quick beeps every five seconds. When the beeps stop, the rebuild is done.

Incomplete Array

A more serious, but far less common problem is an Incomplete Array. An incomplete array results from a physical drive that fails or becomes missing during:

- RAID level migration
- Disk array transport

Migration

Normally, if a physical drive or the controller fails during migration, the disk array goes critical, and you can rebuild it.

Transport

Transport is the action of moving the physical drives of a disk array:

- To different slots in the same subsystem
- From one subsystem to another

If a physical drive fails during a transport, or you do not move all of the physical drives to their new locations, the Pegasus Utility displays an incomplete array. When the Pegasus Utility discovers an incomplete array, it displays a dialog box asking you to:

- Click the **OK** button to accept the incomplete array.
- Click the **Cancel** button to reject the incomplete array.

Before you accept the incomplete array, be sure all of the physical drives are present and that their drive modules are properly installed into the subsystem. See “Replacing a Drive Module” on page 135.

If you choose to accept the incomplete array:

1. Click **OK** in the incomplete array dialog box.
2. Check the operational status of the logical drives in the array.

- If the logical drives are **Critical**, proceed with a rebuild.
- If the logical drives are Offline, contact Technical Support. See “Contacting Technical Support” on page 233.

3. Restore your data from a backup source.

If you choose NOT to accept the incomplete array:

1. Click **Cancel** in the incomplete array dialog box.
2. Do one of the following:

- •Delete the array. This action deletes all logical drives on the array.
- •Replace the missing physical drive.

Unreadable Disk Warning

Your Pegasus logical drive displays on the computer's desktop as a removable-drive icon (right).

If your computer's operating system recognizes a logical drive but cannot access it, the computer might display a warning message. See Figure 6.

Warning message

Normally, you never see this warning message for a logical drive because the Pegasus Utility formats your logical drives automatically.

If the warning message appears, try using the computer's disk utility to REPAIR the problem logical drive. For more information, see the utility's online help or the computer's *User Manual*.

If the disk utility cannot repair the logical drive, contact Technical Support for advice and assistance. See "Contacting Technical Support" on page 233.

CAUTION

If a logical drive has been in use and suddenly displays this warning message, do NOT format the logical drive. Formatting erases all of your data on your logical drive.

Subsystem Problems

Subsystem problem troubleshooting includes:

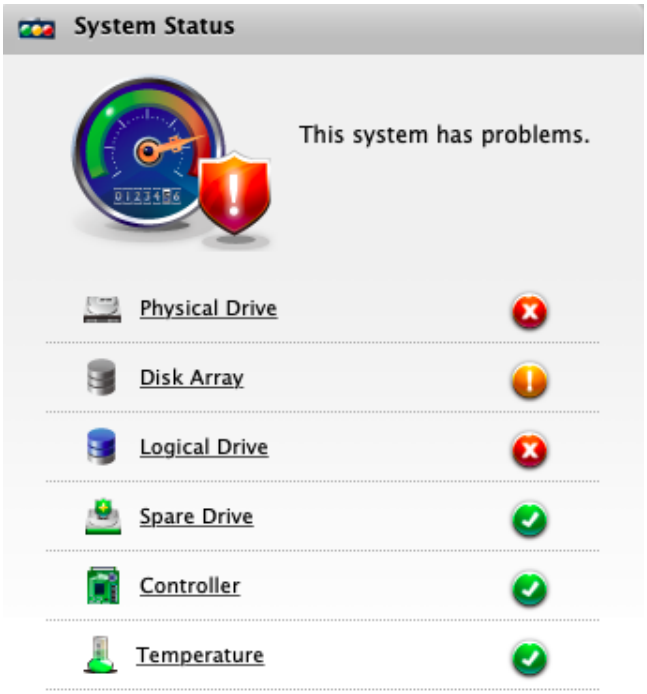
- “Diagnosing a Subsystem Problem”

Diagnosing a Subsystem Problem

Check System Status on the Dashboard tab. If a yellow ! or red X appears in the System Status box:

1. Click the name link of the component with the red X icon.

System Status box on the Dashboard

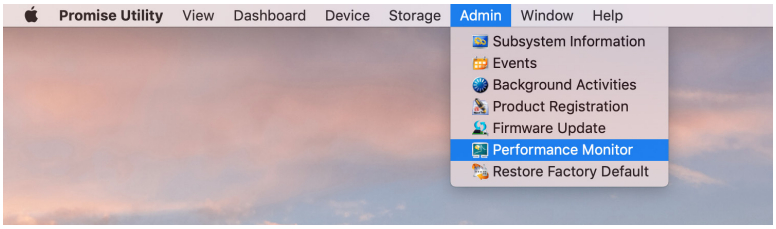


The System Status list contains a list of all the components with their appending status. In case there is a failure with one of the components, an indicator icon will be displayed next to the component.

2. For physical drives, disk arrays, logical drives, and spare drives, mouse-over the component with the red X icon and click the **View** button.

Performance Monitor

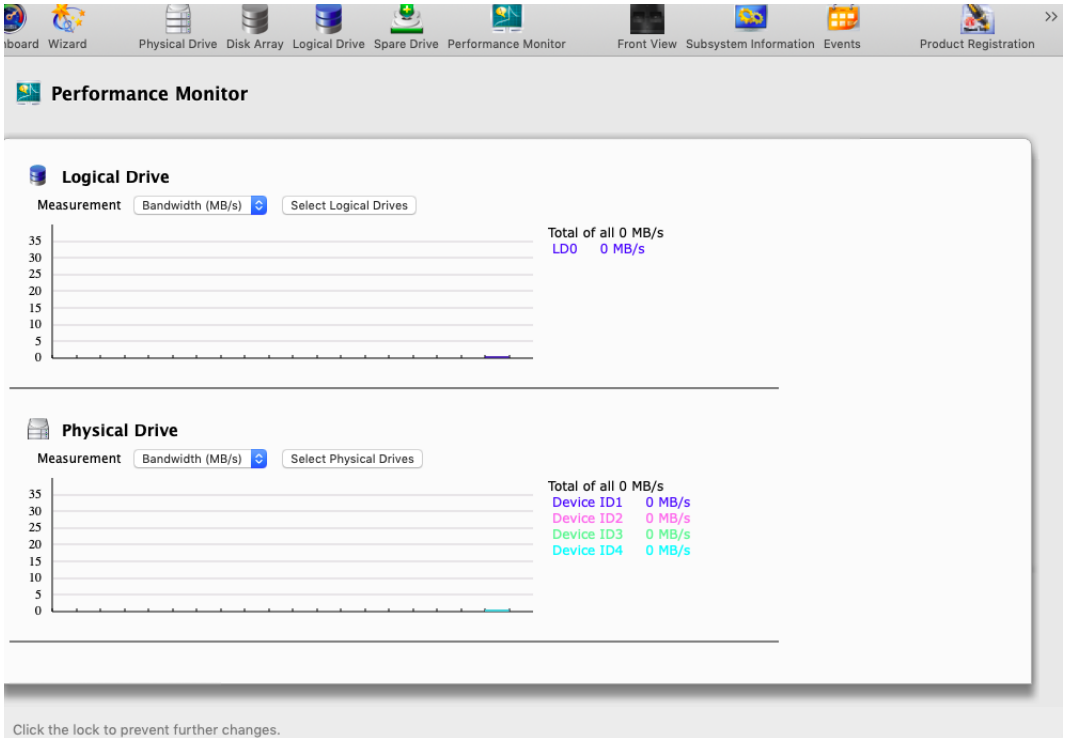
The Performance Monitor display can be useful for diagnosing performance issues that will not necessarily trigger any alerts to appear in the System Status display or event logs. You can use it for testing performance of different drive types.
To display the Performance Monitor information, choose *Performance Monitor* from the **Admin** drop-down menu in the Menu Bar. Note that it is necessary to unlock the interface before the option can be selected.



Note
You must unlock the Pegasus Utility interface to allow selection of the Performance Monitor display.

Performance information is displayed in graph form for logical drives and physical drives. Use the pull-down menus to displayed what parameter is being measured and which logical or physical drive you want to monitor. The parameters available for measurement are Bandwidth (in MB/s) and I/O requests.

