Contents

1 Introduction ................................................................. 5
   LaCie RAID Manager requirements ........................................ 5
   • LaCie professional storage .......................................... 5
   • Minimum operating system ....................................... 5
     • Thunderbolt 3 ................................................. 5
     • Thunderbolt 2 ............................................. 5
   • USB .................................................................. 5

2 LaCie RAID Manager Features and Terms .................................. 7
   Array .................................................................... 7
   • Where is it? ....................................................... 7
   Auto rebuild ................................................................. 7
   • Where is it? ....................................................... 8
   Cache ....................................................................... 8
   • Disabling caching .................................................. 8
   • Where is it? ....................................................... 8
   Consistency check ............................................................... 9
   • Where is it? ....................................................... 9
   Disk check ................................................................... 9
   • Where is it? ....................................................... 9
   Initialization .................................................................. 10
   • Where is it? ..................................................... 10
   Poll SMART status (Device settings) ..................................... 10
   • Where is it? ..................................................... 10
   Spare hard drive ............................................................ 10
   • Where is it? ..................................................... 11
   Stripe size ................................................................. 11
   • Where is it? ..................................................... 11

3 RAID ............................................................................ 12
   Standard RAID levels ..................................................... 12
   • RAID 0 ............................................................. 12
   • RAID 1 ............................................................. 13
   • RAID 5 ............................................................. 13
   • RAID 6 ............................................................. 14
   Nested RAID levels .......................................................... 15
   • RAID 10 ........................................................... 15
   • RAID 50 ........................................................... 16
   • RAID 60 ........................................................... 16
   • RAID+ Spare ....................................................... 17
   Drive failures and synchronizing a spare hard drive .................. 17
   RAID and data security .................................................... 18

LaCie professional storage ..................................................... 5
Minimum operating system .................................................. 5
Thunderbolt 3 ................................................. 5
Thunderbolt 2 ............................................. 5
USB .................................................................. 5
Array .................................................................... 7
Auto rebuild ................................................................. 7
Cache ....................................................................... 8
Consistency check .............................................................. 9
Disk check .................................................................... 9
Initialization .................................................................. 10
Poll SMART status (Device settings) ..................................... 10
Spare hard drive ............................................................ 10
Stripe size ................................................................. 11
Standard RAID levels ..................................................... 12
• RAID 0 ............................................................. 12
• RAID 1 ............................................................. 13
• RAID 5 ............................................................. 13
• RAID 6 ............................................................. 14
Nested RAID levels .......................................................... 15
• RAID 10 ........................................................... 15
• RAID 50 ........................................................... 16
• RAID 60 ........................................................... 16
• RAID+ Spare ....................................................... 17
Drive failures and synchronizing a spare hard drive .................. 17
RAID and data security .................................................... 18
## Getting Started

4. Download and Install LaCie RAID Manager
   - Install LaCie RAID Manager
   - Windows and Thunderbolt 3

## Sign In and Language Selection

5. Sign into LaCie RAID Manager
   - Administrators
   - Users
   - Choose a language for LaCie RAID Manager

## LaCie RAID Manager Navigation

6. Header
   - Left column
   - Center panel
   - No compatible device
   - Overview

## Array Configuration and Maintenance

7. Create a new array
6. Delete an array
5. Create a spare hard drive
   - Dedicated spare
   - New array
   - Existing array
   - Global spare
5. Free a spare hard drive
   - Free a dedicated spare
   - Free a global spare
5. Upgrade RAID level
5. Add an available disk to an existing array
4. Initialize an array
   - Initialization in the Create Array Wizard
   - Initialization as maintenance to an existing array
5. Check the array using Consistency Check
   - Manual consistency check
   - Scheduled consistency check
5. Repair the array using Consistency Check and Fix
5. Check individual disks in an array

## Settings

8. Assign processing priority
6. Poll SMART status
Updates ............................................................................................................................................. 32
Set up email notifications .................................................................................................................. 32
- Custom server ............................................................................................................................... 32
Change cache settings ..................................................................................................................... 34

9 Frequently Asked Questions ......................................................................................................... 35

Problem: I disconnected my computer from the LaCie device during RAID synchronization or initialization. ................................................................. 35
Problem: I see two or more arrays in LaCie RAID Manager but only one is available on my computer (LaCie 6big Thunderbolt 3/LaCie 12big Thunderbolt 3). .................................................................................................................. 35
Problem: Initialization has been running for many days. .................................................................. 35
Problem: I connected LaCie 5big Thunderbolt 2 or LaCie 8big Thunderbolt 2 to my Windows PC but I do not see it in LaCie RAID Manager. .................................................................................................................. 35
Problem: On my LaCie 12big Thunderbolt 3, I created an array with disks 1, 2, 3 and 4 but the performance seems to be slower than expected. ................................................................................................................................................ 35
Problem: For LaCie 6big Thunderbolt 3 and LaCie 12big Thunderbolt 3, I’m not sure how to check for an update to the USB hardware firmware. .................................................................................................................. 36
Problem: I want to run a disk check while an initialization is in progress or, perform more than one maintenance operation at a time. .................................................................................................................................................. 36
Welcome to the User Manual for LaCie RAID Manager. Created specifically for LaCie professional direct-attached storage (DAS), LaCie RAID Manager helps you configure RAID, set up important email alerts, measure the health of the hard drives and more.