Performance Monitor display



Contacting Technical Support

Promise offers local Phone Support for Pegasus series during normal business hours:

For telephone support and business hours click here (http://www.promise.com/ContactUs) Web support and Live Chat is offered 24/7

Web: https://support.promise.com

Live Chat: http://www.promise.com/us/Support

Please be sure to register your product at PROMISE eSupport (https://support.promise.com)

The information below is required for troubleshooting. Please register this information or have it readily available at the time of your support call

- **Serial number** - Located on label toward rear of Pegasus chassis
- **Config Logs**. Please refer http://kb.promise.com/cat/Pegasus R4i-series/ for instruction on acquiring Config Logs.

Limitations

RMAs issued before 12:00 noon PST M-F can be shipped out on same day. RMAs issued after 12:00 noon PST M- F ship out the next business day.

RMA Methods

1. Cross Ship (NOT applicable in APAC and EMEAR)

For this method, Credit card information is required for security purposes. The replacement item is first sent to you (customer). Thirty (30) days, from the day of shipment, are allotted for returning the defective unit. If the defective part is not returned within the allotted 30days, your credit card will be charged the MSRP of the replacement part(s) shipped.

1. Return and Replace

Credit card information is not needed for this method. Once your request for an RMA is approved, an RMA number will be emailed to you along with specific shipping instructions. Product(s) must be returned in its original packaging (inner and outer box). If you do not have the original packaging contents please contact Promise Technical Support. All RMA are shipped standard ground to your location.

See “Returning the Product For Repair” on page 151 for more details.

United States

3241 Keller St.

Santa Clara CA. 95054

Technical Support (E-Support): https://support.promise.com

Web Site: http://www.promise.com

Australia

Technical Support (E-Support): https://support.promise.com

Web Site: http://www.promise.com

EMEA

Netherlands

Science Park Eindhoven 5228

5692 EG Son, The Netherlands

Technical Support (E-Support): https://support.promise.com

Web Site: http://www.promise.com

Austria

Technical Support (E-Support): https://support.promise.com

Web Site: http://www.promise.com

France

Technical Support (E-Support): https://support.promise.com

Web Site: http://www.promise.com

Germany

Europaplatz 9

44269 Dortmund, Germany

Technical Support (E-Support): https://support.promise.com

Web Site: http://www.promise.com

Sweden

Technical Support (E-Support): https://support.promise.com

Web Site: http://www.promise.com

Switzerland ITF

Technical Support (E-Support): https://support.promise.com

Web Site: http://www.promise.com

Norway ITF

Technical Support (E-Support): https://support.promise.com

Web Site: http://www.promise.com

Belguim

Technical Support (E-Support): https://support.promise.com

Web Site: http://www.promise.com

Luxembourg

Technical Support (E-Support): https://support.promise.com

Web Site: http://www.promise.com

United Kingdom

Technical Support (E-Support): https://support.promise.com

Web Site: http://www.promise.com

Taiwan

Technical Support (E-Support): https://support.promise.com

Web Site: http://www.promise.com

China

Room 1108, West Wing, Shi Chuang Plaza, 22 Information Road

Shangdi IT Park, Haidian District, Beijing 100085

Fax: 86-10-8857-8015

Technical Support (E-Support): https://support.promise.com

Web Site: http://www.promise.com

Korea

Technical Support (E-Support): https://support.promise.com

Web Site: http://www.promise.com

Hong Kong

Technical Support (E-Support): https://support.promise.com

Web Site: http://www.promise.com

Singapore

Technical Support (E-Support): https://support.promise.com

Web Site: http://www.promise.com

Japan

3F, Mura Matsu Bldg, 3-8-5, Hongo Bunkyo-ku

Tokyo 113-0033, Japan

Technical Support (E-Support): https://support.promise.com

Web Site: http://www.promise.com

Limited Warranty

PROMISE Technology, Inc. (“PROMISE”) warrants that this product, from the time of the delivery of the product to the original end user:

a) all components for a period of three (3) years;

b) will conform to Promise’s specifications;

c) will be free from defects in material and workmanship under normal use and service.

This warranty:

a) applies only to products which are new and in cartons on the date of purchase;

b) is not transferable;

c) is valid only when accompanied by a copy of the original purchase invoice.

This warranty shall not apply to defects resulting from:

a) improper or inadequate maintenance, or unauthorized modification(s), performed by the end user;

b) operation outside the environmental specifications for the product;

c) accident, misuse, negligence, misapplication, abuse, natural or personal disaster, or maintenance by anyone other than a Promise or a Promise-authorized service center.

DISCLAIMER OF OTHER WARRANTIES

This warranty covers only parts and labor, and excludes coverage on software items as expressly set above.

Except as expressly set forth above, Promise disclaims any warranties, expressed or implied, by statute or otherwise, regarding the product, including, without limitation, any warranties for fitness for any purpose, quality, merchantability, non-infringement, or otherwise. Promise makes no warranty or representation concerning the suitability of any product for use with any other item. You assume full responsibility for selecting products and for ensuring that the products selected are compatible and appropriate for use with other goods with which they will be used.

Promise does not warrant that any product is free from errors or that it will interface without problems with your computer system. It is your responsibility to back up or otherwise save important data before installing any product and continue to back up your important data regularly.

No other document, statement or representation may be relied on to vary the terms of this limited warranty.

Promise's sole responsibility with respect to any product is to do one of the following:

a) replace the product with a conforming unit of the same or superior product;

b) repair the product.

Promise shall not be liable for the cost of procuring substitute goods, services, lost profits, unrealized savings, equipment damage, costs of recovering, reprogramming, or reproducing of programs or data stored in or used with the products, or for any other general, special, consequential, indirect, incidental, or punitive damages, whether in contract, tort, or otherwise, notwithstanding the failure of the essential purpose of the foregoing remedy and regardless of whether Promise has been advised of the possibility of such damages. Promise is not an insurer. If you desire insurance against such damage, you must obtain insurance from another party.

Some states do not allow the exclusion or limitation of incidental or consequential damages for consumer products, so the above limitation may not apply to you.

This warranty gives specific legal rights, and you may also have other rights that vary from state to state. This limited warranty is governed by the State of California.

Your Responsibilities

You are responsible for determining whether the product is appropriate for your use and will interface with your equipment without malfunction or damage. You are also responsible for backing up your data before installing any product and for regularly backing up your data after installing the product. Promise is not liable for any damage to equipment or data loss resulting from the use of any product.

Returning the Product For Repair

If you suspect a product is not working properly, or if you have any questions about your product, contact our Technical Support staff, and be ready to provide the following information:

- Product model and serial number (required)
- Return shipping address
- Daytime phone number
- Description of the problem
- Copy of the original purchase invoice

The technician helps you determine whether the product requires repair. If the product needs repair, the technician issues an RMA (Return Merchandise Authorization) number.

IMPORTANT

Obtain an RMA number from Technical Support before you return the product and write the RMA number on the label. The RMA number is essential for tracking your product and providing the proper service.

Return ONLY the specific product covered by the warranty. Do not ship cables, manuals, CDs, etc.

USA and Canada:	Promise Technology, Inc. Customer Service Dept. Attn.: RMA # _____ 47654 Kato Road Fremont, CA 94538
Asia-Pacific:	Please return the product to your dealer or retailer or Contact Promise technical support for instructions before shipping the product.
Other Countries	Please check Promise E-Support: https://support.promise.com for the location nearest you. Contact the office or repair depot for full instructions before shipping the product.

You must follow the packaging guidelines for returning products:

- Use the original shipping carton and packaging
- Include a summary of the product's problem(s)
- Write an attention line on the box with the RMA number
- Include a copy of your proof of purchase

You are responsible for the cost of insurance and shipment of the product to Promise. Note that damage incurred due to improper transport or packaging is not covered under the Limited Warranty.

When repairing returned product(s), Promise may replace defective parts with new or reconditioned parts, or replace the entire unit with a new or reconditioned unit. In the event of a replacement, the replacement unit is under warranty for the remainder of the original warranty term from purchase date, or 30 days, whichever is longer.

Promise pays for outbound standard shipping charges only. You must pay for any additional shipping options, such as express shipping and return of the defective part or unit.