Review this user manual for instructions how to use LaCie RAID Manager. For common questions and answers about your LaCie RAID Manager, please see Frequently asked questions.

You can get the latest tips regarding your product and updated technical information at LaCie customer support.

LaCie RAID Manager requirements

LaCie professional storage

- LaCie 12big Thunderbolt 3
- LaCie 6big Thunderbolt 3
- LaCie 8big Rack Thunderbolt 2
- LaCie 5big Thunderbolt 2

Minimum operating system

Thunderbolt 3

- macOS Sierra 10.12 and higher
- Windows 10 and higher

Thunderbolt 2

- Mac OS X 10.9 and higher
- Windows 7 and higher

USB

- Mac OS X 10.9 and higher
- Windows 8 and higher
LaCie RAID Manager Features and Terms

Review this section if further details are needed for terms and features found in LaCie RAID Manager.

Array

An array is a combination of two or more physical disks that are presented to the operating system as a single storage device. The hard drives combined in an array are assigned a RAID level, hence the term RAID array.

Note for LaCie 12big Thunderbolt 3: When creating multiple arrays, please do not use consecutive disks in the same array. Performance for an array that has consecutive disks can be negatively affected. For example, do not create an array with disks 1, 2, 3 and 4. Instead, create an array with disks 1, 3, 5 and 7. You can use disks 2, 4, 6, 8 and 10 for the next array.

Where is it?

You can create a RAID array when there are two or more available hard drives. Go to the Overview page and click Create array. The button is not clickable if there are no available hard drives.

Arrays that have been created are available on the Overview page. To view further details about an array, double-click it on the Overview page or click once on it in the left menu.

Auto rebuild

When Auto rebuild is enabled, the device automatically rebuilds a degraded RAID array once a spare hard drive is available. A degraded array generally means that one or more hard drives are missing or are experiencing errors. The amount of disks an array can lose depends upon the RAID level. A RAID 5 array can lose one hard drive and while a RAID 6 array can lose two hard drives. The rebuild cannot begin if there are no spare hard drives.

If auto rebuild is disabled, you can rebuild a degraded array by exchanging a defective hard drive with a healthy hard drive and choosing the array's Maintenance tab. Click the Maintenance button and then choose Rebuild.
Where is it?

Auto rebuild is an option in . It is enabled by default.

Cache

Caching media can improve your LaCie device’s performance by keeping files in a select location rather than sending them directly to the array’s storage. Transfer speeds are faster since your computer retrieves data directly from the cache rather than searching the hard drives. Thus, caching data optimizes your LaCie product for better performance.

Use LaCie RAID Manager to configure caching for your LaCie device. There are two options for caching media.

- **Array cache**: Cache media on the array. Data is stored on a buffer before being flushed to the array at the appropriate time.
- **Disk cache**: Cache media on the individual disks. Data is stored temporarily on the disks’ caches before it is moved to the array.

While caching data is recommended to improve performance, there is a potential drawback in regard to protecting data and data corruption. In the event of power failure, data integrity can be lost if the data has not been fully transferred from the cache to the RAID array. Therefore, make certain to use a stable power supply that cannot be interrupted, such as an uninterruptable power supply (UPS). A UPS allows you to safely shut down the LaCie device if the electricity suddenly terminates at your facility or office.

Disabling caching

When data caching is disabled, all data is accessed from the array. This option is recommended when data protection is critical to your workflow. While access to data is not as fast when disk caching is disabled, transfer rates remain quite high due to the use of a hardware RAID controller and your version of Thunderbolt technology.

Where is it?

The option to cache data is available when configuring a RAID array and in the tab on an existing RAID array’s page. Caching is enabled by default.
Consistency check

A consistency check tests the integrity of parity or mirrored data on the array. Consistency checks are highly recommended as part of regular maintenance for arrays. Consider running a consistency check when an array is not performing as expected.

You can run a consistency check on an array that has had at least one background initialization. The option to choose consistency check is not available for arrays with no initialization or fast initialization. Additionally, a consistency check is not available when a background initialization or a disk is in progress.

Where is it?

To launch or schedule a consistency check, go to the array page and choose the . Click the Maintenance button to review the options for a consistency check.

Disk check

While a consistency check scans the integrity of parity or mirrored data on the array, disk check searches for errors on a single hard drive. Run disk check on an individual disk as part of regular maintenance.

A disk check is not available when an initialization or consistency check is in progress.

Where is it?

To run a disk check, go the array page and find the disk you want to check in the table. Click twice on and the disk and then click Run disk check.

Initialization

Initializing an array can help prevent errors while handling data. A background initialization is the only full initialization that guarantees all mirror or parity blocks are checked and updated to ensure consistency of data on the array. Available initialization options are listed below.

- **None**: The data check is skipped. This option is not recommended as you can encounter data errors and you cannot perform a consistency check on the array.
- **Fast**: Fast initialization is a destructive process that erases all data on the array including the Master Boot Records (MBR) on all physical disks. Use fast initialization if you wish to perform a cursory check before starting a project. However, this option is not a full initialization that performs a thorough check on the array and does not help to prevent data handling errors. Further, you cannot perform a consistency check on an array with fast initialization.
- **Background**: The only option for a full initialization. Since it runs in the background, you can use the array during the initialization. However, a background initialization deletes data previously stored on the array. Data written on the array during a background initialization is safe. A background initialization can
take several days based upon the total capacity of the array and performance is impacted, especially when working on high-end video or graphic projects.

**Caution:** When performing an initialization on an existing array, make certain to back up your files. While it is data destructive for files that have been stored on the array, you can write new data during an initialization. **Thus, new files written during the initialization are not deleted while all files that predate the initialization are deleted.**

### Where is it?

You can choose how to initialize while configuring a RAID array or, go to the array page and choose the . Click the **Maintenance** button to choose **Initialize**.

### Poll SMART status (Device settings)

Enabling this option tells the system to check the disks for SMART statistics. SMART stands for Self-Monitoring, Analysis and Reporting Technology. When enabled, you can review basic information for each hard drive in the enclosure, including the model number, capacity and overall SMART status.

SMART details can be found on the array page in its table of hard drives. The SMART status should be used for informational purposes only, specifically when diagnosing hard drives.

**Important info:** Enabling SMART status can have a negative effect upon performance.

### Where is it?

The option to enable or disable Poll SMART status is available in . It is disabled by default.

### Spare hard drive

A spare hard drive waits to be used in case a single hard drive in a RAID array fails. If **is enabled, a spare hard drive automatically takes the place of a failed hard drive. As part of a rebuild, the device synchronizes data to the spare hard drive so that it can be assimilated into the array.**

A hard drive must be assigned as a spare for auto rebuild to synchronize data. The greatest advantage of having a spare hard drive is the reduction of time wasted waiting to rebuild an array. That is, if all hard drives in the enclosure are being used for one or more RAID arrays, there are no hard drives available to assign as a spare to take over for a failed disk. In such a case, you must contact LaCie support to replace a hard drive purchased through LaCie or, find a replacement if the hard drive did not ship with the device. Since a failed
hard drive generally means the array is degraded, the RAID can no longer protect your data. Further, if another hard drive in the array fails, the data is lost. Therefore, a good amount of time and, potentially, your data, can be lost if a replacement hard drive is not close at hand.

The clear disadvantage to having a spare is losing storage space since a spare hard drive sits on the side waiting for a hard drive to fail. While sitting as a spare hard drive, its storage space cannot be used.

LaCie RAID Manager has two options for assigning spare hard drives.
- **Global spare drive:** Global spare drives can be used by any array. This option is good if you have more than one RAID array.
- **Dedicated spare drive:** Dedicated spare drives are used exclusively for rebuilding a specific array.

**Where is it?**

You can add a spare hard drive when configuring a RAID array or assign an available hard drive at any time.

**Stripe size**

A stripe is the size of a single data block on the array. The range of stripe sizes includes 64K, 128K, 256K, 512K and 1024K. The choice of stripe size varies by device.

The larger the stripe size, the longer it takes for the RAID controller to read from and write to data blocks on the physical disks. Consider the following when configuring the stripe size:
- Use a larger stripe size for applications requiring large data transfers, such as audio, video and graphics.
- Use a smaller stripe size for applications with content much smaller in size, such as emails, documents and other files. For example, archiving applications that manage a large library of small files.

**Where is it?**

The stripe size can be assigned while configuring the RAID array.
Use LaCie RAID Manager to configure the RAID level for an array. The information below provides a basic guide to the RAID modes available to compatible LaCie devices.

RAID level is contingent upon the amount of hard drives in the array. For example, an array with four hard drives supports all standard RAID levels except RAID 1, which is not compatible with arrays greater than two disks. When making comparisons in an array with four disks, RAID 0 appears to be the best choice since it offers 100% storage capacity and high performance. However, RAID 0's major weakness is a lack of data protection in case of hard drive failure. Further, its performance is not much greater than RAID 5, which includes data protection in case one hard drive should fail. RAID 6 and, in some cases, nested RAID levels, can provide data protection in the event that two or more hard drives fail.

<table>
<thead>
<tr>
<th>RAID mode</th>
<th>Type</th>
<th>Minimum hard drives</th>
<th>LaCie devices</th>
</tr>
</thead>
<tbody>
<tr>
<td>RAID 0</td>
<td>Standard</td>
<td>2</td>
<td>All</td>
</tr>
<tr>
<td>RAID 1</td>
<td>Standard</td>
<td>2</td>
<td>All</td>
</tr>
<tr>
<td>RAID 5</td>
<td>Standard</td>
<td>3</td>
<td>All</td>
</tr>
<tr>
<td>RAID 6</td>
<td>Standard</td>
<td>4</td>
<td>All</td>
</tr>
<tr>
<td>RAID 10</td>
<td>Nested</td>
<td>4</td>
<td>All</td>
</tr>
<tr>
<td>RAID 50</td>
<td>Nested</td>
<td>6</td>
<td>LaCie 6big and LaCie 12big Thunderbolt 3</td>
</tr>
<tr>
<td>RAID 60</td>
<td>Nested</td>
<td>8</td>
<td>LaCie 6big and LaCie 12big Thunderbolt 3</td>
</tr>
</tbody>
</table>

Standard RAID levels

**RAID 0**
RAID 0 is the fastest RAID mode since it writes data across all of the array’s hard drives. Further, the capacities of each disk are added together for optimal data storage. However, RAID 0 lacks a very important feature: data protection. If one hard drive fails, all data becomes inaccessible. A recommended option is RAID 5, which offers:

- Performance that can approach RAID 0.
- Approximately 75% of the storage capacity of all the hard drives in the RAID configuration.
- Data protection in case a single hard drive fails.

RAID 1 provides enhanced data security since all data is written to each disk in the array. If a single disk fails, data remains available on the other disk in the array. However, due to the time it takes to write data multiple times, performance is reduced. Additionally, RAID 1 reduces disk capacity by 50% since each bit of data is stored on both disks in the array.

RAID 5
RAID 5 writes data across all hard drives in the array and a parity block for each data block. If one physical hard drive fails, the data from the failed hard drive can be rebuilt onto a replacement hard drive. While the files stored on a RAID 5 array remain intact should one hard drive fail, data can be lost if a second hard drive fails before the RAID is rebuilt with the replacement hard drive.

A minimum of three hard drives is required to create a RAID 5 array.

RAID 5 offers performance that can approach RAID 0. RAID 5’s strong advantage over RAID 0 is data protection. Additionally, you still have approximately 75% of the storage capacity of a RAID 0 array (based upon total available hard drives and storage capacities). The equation for determining the storage is:

\[(\text{The size of the hard drive with the smallest capacity in the array}) \times (\text{Total hard drives}-1)\]

Example 1: An array is assigned five 3TB hard drives for a total of 15TB. The equation is:

\[3\text{TB} \times 4 = 12\text{TB}.\]

Example 2: An array is assigned three 2TB hard drives and one 3TB hard drive for a total of 9TB. The equation is:

\[2\text{TB} \times 3 = 6\text{TB}.\]

**RAID 6**
RAID 6 writes data across all disks in the array and two parity blocks for each data block. If one physical disk fails, the data can be rebuilt onto a replacement disk. With two parity blocks per data block, RAID 6 supports up to two disk failures with no data loss. RAID 6 synchronizing from a failed disk is slower than RAID 5 due to the use of double parity. However, it is far less critical due to its double-disk security.

A minimum of four disks is required to create a RAID 6 array. RAID 6 offers very good data protection with a slight loss of performance compared to RAID 5.

**Nested RAID levels**

**RAID 10**

RAID 10 combines the protection of RAID 1 with the performance of RAID 0. Using four disks as an example, RAID 10 creates two RAID 1 segments, and then combines them into a RAID 0 stripe. Such configurations offer exceptional data protection, allowing for two disks to fail across two RAID 1 segments. Additionally, RAID 10 writes data at the file level and, due to the RAID 0 stripe, gives users higher performance when managing greater amounts of smaller files. This means a more generous input output per second for data, referred to as IOPS.
RAID 10 is a great choice for database managers that need to read and write a multitude of smaller files across the array's disks. The impressive IOPS and data protection offered by RAID 10 gives database managers impressive reliability both in keeping files safe and rapid access.

### RAID 50

RAID 50 combines RAID 0 striping with RAID 5 parity. Due to the speed of RAID 0 striping, RAID 50 improves upon RAID 5 performance, especially during writes. It also offers more protection than a single RAID level. Use RAID 50 when you need improved fault tolerance, high capacity and impressive write speeds.

A minimum of six hard drives is required for a RAID 50 array. A RAID 50 array with a high number of hard drives increases the time to initialize and rebuild data due to the large storage capacity.

### RAID 60

RAID 60 combines RAID 0 striping with RAID 6 double parity. Due to the speed of RAID 0 striping, RAID 60 improves upon RAID 6 performance. It also offers more protection than a single RAID level. Use RAID 60 when you need improved fault tolerance, high capacity and impressive write speeds.
A minimum of eight hard drives is required for a RAID 60 array. Since a RAID 60 array has a high number of hard drives, the time to initialize and rebuild data is longer than a single RAID level.

**RAID+Spare**

A RAID+Spare array gives you a “hot-spare” that is ready to synchronize data immediately should a hard drive fail. If a hard drive in the array fails, the data starts to synchronize with the spare. The advantage for a RAID array with a spare is the immediacy of the replacement hard drive. However, the spare cannot be used as storage during standard operation since its sole task is to take over should a hard drive fail.

You can replace the failed hard drive immediately and, once synchronization is complete, assign it as a new spare.

**Drive failures and synchronizing a spare hard drive**

For RAID+Spare arrays, data remains intact when the minimum number of redundant hard drives fail. However, if an additional hard drive fails before or during data synchronization with a spare hard drive, the data in the array is lost. See the examples below.

- **RAIDs 1 and 5**: one drive has failed and the array immediately begins to synchronize with the spare hard drive. If a second hard drive in the RAID 5 array fails before synchronization is complete, all data in the array is lost.
- **RAID 6**: two hard drives have failed and the array immediately begins to synchronize the first failed hard drive with the spare. If a third hard drive in the RAID 5 array fails before synchronization is complete, all data in the array is lost.
- **Nested RAID**: nested RAID levels have greater fault tolerances depending upon which of the nested RAID arrays have hard drives that fail.
  - **RAIDs 10 and 50**: each of the nested arrays can lose one hard drive. If one of the two nested arrays loses two hard drives before or during the synchronization, data is lost.
  - **RAID 60**: each of the nested arrays can lose two hard drives. If one of the two nested arrays loses three hard drives before or during the synchronization, data is lost.
RAID and data security

While RAID levels higher than 0 can protect data in case of a single drive failure, it cannot guarantee complete data protection for all cases of hardware failure or data corruption. To help prevent the loss of your data in case of extreme circumstances such as hardware failure, LaCie highly recommends that you keep at least two copies of your data, one copy on your LaCie storage device and a second copy on one of the following:

- Another direct-attached storage (DAS) device
- A network attached storage (NAS) device
- Some form of removable or archival storage

Any loss, corruption or destruction of data while using a LaCie hard drive or a LaCie hard drive system is the sole responsibility of the user and under no circumstances will LaCie be held liable for the recovery or restoration of this data.
Getting Started

Download and install LaCie RAID Manager before connecting the LaCie device to your computer. The LaCie RAID Manager installation includes:

- The driver to mount the LaCie device via Thunderbolt 2 and Thunderbolt 3.
- LaCie RAID Manager to manage the storage.

Download and Install LaCie RAID Manager

Download the installer at LaCie RAID Manager.

Install LaCie RAID Manager

1. Launch the installer on the computer that will connect to the LaCie device.
2. Follow the on-screen instructions to complete the installation. You may be prompted to restart your computer.

You can now connect the LaCie device to your computer. See the user manual for your LaCie product for instructions:

- LaCie 6big Thunderbolt 3
- LaCie 12big Thunderbolt 3
- LaCie 8big Rack Thunderbolt 2
- LaCie 5big Thunderbolt 2

The storage in your LaCie enclosure is preconfigured as RAID 5. Check the user manual for details regarding the format for the hard drives.

Windows and Thunderbolt 3

Your LaCie Thunderbolt 3 storage device is certified for use with Windows PCs that have a Thunderbolt 3 port. However, you may experience connectivity issues between the storage device and the Thunderbolt 3 port on a Windows PC. Therefore, before setting up your LaCie Thunderbolt 3 storage device, please visit your PC manufacturer's website to update your Windows PC to the latest versions of:

- BIOS
Thunderbolt 3 firmware
Thunderbolt 3 driver

Also, make certain that your PC has the most recent version of Windows 10.

For questions regarding your PC, please contact the PC manufacturer. You can also review the following website for additional information: https://thunderbolttechnology.net/updates
Sign In and Language Selection

Sign into LaCie RAID Manager

Administrators

Users with administration privileges to the computer can launch LaCie RAID Manager without signing into the application.

Users

LaCie RAID Manager requests administrator credentials when it is launch by a user with standard user privileges to the computer. The administrator for the computer should launch the application to prepare it for the user.

Choose a language for LaCie RAID Manager

LaCie RAID Manager supports multiple regions. Follow the steps below to change the language for LaCie RAID Manager.

1. Disconnect LaCie devices compatible with LaCie RAID Manager from your computer.
2. Launch LaCie RAID Manager.
3. On the upper right, click the Language pull-down menu and choose a language.
4. The updated language is available upon connecting a device compatible with LaCie RAID Manager.
LaCie RAID Manager Navigation

LaCie RAID Manager offers an intuitive interface that helps you manage the LaCie device’s storage.

### Header

The header (top panel) is always available no matter the menu item selected on the left column.

- **Top left**: Click the hamburger menu for device actions and switching devices. Device actions include muting an audible alarm, identifying a device (LaCie 8big Thunderbolt 2 only), quitting and shutting down.
- **Top right**: Click the question mark to access the user manual or the bell to view the latest notifications.

### Left column

The left column is available when a compatible LaCie device is connected to your computer. It includes the following menu items:

- **Overview**
- **RAID ARRAYS**
  - NAME | RAID | CAPACITY | DISKS | STATUS
  - Array 01 | RAID 5 | 20 TB | 6 | OK

- **Arrays**
  - Array 01

- **Available Disks**
  - Disk 7
  - Disk 8

- **Management**
  - Device settings
  - Notifications
  - Updates

Thunderbolt connection: Hardware: OK
Arrays: Click an array to be directed to its page for status, details and management.
Available disks: Click a disk to assign it as a spare.
Management: Click device settings, notifications or upgrade to perform the applicable operation.

Center panel

No compatible device

The center panel asks you to connect a device if none are detected.

Overview

When a compatible device is detected, the Overview menu becomes the home screen. The center panel shows the device’s arrays. You can:
• Double-click an array to go to its unique page.
• Hover the cursor on the array to reveal the Edit pull-down menu. Click Edit to choose one of the following options:
  • Info
  • Upgrade
  • Add spare
  • Delete
The center panel adapts to the menu selected on the left column. You can click **Overview** in the left column to return to the home screen.
You can easily navigate the LaCie RAID Manager menus to perform your desired actions. The application provides instructions or cues to help you manage the device’s arrays. If you are uncertain where to find a specific feature, review the topics for this chapter.

Create a new array

Go to Overview.

When two or more hard drives in the device are present in the menu, the Create array button can be chosen to launch the Create Array Wizard. If you have questions regarding array options, see LaCie RAID Manager Features and Terms.

After creating an array, your operating system prompts you to initialize and format it. Follow the instructions to format the array and use it with your computer. For more information about hard drive formats, see Formatting and Partitioning.

Note for multiple arrays on the LaCie 12big Thunderbolt 3: When creating multiple arrays, please do not use consecutive disks in the same array. Performance for an array that has consecutive disks can be negatively affected. For example, do not create an array with disks 1, 2, 3 and 4. Instead, create an array with disks 1, 3, 5 and 7. You can use disks 2, 4, 6, 8 and 10 for the next array.

Delete an array

Go to Overview and move the cursor over the array you want to delete to make the Edit menu visible. Click Edit > Delete.

Alternatively, you can click the array you want to delete on the left column to view its page. Once on the array’s page, click Manage > Delete Array.

Warning: Deleting an array deletes all of its data. The data cannot be recovered from the LaCie storage device once the array has been deleted.
Create a spare hard drive

LaCie RAID Manager has two options for assigning spare hard drives.
- **Dedicated spare drive**: Dedicated spare drives are used exclusively for rebuilding a specific array.
- **Global spare drive**: Global spare drives can be used by any array. This option is good if you have more than one RAID array.

**Dedicated spare**

**New array**

You can create a dedicated spare hard drive when following the steps for the Create Array Wizard.

**Existing array**

To add a dedicated spare hard drive to an existing array, choose one of the options below.

Click **Overview** on the left column and move the cursor over the array to make the Edit menu visible. Click **Edit > Add spare**.

Alternatively, you can click the array on the left column to view its page. Once on the array’s page, click **Manage > Add a spare drive**.

**Global spare**

Go to Available Disks on the left menu. If it is minimized, click the arrow to expand the section.
1. Click a disk in Available Disks.
2. Choose **Set as spare**.
3. Choose **Global spare** and then click **Set**.

**Free a spare hard drive**

You can free a spare hard drive to add it to an array. For instructions how to add the hard drive to an existing array, see Upgrade RAID level below.

**Free a dedicated spare**

1. On the left column, click the array with the spare you want to free.
2. On the array’s page, go to the disk table on the bottom and click twice on the spare disk.
3. Click **Remove as spare**.

**Free a global spare**
Global spares appear in the array section on the left menu.
1. Click a global spare.
2. Click Remove as global spare.

Upgrade RAID level

RAID levels can be upgraded for greater protection and performance. For example, you can upgrade a RAID 1 array to a RAID 5 array if there are one or more available disks in the enclosure.
1. Click Overview on the left column and move the cursor over the array to make the Edit menu visible.
2. Click Edit and then Upgrade.
3. Follow the Upgrade Wizard to completion.

You can use the array during the upgrade but performance is affected.

Add an available disk to an existing array

To add an available disk to an existing array, use the same steps above for upgrading a RAID array. When following the Upgrade Wizard, make certain to choose the same RAID level.

You can use the array during the upgrade but performance is affected.

Initialize an array

An array can be initialized when in the Create Array Wizard or as a maintenance task.

Initialization in the Create Array Wizard

When selecting options for the RAID, you can perform one of the initialization types listed below.
- **None**: No effort to fix potential sector errors. Immediate array availability but not recommended due to possibility of corrupt data.
- **Fast**: Minimum effort to fix potential sector errors. Immediate array availability but not recommended due to possibility of corrupt data.
- **Background**: Fixes sector errors that can lead to corrupt data. A background initialization can run for hours or days based upon the array’s capacity.

Initialization as maintenance to an existing array

Only a background initialization is available to an existing array. Initializing an existing array can be helpful to clear the array and to fix sectors that may be corrupted. An initialization can run for hours or days based upon the array’s capacity.
Check the array using Consistency Check

A consistency check scans the array for sector errors that lead to corruption. While performing a consistency check is recommended, it does not repairs errors. Fixing bad sectors on an array requires changes to the data and, in some cases, could lead to limited data loss. Therefore, a consistency check only scans the array and lets you know the results. Your data is safe during a consistency check since it is non-destructive. You can use the array during the consistency check but performance is affected.

To run a scan that fixes bad sectors, see Repair the array using Consistency Check & Fix below.

Important info: You can perform a consistency check on an array that has had at least one background initialization. The option to choose consistency check is not available for arrays with no initialization or fast initialization. Additionally, a consistency check is not available when a background initialization is in progress.

Manual consistency check

1. On the left column, click the array that you want for a consistency check.
2. On the array’s page, go to the Maintenance tab and click Maintenance.
3. Click Consistency check. If this option is not available, you must perform an initialization on the array, which is data destructive. See Initialization in the section above.

Scheduled consistency check

1. On the left column, click the array you want for a consistency check.
2. On the array’s page, go to the Maintenance tab and click New schedule.
3. Choose Consistency check and then select how you want to schedule the check.

Repair the array using Consistency Check and Fix

A consistency check & fix scans the array for sector errors that can lead to corruption and repairs them.
While this operation is generally safe, there is a risk that some or all of your data can be lost since repairing sector errors requires making changes to the array.

**Important info:** Consistency check and fix is only available to arrays that have had a background initialization.

1. On the left column, click the array you want to run a consistency check and fix.
2. On the array’s page, go to the Maintenance tab and click **New schedule**.
3. Choose **Consistency check & fix** and then select how you want to schedule it.

## Check individual disks in an array

Check the health of the individual hard drives in an array using Disk check. Array performance can be affected during a disk check. Additionally, spare and available hard drives cannot be checked.

1. On the left column, click the array with the hard drive you want to check.
2. On the array’s page, go to the disk table on the bottom and click twice on the disk you want to check.
3. Click **Run disk check**.
Assign processing priority

By default, the RAID processor for your device gives all actions the same priority. You can change the priority for specific actions in the Device settings menu on the left. For example, you can give initialization a Low priority while you are working during the day and a high priority during the night. Use the sliders to make the preferred adjustments.

Important info: Moving multiple sliders to High affects the performance of all arrays associated with the LaCie device.

Poll SMART status
Enabling this option in LaCie RAID Manager sends the request to the hardware RAID to check the disks for SMART statistics. SMART stands for Self-Monitoring, Analysis and Reporting Technology. When enabled, you can review basic information for each hard drive in the enclosure, including the model number, capacity and overall SMART status.

SMART status should be used for informational purposes only, specifically when diagnosing hard drives.

When the option is enabled, you can view SMART details on the array page. Choose the array on the left menu to see the table of disks on the bottom of the page. SMART is one of the columns on the table.

**Important info**: Enabling SMART status can have a negative affect upon performance.

Updates

Click **Updates** on the left column to view the updates available to your LaCie device. Your computer must have access to the Internet to check for updates.

Set up email notifications

LaCie RAID Manager can send you email updates on the health and status of your device. Make certain that your computer has Internet access and that LaCie RAID Manager remains open in order to send the email notifications.

1. Go to **Notifications** on the left column.
2. Click **Email settings**.
3. Enter your email address and click **Save**.

Custom server

By default, emails are sent from LaCie’s server. However, you can configure email notifications to be routed through a custom server.

1. Go to **Notifications** on the left column.
2. Click **Email settings**.
3. Click the arrow next to LaCie and choose **Custom**.
4. Complete all the fields and click Save.
Change cache settings

For details regarding the cache, see LaCie RAID Manager Features and Terms.

Enabling the cache gives you greater performance while disabling the cache offers some protection in certain cases. The cache is enabled or disabled in two places:

- The Create Array Wizard when creating a new array.
- The Maintenance tab for an array. In Overview, click the array in the left menu and choose the Maintenance tab. You can enable (performance) or disable (protection) the cache.
Frequently Asked Questions

Problem: I disconnected my computer from the LaCie device during RAID synchronization or initialization.

Q: Can I disconnect my computer during RAID synchronization or initialization?
A: Yes. Synchronization and initialization continue uninterrupted when the computer disconnects from the LaCie device. Similarly, your LaCie device can be placed into low power mode or powered off during synchronization and initialization. Provided the same hard drives are in the enclosure, the operation continues once the device is powered on.

Problem: I see two or more arrays in LaCie RAID Manager but only one is available on my computer (LaCie 6big Thunderbolt 3/LaCie 12big Thunderbolt 3).

Q: All the arrays are visible in LaCie RAID Manager. Why can't I see all the arrays on the computer?
A: While LaCie RAID Manager sees all arrays associated with the device, USB connections to LaCie 6big/LaCie 12big allow for one array on your computer. Create a single array from all the hard drives if you connect to LaCie 6big/LaCie 12big via USB. To use multiple arrays, connect to LaCie 6big/LaCie 12big via Thunderbolt 3.

Problem: Initialization has been running for many days.

Q: Has initialization become stuck?
A: With higher capacity storage, initialization can take many days and, in some cases, well over a week. You can check Device settings in LaCie RAID Manager to see if the processing for initialization has been moved to Low. Reducing the processing allotted to initialization can slow down initialization while helping to improve performance. To speed up initialization, move the slider to High. The device's performance can be negatively affected when the slider is set to High.

Problem: I connected LaCie 5big Thunderbolt 2 or LaCie 8big Thunderbolt 2 to my Windows PC but I do not see it in LaCie RAID Manager.

Q: Do I need a special driver for Thunderbolt devices?
A: You must have the most recent Thunderbolt 2 driver and firmware to use LaCie 5big Thunderbolt 2 and LaCie 8big Thunderbolt 2 with a Windows PC. LaCie RAID Manager installs a driver for Thunderbolt but we cannot update your computer's firmware.

Problem: On my LaCie 12big Thunderbolt 3, I created an array with disks 1, 2, 3 and 4 but the performance seems to be slower than expected.

Q: Can I create multiple arrays on LaCie 12big Thunderbolt 3 using consecutive disks?
A: When creating multiple arrays, please do not use consecutive disks in the same array. Performance for an array that has consecutive disks can be negatively affected. For example, do not create an array with disks 1,
2, 3 and 4. Instead, create an array with disks 1, 3, 5 and 7. You can use disks 2, 4, 6, 8 and 10 for the next array. This recommendation is limited to LaCie 12big Thunderbolt 3 and should not be used with other products compatible with LaCie RAID Manager.

Problem: For LaCie 6big Thunderbolt 3 and LaCie 12big Thunderbolt 3, I’m not sure how to check for an update to the USB hardware firmware.

Q: How do I know if the USB firmware should be updated?
A: Periodically check the support page for your device. If a firmware update is required, download it and follow the onscreen instruction.

Problem: I want to run a disk check while an initialization is in progress or, perform more than one maintenance operation at a time.

Q: Is it possible to run multiple maintenance operations at once?
A: Only one maintenance operation can be performed during a set period. Therefore, you can run an initialization and then a disk check but not at the same time. The same is true for a consistency check and an array upgrade.